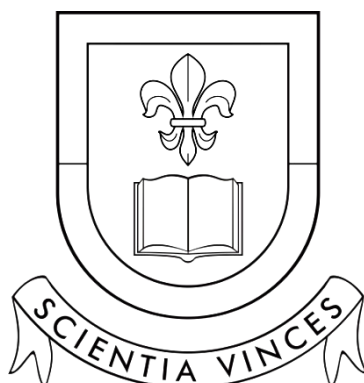


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67. STARPTAUTISKĀS
ZINĀTNISKĀS KONFERENCES
TĒZES

ABSTRACTS OF
THE 67th INTERNATIONAL SCIENTIFIC
CONFERENCE OF DAUGAVPILS
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DAUGAVPILS UNIVERSITĀTES
AKADĒMISKAIS APGĀDS „SAULE”

2025

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Daugavpils Universitātē docētāju un studējošo zinātniskās konferences notiek kopš 1958. gada. Konferencēm ir starpdisciplinārs raksturs, tajās piedalās gan studējošie, gan arī zinātnieki no dažādām pasaules valstīm. Daugavpils Universitātes 67. starptautiskās zinātniskās konferences pētījumu tematika ir ļoti plaša – eksaktajās, humanitārajās, izglītības, mākslas un sociālo zinātņu jomās.

Krājumā Daugavpils Universitātes 67. starptautiskās zinātniskās konferences tēzes = Abstracts of the 67th International Scientific Conference of Daugavpils University apkopoti materiāli, kas tiks prezentēti konferences darba grupās 2025. gada 10.–11. aprīlī un kas atbilst konferences formālajām prasībām.

Krājuma veidotāji saglabā autoru iesniegto tēžu lingvistisko un gramatisko struktūru.

Par norādītajiem faktiem, izteiktajiem viedokļiem un lietoto terminoloģiju atbild tēžu autori.

The annual scientific conferences at Daugavpils University have been organized since 1958. The themes of research presented at the conferences cover all spheres of life. Due to the facts that the conference was of interdisciplinary character and that its participants were students and outstanding scientists from different countries, the subjects of scientific investigations were very varied – in the domains of exact sciences, the humanities, education, art and social sciences.

The Collection of Abstracts of the 67th Scientific Conference of Daugavpils University contains the abstracts on researches, which will be presented in the corresponding work groups organized within the framework of the conference in April, 10–11, 2025. In the abstracts published in Daugavpils Universitātes 67. starptautiskās zinātniskās konferences tēzes = Abstracts of the 67th International Scientific Conference of Daugavpils University we have preserved the authors' style (linguistic and grammatical structures), and the authors themselves are responsible for the facts and opinions reflected and the terminology used in their abstracts.

BIOLOGY

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BIOLOĢIJA

Tatjana Grigorjeva^{1,2}, Tatjana Krama^{1,2}, Sergejs Popovs^{1,2}, Ronalds Krams^{1,2}, Indriķis Krams^{1,2,3}

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COMMON FRUIT FLY (*DROSOPHILA MELANOGASTER*) BEHAVIOURAL STUDY WITH AUTOMATED SYSTEM APPLICATION

The fundamental biochemical processes in the common fruit fly (*Drosophila melanogaster*) share notable similarities with those in humans, particularly regarding the role of serotonin in regulating behavior, such as locomotion, sleep, light/dark preference, gut function and aggression.

In this study, we examined how dietary supplementation with Escitalopram (ESC), Tryptophan and Alpha-methyltryptophan (AMT) influences phototactic behavior in fruit flies. ESC is a selective serotonin reuptake inhibitor that reduces serotonin availability in the brain. Tryptophan, an essential amino acid, serves as a serotonin precursor and increases its levels, while AMT inhibits serotonin synthesis from tryptophan, thereby decreasing overall serotonin concentration.

Using the high-throughput real-time behavioral assay system “FlyVac,” we assessed how these compounds affected flies’ preferences for light versus dark environments. We hypothesized that both ESC and AMT would increase behavioral variability by disrupting serotonin-mediated regulation of phototactic responses.

Despite our expectations, flies exposed to ESC or AMT did not exhibit increased variability in light/dark choice compared to those fed with Tryptophan. These results suggest that ESC and AMT may exert similar effects on serotonin levels in *Drosophila*, potentially leading to comparable outcomes in phototactic behavior.

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CORRELATION OF HAEMOSPORIDIAN INFECTION OCCURANCE IN PARIDAE FAMILY BIRDS WITH PROXIMITY TO WATER BODIES AND HOST SURVIVAL

Haemosporidian parasites, such as *Haemoproteus* and *Plasmodium*, can negatively impact avian hosts by reducing fitness and survival. However, the role of vector distribution in shaping infection dynamics and host vulnerability remains underexplored.

In this study we examined how infection intensity, survival, predation risk and spatial positioning relative to forest water bodies influence parasite dynamics in mixed-species flocks of tits (*Paridae*) during the non-breeding season.

Our findings reveal that parasite prevalence declines with increasing distance from lakes and bogs, suggesting vector abundance may be concentrated near water sources. Willow tits (*Poecile montanus*) exhibited reduced survival rates near water bodies when infected, particularly with both *Haemoproteus* and *Plasmodium*, while crested tits (*Lophophanes cristatus*) were primarily affected by *Haemoproteus*.

Crested tits, who dominate social flocks and forage higher in the forest canopy, showed lower infection rates and higher overwinter survival, possibly due to reduced vector exposure at greater canopy heights.

Furthermore, infected individuals faced a higher risk of predation by pygmy owls (*Glaucidium passerinum*), highlighting a potential fitness cost of parasitism.

Overall, our results suggest that both habitat features, such as proximity to water and foraging behavior, significantly influence parasite exposure and survival outcomes in wintering parid species.

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EFFECT OF DIFFERENT CULTIVATION METHODS ON MINITUBER YIELD OF POTATOES IN CLIMATE-CONTROLLED CONDITIONS

Keywords: potato mini tubers, aeroponics, hydroponics, different substrates

Due to climate change and the increasing prevalence of plant viruses, it is problematic to obtain healthy potato planting material when growing in the field. One solution to produce healthy seed material is to increase the production of small tubers (PBTC seed material) in covered areas under climate-controlled conditions. A study on the cultivation of small potato tubers under climate-controlled conditions was set up at the Biotechnology Centre of the Bulduri Technical School and the Stende Research Centre of the Institute of Aggroresources and Economics in 2023-2024. The aim of the study was to experimentally develop technologies for the production of healthy planting material and to test and compare innovative cultivation methods - hydroponics and aeroponics - that could be used in the cultivation of different crops. One of the tasks of the research at Bulduri Technical School was to experimentally develop a technology for the production of seed potatoes/minitubers in an aeroponic system with different soilless - aeroponics and hydroponics using peat, perlite and vermiculite as substrates. The production of meristematic plants and aeroponic tubers in a greenhouse on peat substrate was tested at the Stende Research Centre of the Institute for Aggroresources and Economics. Two potato varieties 'Agrie dzeltenie' and 'Frieslander', were grown in the study. Potato yield was evaluated in terms of number of tubers per plant and average weight of small tubers. The effect of genotypes from meristematic plants on tuber yield differed significantly ($F_{\text{fact}} < F_{\text{crit}}$). The yield of minitubers from meristem plants varied from 3 to 19 tubers for 'Frieslander' and from 3 to 11 tubers for 'Agrie dzeltenie'. The minituber yield was significantly ($F_{\text{fact}} < F_{\text{crit}}$) higher for 'Frieslander' - 361 tubers from 40 plants, with an average tuber weight of 0.034 kg, compared with 'Agrie dzeltenie' - 222 tubers from 40 plants, with an average tuber weight of 0.031 kg. The results of the study showed uneven germination of the plants when the aeroponically produced minituber were used. For example, the variety 'Agrie dzeltenie' germinated faster and more uniformly than the variety 'Frieslander', which had some tubers that did not germinate at all. The minitubers obtained for both varieties also grew very small - 0.03 kg on average, which allows us to hypothesise that the tubers must be dormant after harvesting. The results indicate the potential of aeroponics and the use of substrates and their influence on the quantity and quality of minitubers.

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IMPACT OF DNA HYPOMETHYLATION INDUCED BY 5AZAC ON TOTAL PROTEIN AND SOME MORPHOLOGICAL PARAMETERS IN DIFFERENT WHEAT ORGANS

Wheat is one of the most important food crops, especially in Europe and North America with great economic importance. Wheat is a powerful genetic model for studying cereal domestication. Epigenetic mechanisms play a critical role in regulating gene expression affecting plant growth, development, responses to stress and diseases through small RNAs, histone modifications, DNA methylation etc. Enzymatic nuclear DNA methylation is an epigenetic mechanism involving the transfer of a methyl group onto the C5 position of the cytosine to form 5-methylcytosine. DNA methylation plays an important role in plant growth and development and it varies in different environments. 5-azacytidine (5-azaC) is a nucleoside-based DNA methyltransferase inhibitor that induces nuclear DNA. It was shown, that 5-azaC interacts with genes related

to specific pathways for protein accumulation in plants, additionally, various studies have revealed the increase in the total protein content is linked to stress tolerance. The phenotypic changes induced by 5-azaC in progeny were observed in many plants and it was demonstrated to increase the phenotypic variation in the progeny.

The aim of this research is to study the role of nuclear DNA hypomethylation, induced by 5-azaC, on some morphological parameters and total protein in different organs of wheat seedlings of some sensitive and not sensitive to environmental Latvian wheat varieties.

The object of this study was etiolated seedlings of wheat (*Triticum aestivum* L., cv. Skagen, Galerist and Creator). After 24 hours of germination on moist filter paper at 26°C etiolated wheat seedlings of equal length were transferred to polyethylene pots containing a solution of 5-azaC and continue growing for up to 6 days at a temperature of 26°C. An Invitrogen Qubit fluorometer is used to determine protein concentrations. The nuclear DNA methylation level was calculated used the LUMA method, which based on combined DNA cleavage by methylation-sensitive restriction enzymes and polymerase extension assay by pyrosequencing (PyroMark Q24).

It was shown that increase of maximum of length of root, length of first leaf and coleoptile, fresh (FW) weights were observed in Creator and Skagen varieties, but at varieties Galerist - was not found. The study of total protein concentration shown, that under 5-azaC influence the total protein concentration decreased in Galerist and Skagen varieties, but in varieties Creator these changes were not observed. In coleoptile of all study varieties (Galerist, Skagen and Creator) the protein concentration was decreased under 5-azaC influence. The hypomethylation of total DNA was different in sensitive and not sensitive to environmental Latvian wheat varieties. Our work in process.

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INCREASED APHOMIA SOCIELLA INFESTATION AND INTERSPECIFIC COMPETITION IN BUMBLEBEES NEAR HONEYBEE APIARIES: IMPACTS ON REPRODUCTION AND IMMUNITY

Bumblebees (*Bombus* spp.) are vital pollinators in temperate regions, however they face increasing pressures from niche overlap and competition with western honeybees (*Apis mellifera*). Such interactions can limit bumblebee resource acquisition and promote the spillover of pathogens and parasites. One notable parasite is the bumblebee wax moth (*Aphomia sociella*), whose larvae infest nests of bumblebees, wasps and weakened honeybee colonies.

In this study we used commercial buff-tailed bumblebee (*Bombus terrestris*) colonies as experimental models to assess the combined effects of interspecific competition (proximity to honeybee apiaries) and parasitism by *A. sociella* on bumblebee immunity, and colony performance. Immune function was evaluated through encapsulation response in bumblebee young queens and workers.

Our results showed that bumblebee colonies situated near apiaries experienced higher infestation rates, reduced reproductive success and significantly weaker immune responses. These findings highlight the compounded stressors faced by bumblebees in shared landscapes with honeybees and raise concerns about increased bumblebee vulnerability to additional parasites, and pathogens under such conditions.

MEIOFAUNA IN FOREST BRYOPHYTES

One of the significant challenges of modern forest ecology is understanding the processes of species dynamics which are responsible for the coexistence of biodiversity in temperate forest ecosystems. This is incredibly challenging and crucial today, when unpredictable global climate changes occurring all over the world and could disrupt biotic interactions. The relationship between bryophytes and their meiofauna can be referred to as commensalism, because bryophytes do not only provide protection, but also serve as a habitat, where food resources such as bacteria, algae or small invertebrates can co-exist. Both communities, bryophytes and meiofauna are humidity dependent. Bryophyte meiofauna mainly consists of Nematoda, Rotifera and Tardigrada and their life cycles are highly dependent on the humidity of the bryophytes. We did a pilot study to evaluate the abundance of bdelloids in relation to indirect humidity influence on tree stems. The pilot study was done on three trees of *Acer platanoides* in slope forest, where bdelloids were extracted from epiphytic bryophyte mats. Samples were collected from tree basal part (0.5 m) and higher up on the tree stem (1.5 m).

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MICROSCOPY OF ADULT ALARIA ALATA USING FLUORESCENT 3-AMIDINE BENZANTHRONE

The current study presents fluorescent benzanthrone N-substituted amidine dye for confocal laser scanning microscopy (CLSM) imaging of the parasitic flatworm adult *Alaria alata*, showcasing their potential for visualizing biological specimens. *A. alata* is a trematode with a complex life cycle, and it infects amphibians as its second intermediate hosts. When the egg comes into contact with fresh water, the larval miracidium develops and hatches within approximately two weeks. The free swimming miracidia then infect planorbid snails of the *Planorbis* or *Helisoma* genres, where they undergo asexual replication as sporocysts. Motile cercariae are released into the water, penetrating the skin of larval amphibians (tadpoles) and transforming into mesocercariae. Several frog species act as second intermediate hosts, harboring the larval stage in their tissues. Alternatively, infected tadpoles may be consumed by frogs, snakes, rodents, wild birds, or other paratenic hosts. The definitive hosts, such as a red foxes, raccoon dogs or other carnivores becomes infected by ingesting an infected frog or paratenic host.

The fluorescently substituted 3-amidine benzanthrone dye is effective for detailed imaging of both the internal and external structures of the *A. alata* parasite using CLSM. Key systems of the parasite, such as the reproductive, digestive, and excretory systems, were clearly visible. However, the dyes were not as effective with muscular tissue, making it challenging to detect the layers and structure of the muscles. The fluorescent dye showed promising initial results, which encouraged us to conduct a more in-depth investigation of these group of dyes in future studies.

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POND ECOSYSTEM RECOVERY FOR PROTECTED SPECIES IN SILENE NATURE PARK, LATVIA: TEMPORAL DYNAMICS, ECOLOGICAL SUCCESSION, AND TRADE-OFFS IN WETLAND RESTORATION

Wetland restoration is a complex ecological process influenced by temporal dynamics, successional trajectories, and the interplay between ecosystem recovery and species conservation efforts. This study integrates multi-scale environmental assessments to evaluate the effectiveness of wetland restoration measures, with a focus on surrounding ecosystem interactions, hydrological stability, historical landscape transformations, and water quality parameters.

A critical component of wetland restoration is the analysis of the surrounding ecosystem, as adjacent land use, vegetation composition, and hydrological connectivity significantly influence restoration success. Identifying ecological gradients and potential stressors from the broader landscape helps determine constraints on successional pathways and informs adaptive management strategies. Water level monitoring provides crucial insights into hydrological variability, a key determinant of wetland habitat stability and species assemblages. By tracking seasonal fluctuations and long-term trends, we assess the extent to which restored wetlands achieve functional hydrological regimes necessary for sustaining biodiversity and ecosystem services. In parallel, comprehensive water quality assessments are conducted, including measurements of pH, dissolved oxygen, temperature, conductivity, turbidity, and key nutrients such as phosphorus and nitrogen.

By integrating these methodological approaches, this research comprehensively evaluates wetland restoration progress, highlighting key trade-offs and synergies between ecological recovery goals and species reintroduction measures. The findings contribute to a deeper understanding of wetland resilience, guiding evidence-based management strategies to enhance ecosystem functionality and biodiversity conservation in restored wetland landscapes.

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PROSPECTS OF WETLAND ECOLOGICAL HOTSPOTS RESEARCH USING INNOVATIVE METHOD OF THE ESTIMATION OF ADULT FROG DENSITY AND METRICS FOR COMMUNITY ASSESSMENT AND ECOSYSTEM THRESHOLDS IDENTIFICATION

Wetlands represent biodiversity-rich ecosystems where both native and invasive species interact through complex top-down and bottom-up processes, shaping community structure and ecosystem functionality. Understanding these interactions, along with the ecological triggers and thresholds that determine species persistence or decline, is critical for effective conservation and management strategies. This study explores the role of amphibians as bioindicators of wetland ecosystem health, utilizing an innovative approach to estimate adult frog densities and assess community-level responses to environmental pressures.

Anuran amphibians (frogs, toads, and related species) are particularly sensitive to ecological changes, making them key subjects for monitoring wetland ecosystem stability. Traditional survey methodologies often rely on male vocalization intensity rather than precise population counts due to observational constraints. However, the use of Calling Amphibian Male Counts (CAMC) presents a cost-effective and standardized method for estimating relative population sizes across multiple wetland sites. This approach not only facilitates large-

scale assessments but also provides insights into species-specific responses to invasive pressures, habitat alterations, and climate-driven ecological thresholds.

This research highlights the critical importance of population monitoring in detecting early warning signals of ecosystem change, identifying thresholds beyond which wetland community composition shifts irreversibly, and informing adaptive management approaches. Through a better understanding of trophic interactions, species vulnerabilities, and invasion dynamics, we can enhance the resilience of these ecological hotspots and safeguard the integrity of wetland biodiversity.

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SYNTHESIS OF AG AND AU NANOPARTICLES WITH MEDICAGO SATIVA L. CALLUS CELLS

Silver (Ag) and gold (Au) nanoparticles (NPs) have diverse applications in healthcare, vaccine development, and drug delivery. Due to anticancer properties, they are being investigated as therapeutic agents for combating tumors. The insoluble nature and unique physicochemical, antibacterial properties increase bio-NPs use in plant protection.

To obtain human health friendly NPs chemical synthesis involving toxic solvents should be replaced with biosynthesis using plant-derived reducers. Alfalfa (*Medicago sativa* L.) can reduce metal ions to elemental form, facilitating the transformation of salts into nanoclusters without free radicals, with antioxidant and anti-inflammatory properties, expanding their potential applications in various fields.

In this study, callus cultures of *Medicago sativa* L. genotypes, "Kometa" and "la Bella," were treated with two precursors (AgNO₃ and HAuCl₄) for 24 and 48 hours to evaluate their potential for biological NPs synthesis. Spectrophotometry revealed statistically significant ($p < 0.05$) absorption values in samples with AgNO₃ (350, 470 nm) and HAuCl₄ (450, 650 nm) for both genotypes. Strong UV absorption was shown at 534 and 286 nm in HAuCl₄-treated samples, while AgNO₃-treated samples exhibited a peak at 286 nm and lacked the characteristic SPR band of silver NPs (400–450 nm). Dynamic light scattering (DLS) and zeta potential assessments indicated modifications in the liquid medium composition. Transmission electron microscopy (TEM) confirmed the formation of Au and Ag NPs, with nanoscale-sized particles detected in extracts of both genotypes.

To optimize NPs biosynthesis, it is necessary to reduce process duration, costs, and complexity while ensuring efficiency and scalability. This study simplifies the biological production of Ag and Au NPs by introducing a new salt separation method from alfalfa callus extracts. It compares two alfalfa genotypes, highlighting genotype-dependent precursor distribution differences.

THE ECOLOGY OF DAY-ACTIVE BUTTERFLY POPULATION IN THE FOREST AND URBAN BIOTOPES OF DAUGAVPILS CITY: ASSESSMENT OF CLIMATIC AND ENVIRONMENTAL FACTORS

Keywords: *butterfly ecology, climatic factors, Daugavpils, urban planning, biodiversity*

The study on the ecology of day-active butterfly populations in the urban and forest biotopes of Daugavpils city reveals potential significant correlation trends and features between climatic factors and butterfly abundance.

Using a wide range of meteorological and climatic factors – temperature, wind speed, wind gust speed, Poaceae pollen concentration in the air, precipitation, atmospheric pressure, humidity, ultraviolet radiation, and geomagnetic activity – the author identified potential statistically significant correlations that could substantially influence butterfly activity in Daugavpils.

The results of Pearson's linear correlation analysis indicate that temperature, ultraviolet radiation and atmospheric pressure have a strong positive impact on butterfly numbers, whereas geomagnetic activity and precipitation show a negative correlation with their presence in observation sites.

Although the multivariate linear regression model demonstrates complex interactions between climatic parameters, its statistical significance was limited, highlighting the need for further long-term research in this field in Daugavpils.

Based on the obtained data, the author formulated recommendations for urban planning, including the creation of uncut flowering areas and balancing moisture regimes, thereby promoting the sustainability of butterfly populations under changing climatic conditions.

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THE EFFECTS OF BALTIC PINE (PINUS SYLVESTRIS) NEEDLE EXTRACT ON THE LIFESPAN OF DROSOPHILA MELANOGASTER

Plants and herbivores have co-evolved through an arms race of defence and counter-defence mechanisms. Coniferous trees, such as Baltic pine (*Pinus sylvestris*), produce bioactive compounds - terpenoids, phenolics, and resin acids, that act as natural insect deterrents and antimicrobial agents. While the effects of pine-derived chemicals on insect pests are well documented, their impact on insect lifespan remains unclear.

In this study, we investigated how pine needle extract influences the longevity of *Drosophila melanogaster*, a widely used model organism for aging and toxicity research. We hypothesized that increased concentrations of pine needle extract in the diet would reduce lifespan, potentially through antimicrobial and physiological stress effects. Given that a related species, *Drosophila suzukii*, is a major agricultural pest, understanding these interactions may provide insights for botanical pesticide development.

Our findings contribute to the broader discussion of plant-insect interactions and the potential applications of conifer-derived compounds in pest management.

DOKTORANTU SEKCIJA "VALODU UN LITERATŪRAS STUDIJAS"

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DEKOLONIĀLĀ PARADIGMA UN PRETESTĪBAS PRAKSES DZIESMU TEKSTU ATDZEJAS PUBLIKĀCIJĀS ŽURNĀLĀ "AVOTS"

Atslēgvārdi: žurnāls "Avots", dekoloniālie procesi, pretestības prakses, dziesminieku teksti, atdzeja

Avangardiskais literārais žurnāls "Avots" iznāca būtiskā dekoloniālajā kultūrtelpā un laikmetā. Dekoloniālie procesi un pretestības prakses, kas atspoguļotas žurnālā, saistāmas ar aplūkojamā laikmeta sociālpolitisko kontekstu un realitāti. Latvija 1987. gadā bija okupēta, bet PSRS īstenoja perestroikas (pārbūves - no krievu val.) un glasnostj (atklātības - no krievu val.) politiku, kā arī norisinājās Trešās atmodas procesi. Referātā pievērsīšos būtiskai žurnāla "Avots" rubrikai – bardu jeb dziesminieku dziesmu tekstu atdzejai, kuru veica tolaik Latvijas kultūrtelpā pazīstami literārie tulkotāji. Dziesmu tekstu publikācijām žurnālā tika izvēlēti dziesminieki, kuri pasaulē pazīstami ar progresīviem un indivīda brīvību kultivējošiem uzskatiem. Atdzejas vidū bija Pola Makartnija, Boba Dilana, Vladimira Visocka u.c. dziesminieku teksti. Tādējādi žurnāla redakcija izvēlējās vērtības un īstenoja pretestību oficiālajai varai, izvairoties no padomju varas oficiālā diskursa izplatīšanas. Bieži šāda izvēle izpaudās kā prasmīga manipulācija ar zemtekstiem, kas iekļāvās žurnāla kopējā diskursā. Šī materiāla atlases startēģijas referātā tiks analizētas ar starpdisciplināru pieeju – dienaskārtības noteikšanas (agenda-setting) un "vartu sargāšanas" ('gate keeping') teorijām.

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DEPORTĀCIJU TRAUMATISMA TĒLOJUMS SANDRAS KALNIETES DARBĀ "AR BALLES KURPĒM SIBĪRIJAS SNIEGOS"

Sandras Kalnietes autobiogrāfiskais darbs "Ar balles kurpēm Sibīrijas sniegos" ir dziļš un daudzslāņains vēstījums par deportācijas traumu. Autore atklāj deportāciju ne tikai kā fizisku izsūtīšanu uz svešu un naidīgu vidi, bet arī kā plaisu starp pagātni un tagadni, starp mājām un izsūtījuma vietu, starp normālu dzīvi un tās piespiedu pārtraukumu, pamatojot to ar vēsturiskiem faktiem.

Kalniete īpašu uzmanību pievērš tam, kā deportācija ietekmē cilvēka identitāti, emocionālo pasauli un attiecības. Viņas darbs izgaismo psiholoģisko pieredzi, kas rodas no šķiršanās no dzimtenes, ģimenes un ierastās dzīves kārtības. Šī trauma tiek aplūkota gan individuāli, gan kolektīvi. Šīs pieredzes kopumā veido plašāku vēsturisko naratīvu, kas raksturīgs visai izsūtīto paaudzei. Tādējādi Kalnietes teksts kalpo kā starpnieks starp individuālām atmiņām un kolektīvo vēsturi.

Autore parāda, ka deportācijas sekas saglabājas vēl ilgi pēc fiziskās atgriešanās, ietekmējot cilvēka spēju iekļauties sabiedrībā un veidot jaunus sociālos sakarus.

Īpaša vieta darbā atvēlēta atmiņai kā vēstures lieciniecei. Autore personīgais stāstījums kļūst par daļu no plašākas vēstures izpratnes, kas apliecina, ka deportāciju pieredze nav tikai pagātnes notikums, bet arī ilgstošs un iedarbīgs faktors, kas ietekmē nākamās paaudzes un veido kolektīvo atmiņu. Kalniete uzsver, ka trauma nav tikai individuāla – tā pārmantojas un transformējas, kļūstot par neatņemamu sabiedrības identitātes daļu.

DZĪVESSTĀSTI JAUNĀKAJĀ LATVIEŠU PROZĀ (2020-2024): BIEŽĀK SKARTIE TEMATI

Latvijas literatūrā, it īpaši prozā, pēdējo gadu laikā novērojama tendence arvien vairāk pievērsties autobiogrāfiskiem vēstījumiem, kas aktualizē personīgās pieredzes reprezentāciju literāra teksta formā, lielākā vai mazākā mērā atklājot autora dzīvesstāstu. Šiem darbiem raksturīga dokumentalitātes un fikcijas saplūsmē, kas literatūras pētniekiem paver iespēju jauniem atklājumiem, meklējot dokumentalitātes un literatūras krustpunktus. Šī pētījuma mērķis ir apzināt aktuālās tendences tematikas izvēlē dokumentāli literāros hibrīdtekstos ar autobiogrāfiskiem naratīviem, kas Latvijā izdoti laika posmā no 2020.–2024. gadam. Pētījuma metodoloģija: jaunākās literatūrzinātnes pieejas autobiogrāfisko tekstu analizē un žanru teorijā, avotekstu komparatīvā analīze.

Pētījuma galvenie secinājumi liecina, ka šobrīd autobiogrāfiskajā prozā vērojama izteikta žanrisko formu daudzveidība, izdalot arvien jaunus paveidus, piemēram, autobiogrāfiskais romāns, fikcionālā autobiogrāfija, autofikcija, metaautobiogrāfija u. c. Laika posmā no 2020.–2024. gadam Latvijā izdotie autobiogrāfiskie dokumentāli literārie hibrīdteksti īpaši pievēršas tādām tēmām kā bērnības un jaunības atmiņu naratīvi un pieaugšanas stāsti (piemēram, Zane Daudziņa "Bērnudienas Komunālijā" (2024); Guntars Svilis "Bet kas būs ar mums?" (2024)), aktuāli ir dienasgrāmatas formāta prozas darbi, kas vēsta par kādu noteiktu laika posmu autora dzīvē (Andra Neiburga "Es esmu tas, kas paliek pāri. Dienasgrāmatas. 2003–2019" (2024)), sabiedrībā zināmas personas savus dzīvesstāstus atklāj memuārveida literatūrā (Ēriks Hānbergs "Manas vakardienas šodienās" (2024)), aktualizējas militārā tematika, proti, Otrā pasaules kara, leģionāru, trimdas un izsūtījuma tēma (Baņuta Rubess "Te bija Brunis" (2024); Juris Rozītis "Displaced Person. Kāda latvieša stāja svešumā" (2024)), padomju armijas dienestā gūtās pieredzes atklāšana (Mārtiņš Volfs "'Krievos" (2024)), mazliet tiek ieskicēts arī Ukrainas kara konteksts mūsdienu laiktelpā (Zane Daudziņa "Mans kara gads" (2023)) u. c. Tāpat arī aplūkotajā laika posmā Latvijas literatūrā iezīmējas tendence arvien vairāk pievērsties margināliem naratīviem, kas līdz šim atradušies perifērijā, pamazām mainot fokusu no globālā uz ikdienišķo.

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E. KATAJA AUTOBIOGRĀFIJAS "ZEM DESMIT VALSTU KAROGIEM" LITERATŪRAS RECEPCIJA LATVIJAS KULTŪRAS TELPĀ

"Zem desmit valstu karogiem" (2000) ir vairāk nekā tikai autobiogrāfija – tā ir kultūras fenomēns, kas ir veicinājis plašas diskusijas par Latvijas vēsturi un mūsdienu identitāti. Darba tematika un autobiogrāfiskie stāsti rada iespēju salīdzināt individuālo dzīves pieredzi ar plašākiem sociāliem un vēsturiskiem procesiem, kas ir īpaši svarīgi mūsdienu kultūras diskursā. Tas ir spēcīgs rīks, kas palīdz lasītājiem pārdomāt savas saknes un atklāt jaunas perspektīvas par pagātņi. "Desmit karogi" simboliski attēlo dažādās ietekmes – gan iekšējas, gan ārējas –, kas vienlaikus veido un izaicina stabilu un vienotu identitāti. E. Kataja "autobiogrāfija" ir kļuvusi par nozīmīgu literāru darbu Latvijas kultūras ainavā, kas ne tikai bagātina literatūras kanonu, bet arī sniedz ieguldījumu plašākās diskusijās par vēsturi, identitāti un atmiņām.

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TRANSLATIONS OF CHINESE EMPERORS' POETRY AND THE INTERPRETATION OF AUTOBIOGRAPHICAL MOTIFS: LINGUISTIC AND CULTURAL CHALLENGES

The understanding of literature, especially poetry and individual literary works, provides an opportunity to delve not only into the specific aspects of Chinese culture but also to gain insight into the personalities of its people and the characteristics of different historical periods. This connection is particularly evident in Chinese

literature, which is why, as a cultural domain, it is significant for both young researchers and experienced scholars.

Poetry has been a crucial aspect of Chinese state governance since the very beginning when the government issued official decrees to collect folk songs and poems to understand people's thoughts, sentiments, and needs. Consequently, the poetry genre was one of the earliest and most important in Chinese literary tradition. Poetic compositions formed the basis of imperial examinations, and poetry served as a means of communication at social events. Rulers and emperors also engaged in writing poetry, and several of their works were regarded as high literary and artistic achievements, remaining widely recognised even today. Even in modern times, there are politicians and ambassadors who compose poetry and present their works to the public.

This study examines the challenges of translating such poetry, focusing on linguistic peculiarities and cultural differences that influence the interpretation of autobiographical motifs and the adaptation of Chinese poetry for Western readers. The research can help translators navigate classical Chinese linguistic structures, metaphorical expressions, and historical contexts to preserve the original meaning while maintaining the poetic aesthetics. Additionally, the research explores cultural adaptation strategies and the impact of different translation approaches on readers' perception. The findings contribute to a broader understanding of cross-cultural literary translation and the role of autobiography in imperial poetry.

Haralds Broks

KRISTIETĪBA UN JŪDAISMS: MĀRA BĒRZIŅA ROMĀNA "SVINA GARŠA" MĀKSLINIECISKĀ PASAULE

Māra Bērziņa romāns "Svina garša" (2015) ir viens no unikālākajiem latviešu romāniem 21. gadsimta sākumā, iekļauts starptautiskā izdevēja "Dalkey Archive Press" antoloģijā "Best European Fiction 2017". Tas aptver laika posmu no 1939.-1941.gadam, vēstījot par liktenīgajiem notikumiem Latvijas vēsturē, kad viena pēc otras sekoja divas okupācijas – padomju un vācu. Vēsturiskā romāna mākslinieciskajā pasaulē reliģijas un baznīcas tēma ieņem vadošo lomu gan sižeta veidošanā, gan autora filozofiskajā skatījumā, gan galvēna varoņa Matisa rakstura kodols. Romāna struktūrā reliģiskā tēma ietver kristietības un judaisma mijiedarbību, citas svešas kultūras apzināšanas formu. Bībeles citāti pastiprina vēstījuma vēsturisko un reliģisko ietvaru, kļūstot par neparastām atsaucēm uz identitātes un ticības jautājumiem, ļaujot redzēt mītus, to radītājus un sekotājus. Laikmeta kolīzijas un izvēles, kuras ļauts skatīt ar galvenā varoņa Matisa acīm, atklāj humānisma balss senaizmirsto dziļumu, vēsturiski skaudro un sarežģīto notikumu sadursmē. Referātā tiek apskatīti reliģiskās tēmas un kristietības - judaisma mijiedarbības semiotiskie aspekti.

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NOVEL "ТУМАННОСТЬ АНДРОМЕДЫ" BY I. YEFREMOV IN TRANSLATIONS BY G. HANNA AND A. HERRAIZ: GENERAL CHARACTERISTIC THROUGH THE PRISM OF THE TRANSLATORS' PERSONALITIES

The novel "Туманность Андромеды" by Ivan Yefremov was translated in various languages. The article aims to consider the translations of the novel in English by George Hanna and in Spanish by Angel Herraiz. Special attention is paid to the translators' personalities and their influence on the target texts.

EKONOMIKA

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ECONOMICS

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DIGITAL TOURISM RESEARCH: A GLOBAL BIBLIOMETRIC ANALYSIS OF TRENDS AND DEVELOPMENTS

This study presents a global bibliometric analysis of digital tourism research, highlighting key trends, developments, and future directions. Digital tourism has experienced rapid growth, driven by technological advancements, policy support, market competition, and evolving consumer preferences. The COVID-19 pandemic significantly influenced the sector, accelerating digital transformation and fostering innovations such as AI, VR, and smart tourism solutions. Using bibliometric analysis, this research systematically examines citation networks, co-authorship patterns, and keyword trends to identify emerging themes. Based on literature from 2015 to 2024, findings reveal increasing research interest post-2021, with major contributions from Asia and Europe. However, limited cross-disciplinary and international collaboration remains a challenge. The study underscores the importance of digital tourism in economic development, particularly through digital marketing, enhanced user experiences, and smart tourism applications. Future research should focus on integrating marketing strategies, service design, and innovative digital tools to enhance industry resilience and sustainability.

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GENDER DYNAMICS IN RURAL LATVIA - BETWEEN TRADITION AND CHANGE IN AN EASTERN EUROPEAN CONTEXT

Keywords: *rural gender relations, Eastern Europe, feminist perspectives*

Gender relations in rural Eastern Europe have been shaped by historical, political, and socio-economic transformations. While feminist rural studies have long documented gender inequalities in agriculture and rural communities (Brandth, 2002), research also suggests that many farm women do not align with mainstream feminist discourses, instead emphasizing cooperation and traditional roles as central to family and community well-being (Brandth, Haugen, 1997). In post-socialist Eastern Europe, rural gender roles have been further influenced by the legacy of socialist-era gender policies, which promoted formal equality but often reinforced women's "double burden" of productive and reproductive labor (Duffy, 2010).

This paper explores gender relations in rural Latvia through 20 qualitative interviews with men and women (aged 45-64) in Stāmeriena, offering insights into how rural women structure their daily lives and position themselves within family and community settings. We propose several models reflecting these lived experiences, ranging from those who navigate traditional gendered expectations to those who assert greater independence in rural life. While patriarchal structures remain influential, these models challenge assumptions that rural gender relations must follow a linear path toward urban-centric feminist ideals. Instead, they highlight the complex ways in which rural women negotiate agency within their specific socio-cultural contexts.

By situating our findings within broader discussions on gender and rurality in Eastern Europe, this paper seeks to contribute to debates on how rural gender roles evolve and what they reveal about gendered experiences in rural settings.

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INFORMATION TECHNOLOGY AND ARTIFICIAL INTELLIGENCE IN LATVIAN COMPANIES

The aim of the study is to analyse the level and trends of information technology (IT) and artificial intelligence (AI) use in Latvian companies. The object of the study is Latvian enterprises in general, as well as in terms of their size (number of employees) and economic sectors (according to NACE 2 classification), using data from the Central Statistical Office of Latvia (CSO), starting from 2013. To achieve the objective of the study, a dynamic analysis of statistical data was used, applying the method of comparative data analysis and calculating the coefficient of variation. An attempt has also been made to analyse the level and trends of information technology and artificial intelligence use in Latvian companies on a regional basis, based on the analysis of the results of other scientific studies, as there are no publicly available statistics on this in Latvia, and there are no statistical data on the use of AI in Latvian companies. The results show that the use of information technology and artificial intelligence in Latvian companies is growing rapidly (mainly due to the σ -convergence of website presence and social network use - the convergence of indicator values between different types of companies in terms of number of employees and economic sector), but there is still significant potential for development. The level of IT and MI use in Latvian companies lags significantly behind the EU average - for example, only a small number of companies successfully use digital channels to attract customers. IT and AI are used effectively by companies that are able to adapt to new technologies and integrate them strategically into their operations, but many companies face technical and professional challenges. The study also highlights that while the digital divide in access to IT and AI among Latvian companies is rapidly narrowing, economic and social (including regional) disparities continue to affect the ability of companies to fully exploit IT and AI opportunities.

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THE LATVIAN RURAL COMMUNITY RESILIENCE MODEL: QUALITATIVE CHARACTERISTICS OF LEVELS

Keywords: *rural community, resilience, qualitative characteristics, resilience model*

The social, cultural, economic life and living environment comfort in specific territories are shaped by public activities and socially connected cohabitation. The quality of life in rural areas depends on the capacity of rural communities to respond to external changes by adapting their internal resources. Nowadays, resilience is positioned as the key concept of societal well-being. Resilience is not a static state but a dynamic process that requires continuous adaptation and innovation. Measuring community resilience is complex, as it includes both quantitative and qualitative factors.

The process of rural community resilience manifests on multiple levels, which interact with one another, and all these levels must be developed and balanced. In the context of sustainability, it is essential to understand the mechanisms that regulate community resilience and the conditions under which a community operates effectively. Contemporary theoretical approaches highlight three processes that characterize community sustainability. These processes evolve separately and independently but interact with each other and expand the community's capacity for resilience.

Balance, adaptation, and transformation have been described as key processes characterizing community resilience in the study "Community Resilience" (Boston et al., 2024). M. Zurek proposed a definition of resilience that includes "persistence," "recovery," and "reorientation" (Zurek et al., 2022).

Analyzing the viability of contemporary Latvian rural communities and defining the characteristics that outline community resilience, development, and a sustainable future is a challenge, as communities are diverse, and the understanding of quantitative and qualitative indicator systems varies. The "Latvian Rural Community Resilience Model" conceptualizes resilience as a dynamic process in which community resilience is viewed as continuous adaptation, balance maintenance, and transformation that interact with each other.

The qualitative characteristics of the resilience process, such as a conscious sense of place identity, social capital, and community agency, reflect the resilience processes of rural communities. The study was conducted within a case study research design, allowing for an exploration of the phenomenon of rural community resilience in its natural environment. The opinions of experts with knowledge and competence in the subject matter were gathered to assess the suitability and applicability of the model.

FILOLOĢIJA

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PHILOLOGY

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МЕДИАЛИЗАЦИЯ ЛИТЕРАТУРЫ: НОВЫЕ ТРЕБОВАНИЯ И ПЕРЕСЕЧЕНИЕ НАРРАТИВОВ

Медиализация литературы: новые требования и пересечение нарративов

Новые тенденции в литературном дискурсе. Симбиоз бумажной литературы и интернета - "сететура" - трансформирует писательские авторские стратегии, превращая самого автора в многопрофильного культурного деятеля.

Новые писательские функции. Виртуальная реальность конструирует ранее не существовавшие понятия, знания, нормы, ценности, поведенческие образцы, и литературное творчество превращается в мультидисциплинарный процесс, предполагающий активное продвижение в медиапространстве.

Авторские стратегии и функции блога писателей. Создание виртуальной идентичности через соцсети и личные блоги обеспечивает писателю не только связь со своей аудиторией, но и так называемое мультимедийное присутствие, которое позволяет повышать узнаваемость. Татьяна Толстая формирует интересубъективное взаимодействие с аудиторией, а Григорий Чхартишвили выстраивает со своим читателем коммуникацию на основе персонализированного подхода, создавая определенную форму взаимосвязи и взаимозависимости популярности писателя Бориса Акунина от писателя-блогера Григория Чхартишвили. В докладе на основе переписки и лично организованных интервью с авторами, например, Наринэ Абгарян и Яной Вагнер, будет проведен более детальный анализ как влияния писателей на блогосферу, так и его реверсивного варианта – влияния блогосферы на профессиональную деятельность писателей.

Влияние блогосферы на литературные жанры. Медиапространство преобразует традиционные жанры и жанровые формы – авторский материал в цифровой среде становится не только законченной, самостоятельной литературной единицей, но источником вдохновения и претекстом для традиционных произведений (романов, как, например, у Е. Гришковца или Д. Глуховского, сборников рассказов, как, например, у Славы Сэ). Можно утверждать, что блогосфера возвращает литературу к первичным речевым жанрам – сказанию, притче и анекдоту, что оказывает влияние и на образ героя, и на нарративные стратегии.

PHYSICS

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FIZIKA

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IMPACT OF ZNO NANOSTRUCTURE MORPHOLOGY ON ELECTROCHEMICAL SENSING PERFORMANCE FOR LEAD ION DETECTION IN REAL WATER SAMPLES

This study investigated the morphological dependence of ZnO nanostructures, specifically nanotube- and nanorod-based electrodes, on their electrochemical performance for the detection of lead ions (Pb²⁺) in aqueous solutions. The results demonstrate that ZnO nanotubes exhibit significantly enhanced sensitivity compared to nanorods during CV measurements. During SWV measurements, the sensitivity (116.79 mA mM⁻¹) and a lower limit of detection of 0.0437 μM were determined. The hollow, high-aspect-ratio structure of nanotubes provides a larger active surface area and facilitates better ion accessibility, resulting in superior electron transfer efficiency and catalytic activity. These results underscore the critical role of morphology in optimizing ZnO-based sensors. Analysis of real water samples from various natural reservoirs revealed no detectable lead, while lead was identified exclusively in artificially prepared samples containing water exposed to lead hunting shot. Over a 30-day period, the sensor retained over 95% of its initial performance when stored under vacuum conditions, demonstrating minimal signal degradation. Under ambient conditions, stability loss was attributed to moisture adsorption on the porous nanostructure. The sensor also displayed outstanding reproducibility, with current response variations across multiple probes remaining within 4%. The cost-effective and simple fabrication process of ZnO nanostructures further highlights their potential for scalable production, environmental monitoring, and integration into portable sensing devices.

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USE OF QUANTUM DOTS TO VISUALIZE NANO PARTICLE DELIVERY MECHANISMS IN PLANTS

Nanotechnology offers new approaches to delivering nutrients and protective agents to plant tissues while minimizing environmental damage. Using quantum dots to visualize and study transport mechanisms in plants allows for a deeper understanding of the uptake and movement of nanomaterials. This is important for developing environmentally friendly and efficient agricultural technologies that reduce fertilizer losses, increase resource efficiency, and improve agricultural sustainability.

DYNAMICS OF MARINE ECOSYSTEMS AND FACTORS INFLUENCING THEM

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JŪRAS EKOSISTĒMU DINAMIKA UN TO IETEKMĒJOŠIE FAKTORI

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CLIMATE CHANGE-DRIVEN CHANGES IN COASTAL PROCESSES IN THE SOUTHERN AND EASTERN BALTIC SEA AND THEIR POTENTIAL IMPACT ON MARINE HABITATS

Sediment transport processes play a crucial role in highly dynamic coastal ecosystems. These natural coastal processes are strongly altered by wave activity, water level changes, ice cover, and wind drift. We analyse how these coastal process drivers shape the evolution of sedimentary shores along the southern and eastern Baltic Sea coast. Climate change is altering these processes, as seen in rising global mean sea levels, increased storm intensity, and shifting wave regimes.

Changes in average water levels have a strong impact on southern shores of the Baltic Sea, but eastern subbasins of the Gulf of Finland and Gulf of Riga are mostly affected by rapid increases in the water level extremes. The fragile balance of alongshore sediment transport is created by a two-peak structure of predominant winds along the Baltic proper and the Gulf of Riga. But this balance can be disturbed if the predominant wave directions would rotate just by a few degrees. Southern shores experience severe waves with close to long-term mean water levels, while the eastern shore has a common synchronisation of strong waves and high water level. Ice cover duration that affects erosion processes also is impacted by climate-driven changes. Shorter or non-existing ice cover makes the beaches more unstable.

The impact of climate change may greatly vary in different parts of the Baltic Sea and to these factors, connected coastal processes are very site-specific. The changes in longshore sediment transport also affect the nearshore ecosystems. By knowing how climate change can impact different areas of the Baltic Sea, adaptive strategies can be created to protect ecosystems and mitigate loss of biodiversity and coastal instability.

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CYANOBACTERIA ECOLOGY IN THE GULF OF RIGA

Cyanobacteria play a crucial role in the ecology of the Gulf of Riga, particularly through their ability to fix atmospheric nitrogen. This process is essential in replenishing bioavailable nitrogen in the ecosystem, supporting primary production in nitrogen-limited conditions.

Heterocystous cyanobacteria, such as *Aphanizomenon flosaquae* and *Nodularia spumigena*, are dominant nitrogen-fixers in the Gulf of Riga, forming dense summer blooms. These blooms contribute significantly to nitrogen input, enhancing phytoplankton growth but also potentially leading to eutrophication and hypoxic conditions upon decomposition. The nitrogen fixation process is influenced by environmental factors such as temperature, salinity, and phosphorus availability, with heterocyst formation being a key indicator of fixation activity.

Studies indicate that phosphorus availability is a major driver of cyanobacterial blooms, yet short-term phosphorus enrichment does not always lead to immediate increases in biomass or nitrogen fixation rates. This suggests that additional ecological and physiological factors regulate nitrogen fixation dynamics.

The ecological balance in the Gulf of Riga is closely tied to the activity of nitrogen-fixing cyanobacteria. While they provide a crucial nitrogen source, their blooms must be monitored to mitigate potential negative impacts

on water quality and ecosystem stability. Understanding these dynamics is vital for sustainable management of the region's aquatic resources.

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IMPLEMENTING NEW LAKE RESTORATION METHODS IN LATVIA: PREPARING FOR OF THE FIRST ALUMINUM TREATMENT IN THE BALTIC STATES

Over the past decades, the ecological status of many lakes in the Baltic States have declined due to excessive inputs of anthropogenic nutrients. Resulting eutrophication poses one of the greatest challenges for water management in this region. The aluminum treatment is a proven, cost-effective restoration technique developed to reduce internal phosphorus loading. It has been successfully applied in more than 200 lakes worldwide, however, the first aluminum treatment in the Baltic States was performed in Latvia in 2024. Limited technical knowledge, relatively high initial costs, and social concerns regarding the use of chemical methods for lake restoration are among barriers that hinder the adoption of this method in the Baltic countries. To address this gap, Lake Velnezers – a small, dimictic lake located in Riga, Latvia – was selected as the pilot site for the implementation and demonstration of the aluminum treatment method in the Baltic States. Monthly monitoring conducted for over a year before treatment revealed high phosphorus concentrations in the water, resulting in excessive algal blooms and a critically low oxygen bottom layer prevalent during the times of stratification. A comprehensive assessment of biota further confirmed the poor ecological status of the lake. The results of monthly monitoring, analysis of the sedimentary mobile phosphorous pool and an extensive watershed analysis were used to model the optimal aluminum dosage of 56 g Al/m². Early post-treatment monitoring revealed an upsurge in water turbidity, and a significant decrease in surface water total phosphorus levels compared to the same months of the previous year. Ongoing monitoring will determine whether the water quality improvement achieved by the reduction of internal phosphorus loading in Lake Velnezers will be reflected in the composition, richness and diversity of biota, and the lake's trophic status. The study was supported by the Interreg Baltic Sea Region project TRUST ALUM.

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INTERDISCIPLINARY METHODOLOGICAL APPROACH TO ASSESSING SEDIMENT QUALITY IN THE GULF OF RIGA

Chemical analysis of pollutants in sediments alone does not comprehensively answer whether pollution adversely affects marine organisms. However, it is increasingly important to clarify the relationship between the consequences of potential pollution on organism development and the reduction of biological diversity. Therefore, it is crucial to consider the effects of mixtures of substances in general and determine the ecological quality of sediments using an interdisciplinary method solution approach.

This work will demonstrate the practical significance of employing an interdisciplinary approach and weighted criteria to synthesise and integrate various types of data (as lines of evidence—LOEs) to assess sediment quality. This method integrates the evaluation of three components: sediment chemistry, sediment toxicity (using aquatic organisms – bioassay and biological effects) and structural characteristics of benthic communities.

The main goal of this study was to evaluate chemical contaminants in sediments and organism tissues and link contaminant levels with biomarker activity in the GoR benthic organisms. The long-term dynamics of the macrozoobenthos abundance in the GoR show considerable inter-annual changes during the last decades. Existing monitoring and research data on chemical contaminants, biological effects, and biodiversity were compiled, and a new sampling campaign for selecting polluted and reference sites of the GoR was performed. Findings indicate that biological effects methods are effective for environmental quality assessment, especially using enzymes like AChE in bivalves *Macoma baltica* and reproductive aberrations in amphipods *Monoporeia affinis*. These biomarkers respond significantly to organic contaminant groups like PAHs accumulated in the sediments.

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NATURE-BASED SOLUTIONS FOR FUCUS VESICULOSUS RECOVERY IN THE BALTIC SEA: A CASE STUDY FROM THE GULF OF RIGA

Nature restoration aims to re-establish habitats, hydrological processes, biological mechanisms, and populations where they have been lost. In the marine environment, restoration can be passive, relying on natural recovery after removing disturbances (e.g., restricted fishing), or active, involving direct human intervention to accelerate recovery through habitat enhancement or species reintroduction.

The decline of *Fucus vesiculosus* in the Gulf of Riga (GOR) threatens coastal ecosystem stability. In response, a three-year project launched in late 2024 applies nature-based solutions (NBS) to restore Fucus populations. This study tests restoration techniques across various GOR bays with different environmental conditions to assess their effectiveness and inform conservation strategies.

Five key restoration approaches are tested: (1) transplantation using the stone method, relocating small stones with attached thalli; (2) direct transplantation of adult plants onto artificial substrates; (3) deployment of artificial substrates at donor sites for seedling establishment and later transfer; (4) artificial seeding at restoration sites using fertile branches; and (5) clearing restoration sites of sediment and annual algae to improve germling settlement.

So far, an environmental database has been established to support site selection and monitoring. Key parameters include water depth, temperature, salinity, oxygen, nutrients, wave exposure, Secchi depth, photosynthetically active radiation (PAR), substrate type, epiphytic growth on Fucus, chlorophyll-a levels, and benthic community composition. This data enables the identification of historically significant Fucus habitats and optimal restoration sites.

The project contributes to developing evidence-based guidelines for sustainable Fucus management in the NE Baltic Sea, ensuring the long-term viability of this keystone species. Funded by Interreg VI-A Estonia-Latvia Programme 2021-2027.

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PELAGIC FOOD WEB OF THE GULF OF RIGA: INSIGHTS FROM ECOLOGICAL NETWORK ANALYSIS

Interpreting food web changes is challenging, but network metrics like robustness help assess system stability. Using Ecological Network Analysis (ENA), we examine the coastal pelagic food web of the Gulf of Riga, a freshwater-influenced, eutrophied ecosystem. The study identifies key functional guilds essential for stability and assesses seasonal variability, focusing on the microbial loop and plankton. Three seasonal periods were

identified: (i) the spring phytoplankton bloom, (ii) early summer with low planktivorous fish pressure, and (iii) late summer to early autumn with high fish pressure. Across all seasons, but especially in early summer, the dominant carbon pathway flowed from the microbial loop through herbivorous filter feeders to omnivores, highlighting the role of bacterio- and microplankton. The mixotrophic ciliate *Mesodinium rubrum* emerged as a key element, contributing ~10% of total carbon for first-level consumers. Trophic network metrics, including robustness, showed limited seasonal variation. The overall connectance (~11%) was typical for marine food webs and dominated by generalists. However, robustness was relatively low (0.3–0.5), suggesting decreased system efficiency.

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REGENERATIVE OCEAN FARMING IN THE BALTIC SEA: A COMMUNITY-LED APPROACH FOR SUSTAINABLE MARINE BIOMASS PRODUCTION

A regenerative ocean farming is a concept outlined by transformative approach to sustainable marine biomass production and ecosystem restoration in the Baltic Sea region. A traditional marine aquaculture is redefined by promoting multi-trophic cultivation and community engagement to counteract climate change and reverse the degradation of marine ecosystems.

COOL BLUE BALTIC project examines innovative, low-impact cultivation methods that not only produce biomass for food and feed but also restore ecological balance by operating on the ecosystem's own terms. By integrating modular and scalable farm designs with localized education and community activism, the study aims to propose robust business models for the Baltic Sea countries, currently without any considerable marine aquaculture.

Preliminary findings indicate that embedding regenerative practices into local biomass value chains can enhance ecosystem resilience and drive socio-economic benefits, including job creation and knowledge sharing. There is an urgent need for further interdisciplinary investigations into the long-term ecological and economic outcomes of these practices. Still, some positive examples are already here, and experience in small-scale cultivation of mussels and algae from Denmark will also be shared.

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RESEARCH OF MARINE PROTECTED HABITATS IN EEZ AND DETERMINATION OF THE NECESSARY CONSERVATION STATUS IN LATVIA - LIFE REEF PROJECT

There still are considerable gaps in knowledge about the marine environment, distribution and status of marine habitats and species as well as discrepancies in interpretation especially in the exclusive economic zone of Latvia, where scientific research activities have not been performed at all. Towards achieving the 30/30 goals LIFE REEF project contributes to a comprehensive management system of MPAs in Latvia by identifying protected habitats and determine areas for protection in the Latvian marine waters.

Project results showed that the widely used sediment map created in the 80-ties of the previous century is inaccurate. It is turned out that the sand areas marked on the sediment map are solid ground covered with mussels and macroalgae and clearly corresponding to reef biotope 1170 - habitat protected by Habitats Directive (Annex 1, Council Directive 92/43/EEC) and considered as a biodiversity hotspot for attracting invertebrates, fish, birds and plants.

Although on the one hand the wide reef areas allow Latvia to easily achieve the 30/30 goal, on the other hand new challenges came into the front: renewable offshore development, oil extraction and aquaculture. Moreover, in the Latvian coastal waters, one of the main challenges of developing effective biodiversity protection measures relates to the fact that MPAs are area-based nature conservation measures that presume setting protection objectives for geographically distinct zones while the main dangers, such as eutrophication,

invasive species and hazardous substances impact the whole sea area. We will discuss possible solutions emphasizing cooperation between states around Baltic Sea and policies aiming to reduce nutrient loads from land-based sources, such as the EU Water Framework Directive's River Basin Management Plans, nutrient reduction targets set by HELCOM's Baltic Sea Action Plan, EU Marine Strategy Framework Directive, and several others – both pan European, macro-regional and national.

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TACKLING AGRICULTURAL PHOSPHORUS LOADS BY SOIL AMENDMENTS

Eutrophication is one of the key problems affecting the ecological quality of the Baltic Sea's ecosystems. Freshwater systems, particularly lakes and rivers, are the main vectors transporting nutrients, including phosphorus, to the sea. Approximately 60–80% of the phosphorus entering the Baltic Sea originate from agricultural activities (HELCOM).

One potential solution to reduce this impact is the application of gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) to agricultural soils. Gypsum can be obtained from various sources – either naturally from quarries, where it forms and accumulates under natural conditions, or as a by-product from fertilizer, fiberglass, and thermal energy production. In Latvia, gypsum is primarily found in naturally occurring quarries, but there is also potential for utilizing gypsum produced as a by-product in fiberglass production.

Gypsum application has been studied and implemented in Finland as an effective measure to reduce phosphorus losses from agricultural fields, with reductions of 30–50%. However, no such experiments with gypsum amendments have been carried out in Latvia, thus there is limited information on how gypsum might affect Latvian soils.

To better understand the effect of gypsum on soils, we selected three of the most common agricultural soil types in Latvia: sod carbonate soil with clay, sod podzol soil with sandy loam, and sod podzol soil with clay sand. For the experiments, two different types of gypsum were used – mined gypsum from the Saurieši quarry in Latvia, and phosphogypsum from Siilinjärvi, Finland.

Each soil type was treated with both types of gypsum, along with untreated control samples. Three replicates were prepared for each setup, resulting in a total of 27 soil columns. The soil columns were watered for 4 weeks to ensure the formation of infiltrates. Infiltrates were collected three times and analyzed separately.

This study is part of the Interreg Baltic Sea Region project “Tackling agricultural phosphorus loads by soil amendments (GYPREG)”. The project brings together national and public authorities, NGOs, and farmers' associations from Finland, Sweden, Lithuania, Poland, and Latvia to promote gypsum application on agricultural fields and to inform stakeholders about gypsum's potential to reduce phosphorus losses and combat eutrophication.

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THE DISTRIBUTION OF NON-INDIGENOUS CRUSTACEAN AND MUSSEL SPECIES IN LATVIAN PORTS

Ports create a highly suitable environment for non-indigenous species (NIS) to spread successfully due to intense shipping traffic and the constant exchange of vessels. Ship ballast water and hull biofouling serve as the primary vectors for the global spread of NIS, facilitating the introduction and establishment of new species in local ecosystems. When NIS settle in ports, they contribute to biological fouling on artificial structures such as buoys, breakwaters, and docks, with algae, mussels, and crustaceans being the most common fouling organisms. Under favorable environmental conditions, these species can spread rapidly and establish themselves in new ecosystems. Once established, NIS may outcompete native species for space and resources, disrupt trophic interactions, and introduce new pathogens, creating a hostile environment. Monitoring port

environments is essential for identifying which species are arriving, how quickly they are spreading, and assessing their potential impact on local ecosystems.

Our study analyzes monitoring data to understand the abundance and distribution of NIS in ports of Riga, Ventspils and Liepaja.

In Latvian ports, the prevalent non-indigenous species include the mussels *Dreissena polymorpha* and *Mytilopsis leucophaeata*, as well as the crustaceans *Chelicerophium curvispinum*, *Sinelobus vanhaareni* and the mud crab *Rhithropanopeus harrisii*. Since 2019, *S. vanhaareni* and *M. leucophaeata* have shown a significant increase in abundance in Latvian ports.

Since their introduction, the crustacean *Chelicerophium curvispinum*, the mussel *Mytilopsis leucophaeata*, and the crustacean *Sinelobus vanhaareni* have each established distinct population patterns in Latvian ports, with each species exhibiting the highest abundance in its respective port: *C. curvispinum* in Riga, *M. leucophaeata* in Ventspils, and *S. vanhaareni* in Liepaja.

EDUCATIONAL SCIENCES

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IZGLĪTĪBAS ZINĀTNES

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"SHADOW EDUCATION" FROM METAPHOR TO ACADEMIC DEFINITION

"Shadow Education" is a widespread, ambiguous concept that is interpreted differently in different countries. Starting from the 1980s, this topic began to emerge as a specific subject of academic literature, but the first global comparative study of this phenomenon appeared only in the late 1990s. The phenomenon of this concept was first studied in the world by such scholars as: Bray, Zhang, Marimuthu, George, Stevenson, Baker and many others. The article examines: how this concept has developed in different countries from the initial metaphor to the academic definition, what difficulties researchers have encountered determining the precise boundaries of shadow education, terminological nuances in different languages and cultures and keywords of the topic, as well as how this concept is perceived and used in the Latvian context.

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ADAPTIVE SPORTS FOR ADOLESCENTS WITH MILD INTELLECTUAL DISABILITIES IN CHINA: A PATH TOWARD INCLUSIVE EDUCATION

Keywords: *Inclusive Sports Education, Mild Intellectual Disability, Adapted Physical Activity, Policy Reform, Inclusion Models*

China's educational landscape is progressively embracing the integration of adolescents with mild intellectual disabilities into mainstream classrooms, reflecting a nation-wide commitment to inclusive education. This study examines the challenges and current state of inclusive sports education, a critical component of special needs education that remains under-optimized. Despite policy advancements, the practical implementation of inclusive sports is slow, highlighting a need for deeper exploration and effective strategies. This research identifies key barriers, such as inadequate facilities, lack of trainer competencies, and a general lack of awareness regarding the needs of individuals with disabilities. To address these issues, an adapted physical activity program is proposed, validated through meta-analysis for its feasibility and effectiveness. The study incorporates a comprehensive literature review that emphasizes the importance of innovative strategies that cater to the specific needs of students with mild intellectual disabilities. The research delves into the spectrum of inclusion models, from the integration model to the Inclusion Spectrum model, considering aspects like separate activities, parallel activities, and modified activities to accommodate the needs of individuals with disabilities. It also discusses the bio-psychosocial model of disability and the emphasis on 'inclusion', 'equality', and 'physical literacy' as central to society's sustainable development. The paper elaborates on legislation in China. Inclusive education in China is underpinned by legislation that has progressively established a framework for compulsory education for disabled children and adolescents. The study outlines the development of policies and regulations that have elevated inclusive education to the national legal level, ensuring the educational rights of people with disabilities and improving the quality of inclusive education. Conclusions and Suggestions: Reflecting on the paradigm shift since the Salamanca

Statement in 1994, the study suggests that sharing good practices and modernizing teacher training are essential for advancing inclusive sports education. It calls for systemic changes, collaborative efforts, and a societal attitude shift towards inclusion.

Discussion: The authors propose further qualitative research to explore the nuances of inclusive practices and effective intervention strategies, aiming to uncover models suitable for integration into China's educational system.

CLASSROOM TEACHER OBSERVATION IN LATVIA 1918–1934: OBJECTIVES AND PROFESSIONAL DEVELOPMENT BENEFITS

In theoretical literature and practice, at least three fundamentally different objectives of classroom teacher observation are distinguished: (1) observation for the purpose of assessing or evaluating a teacher's performance, (2) observation aimed at providing individualized support to a teacher, such as within mentoring or instructional coaching frameworks, and (3) observation for the observer's own learning purposes or for peer observation to promote mutual learning, as seen in lesson study practices. Each of these classroom teacher observation goals is associated with distinct benefits for both the observer and the teacher conducting the lesson.

This study examines how classroom teacher observation was reflected in printed historical sources from 1918 to 1934, primarily in the press, to address two research questions: (1) What objectives for classroom teacher observation were mentioned in printed historical sources in Latvia between 1918 and 1934? (2) What professional development benefits were associated with classroom teacher observation?

Findings indicate that during the studied period, classroom teacher observation was conducted with multiple objectives, particularly those related to mutual learning and the exploration and implementation of new pedagogical approaches.

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CROSS-SUBJECT LINK IN SAMPLES OF THE PHYSICAL AND MATHEMATICAL CURRICULUM OF PRIMARY EDUCATION IN LATVIA

Keywords: *cross-subject connections, primary education, pressure, motion, electricity, unit systems, graphical organizers, mnemonics*

To develop students' deeper understanding of the relationship between physical objects in the real world and abstract mathematical structures, interdisciplinary links between mathematics and physics should be reinforced already at the primary education level. Such an approach fosters students' analytical thinking and facilitates knowledge integration across different subjects.

The aim of this study was to analyze which aspects of cross-subject connections are emphasized in samples of curriculum of physics in Latvian primary education and how they align with the content of the mathematics curriculum. A content analysis was conducted on the current curricula of physics for grades 8 and 9, as well as mathematics for grades 1–9 in Latvia. The results indicate that there is alignment between the two curricula; however, the practical implementation of cross-subject connections largely depends on teachers' individual approaches and the organization of the teaching process.

Several mathematical strategies will be examined in more detail, based on international scientific and methodological literature. For example: The use of mathematical strategies in converting physical units of measurement, Enhancing students' understanding of physical concepts and laws through graphical organizers (Euler-Venn diagrams, line and bar charts, etc.), The application of the "formula triangle" as a mnemonic aid.

Such an analysis provides teachers with insights into the advantages and limitations of the strategies recommended in the methodological commentary (from the samples curriculum of physics for grades 8 and 9) to support students' understanding of the interaction between these two subjects and their application of knowledge in real life.

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EXAMINING AI-INDUCED THREATS AMONG THE LESOTHO PRE-SERVICE TEACHERS: A QUEST FOR SUSTAINABLE AI LITERACY

Keywords: artificial intelligence, HEI, pre-service teachers, Lesotho, sustainable AI literacy

Background and aim: The increasing use of artificial intelligence (AI) tools for automated writing assistance has transformed educational practices; however, among Lesotho's pre-service teachers, these tools are increasingly misused, leading to over-reliance, plagiarism, and compromised critical thinking. This study examines AI-induced threats in this context, with a particular focus on the decline of linguistic proficiency, and aims to inform sustainable AI literacy among pre-service teachers.

Methods: Grounded in Error Analysis Theory, Cognitive Load Theory and Legitimation Code Theory (semantic density and gravity), this study adopted an explanatory sequential mixed methods design. 162 pre-service teachers from one higher education institution (HEI) in Lesotho participated in the study. Data were collected using surveys, document analysis and semi-structured interviews, and analysed through descriptive statistics and thematic analysis. **Results:** Results indicate that a significant fraction of the participants exhibits extensive dependence on AI tools, which leads to unintentional plagiarism and weakened writing skills; the participants frequently overlook mistakes in AI-generated content; diminished critical thinking and the erosion of linguistic proficiency were also highlighted.

Implication, conclusion and recommendations: The results imply that although AI tools provide immediate feedback, their misuse weakens fundamental learning processes and academic integrity. It was concluded that there is an urgent need for a sustainable framework for AI literacy that not only promotes the ethical use of AI tools but reinforces traditional linguistic skills and analytical thinking as well. This study recommends curriculum innovation and targeted training programmes are emphasised to enable the pre-service teachers to critically, ethically, and sustainably engage with AI technologies in HEIs.

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EXPLORING AI ETHICAL AWARENESS AMONG IN-SERVICE GEOGRAPHY AND ENGLISH LANGUAGE TEACHERS IN LESOTHO SECONDARY SCHOOLS

Keywords: artificial intelligence, ethics, in-service teachers

Background and Aim: The integration of artificial intelligence tools in education has received a growing interest in this digital era, mainly because of their potential to accelerate education that is global, inclusive, equitable, and sustainable. Currently, AI is considered to hold the promise of accelerating education that can prepare learners who are resilient to global challenges. Research conducted in education so far focuses on the impact of AI integration in education, with findings revealing a positive impact. However, less has been said regarding AI ethical awareness among in-service teachers. Teachers' AI ethical awareness should be key as they are expected to integrate AI in class. Therefore, this study sought to explore AI ethical awareness among in-service Geography and English Language teachers in Lesotho Secondary schools. **Methodology:** This study situated itself in the theoretical lenses of the TPACK model and philosophical lenses of pragmatism, adopting a mixed methods explanatory sequential design. The sample comprised 120 Geography and English language in-service teachers. Quantitative and qualitative data were collected with surveys and in-depth interviews and analysed with descriptive statistics and thematic analysis with the help of SPSS and Atlas.ti, respectively. **Findings:** The findings of this study reveal that teachers' level of understanding of ethical issues surrounding the use of AI is significantly high. Furthermore, the findings indicate positive perceptions of teachers concerning the importance of observing AI ethics when using AI tools in class. **Conclusion and Recommendations:** The study concludes by emphasising the importance of equipping teachers with the necessary skills and knowledge to use AI tools and highly recommends the organisation of teacher professional development (TPD) programmes.

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EXPLORING AI WRITING ASSISTANTS IN TOEFL PREPARATION: DESIGNING SMART LEARNING SOLUTIONS IN EDUCATION

Keywords: *AI writing assistant; TOEFL preparation; smart education; human-AI teamwork; personalized learning; self-directed learning; essay feedback*

This study proposes an AI-powered writing assistant model for TOEFL preparation, combining real-time AI feedback with structured teacher support. Based on human-AI teamwork principles, the model operates through three phases: basic error correction, interactive guidance, and critical thinking development, aiming to enhance writing skills and self-regulated learning abilities. The system automatically tailors training priorities by analyzing students' language errors, logical flow, and content quality in essays, creating personalized learning plans. A comparative experiment will compare three approaches: traditional teacher feedback, AI-only feedback, and a combined "AI+teacher" approach, with the hypothesis that the hybrid method better improves TOEFL writing performance. By examining students' revision patterns and writing habits, the research seeks to identify key factors in AI-assisted writing improvement. Safeguards like teacher spot-checking and phased reduction of AI hints are designed to prevent overreliance on technology. The outcomes aim to provide practical insights for integrating smart tools with classroom teaching, helping learners use AI more effectively in high-stakes language exams.

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EXPLORING ROLE-PLAY IN ENHANCING SPEAKING COMPETENCY FOR BEGINNERS IN FRENCH FOREIGN LANGUAGE: A CASE OF ONE PRIMARY SCHOOL IN LESOTHO

Keywords: *French as a foreign language, role-play, speaking competency, beginners*

In a world where learning foreign languages is essential, literature demonstrates that most of the beginners of a foreign language have difficulties in speaking fluently and expressing themselves in the target language, owing to different structures of their maternal languages and the second languages. The purpose of this study was to explore role-play strategy in enhancing speaking competency for beginners in French as a foreign language among primary learners in Lesotho. Using the action research qualitative study, thirty-eight grade 4 learners were purposively selected. Additionally, data was generated through unstructured observations and document analysis. Similarly, the results were analysed thematically and through content analysis. Resultantly, this study revealed that role-play as an intervention used in enhancing speaking competency allows learners to exercise their speaking competency as they are exposed to various real-life scenarios where they practice speaking in French, thereby enhancing fluency. It is recommendable that in the teaching and learning of foreign languages, learners may be allowed to practice their language skills through role-plays, which render them as active participants in their language acquisition.

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HAPPINESS AND EDUCATION FOR SUSTAINABLE DEVELOPMENT: A PERSPECTIVE FROM CHINA

This theoretical presentation explores the concept of happiness in Chinese culture, examining its historical and philosophical foundations and its relevance to Education for Sustainable Development (ESD) within the framework of metamodernism. It also justifies the need for an empirical study on this subject to deepen understanding of the interplay between happiness, education, and sustainability. In the metamodern context, the "happiness economy" concept extends to education by advocating for a system that integrates well-being, emotional intelligence, and holistic development alongside academic achievement. Educational institutions

play a critical role in mitigating stress, promoting mental health, and fostering a sense of purpose. A comprehensive model of well-being, one that harmonizes material success with psychological, social, and cultural fulfilment, should inform future educational frameworks, particularly within ESD. By synthesizing Western and Eastern philosophical perspectives, this approach aims to enhance both individual and collective well-being, contributing to broader social progress. This paradigm shift necessitates a new cultural framework that reconciles diverse perspectives through the principles of metamodernism. The presentation examines happiness from psychological and cultural perspectives, analyzes its evolution in traditional and contemporary Chinese society, and investigates its interconnections with education and sustainability within the metamodern paradigm. It offers a conceptual framework for assessing ESD in global and Chinese contexts, providing a basis for discussing its alignment with China's vision of happiness.

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IMPROVING SECONDARY SCHOOL STUDENTS' INFORMATION ANALYSIS SKILLS IN "PEOPLE AND MICROECONOMICS"

Keywords: *information analysis skills, microeconomics, secondary school*

Microeconomics is concerned with the decision-making of individuals and firms in the allocation of resources. The student should be able to analyse different ways of using and investing financial resources, the prices of financial services, opportunity costs and their impact on personal budgets.

Secondary school pupils develop critical thinking and the ability to analyse economic processes in society by learning the basics of microeconomics. Analytical skills are particularly important in microeconomics, which often relies on the interpretation of numerical data and the analysis of graphs to understand market dynamics and consumer behaviour. For example, by analysing the relationship between price and demand in different markets, students can infer how different factors, such as income levels or competition, affect the price and demand for goods. This not only develops students' analytical skills, but also provides a practical understanding of how markets work. Microeconomics is closely linked to people's everyday lives, as each individual makes economic decisions on a daily basis. Understanding these processes helps students to make informed decisions about their personal budgets, consumption and investments.

Active teaching methods such as group discussions, analytical exercises and case studies should be used to develop secondary students' information analysis skills in microeconomics. Practical examples and simulations help students to understand the application of theory.

The aim of this work is to use a variety of pedagogical approaches, including practical exercises and data analysis, to enhance students' ability to apply their knowledge and develop their analysis skills.

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INVESTIGATING IMPACT OF CULTURAL CAPITAL VARIATIONS ON STUDENTS' ACADEMIC PERFORMANCE BETWEEN PRIVATE AND PUBLIC SCHOOLS IN TWO DISTRICTS OF LESOTHO

Keywords: *Differential cultural capital, socioeconomic background, academic performance, private school, public school, habitus*

Grounded largely on Pierre Bourdieu's observations of cultural capital and symbolic violence, this study surveyed cultural capital variations and academic performance between private and public post primary schools in Butha-Buthe and Leribe districts of Lesotho. The impact of cultural capital differentiations and academic performance between two selected private and two public secondary schools of Butha-Buthe and Leribe districts in Lesotho; in terms of usage of resources and practices in academic performance was sought. Qualitative research employing case study was embraced to find in-depth information about the impact of cultural capital variations. Ten teachers from the two public (5 each school) and ten from two private schools (5 from each) were purposefully selected and interviewed. Data which was gathered was thematically analysed.

The findings of this study revealed that students from prosperous socio-economic upbringings, who also attend schools with a rich and pertinent cultural capital, values and attitudes enjoy massive advantage of school. The opposite is true on their equivalents whose social class and social circumstances lack the cultural capital cherished in school as advantageous for educational success. The results also exposed that cultural capital impact students who have high level of it positively in terms of academic performance. The study thus, recommend that the government, principals and teachers need to be conscious of the presence of the differences in their students' cultural capital and find appropriate ways of excellently communicating with their assorted students without allowing others privileged treatment at the expense of others.

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INVESTIGATING THE IMPACT OF CULTURO TECHNO CONTEXTUAL APPROACH (CTCA) IN ENHANCING LEARNERS' PERFORMANCE AND PROMOTING MEANINGFUL LEARNING OF ACCOUNTING SUBJECT IN LESOTHO SECONDARY SCHOOLS

Background: In Lesotho, Accounting is one of the disciplines offered in secondary levels, with the purpose of equipping learners with the knowledge and skills necessary for establishing and managing their businesses successfully. The subject is also intended to serve as a foundation for learners who may want to pursue a career in the commercial field. However, learner performance in this subject seems to be declining considerably each year. One of the contributing factors to this decline is the abstract nature of Accounting, which relies on complex concepts and terminology that many students find difficult to grasp. This difficulty is further heightened by the lack of meaningful, real-world applications within conventional teaching methods of the subject.

The aim of the study: To address this issue, this study intended to investigate the impact of Culturo Techno Contextual Approach (CTCA), an alternative pedagogical strategy intended to bridge the gap left by conventional teaching methods on learners' performance in Accounting.

Methodology: A quantitative approach was employed in this study whereby a quasi-experimental, non-equivalent group design was adopted. The population of the study was made up of secondary learners. The sample consisted of two Accounting classes from one secondary in Maseru district. One class was Grade 9 with 45 learners and the other class was a Grade 10 with 52 learners. Data collection methods included structured observations and tests; pre and post-tests. Data was analysed through Excel and ANCOVA in Statistical Package for Social Sciences (SPSS) version 26

Results and conclusion: Results of the study revealed that the use of CTCA had a significant positive impact on the learners' performance in the treatment group. This was due to the integration of learners' cultural practices, the use of technological tools, and real life examples drawn from learners' environment. The use CTCA has proven its effectiveness in enhancing comprehension and engagement, improving learners' performance and meaningful learning in Accounting by making abstract concepts more accessible and applicable to real-world contexts.

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PEDAGOGY AS A SCIENCE IN THE EDUCATION SYSTEM OF LATVIA

Keywords: features peculiarities of the subject of pedagogy, human nature, trend of society development, didactic bases, humanitarian and moral bases.

In the 21st century, due to profound social and cultural changes in society, the human factor has become a key component of social development. In accordance with these changes in the educational process at school, it is necessary to turn to the human being, to the spiritual enrichment of the personality, cultural development, to the personal, social and professional self-determination of the student. These trends should be reflected in pedagogy as a science. In this regard, the replacement of the term "pedagogy," traditional in the history of pedagogy in Latvia, with the term "education science", which is reflected in the new name of the Faculty of

the University of Latvia is scientifically limited, does not meet the modern trends of society development, human nature. **The research problem** concerns the methodological substantiation of the status of pedagogy as a science in the educational system of the University of Latvia. **The aim** is to determine the peculiarities of the subject of pedagogy as a science in accordance with modern trends of society development, on this basis to restore the status of pedagogy as a science in Latvia. **Research methods** - theoretical analysis. **Results of the research** - the peculiarities of the subject of pedagogy as a science in modern society are determined encompassing both didactic foundations (knowledge, abilities, skills) and humanitarian-pedagogical foundations (interpersonal relationships, universal values). Thus, the subject of pedagogy is human upbringing. It is concluded that the subject of pedagogy is a universal value, pedagogy as a discipline represents Latvia's historical and cultural heritage. This is the basis for restoring the status of pedagogy as a science at the University of Latvia.

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PRESCHOOL TEACHERS' BELIEFS ABOUT THE STATE LANGUAGE AS A VALUE IN EDUCATIONAL PRACTICE

Keywords: Latvian language, state language, preschool education, teachers' beliefs, values.

Preschool education plays a significant role in shaping children's early understanding of values, including the state language. In Latvia, the 2023 transition from Latvian-language and bilingual preschool education to fully Latvian-language instruction has significantly increased linguistic diversity in preschool units, creating new pedagogical challenges for teachers. This study aims to explore preschool teachers' beliefs and experiences regarding the Latvian language as a core value in preschool education including linguistically diverse educational environments.

A qualitative cross-sectional study was conducted through semi-structured interviews with 24 preschool teachers from municipal and private educational institutions. The interviews focused on teachers' approaches to promoting Latvian language learning, teaching strategies applied, perceived barriers, and their professional development needs.

Thematic analysis revealed sufficient data saturation and diversity of teachers' beliefs. Teachers emphasized that early acquisition of the Latvian language promotes children's sense of belonging, emotional security, and successful integration into society. They reported using creative methods such as storytelling and dramatization to engage children, but also highlighted insufficient parental support in minority communities and a lack of methodological resources. Some minority teachers noted gaps in their preparedness to effectively promote the state language through traditional culture heritage.

The findings indicate a need for systematic support, including targeted training and resource development, to strengthen the integration of the Latvian language as a value in preschool education. Further research is recommended to evaluate effective strategies in state language promotion in preschool education settings as well as the impact of teachers' explicit and implicit values.

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PROMOTION OF STUDENTS' SELF-DIRECTED LEARNING SKILLS IN COMPUTER SCIENCE AT THE PRIMARY EDUCATION LEVEL

Keywords: computer science, basic education level, self-directed learning.

The teacher's experience work analyzes the significance of self-directed learning (hereinafter referred to as 'SDL') and its impact on the development of students' digital competencies. In the context of the competency-based approach to curriculum content, SDL is considered one of the most important skills to be acquired, as it promotes students' independence, critical thinking, and ability to adapt to a digitally developed environment. (Skola2030)

The work is based on the latest scientific research (Li, J., Ye, H., Tang, Y., Zhou, Z., & Hu, X., Quigley, A., Muijs, D., Stringer, E. (2018)), analyzing the advantages, disadvantages, and most effective implementation methods of SDL in the educational process. Special attention is given to the subject of computer science, evaluating the Cabinet Regulation No. 747 "Regulations Regarding the State Basic Education Standard and Model Basic Education Programmes" teaching approaches, and digital tools that promote the development of students' self-directed learning skills. The experience work also analyzes the role and strategies of teachers in promoting students' independent learning, as well as the challenges students face in the process of learning computer science.

The empirical part involves a comparative analysis of 43 students from two classes, exploring their views on the challenges and opportunities of SDL in computer science lessons. The study analyzes backward planning as an effective method for promoting students' self-directed learning and strengthening responsibility for their learning process, and also evaluates various digital learning tools that support the SDL process.

This work will be useful for educators, curriculum developers, and educational researchers, offering insights into modern teaching approaches and providing practical recommendations for promoting SDL skills in the computer science learning process.

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SECONDARY SCHOOL STUDENTS' LANGUAGE ACQUISITION AT A1 LEVEL IN YEAR 10: SPANISH AS A THIRD FOREIGN LANGUAGE

Keywords: *Spanish, third foreign language, secondary school, Year 10, A1 level, language acquisition.*

In Latvia, there is no established model curriculum for teaching Spanish as a third foreign language in secondary schools. As a result, teachers must adapt their teaching content based on other languages and the basic education standard. However, since Spanish is only introduced at the secondary school level, there are challenges in effectively developing students' language skills within the limited time frame of two lessons per week.

This teacher's experience study focuses on the acquisition of Spanish as a third foreign language in Year 10 of secondary school, with an emphasis on achieving A1 proficiency across all language skills (listening, speaking, reading, and writing).

The objective is to develop a comprehensive thematic plan for teaching Spanish in Year 10 (A1 level) to ensure a structured and effective language learning process that aligns with secondary education requirements and the available lesson time.

Methodology: Analysis of the general secondary education standard and reference model curricula for other languages (French, German); backward design planning based on target learning outcomes; development of lesson plans and teaching materials in accordance with the Common European Framework of Reference for Languages (CEFR) descriptors; creation of self-assessment scales and tests to evaluate students' progress; and ongoing refinement of the thematic plan.

Results: A detailed thematic plan for teaching Spanish as a third foreign language in Year 10 has been developed. The study evaluates whether the allocated lesson time is sufficient or insufficient and explores potential modifications to facilitate students' successful attainment of B1 proficiency by the end of Year 12.

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THE EFFECTIVENESS OF TEACHERS SELF-MOTIVATION FOR IMPROVING THE LEARNING PROCESS

Key words: *self-motivation, teachers, pedagogy*

The necessity of this research is determined by the fact that innovations of the educational process are essential nowadays, making their use important also in teachers' self-education. Society needs teachers who continuously develop their personal and professional qualities. The professional development of a teacher, in line with modern professional activity requirements, is an ongoing process not only during initial training but also in further education courses and self-learning, as a knowledge and skills acquired at university are not longer sufficient.

The aim of this article is to explore and justify the importance of teachers' self-education in the pedagogical context and to provide a theoretical basis for the concepts of teacher self-education. Pedagogy encompasses several scientific approaches that help to understand the meaning of the term "self-development". These approaches contribute to forming an understanding of the interconnection between education, development and self-development.

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THE IMPACT OF LANGUAGE INTERFERENCE ON THE DEVELOPMENT OF HIGH SCHOOL STUDENTS' WRITING SKILLS IN LEARNING ENGLISH AS A FOREIGN LANGUAGE

Keywords: *interference, languages, native language, English language, writing skills*

Language interference is one of the three ways of language interchange. It involves the transfer of native language features to the language being learned. Language interference in foreign language acquisition can be both positive and negative. Several studies (Swan M., Smith B., 2001; Gashimov E., 2023) have been conducted on language interference between the native language and the foreign language being acquired. This phenomenon cannot be entirely eliminated, as native language skills dominate over foreign language knowledge and inherently require some form of interaction between the two languages to ensure effective foreign language acquisition.

The aim of this study is to identify and validate cases of language interference in high school students' English language learning by assessing their writing skills and providing methodological recommendations for highlighting and applying positive instances of interference to enhance language acquisition. The research method used is content analysis of students' written work.

Methodological recommendations from the author suggest regularly assigning students longer writing tasks, reviewing them, and communicating the errors made along with possible solutions for correction. Before essay writing, students can be shown an informative video on writing a specific type of essay, such as an argumentative essay, which served as the practical foundation of this study. One of the most effective methods for essay writing and revision was peer editing, where students exchanged essays and corrected errors based on their peers' abilities. This process was also monitored by the teacher, who provided constructive feedback.

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THE ROLE OF ARTIFICIAL INTELLIGENCE IN EDUCATION: CHALLENGES AND OPPORTUNITIES IN THE CONTEXT OF THE HIGH SCHOOL (AGE 16-18)

Keywords: *artificial intelligence, secondary education, personalized learning, adaptive learning, ethics, technology integration*

The integration of artificial intelligence (AI) in high school education (ages 16–18) is transforming teaching and learning methodologies. This study examines the challenges and opportunities associated with AI implementation in high school education, focusing on its impact on student engagement, academic performance, and teacher roles. The research aims to assess AI's effectiveness while identifying potential risks such as data privacy concerns, algorithmic bias, and the necessity for digital literacy among educators and students.

A mixed-methods approach was employed: surveys, and expert interviews with teachers and regional and national policymakers to evaluate the effectiveness and implications of AI technologies in the context of high school education (ages 16–18). Additionally, this study conducts a comparative analysis between Latgale and Riga to assess regional differences in AI adoption and its impact on educational outcomes. Key issues explored include data privacy, ethical concerns, teacher preparedness, and AI's influence on critical thinking and creativity.

This research underscores the importance of a sustainable and ethical approach to AI integration. It recommends strategic policy development, interdisciplinary collaboration, and enhanced digital literacy among educators to maximize AI's benefits while mitigating its risks. By addressing these challenges, AI can serve as a transformative force, fostering innovation while preserving essential pedagogical and social values in education.

This research will contribute to the field of educational technology and policy by providing empirical insights into AI's role in high school education, informing policymakers and educators on best practices for ethical and effective AI implementation.

CHEMISTRY

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KĪMIJA

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ELECTROCHEMICAL HALOGENATION OF 9-AMINOANTHRAQUINONE: A NOVEL APPROACH TO FUNCTIONALIZED INTERMEDIATES

Electrochemical halogenation offers a precise and environmentally friendly method for the functionalization of organic molecules, enabling controlled reactivity without the need for harsh chemical reagents. In this study, we explore the electrochemical halogenation of 9-aminoanthraquinone under optimized conditions, using ammonium salts as halogen atom source and electrolyte in an acetonitrile-based system. The process parameters, including voltage and reaction time, were carefully adjusted to maximize product yield while minimizing side reactions. The resulting halogenated derivatives are characterized using thin-layer chromatography (TLC) and other analytical techniques to confirm their structure. Cyclic voltammetry method is applied for study of performed reactions. This work aims to expand the scope of electrochemical methodologies for anthraquinone derivatives, providing new functionalized intermediates for potential applications in organic synthesis and material science.

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A FUNCTIONAL METHOD FOR REDUCING TAR CONCENTRATIONS IN PRODUCER GAS FROM THE BIOMASS GASIFICATION PROCESS

Producer gases are products obtained in the gasification process of biomass, and they are receiving more attention from the scientific research side, because they are used as raw materials in the production of second-generation biofuels.

The most complex part of the production process is the purification of producer gases. The purification of producer gases obtained in the gasification process from tars and other pollutants is a complicated and expensive process, therefore, there is an increased demand from entrepreneurs for determining the regularities between the selected type of biomass and the pollutants that arise in its gasification process.

The obtained producer gases require an extremely low level of pollution in order to reduce the negative impact on the expensive and sensitive catalysts used in the Fischer-Tropsch synthesis process, which, in the presence of pollutants, have a tendency to poisoning and subsequent destruction.

Currently, there are producer gas producers in Latvia, from which there is also an extremely high demand for new and sensitive analytical methods for determining pollutants in their products. However, there is currently a lack of practical research on a national scale to meet this demand.

The aim of this research is to develop and test a new and functional method for analyzing producer gases obtained in the gasification process for tar determination and, based on the results obtained, to provide entrepreneurs with proposals for achieving optimal physical parameters in the gasification process.

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ASSESSMENT OF THE EFFICIENCY AND UTILIZATION POTENTIAL OF BIOGAS PRODUCED FROM FISH PROCESSING WASTE

The fish processing industry annually generates a significant amount of organic waste, the inefficient management of which creates risks of environmental pollution and waste of resources. At the same time, the demand for renewable energy resources is growing, promoting the search for sustainable solutions. Biogas production from fish processing waste is a promising way to simultaneously reduce the amount of waste, create valuable energy resources and promote a circular economy. The relevance of this research is based on the need to develop effective technologies that promote the use of fish processing by-products for energy production, reducing the negative impact of waste on the environment and promoting sustainable development. The results of the research could provide a practical contribution both locally and globally, offering solutions for resource recycling and environmental protection. Accordingly, the aim of the research is to investigate and assess the efficiency of biogas production from fish processing waste and its potential for use, identifying the main processes and factors that affect the quality and energy value of the produced biogas, as well as to assess the suitability of this method for sustainable resource recycling.

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DETERMINATION OF PHARMACEUTICAL POLLUTANT RESIDUES IN DAUGAVPILS CITY WASTEWATER AND THEIR IMPACT ON THE ENVIRONMENT

Pharmaceutical pollutants are a growing global problem that threatens the environment and public health. Various drug residues, including antibiotics, hormones and analgesics, enter wastewater through domestic, hospital and industrial activities. Existing wastewater treatment technologies are often unable to effectively remove such pollutants, which can cause accumulation in natural water bodies and affect the health of aquatic organisms. Studies show that the impact of such pollution can cause hormonal disruptions and the spread of antimicrobial resistance.

This study is relevant because it will not only provide accurate information on the distribution and concentration of pharmaceutical compounds in Latvian wastewater, but also offer solutions to improve pollution control systems, reducing the negative impact on the environment and society.

The aim of the developed study is to develop and test an analytical method for the identification and quantification of pharmaceutical compounds in Daugavpils city wastewater, as well as to assess their potential impact on the environment, contributing to the creation of more effective pollution control mechanisms.

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DEVELOPMENT OF A CATALYTIC PYROLYSIS METHOD FOR REDUCING THE CONTENT OF TAR COMPOUNDS IN FUEL OBTAINED FROM THE PYROLYSIS PROCESS OF SOLID WASTE

Nowadays, the amount of solid waste is increasing, which creates a significant environmental pollution problem. One of the most promising solutions is the processing of this waste into energy using the pyrolysis process, which results in valuable products - liquid fuel, gas and biochar. However, one of the main obstacles to the practical use of these products is the presence of tar compounds. Tar compounds not only pollute the environment, but also damage equipment and reduce fuel quality.

The aim of this research is to develop an effective and economical catalytic pyrolysis method that would help reduce the content of tar compounds in fuel, making it more environmentally friendly and suitable for practical use. As a result, it would be possible not only to reduce the amount of waste, but also to promote

sustainable energy production. Such an approach is important not only for the scientific community, but also for entrepreneurs and the wider community, as it promotes more efficient use of resources and reduction of environmental pollution.

The research will make a significant contribution to the development of new technologies that will help solve global environmental problems, while developing environmentally friendly alternatives to traditional energy sources.

The research aims to develop a new, effective and economically justified catalytic pyrolysis method, based on the results obtained in 2024 within the framework of the DU student research project (DU reg. no. 14-89/2024/2), in order to reduce the content of tar compounds in the fuel obtained from the pyrolysis process of solid waste. During the research, optimization options for various catalysts and physical parameters will be analyzed, providing proposals to entrepreneurs on the application of technologies to improve fuel quality and reduce its processing costs.

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FLUORESCENT BENZANTHRONE DYES FOR PATHOGEN STUDIES AND DNA ANALYSIS

The development of novel luminescent compounds with minimal or no toxicity is essential for safe biological and industrial applications. While traditional fluorescent dyes are widely used, their harmful effects on living organisms necessitate the creation of safer alternatives. In our current study, we focus on designing new luminescent compounds based on benzanthrone as a core structure, including ethidium bromide analogs, to enhance nucleic acid (DNA and RNA) detection. By leveraging the unique properties of conjugated pi-systems, we aim to optimize fluorescence efficiency and develop safer, more effective tools for genetic research and biological studies. Additionally, modifications in molecular design are being explored to increase the ability of dyes to interact with proteins, thereby expanding their potential applications in pathogen studies and DNA analysis. Understanding these interactions at the molecular level will contribute to the development of next-generation fluorescent probes with improved specificity and biocompatibility.

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INFLUENCE OF PH ON THE PHOTOLUMINESCENCE OF SILICON NANOPARTICLES

Since the discovery of photoluminescence in nanosilicon, research has focused on its mechanisms and potential applications, particularly in biomedicine as optical contrast agents due to silicon's non-toxicity, abundance, and low cost. Understanding factors influencing the photoluminescence behavior of silicon nanoparticles in biological media is crucial. This study synthesized hydrogen-terminated silicon nanoparticles via a sol-gel method, suspended them in ethanol, and titrated with acid and base. Fourier-transform infrared and photoluminescence spectroscopy revealed that ethanol quenched red photoluminescence emissions ($\lambda_{\text{max,em}} \sim 630 \text{ nm}$) and reduced hydrogen termination. Acid titration restored emissions, while base had no effect. Heating and resuspension in hexane temporarily revived emissions. These findings highlight key structural and behavioral aspects of silicon nanoparticles, prompting further research.

SUSTAINABLE BIOGAS PRODUCTION TECHNOLOGIES: INTEGRATION OF FISH PROCESSING AND AQUACULTURE BY- PRODUCTS

As the aquaculture and fish processing industries expand, they inevitably generate large amounts of organic waste, including fish offal, sludge, and uneaten feed. Although traditionally considered a disposal problem, these materials contain high levels of nutrients and organic matter, making them excellent substrates for anaerobic digestion. This process converts organic matter into biogas – primarily methane and carbon dioxide – while simultaneously addressing waste management challenges.

This study presents innovative pretreatment and co-digestion strategies designed to increase the efficiency and output of biogas production from fish processing by-products. Co-digesting fish waste together with other organic materials – such as agricultural residues and food waste – helps balance nutrient composition and enhances microbial synergy within the digester. This approach leads to greater process stability and higher biogas yields. Case studies illustrate the importance of selecting compatible feedstock mixes and fine-tuning operational parameters for optimal performance.

Furthermore, the research evaluates the environmental and economic viability of implementing these biogas production methods in the aquaculture and fish processing sectors. Lower waste disposal costs, combined with the generation of renewable energy, make a strong case for wider adoption. In addition, digestate – an anaerobic digestion by-product – can be used as a nutrient-rich fertilizer, presenting another opportunity for sustainable resource recovery.

In conclusion, advanced biogas production techniques for fish processing and aquaculture waste offer a pathway to more efficient resource utilization, reduced environmental impact, and enhanced sustainability in these industries.

MATHEMATICS

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MATEMĀTIKA

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BOUNDEDNESS RESULTS FOR DUFFING OSCILLATOR

We consider the Duffing oscillator with no damping and no forcing in the form $x_1'' = a_1x_1 + b_1x_1(x_1^2 + x_2^2)$, $x_2'' = a_2x_2 + b_2x_2(x_1^2 + x_2^2)$.

If b_1 and b_2 are different, then the system is not Hamiltonian system. We study the existence and kind of the equilibrium points of the system under consideration in dependence on parameters a_i , b_i ($i=1,2$). Using numerical experiment, we discuss the existence of bounded solutions near equilibrium points of the system.

ART ≈ MĀKSLA

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ART EDUCATION AND CULTURAL EVENT COLLABORATION: HOW TO DEVELOP YOUTH INTEREST IN CONTEMPORARY ART

Key words: *art education, cultural events, cultural access, contemporary art, critical thinking, collaboration, innovation*

Art education and cultural events are fields that mutually enrich and depend on one another. Culture and the arts represent a shared wealth and opportunity for humanity. Ensuring the accessibility of culture and fostering cultural literacy are essential for both individual well-being and the overall development of society. The framework document adopted at the 2024 UNESCO World Conference on Culture and Arts Education identifies access, inclusion, and equity in cultural and arts education as primary strategic objectives. Additionally, it emphasizes the importance of a contextually relevant and high-quality cultural and arts education offering for individuals across all spheres of life.

Students in arts education programs engage with culture and the arts on a daily basis. However, the academic curriculum does not always allocate sufficient time for an in-depth study of contemporary art—an essential aspect that encourages students to seek answers to personally relevant questions, reflect on their choices, and critically evaluate their decisions. Therefore, it is crucial to conduct research in the expanding field of cultural management by proposing a framework for strategic collaboration between the educational and cultural sectors. This framework should address both institutional objectives and the developmental needs of young people within an evolving cultural landscape. Furthermore, fostering interdisciplinary dialogue, integrating innovative pedagogical approaches, and promoting active participation in cultural life can enhance students' creative capacities, critical thinking skills, and social engagement. By bridging the gap between education and cultural practice, such initiatives can contribute to a more inclusive, dynamic, and forward-thinking society where culture serves as a catalyst for personal and collective growth.

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INNOVATIONS IN CULTURAL PROJECTS IN LATVIA (2024 - 2025): CASE STUDIES AND ANALYSIS

Keywords: *contemporary culture, innovations, innovation management, cultural projects in Latvia, case studies.*

Innovations are the driving force for the development of the state and society. In modern society, innovations can be found in all areas, from technology and medicine to business, education, culture and art. The biggest challenges in introducing modern technologies in the cultural sector are currently the human factor - fear of change, skepticism, the desire to follow the familiar path, conservative thinking, lack of understanding and funding. In Latvia, cultural projects and innovation initiatives are constantly evolving. Creative multimedia projects are initiated and implemented every year, and innovations are positioned to popularize art, culture and social cohesion. The growing importance of contemporary cultural projects in Latvia is reflected in the diverse opportunities for project funding, namely project competitions and target programs of the State Capital of Culture Fund, regional cultural programs, as well as municipal and patronage project competitions. The study aims to identify and analyze cases of innovation in cultural projects in Latvia from 2024 to 2025 in order to characterize and evaluate their significance at the national and regional levels.

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LONG EXPOSURE IN CONTEMPORARY PHOTOGRAPHY: A TOOL FOR ARTISTIC EXPRESSION AND COMMERCIAL APPLICATIONS

Keywords: *long exposure, photography, fashion photography, contemporary photography*

Throughout the history of photography, artists have continually sought new ways to expand the expressive potential of the photographic image, experimenting with various technical and stylistic approaches. One such approach is the long exposure technique, where prolonged sensor exposure to light creates a blurring effect. This technique has been widely used in artistic photography to depict motion, enhance atmospheric effects, and alter the perception of time. In recent years, long exposure has found applications beyond artistic photography, becoming an important tool in commercial visual communication, particularly in fashion photography.

This study examines the role of long exposure in contemporary photography by analyzing images published in leading fashion magazines (*Vogue*, *Harper's Bazaar*) as well as works by independent contemporary photographers. The research aims to identify the artistic strategies and technical aspects associated with long exposure, evaluating their impact on visual expression and their significance in contemporary visual culture.

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SYMBIOSIS OF TRADITIONAL AND CONTEMPORARY ART. THE EXAMPLE OF DAUGAVPILS

Keywords: *cultural space, contemporary, traditional, multinational, Daugavpils*

In the modern cultural space we can observe how traditional and contemporary art coexist. Its functioning in parallel with each other and creating a harmonious artistic performance that combines two opposites – the dynamic change and the fundamental stability. In a multinational society, where ethnic traditions and communication diversity coexist, this symbiosis is especially creatively saturated. The dialogue of cultures provides a wide range of art/cultural products, accelerating the continuous development of contemporary art/culture. It facilitates the evolution of current and original concepts in conjunction with the identification and popularization of the values of traditional intangible cultural heritage.

The research question is to analyze events of traditional and contemporary art, explore its diversity, ability to coexist and encompass the multinational audience of the city of Daugavpils.

The aim of the study is to analyze the most remarkable cases of symbiosis of traditional and contemporary art in the Daugavpils cultural space in 2024 - 2025.

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THE TABLE IN ART: SYMBOLISM AND INTERPRETATIONS

Keywords: *art, painting, table, symbol, interpretations*

The depiction of tables in art is often a symbolic element that offers various meanings depending on the context and the artist's intent. Tables in art, including painting, are depicted to reflect everyday life scenarios, which can indicate the rhythm of human life, family life, or relationships between people. Additionally, the representation of tables can serve as a tool to explore social relationships, power dynamics, or hierarchy. Tables are also used in sacred art, where in this context, the table can symbolize unity, fellowship, food, or sacrifice, which is related to human spiritual or physical well-being. Tables can also be associated with psychological and emotional meanings, such as support, protection, or even mystery. Paintings featuring people sitting at a table may emphasize how they interact, as well as moments of reflection or communication. This theme should be explored from various aspects, such as depictions of domestic life, social relationships, religious meanings, exploration of art aesthetics, material and spiritual values, and psychological and philosophical associations. The aim of the study is to explore and analyze how different artists have depicted tables in painting and what their meanings are.

MANAGEMENT

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MENEDŽMENTS

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CONCEPTUAL ASPECTS OF LEAN AND AGILE PHILOSOPHIES AND THEIR SYNERGY IN IMPROVING PRODUCTION PROCESSES

Keywords: *Lean philosophy, Agile philosophy, their synergy, improvement of production processes*

The article is devoted to the study of the conceptual aspects of *Lean* and *Agile* philosophies. The ability of any organization to function in rapidly changing conditions increased with the combination of *Lean* production philosophy (*Lean*) and flexible production philosophy (*Agile*). The conceptual aspects and practical tools of these philosophies complement each other and allow for the development of effective management decisions, taking into account the main factors influencing the production process: *Lean* philosophy is focused on reducing production losses, and *Agile* philosophy – on the smooth adaptation of the production process to changing environmental requirements. The article pays special attention to the synergy effect of these two production philosophies and its importance in improving the production process.

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DEPOPULATION: A CHALLENGE TO FIGHT OR AN ADVANTAGE TO USE

Although the number of population in the world continues to grow, and according to the world population census data in 2025 has already reached 8.2 billion, in a large part of the developed countries, including Latvia, the number of population is decreasing and the population as a whole is ageing. It is Europe that is changing remarkably, and it is particularly facing falling birth rates, the ageing of society, increasing urbanization and other challenges. The unfavourable demographic situation has mainly developed in cities and regions, where the number of deaths systematically exceeds the number of births, the net reproduction rate of the population is negative, as well as economically less developed countries have lost their population due to active migration, as people have gone in search of better opportunities for living, well-being, work or education. Despite the economic growth over the past 30 years, the number of Latvia's population during this period has continued to decrease by every year, which has long ranked Latvia among the fastest depopulation experienced countries in the world. The areas affected by these challenges are trying to accept and tackle them through the development of planning documents and different studies, as well as the analysis and adaptation of good practices. Both globally and in Latvia, the tendency to solve the problem of depopulation is common: with the help of strategies aimed specifically at improving the economic situation, however, international experience increasingly shows that the causes of depopulation are much more complex to be solved. Economic factors are essential, however, it is impossible to stop the issue only by those. They need to be combined or replaced by classic investments of a social nature, such as in social services, healthcare, housing, lifelong learning, support for businesses and the creation of wellbeing in general. Special care must be taken for people, human resources and human-potential, generally improving their well-being by a complex upgrade of the quality of life of the population.

Several years of research and use of strategic documents have not changed the depopulation situation and impact in Latvia. Depopulation continues to be a major challenge at all levels, which must be solved with a complex approach or a radical change of view, for example, looking at it as an advantage. Depopulation is the biggest threat to an economy based on growth. Switching to a model, based on lower birth rates, could help fight climate change and increase prosperity. People, human resources and human-potential must be positioned as the core, around which all the essential environment for the development and sustainability must be created. Depopulation could bring positive change if it is viewed not as a problem, but as an

advantage, by understanding and dealing more deeply with its causes, rather than intensively struggling with the consequences.

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EU BORDER MANAGEMENT IN COUNTERACTING SMUGGLING ON THE EXAMPLE OF POLISH

The European Union faces many challenges in managing its borders, especially in the context of anti-smuggling. Poland, as one of the key border states of the EU, plays an important role in the protection of the eastern borders of the Community. Due to its geographical location, Poland is particularly vulnerable to smuggling of people, goods and illegal substances. Effective border management and international cooperation are key factors for the effective protection of the EU's borders. The aim of this presentation is to present the role of Poland in the management of EU borders and to analyse the tools used in the fight against smuggling. Technologies used in border protection, cooperation with EU agencies and key challenges faced by Polish border services will be discussed.

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LEGAL AND PSYCHOLOGICAL ASPECTS OF MOBBING IN WORK ORGANIZATIONS

Keywords: *mobbing, types of mobbing, legal and psychological aspects of mobbing, recommendations for eliminating mobbing*

A healthy, lawful, and favorable work environment is the foundation of an individual's professional life. The Australian organization HuffPost has analyzed the average number of years spent at work and concluded that the total work time amounts to approximately 13 years. This time spent in the workplace affects an individual's physical and psychological health and is directly linked to work productivity, which in turn impacts the economy and national well-being. Mobbing leads to decreased work efficiency, increased costs, economic burdens on healthcare, and negatively affects a company's reputation.

By summarizing the opinions of various literature sources and scientific publications, this study examines different types of mobbing, analyzes legal regulations, compiles psychological aspects, investigates factors that contribute to mobbing, and explores preventive measures to eliminate mobbing in workplaces.

In Latvia, the concept of mobbing initially emerged in the 1990s, primarily in the context of bullying among students and young people. Since 1998, the State Police have actively worked within schools to foster a positive microclimate, but workplace environments were not yet a topic of discussion. However, in the past decade, the Ombudsman of Latvia has focused on improving regulatory frameworks and initiated research in this field. The year 2012 became a significant turning point in recognizing the problem of mobbing in Latvia. That year, the Free Trade Union Confederation of Latvia published a report addressing the identification, prevalence, and potential solutions for mobbing in the workplace. Since then, mobbing as a concept has gained wider use, both among researchers and employees. Workers now recognize the importance of workplace well-being, job satisfaction, and how full engagement and increased productivity directly influence the economy. The aim of this article is to develop recommendations based on theoretical literature, the guidelines of the World Health Organization, and regulatory documents from various countries and international organizations to identify and reduce mobbing in workplaces.

PSYCHOLOGY

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PSIHOLOĢIJA

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ADAPTATION AND VALIDATION OF THE SHORT VERSION OF THE NATURE RELATEDNESS SCALE (NR-6) IN LATVIAN

Introduction. Nature relatedness refers to an individual's cognitive, affective, and experiential connection with the natural environment, and is considered a relatively stable personality trait linked to well-being and pro-environmental behaviour. The current study aimed to adapt the short version of the Nature Relatedness Scale (NR-6) into Latvian and evaluate its psychometric properties within the Latvian cultural context.

Materials and methods. The study builds upon previous work on the full version adaptation of the Nature Relatedness Scale, using the same item translations. Psychometric evaluation included exploratory factor analysis, internal consistency reliability, and correlation with theoretically related construct such as well-being, measured using the World Health Organization Well-being Index (WHO-5). The sample consisted of 401 participants (87.8% female; 70.1% urban population; age range 18–65 years; $M = 29.11$, $SD = 10.64$).

Results. The Latvian NR-6 demonstrated good internal consistency (Cronbach's $\alpha = .852$) and a one-factor structure consistent with the original version. Factor loadings ranged from .566 to .878, supporting unidimensionality, and item-total correlations ranged from .442 to .776. Statistically significant positive correlations were found between NR-6 scores and well-being ($r = .344$, $p < .01$), indicating good construct validity.

Conclusions. The NR-6 adaptation offers a concise, reliable tool for assessing nature connectedness, suitable for broader use in ecological psychology, sustainability education, and well-being research. Preliminary evidence supports its validity and highlights its relevance for psychological and environmental research in Latvia. Future studies should examine predictive validity and applicability across diverse populations.

Keywords: factor analysis, measurement validation, nature relatedness, well-being.

SPORT

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SPORTS

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THE THEORETICAL BASIS OF ADVENTURE ACTIVITIES FOR INCLUSION IN PHYSICAL EDUCATION LESSONS IN ELEMENTARY SCHOOL

The purpose of the work: A literature review on the inclusion of adventure activities in physical education lessons in elementary school. The task of the work: To study the sources of scientific information and documents on the content of adventure activities in physical education lessons. Methods: Research of scientific literature sources and documents.

Adventure education is based on many activities that take place in an outdoor environment and that affect the health and well-being of pupils. Adventure activities are one of the components of physical education, the aim of which is to engage groups of pupils in cooperative tasks, promoting teamwork, communication, and other social skills or, within the compulsory content of basic education, transversal skills (Cabinet Regulation No. 747, 2018), as well as to challenge pupils in various physical activities within physical education lessons. Adventure activities in physical education (PE) should be such that they pose a moderate degree of perceived risk to physical safety to promote the physical, social, emotional, cognitive, and moral development of pupils. When talking about the integrated foundation of adventure-based learning and PE lessons, in this case, we can talk about the following concepts: challenge, cooperation, risk, trust, and problem-solving. For pupils' personal growth through adventure, four main conditions must be met: activities must take place in an outdoor environment; they must be directed towards experiential learning; challenges must be of their own choice; students must manage their own risk. In the study "Introducing Adventure Education Activities in Physical Education Lessons" (Ganea & Grosu, 2019), authors indicate that implementing adventure activities in PE lessons will increase the importance of the subject of PE.

Keywords: adventure activities; physical education; the field of health and physical activity; elementary school.

LAW

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TIESĪBU ZINĀTNE

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WITNESS IMMUNITY OR THE RIGHT TO BE EXEMPTED FROM THE DUTY TO TESTIFY IN CRIMINAL PROCEEDINGS

Keywords: criminal proceedings, duties and rights of a witness, exemption of a witness from giving testimony, witness immunity or the right to be exempted from the duty to testify in criminal proceedings. One of the current theoretical and practical challenges in criminal proceedings, which must be addressed by the person directing the proceedings, concerns granting an individual the status of a witness and adhering to procedural conditions for obtaining witness testimonies. The implementation of this issue is linked to the fact that, from the perspective of argumentation theory, witness testimony is considered as a type of personal evidence. Consequently, for various reasons (both objective and subjective), there are risks of transformation of witness testimonies or even risks of repeated unavailability of the witness during the course of criminal proceeding. The article examines the rights of a witness to be exempted from the obligation to testify, which can be earmarked as the witness's immunity from the duty to testify, and the current legal regulation and application of this in Latvia's criminal procedure. The research is based on the provisions of Chapter 8 of the Constitution, Sections 7 and 8 of the Criminal Procedure Law, as well as opinions expressed in doctrinal sources and conclusions drawn in case-law rulings (2019–2024).

The following methods are used in the development of the study: literature analysis, synthesis, induction, as well as the sociological observation method. The article draws conclusions on the legal prerequisites for the release of witnesses from the obligation to testify, including for various reasons (profession, age, health status, physical characteristics, guarantees provided for by law), on the legal impact of procedural errors in ensuring such rights on the exercise of the rights of a particular individual - a witness, as well as in general their possible impact on the fair settlement of criminal legal relations in criminal justice. The problems of the application of procedural rights for the exemption of a witness from the obligation to testify are summarized and the ways of resolving them are proposed.

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LEGAL ASPECTS OF THE CONSTRUCTION OF THE BORDER BARRIER ON THE POLISH-BELARUSIAN BORDER

This presentation will analyze the legal aspects of the construction of the wall on the Polish-Belarusian border in the context of Poland's national security. The legal foundations of this project will be discussed in light of national, EU, and international law, with particular emphasis on regulations concerning border protection, states of emergency, human rights, and crisis management measures. The study will examine constitutional provisions regarding state sovereignty and the government's obligation to ensure citizens' security, as well as legal acts regulating the operation of the Border Guard and other services responsible for border protection. The paper will also analyze the compliance of the wall's construction with EU principles on external border protection, fundamental rights, and the principle of proportionality in security measures.

Additionally, the presentation will address the impact of the wall on Poland's migration policy and international commitments concerning refugee protection. Possible legal consequences of potential violations of international norms will be examined, including the risk of proceedings before the Court of Justice of the European Union and the European Court of Human Rights. Furthermore, the strategic implications of this investment for Poland's security, its position within the European Union, and relations with neighboring countries will be considered.

MICRO-RESERVES FOR THE PROTECTION OF SPECIALLY PROTECTED SPECIES AND HABITATS IN LATVIA AFTER THE RESTORATION OF INDEPENDENCE UNTIL TODAY

A micro-reserve means an area defined to ensure the conservation of the specially protected species or biotopes outside the special areas of conservation, as well as in the special areas of conservation, where one of the functional zones does not provide it.

Micro-reserves have been established for specially protected species: mammals, amphibians, reptiles, invertebrates, vascular plants, moss, algae, lichens, and fungi; for conservation and protection of the biotopes of the specially protected species of birds and fish.

The conditions for the establishment and termination of a micro-prohibition, the legal basis, compensation mechanisms and court practice in Latvia after the restoration of independence until today are reviewed.

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REGULATORY CHALLENGES FOR PARTICIPATION RELATED TO REFERENDUMS AND AGENDA INITIATIVES: INSIGHTS FROM THE LATVIAN CASE STUDY

Keywords: *Mechanisms of direct democracy, Referendum Regulation, Citizens' Initiatives, Agenda initiatives, popular participation*

This article, via the lens of forms of political participation, focuses on three mechanisms provided by the Constitution of Latvia, Satversme, and the Rules of Procedure of the Saeima, i. e., national referendums, citizens' legislative initiatives, and agenda initiatives. A critical key distinction among these mechanisms lies in whether the outcome is binding or not on the Parliament.

We argue that the question of whether the referendum mechanism, as stipulated by the Satversme, was designed to actively engage society in decision-making should be addressed with caution. We conclude that this mechanism grants the electorate a rather passive role, which should only be exercised under exceptional circumstances.

Moreover, it primarily serves as a safeguard within the system of checks and balances. Additionally, the referendum process remains highly formalized, multi-stage, and rather inflexible, where each subsequent step depends on the previous one, or the actions of the parties involved in the process are strongly related to the will of other parties. This arrangement was established in the 1920s and remains in line with the spirit of the Satversme. Thus, referendums in Latvia might not be the most suitable mechanism of direct democracy to consider when seeking to boost the levels of popular participation.

Agenda initiatives, on the other hand, are a less formal mechanism, and a significant portion of society members is increasingly using this form of participation in their endeavors to reach Parliament, thus informing it of their concerns and expectations.

In sum, while Latvia's mechanisms of direct democracy provide formal avenues for popular participation, their practical efficacy for this purpose may be constrained by procedural rigidity and high turnout thresholds. These structural challenges continue to raise critical questions about the adaptability of certain mechanisms of direct democracy to the contemporary landscape of democratic governance.

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THE CRIMINOLOGICAL FRAMEWORK OF DARK PERSONALITY TRAITS: "THE DARK TRIAD" AND "THE DARK TETRAD"

Within modern criminology, the study of the criminal personality remains a relevant field. Crime develops in a social context and is shaped by both individual actors and external factors. It arises due to an individual's unwillingness or inability to act in accordance with socially accepted rules and laws. The study of the criminal personality is one of the central issues in criminology. Understanding the formation of a criminal personality, its underlying causes, and its motivations is crucial (Kriminoloģija, 2004). Investigating the criminal personality helps develop crime prevention and control strategies, including measures to counteract specific criminal offenses.

In recent years, the terms "Dark Triad" and "Dark Tetrad" have gained popularity in criminology. These concepts are used to analyze both violent crimes and economic offenses, as well as general criminal behavior (e.g., property damage, arson). For instance, psychopaths exhibit extreme cruelty in their actions toward others. It is suggested that psychopaths, due to certain neurological factors, lack empathy and conscience, display minimal emotionality, and are incapable of experiencing emotions towards others (Boddy et al., 2010; Hare, 1994). As a result, approximately one percent of the population consists of unemotional, entirely rational, and utterly ruthless individuals who pursue material gain and financial advantage regardless of the harm inflicted on those they interact and work with (Hare, 1999; Babiak & Hare, 2006).

The Dark Triad model of dark personality traits was developed in 2002 by Canadian psychologists Delroy Paulhus and Kevin Williams (Paulhus & Williams, 2002). This model includes three interrelated traits with distinct expressions, forming a set of three malevolent and socially malicious personality traits, which correlate positively with a callous and manipulative interpersonal style. The Dark Triad personality model consists of three traits. In 2019, researchers proposed expanding the concept of the Dark Triad by incorporating an additional personality trait – sadism – thus forming the Dark Tetrad. Dark Tetrad personalities are a constellation of psychopathy, machiavellianism, narcissism, and sadism, and share traits of manipulation, callousness, and egocentrism (Lyons, 2019).

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WOMEN'S CRIME IN LATVIA: CURRENT SITUATION AND DEVELOPMENT PERSPECTIVES

Women's crime is a significant yet less studied aspect of criminology that impacts societal security and stability. Although men commit the majority of criminal offenses, the share of female crime in Latvia accounts for approximately 10–15% of total crime, reflecting both socio-economic changes and developments in legal policy. Women are less likely to commit violent crimes but are more often involved in economic and financial crimes, as well as drug-related offenses.

Criminological analysis indicates that female crime is linked to various factors, including socio-economic conditions, experiences of violence, and addiction. Financial instability and labor market inequality contribute to women's involvement in fraud and theft, while psychosocial factors influence their participation in criminal groups and drug trafficking. Statistical data suggest that female crime remains stable, with a tendency to increase in economic and financial offenses.

The study also examines the development prospects of female crime and preventive measures. To reduce female crime, social support mechanisms, psychological assistance, and economic opportunities are necessary. The reduction of crime also depends on improving legal policies and assessing gender-specific factors, promoting public safety and mitigating the impact of social inequality on crime rates.

HEALTH CARE SCIENCE

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MASQUELET TECHNIQUE IN WAR-RELATED BONE DEFECTS - THE NEW MAINSTREAM?

Keywords: Masquelet technique, Induced membrane, Orthoplastic surgery, Bone defect reconstruction

Introduction: Armed conflicts and military operations frequently lead to severe musculoskeletal injuries, with large bone defects being one of the most challenging orthopedic complications. Traditional reconstructive options such as free vascularized bone grafting or distraction osteogenesis are technically demanding, time-intensive, and require specialized infrastructure, often unavailable in many hospitals.

The Masquelet Technique (MT), a two-stage procedure involving the creation of a bioactive induced membrane after radical resection of damaged or infected tissues, has emerged as a practical, reliable solution for reconstructing large bone defects in both civilian and war-related trauma. This technique is gaining popularity due to its relatively simple application, compatibility with infection control strategies, and robust clinical outcomes in austere environments.

Aim: To conduct a literature review evaluating the effectiveness, versatility, and outcomes of the MT in the treatment of war-related bone defects, with emphasis on infection control, bone healing rates, and surgical adaptability in conflict settings.

Methods: A literature search was performed with focus on following MT stages:

Stage 1: Debridement, infection management, cement spacer implantation, induced membrane formation

Stage 2: Bone grafting strategies, including the use of autograft, allograft, or bone substitutes, depending on field resource availability.

Results: Studies demonstrate that the induced membrane serves as a biologically active chamber, enhancing vascularization, protecting the graft from infections, and modulating inflammatory responses.

In combat-related injuries MT achieves:

- high rates of bone union (up to 85% in complex cases)
- effective infection control
- shorter surgical learning curves, making it feasible for orthopedic teams with limited subspecialty training
- flexible grafting options depending on available resources.

Conclusions: The MT is emerging as the rising new standard for managing large bone defects including osteomyelitis.

MT is effective both in military and in civilian trauma care.

MT is developing in conjunction with discoveries in biomaterials and cell technologies.

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THE RELATIONSHIP BETWEEN THE FREQUENCY AND AMOUNT OF ALCOHOL CONSUMPTION AND PAIN IN VARIOUS LOCATIONS, AS WELL AS THE USE OF PAIN RELIEVERS

An anonymous survey was conducted with 200 Latvian residents aged 15-70. Among the respondents, 83.5% or 167 were women, and 16.5% or 33 were men. The survey included an exclusion question: respondents who do not consume alcohol on a regular basis were excluded from the survey, making up 8.5% or 17 participants. All completed questionnaires were valid.

The survey questionnaire was designed to include questions from the Alcohol Use Disorders Identification Test (AUDIT), as well as questions regarding the development of pain in various locations after alcohol consumption and the use of pain relievers to alleviate these pains. AUDIT includes questions about the amount of alcohol consumed, measured in alcohol units, possible alcohol dependence, and experiences of harm associated with alcohol use. In Latvia, one alcohol unit corresponds to 12g of pure (100%) alcohol. The maximum possible score on the AUDIT is 40, with 8 or more points for men, and 7 or more points for women, indicating a likelihood of hazardous or harmful alcohol consumption. A score of 15 or more points suggests possible alcohol dependence and the need for specialized treatment.

Summarizing the data, we found that 23 women, or 14.8%, had an AUDIT score greater than 7 points, indicating hazardous or harmful alcohol consumption, and 4 women, or 2.5%, scored higher than 15 points, indicating possible alcohol dependence. 13 men, or 46.4%, had an AUDIT score greater than 8 points, indicating harmful or hazardous alcohol consumption, and no men in the survey had a score higher than 15 points.

The study's results show that those with an AUDIT conclusion of harmful or hazardous alcohol consumption were significantly more likely to suffer from headaches after alcohol consumption than other groups ($p < 0.01$). They also reported using pain relievers 1-7 days per month to alleviate headaches caused by alcohol consumption.

In conclusion, the study suggests that alcohol consumption among Latvian residents is above recommended levels. Those with higher alcohol consumption are more likely to use pain relievers for headaches following episodes of excessive drinking. To obtain more accurate and comprehensive data on alcohol consumption in the country, as well as the use of pain relievers for pain caused by alcohol consumption in various locations, further research is needed, including surveying a broader segment of the Latvian population.

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A REVIEW OF THE SEMS HOSPITALIZATION REFORM FROM THE PERSPECTIVE OF ONE LEVEL 1 HOSPITAL AND THEIR CLOSEST SEMS TEAMS OVER A 5 MONTH PERIOD

Keywords: level 1 hospital, hospitalisation reform, State Emergency Medical service(SEMS)teams, Emergency room(ER)

Introduction: on 01.10.2024, a reform of the SEMS hospitalization plan started, allowing SEMS to also transport some patients to Level 1 hospitals. This has led to some changes in the daily work of both the SEMS's teams and the Hospital.

Aim: to identify reasons for 1)not admitting patients to the Analyzed Hospital, 2)transferring inpatients to a higher-level hospital. Draw preliminary conclusions about the reform's temporary impact on closest SEMS's teams.

Methods: retrospective study of medical documentation from the end of October 2024 to mid-March 2025, selecting patients brought with SEMS. A questionnaire for the nearest (to the Hospital) SEMS teams.

Results: 70 patients were transported with SEMS to the Analyzed hospital. 8 (11%) patients were discharged as outpatient, 5 (7%) were immediately referred to a higher-level hospital. 57 (81%) patients were admitted. Of these, 7 (10% of total) were eventually transferred to a higher-level hospital, with 5 (71% / transferred) having to be transferred within the first 24 hours.

The questionnaire had 17 respondents. 59 % of respondents report at least 1 case where a patient is immediately referred from the Hospital. 35% of respondents report at least 1 case where the dispatcher ordered the team to a higher-level hospital immediately, disagreeing with the team leader.

Conclusions: for now, the number of patients taken to the Analyzed level 1 Hospital by SEMS is relatively small. Reasons for subsequently transferring an inpatient to a higher-level hospital were: a) an inaccurate primary diagnosis (3 cases), b) deterioration despite treatment (2), c) complications detected in examination, requiring additional examination and therapy (1), d) other unexpected acute diseases (1). The reasons for admission refusal, according to SEMS team leaders, are a) absence of the necessary doctor, b) diagnosis mismatch between the team leader and ER physician, c) personal reasons, d) inaccessibility of potentially necessary examinations. The hospitalization reform is generally viewed neutrally.

AGE AND ANTHROPOMETRIC PARAMETERS AS RISK FACTORS FOR ENDOMETRIOSIS

Background. Endometriosis is one of the most common gynaecological diseases. The prevalence of endometriosis is estimated to range from 2% to 10% in the general female population, however the exact prevalence remains unknown. The clinical symptoms of endometriosis include chronic pelvic pain and infertility, leading to a significant deterioration in the quality of life. The etiology of the disease is unclear, and many studies focus on identifying factors contributing to its development. Among these factors are age and female anthropometric parameters such as BMI and height. Lower BMI and greater height have been considered as potential risk factors for endometriosis. Data on age with the highest incidence of endometriosis varies in the literature, overall, the peak incidence of the disease occurs between the ages of 25 and 45.

Aim. This study aims to analyse the association of age, BMI and height with the risk of developing endometriosis.

Methods. A retrospective study was conducted using medical record data from 150 patients, aged 19 – 80 years. Patients were divided into a study group (n=75) and a control group (n=75). The study group comprised patients with surgically confirmed endometriosis. The control group included patients, who underwent surgical procedures for various gynaecological conditions, such as uterine leiomyoma, ovarian cystadenoma, mature ovarian cystic teratoma and *sactosalpinx*, with no endometriotic lesions identified during surgery. Data analysis was performed using Chi-square test and binary logistic regression. Results were considered statistically significant when the p-value was <0.05.

Results. No statistically significant association was observed between height and the risk of endometriosis (p=0.703). Differences in the number of patients across age groups were found to be statistically significant in the Chi-square test (p=0.0003). Therefore, further analysis was performed using binary logistic regression model to calculate odds ratios. The results suggest that being between the ages of 41 and 60 reduces the odds of developing endometriosis (OR 0.2; 95% CI 0.094-0.462; p<0.001). Differences in BMI between the study and control groups showed a trend towards statistical significance in Chi-square test (p=0.088), therefore BMI was also included in binary logistic regression model. Patients with BMI of 25.00-29.99 kg/m² (OR 2.1; 95% CI 0.877-5.047; p=0.096) and >30.00 kg/m² (OR 1.3; 95% CI 0.430-3.724; p=0.669) seemed to be more likely to develop endometriosis, however no statistically significant correlation was found.

Conclusions. The current study did not identify age, BMI and height as factors increasing the risk of endometriosis. The results suggest that being between the ages of 41 and 60 reduces the likelihood of developing endometriosis. The BMI showed a trend towards statistical significance, indicating that patients with higher BMI may have an increased risk of endometriosis. Further studies with a larger sample size are needed.

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ALCOHOL CONSUMPTION AMONG RESIDENT PHYSICIANS IN LATVIA: A CROSS - SECTIONAL STUDY

Objectives: Latvia's high alcohol consumption rates raise concern about its impact on high-stress professions, like medical professionals. Data on alcohol behaviors among resident physicians in Latvia is scarce. The study aimed to assess the prevalence of alcohol use disorder risk and its potential associations with sociodemographic factors and residency profiles.

Methods: An anonymous online survey was conducted as part of a quantitative, cross-sectional study among resident doctors from two medical universities in Latvia. The survey contained 18 questions, 8 of which addressed socio-demographic and occupational factors, and 10 that were a part of the Alcohol Use Disorders Identification Test (AUDIT). The data was processed using IBM SPSS software.

Results: The survey was completed by 188 respondents, comprising 35 males (19%) and 153 females (81%). Low-risk alcohol consumption was reported by 82.4% of medical residents, while 17.6% exhibited hazardous

or harmful consumption patterns, with a likelihood of dependence. Hazardous consumption was more frequently observed for men – 31.4%, than for women – 14.4%, ($p=0.025$), also for respondents who are not in a relationship – 29.3% compared to in a relationship – 18.4% and married – 10% ($p=0.037$). There is a statistically significant difference in alcohol consumption patterns among universities ($p=0.042$), but no significant difference regarding study year ($p=0.518$) and the specialty profile (surgical vs non-surgical) ($p=1$). Increased age correlates negatively with the risk of alcohol consumption (Spearman's coefficient= -0.102), although not statistically significantly ($p=0.163$).

Conclusions: The risk of alcohol disorder among resident physicians varies according to gender, relationship status and university. There is a negative correlation between the increase of age and risk of alcohol consumption, although the correlation is not statistically significant. Further research is needed to cover a larger study population.

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ANALYSIS OF CLINICAL OUTCOMES IN THE TREATMENT OF SEVERE HEAD INJURY DURING THE PERIOD FROM 2022 TO 2024, IN PATIENTS AGED 18 TO 40 YEARS

Keywords: *neurosurgery, head injury, subdural, epidural, cerebral contusion*

Introduction: Severe head injuries (HI) are among the most common and serious health issues, potentially leading to long-term consequences and significantly impacting patients' quality of life. These injuries often occur as a result of traffic accidents, falls, violent incidents, and sports activities, and they can cause neurological damage of varying severity. Effective treatment and early intervention are crucial factors influencing patients' recovery prognosis and long-term outcomes.

To assess the severity of HI, the Glasgow Coma Scale (GCS) is widely used in medical practice. The maximum possible score is 15 (indicating normal consciousness), whereas a GCS score of 8 or lower signifies a severe HI, indicating deep consciousness impairment and a potential need for intensive care.

Materials and methods: In the clinic RAKUS, patient records (patient charts and surgical reports) classified under the ICD-10 codes for severe HI (S00-S09) will be requested from the statistical department of university clinical hospitals, upon obtaining approval from the ethics committee. The selection will include data from patients who have undergone surgical treatment. Obtained data was statistically analyzed in Microsoft Excel 2021 and IBM SPSS software, 20.0 version.

Results: In June 2024, the Emergency Medicine and Patient Admission Clinic (NMPUK) at the Riga East University Hospital provided emergency care to 6,391 patients. Of these, 3,951 patients, or nearly 62%, were discharged for outpatient treatment after medical consultations, and treatment, while around 38% required further inpatient care.

An increase in patient numbers has been observed across all medical profiles, but the particularly concerning trend is the rise in the number of trauma patients. The total number of patients in the first month of summer increased by 11.5% compared to June 2023, while the number of trauma cases rose by as much as 13%. Every day, at least 40 patients with various injuries seek help at the trauma unit, approximately 25% of all trauma patients were intoxicated by alcohol at the time of the accident.

Conclusion: The results of this retrospective study showed that the clinical outcome of severe head injury depends on many factors ranging from the mechanism of injury to the presence of alcohol in the patient's blood. The fewer the complicating factors, the faster the treatment process and the higher the chance of full recovery.

ANALYZING FUNCTIONAL OUTCOMES OF ACUTE STROKE USING THE MODIFIED RANKIN SCALE AND MACHINE LEARNING TECHNIQUES

Introduction: Stroke is the third most common cause of disability worldwide with a wide variety among patients. Early outcome stratification and prognosis are crucial for rehabilitation strategies. Considering the multivariate nature of acute stroke outcomes, evaluation remains complex and involves processing large datasets. Machine learning (ML) algorithms provide a new approach to assessing patient specific factors accounting for the high number of variables. This presentation evaluates ML ability to predict post-stroke outcomes using the modified Rankin Scale (mRS).

Methods: A retrospective case – control study was performed on 1915 acute stroke patients from PSKUS hospital's 2022. – 2023. Res-Q register's data. WEKA program was used to predict 3 types of functional outcomes (mild, moderate, severe) at discharge based on mRS scores using ML models - Logistic Regression, Multilayer Perception Neural Network, C4.5 Decision Tree and SMO Support Vector Machine. The ML models were evaluated using the Receiver Operating Characteristic (ROC) curve's and Precision Recall curve's (PRC) area under the curve (AUC). The model with the best performance was selected for interpretation analysis. The Wrapper method selected parameters from the initial 173 to 25. Each parameter was evaluated separately based on its merit to model's performance.

Results: Functional outcomes were best predicted by Logistic Regression with the weighted average ROC AUC of 0.801. Parameters of highest significance were: NIHSS scale, GCS scale, age, pre-stroke mRS, thromboembolism, pneumonia, urinary tract infection, atrial fibrillation, heparin therapy, thrombectomy, glucose, carotid endarterectomy, thrombolysis, pulmonary embolism, recurrence, use of anticoagulants, arterial hypertension.

Conclusions: Logistic Regression models effectively predicted functional outcomes through mRS allowing for early rehabilitation planning, while ML introduces a novel strategy for large scale data computations.

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ANATOMICAL VARIATIONS OF LEFT CORONARY ARTERY BRANCHING

Introduction. Left coronary artery (LCA) is one of two main coronary vessels that supply the heart with arterial blood. It arises from the ascending aorta and then in most of the population it bifurcates, splitting into two arteries - left anterior descending artery (LAD) and Left Circumflex artery (LCx). However, there are anatomical variations in which LCA trifurcates or even quadrifurcates. In the case of trifurcation, the LCA additionally gives ramus intermedius.

Aim of the study. To analyze the pattern of left coronary artery branching and to determine the prevalence of bifurcation, trifurcation and quadrifurcation in the artery.

Materials and methods. Virtual dissection table "Anatomage" and preserved human cadavers hearts from Laboratory of Anatomy of the Department of Morphology of the Institute of Anatomy and Anthropology were included in the research. Initially 20 hearts were examined in the study but 6 were excluded due to impairment to the area of Left coronary artery (LCA) division. Remaining 14 hearts were included, the LCA main trunks division was noted and classified as bifurcation, trifurcation or quadrifurcation. Theoretical knowledge was obtained using different sources, including *Scopus*, *PubMed* and *Science Direct*.

Results. From the 14 hearts that were included in the study the most common branching pattern was bifurcation (64.29%) – seen in 9 Left Coronary arteries (LCA) of the hearts. Trifurcation (28.57%) was found in 4 LCA main trunks and 1 case of quadrifurcation (7.14%).

Conclusion. The most common branching pattern of left coronary artery (LCA) is bifurcation. As this research shows the prevalence of trifurcation and quadrifurcation are high enough that should be examined more in the clinical field. Further research should be done about the clinical significance of the pattern of division of the LCA, its impact on coronary artery disease incidence, severity and treatment outcomes.

ANTHROPOMETRIC CHANGES IN LATVIAN CHILDREN: A LONGITUDINAL STUDY

Objectives. This study examines craniofacial and height growth patterns in Latvian children aged 1-17. It analyzes changes in head circumference, bizygomatic width, bigonial width, and body height, assesses gender differences and explores correlations.

Materials and Methods. The longitudinal study, conducted in 2005/2006 and set to conclude in 2025, encompassed 375 healthy children from Latvia, ranging in age from 1 to 17 years. Annual anthropometric measurements were conducted at the Anthropology Laboratory of the Institute of Anatomy and Anthropology, Rīga Stradiņš University. Measurements included head circumference, bizygomatic width, bigonial width, and body height, using standardized instruments. The analysis involved descriptive and inferential statistical methods, utilizing the Pearson Chi-square test and the Spearman correlation coefficient.

Results. In early childhood (1-5 years), boys consistently had larger body height, head circumference, and bizygomatic width than girls, with significant differences (e.g., body height: 77.56 cm for boys vs. 75.63 cm for girls at age 1, $p < 0.001$). From ages 11-12, girls showed a temporary increase in body height (148.93 cm vs. 148.03 cm at age 11), indicating earlier pubertal growth. However, from age 13 onward, boys surpassed girls, reaching a final height of 180.51 cm at age 17, compared to 164.91 cm in girls.

Head circumference was also larger in boys across all age groups, with the gap widening during adolescence. At age 15, boys' head circumference was 56.99 cm, compared to 55.26 cm in girls. Similarly, boys consistently had wider bizygomatic width, with significant differences such as at age 1 (10.77 cm for boys vs. 10.15 cm for girls, $p < 0.001$) and age 15 (13.81 cm vs. 13.11 cm, $p < 0.001$).

The angulus mandibulae width was slightly larger in boys, with significant differences observed from age 1 (8.22 cm vs. 8.03 cm, $p < 0.001$) to age 17 (10.77 cm vs. 10.24 cm, $p < 0.001$). Correlations between body height and craniofacial dimensions were weak in early childhood but strengthened in adolescence, with the highest correlations observed in late adolescence (e.g., body height and bizygomatic width at $r = 0.65$ at age 16).

Conclusions. This study highlights significant gender differences in craniofacial and body height patterns in children aged 1-17. Boys generally have greater body height, head circumference and craniofacial dimensions than girls, with the most pronounced differences emerging during adolescence. Growth in craniofacial measurements becomes more correlated with body height as children grow older. These findings contribute to age-specific growth standards and offer insights into the coordinated development of craniofacial and body dimensions. The data from this study will be valuable for physical anthropology, pediatrics, forensic science, medical research and clinical practice.

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APPLICATION OF MACHINE LEARNING MODELS IN PREDICTING IN-HOSPITAL MORTALITY AND ITS RISK FACTORS FOR ACUTE STROKE

Introduction: Stroke is the second most common cause of death worldwide. Stroke in-hospital mortality remains alarmingly high. Identifying factors characterizing acute stroke in-hospital mortality would yield increased clarity on patient prognosis and targets for therapy. Yet due to the vast scope of processable data this becomes increasingly difficult, however, artificial intelligence and machine learning (ML) algorithms are designed for inferring conclusions from these large datasets, thus being able to discover patterns where classical statistics fail.

Methods: A retrospective case - control study was performed on 1915 acute stroke patients from PSKUS hospital's 2022. - 2023. Res-Q register's data. WEKA program was used to predict in-hospital mortality using the following ML models - Logistic Regression, Multilayer Perception Neural Network, C4.5 Decision Tree and SMO Support Vector Machine. The Wrapper method selected parameters from the initial 173 to 24. The ML models were evaluated using the Receiver Operating Characteristic (ROC) curve's and Precision Recall curve's (PRC) area under the curve (AUC). The model with the best performance was selected for interpretation analysis. Each parameter was evaluated separately based on its merit to model's performance.

Results: The best model for predicting in-hospital mortality was Logistic Regression with the weighted average PRC AUC of 0.949, while the following parameters were found to be significant: NIHSS scale, GCS scale, pneumonia, post stroke complications, age, occupational therapy, glucose, fever, speech therapy, physiotherapy, carotid imaging, CHA₂DS₂-VASc scale, patient ventilation, thrombolysis therapy, imaging within one hour, pulmonary embolism, recurrence, old infarcts.

Conclusions: Logistic Regression models effectively predicted in-hospital mortality offering a valuable tool for early risk stratification. ML methods give new alternative insights into large scale data multivariable analysis.

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ASSESSMENT OF STOMA CLOSURE COMPLICATIONS IN ONCOLOGICAL PATIENTS AFTER LAPAROSCOPIC COLORECTAL SURGERIES

Introduction. Stoma closure after laparoscopic colorectal surgery in oncological patients is a critical step in restoring bowel continuity, but it carries the risk of various complications. Understanding these complications is essential for optimizing patient outcomes and surgical strategies.

Aim. This study aims to assess the incidence of complications following stoma closure in oncological patients who have undergone laparoscopic colorectal surgery, with the goal of improving postoperative management and patient care.

Materials and Methods. This retrospective study analyzed data from a prospective colorectal patient medicine database, approved by the ethics committee (Agreement No. 20-A/20). Patients who underwent laparoscopic colorectal surgery between January 2021 and November 2024 were included. Data were collected using the EBM SPSS statistical analysis program. The study focused on patients diagnosed with C18.7, C19 and C20, who underwent laparoscopic colorectal surgery with or without stoma creation. Variables analyzed included demographic data, cancer stage, hospitalization duration, surgical details (including anastomosis and stoma formation), second surgery duration, stoma closure procedures, and postoperative complications.

Results. Among 217 oncological patients who underwent laparoscopic colorectal surgery, 62 (28.6%) had stoma closure. Postoperative complications occurred in 13 (21%) of the patients. The average age of stoma closure patients was 62.8 years. Of these, 59 (95.2%) had stoma closure within a year, with an average of 90.41 days. Hospitalization averaged 7.05 days, and surgery duration was 91.9 minutes. Complications occurred in 13 (44.8%) of stoma patients, while 16 (55.2%) of non-stoma patients also had complications. Overall complication rate for laparoscopic rectal surgery was 27.9%.

Conclusions. This study assesses stoma closure complications in oncological patients after laparoscopic colorectal surgery. Among 62 patients (28.6%) who underwent stoma closure, 21% experienced postoperative complications. The procedure was performed within an average of 90.41 days post- first surgery, lasting 91.9 minutes, with a 7.05-day hospital stay. These findings highlight the need for more careful postoperative management to reduce complication rates following stoma closure.

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ASSOCIATION BETWEEN DIABETIC RETINOPATHY AND GLYCEMIC CONTROL PARAMETERS IN PATIENTS WITH TYPE 1 DIABETES IN LATVIA

Background. Diabetic retinopathy (DR) is a leading cause of vision impairment in individuals with type 1 diabetes (T1D). Risk factors such as poor glycemic control, diabetes duration, and glucose fluctuations contribute to its development. While glycated hemoglobin (HbA1c) is traditionally used to assess glycemic control, recent studies suggest that glucose variability and hypoglycemic events may also play a significant role in DR progression. However, there is limited data on how these factors differ between patients with and without DR in Latvia.

Aim. This study aimed to evaluate the association between diabetic retinopathy and key clinical and glycemic control parameters, including HbA1c, glucose variability, and hypoglycemia, in patients with T1D.

Methods. A total of 98 patients with T1D were included in the study. Participants were divided into two groups based on the presence of DR: "No Retinopathy" group (NR) – patients without diabetic retinopathy. "Diabetic Retinopathy" group (DR) – patients diagnosed with diabetic retinopathy, including mild, moderate, and severe forms. The following parameters were analyzed: age, diabetes duration (years), body mass index (BMI), glycated hemoglobin (HbA1c, %), number of hypoglycemic episodes, overnight hypoglycemia (yes/no). Statistical analysis was conducted using the Wilcoxon rank-sum test to compare biomarker distributions between the two groups.

Results. Significant differences were observed between patients with DR (n=42) and those without retinopathy (n=56): patients with DR had a significantly longer diabetes duration (median 30 vs. 18 years, $p=0.000002$). The median age was higher in the DR group (49 vs. 39 years, $p=0.00156$). No statistically significant differences were found in BMI (24.3 vs. 25.1, $p=0.106$). The presence of overnight hypoglycemia did not show a strong association with DR ($p=0.238$). HbA1c levels were not significantly different between the groups ($p=0.653$).

Conclusions. This study identified diabetes duration and age as the most significant risk factors for DR, confirming that the longer a person has diabetes, the higher the risk of developing retinopathy. Contrary to expectations, HbA1c levels and BMI did not show a strong association with DR, suggesting that other factors, such as glucose fluctuations and long-term metabolic control, may play a more crucial role. These findings highlight the importance of early screening and proactive management of diabetes complications to delay the progression of DR.

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ASSOCIATION BETWEEN PARITY AND HIGH-GRADE SQUAMOUS INTRAEPITHELIAL LESIONS (HSIL)

Background: High-grade squamous intraepithelial lesions (HSIL) are precancerous cervical abnormalities primarily caused by persistent infection with high-risk human papillomavirus (HPV) types, particularly HPV 16 and HPV 18. These lesions can progress to invasive cervical cancer if not detected and treated. Multiple risk factors have been identified in the pathogenesis of HSIL, including HPV type, smoking, immunosuppression, and sexual behaviors. However, the role of parity in HSIL development remains controversial. Parity may influence the immune response to HPV infection, with hormonal changes during pregnancy potentially affecting cervical cells. Some studies suggest that parity could increase the risk of HSIL due to altered immune responses, while others suggest a protective effect or no association.

Aim: The aim of the current study was to assess the association between parity and the risk of developing high-grade squamous intraepithelial lesions (HSIL) in women.

Methods: This retrospective study analyzed medical records of women who underwent colposcopic examination. Participants were stratified into two groups: nulliparous (never given birth) and parous (given

birth). Additionally, colposcopic findings were analyzed by stratifying patients into those with confirmed HSIL lesions and those without. A case-control study was conducted, and the odds ratio (OR) was calculated to assess the association between parity and HSIL.

Results: The study included 409 patients. Among them, 258 (63.1%) were parous, and 151 (36.9%) were nulliparous. The participants' ages ranged from 24 to 67 years, with a mean age of 37 years, which was consistent across both groups. Among parous women, 80 (31.0%) were diagnosed with HSIL, whereas 178 (69.0%) were not. Among nulliparous women, 49 (32.5%) had HSIL, and 102 (67.5%) did not. The odds ratio (OR) was calculated at 0.94, with a 95% confidence interval (CI) of 0.61–1.44 and a p-value of 0.85. These results suggest no statistically significant difference in the risk of HSIL between parous and nulliparous women.

Conclusion: Our findings suggest that parity does not appear to be a significant risk factor for HSIL development. The lack of statistical significance ($p = 0.85$) and a confidence interval that includes 1 further support this conclusion. Therefore, parity should not be considered an independent predictor for HSIL development in clinical risk assessment.

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ASSOCIATION OF TUMOR MARKERS WITH CLINICAL AND HISTOPATHOLOGICAL FEATURES IN BREAST CANCER PATIENTS

Background. Breast cancer is one of the most common malignant tumors in the world and one of the most common causes of death in women. Tumor markers play a crucial role in this context, offering valuable insights into the biological behavior of the disease. These markers not only aid in diagnosis and monitoring but also serve as potential indicators of disease progression and recurrence. However, the expression levels and clinical significance of these markers can vary widely among patients, often correlating with specific clinical and histopathological factors such as tumor size, histological grade, lymph node involvement, hormone receptor status, and molecular subtypes. Understanding these correlations is crucial for refining risk stratification, tailoring treatment strategies, and predicting patient prognosis.

Aim. To examine the relationship between tumor markers and various clinical and histopathological characteristics in breast cancer patients

Methods. A retrospective study conducted at the Oncology Clinic of Pauls Stradiņš Clinical University Hospital. Data were collected from patient medical records, Oncology Clinic council conclusions, and the Datamed program. The data were anonymized and analyzed using IBM SPSS v.29. The analysis of patients was performed by dividing them into three large groups according to oncomarkers: Group 1 – CA125, Group 2 – CEA, Group 3 – CA15-3. In these groups, the correlation of various clinical and histopathological factors with the level of oncomarkers was studied, including: Presence of recurrence, Histological type, Tumor size, Depth of primary tumor invasion (pT), Lymph node involvement (pN), Pathological TNM stage of the tumor, Expression of estrogen and progesterone receptors. The level of statistical significance was set at 0.05.

Results. The mean age of the patients was 64; and a statistically significant correlation with tumor marker levels was found in the CEA ($r=0.076$; $p=0.041$) and CA15-3 ($r=0.082$; $p=0.038$) groups. It was found that tumors larger than 5 cm showed a statistically significant correlation with CA15-3 levels ($r=0.244$; $p=0.003$). This indicates that a larger tumor mass may contribute to an increase in CA15-3 levels. The presence of recurrence showed a strong statistically significant correlation with all three tumor markers: CA125 ($r=0.172$; $p=0.011$), CEA ($r=0.082$; $p<0.001$), CA15-3 ($r=0.244$; $p<0.001$).

Conclusion. This study found significant correlations between tumor marker levels and clinical and histopathological factors in breast cancer patients. Older age was associated with elevated CEA and CA15-3 levels, while tumors larger than 5 cm showed a significant correlation with CA15-3. Recurrence was strongly correlated with all three tumor markers, suggesting their potential role in disease monitoring. These findings highlight the clinical relevance of tumor markers in assessing disease progression and guiding patient management.

COLORECTAL ANASTOMOTIC LEAKAGE: RISK FACTORS, DIAGNOSIS AND MANAGEMENT

Introduction. Anastomotic leak (AL) occurs when the intestinal wall is compromised at the site of colorectal anastomosis, resulting in a communication between the intraluminal and extraluminal compartment and causing intestinal contents to spill into the abdominal cavity. To this day, it is still recognised as one of the most critical complications of colorectal surgery with significant morbidity and mortality rates.

Objective. The objective of this study is to analyze perioperative risk factors associated with AL, as well as diagnostic modalities and treatment alternatives.

Materials and methods. This is a retrospective cohort study that was conducted at Pauls Stradiņš Clinical University Hospital and included 65 patients who underwent colon or rectal resection with primary anastomosis between January 2020 and December 2023. Data were obtained from the patient's medical records, including preoperative, intraoperative and postoperative assessments, along with diagnostic findings and therapeutic approach. Statistical analyses were conducted using Microsoft Excel 365 and IBM SPSS software.

Results. A total of 65 patients were included in this study, among them 19 (29.2%) developed AL, while the remainder did not exhibit leakage. The mean age was 66.45 (SD = 13.3). The patients in the AL group had an average hospital stay of 14.11 days (SD = 2.0), whereas the non-AL group had an average of 6.39 days (SD = 0.6). Patients who received preoperative antibacterial treatment including metronidazole, cephazolin, and ciprofloxacin, as well as those who had open surgery, showed a significantly reduced incidence of AL ($P < 0.01$, $P = 0.021$). On the contrary, a higher incidence of AL was observed in patients with a history of neoadjuvant therapy ($P = 0.02$) and those who converted from laparoscopic to open surgery ($P = 0.023$). On average, the diagnosis was established 5.42 days after the operation. Four AL cases were diagnosed by clinical evaluation and 15 cases were identified using contrast-enhanced abdominal CT. The symptoms commonly associated with AL were abdominal pain (37.8%), diffuse peritonitis (10.8%), lack of bowel movement (10.8%), and fecal discharge from the drain (8.1%). However, the most frequent radiological findings included free air in the abdomen (26.8%), free fluid in the abdomen (19.5%), and dilated bowel loops (12.2%). One patient was treated conservatively, while the other 18 patients required surgical management.

Conclusions. These findings highlight the importance of comprehensive preoperative evaluation and treatment strategies, such as the choice of antibacterial therapy and surgical approach, to reduce the likelihood of postoperative complications.

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CONTINUOUS GLUCOSE MONITORING IN INDIVIDUALS WITH PREDIABETES RISK FACTORS: DATA FROM THE PRAESIIDIUM STUDY

Background. Prediabetes is a metabolic state characterized by elevated glucose levels above normal but below the diagnostic threshold for diabetes. Traditional markers such as HbA1c and fasting glucose fail to capture daily glucose fluctuations, which may reflect early metabolic instability and increased cardiometabolic risk. Continuous glucose monitoring (CGM) provides real-time insights into glucose variability, offering valuable data on both hypoglycemic and hyperglycemic episodes.

Aim. To analyze CGM-derived glucose variability and assess its correlation with metabolic and inflammatory markers in individuals at risk of prediabetes

Methods. This study was conducted as part of the Horizon Europe PRAESIIDIUM project. A total of 61 participants (aged 21–55 years, BMI 25–35 kg/m²) with no prior diabetes diagnosis were included. Exclusion criteria comprised pregnancy, alcohol misuse, and any known condition affecting glucose metabolism.

Participants underwent 14-day CGM using the Abbott Libre Pro IQ device, which provided minute-by-minute glucose data. Key glucose variability metrics included:

- Time in Tight Range (TITR) – 3.9–7.8 mmol/L

- Time Below Range (TBR) – <3.9 mmol/L

- Time Above Tight Range (TATR) - >7.8 mmol/L

Metabolic and inflammatory markers included: HDL, LDL, total cholesterol, triglycerides, remnant cholesterol, uric acid, and creatinine. Statistical analysis included tests for normality (Shapiro-Wilk), between-group comparisons (Mann-Whitney U test and ANOVA), correlation analysis (Spearman's rank correlation), and regression modeling.

Results. The mean glucose level was 5.55 ± 0.29 mmol/L. The median T1TR was 98% (IQR 3%), suggesting stable glucose levels in most participants. TBR was recorded in 40.98% of participants, indicating frequent hypoglycemia, while TATR occurred in 32.79%, reflecting postprandial hyperglycemia.

Correlation analysis showed that TATR correlated positively with triglycerides ($\rho = 0.483$, $p < 0.001$) and waist-to-height ratio ($\rho = 0.37$, $p = 0.016$), suggesting that lipid metabolism and abdominal adiposity may contribute to postprandial hyperglycemia. In contrast, TBR showed a negative correlation with triglycerides ($\rho = -0.335$, $p = 0.009$) and a positive correlation with HDL ($\rho = 0.262$, $p = 0.043$), indicating that higher HDL levels may have a protective effect against hypoglycemia.

Regression analysis indicated that TATR was significantly influenced by triglyceride levels ($\beta = 0.03$, $p = 0.010$), while TBR was associated with HDL levels ($\beta = 0.03$, $p = 0.043$). T1TR was influenced by sex, eosinophil, and basophil levels, with the final model explaining 57% of the variability ($R^2 = 0.57$, $p = 0.001$).

Conclusions. CGM provides valuable insights into glucose variability in individuals at risk of prediabetes. Despite normal HbA1c and fasting glucose levels, significant glucose excursions were observed, indicating early metabolic dysfunction. The association between TATR and triglycerides suggests that lipid metabolism plays a key role in postprandial hyperglycemia, whereas the link between TBR and HDL implies that higher HDL levels may contribute to improved glucose stability. These findings reinforce the potential of CGM-based monitoring for early metabolic risk stratification and targeted interventions.

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CORRELATION OF MEDULLARY THYROID CANCER WITH GENETIC SYNDROMES

Keywords: Thyroid gland, medullary carcinoma, MEN syndrome, incidence in Latvia, 2012-2022

Introduction. Medullary thyroid cancer (MTC) is a distinct type of thyroid cancer that develops in the parafollicular C-cells of the thyroid gland. MTC is rare, accounting for 5-10% of all thyroid cancers. Medullary carcinoma can be sporadic or hereditary, caused by a mutation in the RET proto-oncogene, and is associated with MEN2 syndrome, which is subdivided into MEN2A, MEN2B and Familial medullary thyroid carcinoma (FMTC). RET mutations can be detected through genetic testing, which plays a crucial role in early diagnosis and risk stratification for affected families.

Aim of the study. To analyze data from medical records in the archive of the Latvian Oncology Center from 2012 to 2022, to examine the incidence of medullary thyroid cancer in the last 10 years, to determine its correlation with genetic syndromes and RET mutations, to investigate the relationship between MTC development and patient demographics (age, gender), and to perform statistical analysis.

Materials and Methods. A retrospective analysis of 92 patients diagnosed with medullary thyroid cancer between 2012 and 2022 was performed. Patient data were collected from medical records in the archive of the Latvian Oncology Center. Genetic testing for RET proto-oncogenemutations was performed for patients suspected of hereditary MTC. Data processing was performed using SPSS statistical software.

Results. Of the 92 patients, 75% (n=69) were female and 25% (n=23) were male. The mean age of the patients was 60 ± 13.6 years, with a minimum age of 27 years and a maximum age of 84 years. The annual incidence of the disease was determined as follows: in 2012, 13 patients (14.1%) were diagnosed; in 2013, 9 (9.8%); in 2014 and 2018, 5 (5.4%); in 2015 and 2017, 6 (6.5%); in 2016, 4 (4.3%); in 2019, 7 (7.6%); in 2020 and 2022, 12 (13%); and in 2021, 13 (14.1%). Stage I cancer was diagnosed in 45.7% (n=42) of patients, stage II in 14.1% (n=13), stage III in 21.7% (n=20), and stage IV in 18.5% (n=17). The most common tumor location was unilateral (n=70, 76.1%), while bilateral was three times less common (n=22, 23.9%). Unilateral tumor location was more frequently associated with female patients (n=59, $p < 0.001$) and stage I-III ($p < 0.001$), whereas bilateral location correlated with a confirmed RET mutation (n=11, $p < 0.001$). Among all MTC cases, a RET mutation was identified in 17.4% (n=16) of patients and MEN 2A syndrome was confirmed in 4.3% (n=4). Total

thyroidectomy was performed in 81 patients (88%), while 11 patients (12%) underwent hemithyroidectomy, which was associated with stage I cancer ($p=0.002$). Postoperative complications were observed in 78.2% ($n=72$) of patients, while 21.7% ($n=20$) had no complications. MEN2A syndrome was observed only in patients with a confirmed RET proto-oncogene mutation ($p<0.001$).

Conclusions. Based on data from a single hospital, 92 cases of medullary thyroid cancer were identified over the past 10 years. The highest incidence was observed in 2012 and between 2020-2022. The disease is predominantly sporadic, affects more women than men, is most often diagnosed unilaterally, at the age of 60, and in stage I. Genetic analysis confirmed that MEN2A syndrome was exclusively present in patients with RET mutations. This highlights the critical role of genetic screening in the clinical management of MTC, enabling early intervention for affected individuals and their relatives.

References:

- Brandi, M.L., Gagel, R.F., Angeli, A., Bilezikian, J.P., Beck-Peccoz, P., Bordi, C., Conte-Devolx, B., Falchetti, A., Gheri, R.G., Libroia, A., Lips, C.J.M., Lombardi, G., Mannelli, M., Pacini, F., Ponder, B.A.J., Raue, F., Skogseid, B., Tamburrano, G., Thakker, R.V. and Thompson, N.W. (2001). CONSENSUS: Guidelines for Diagnosis and Therapy of MEN Type 1 and Type 2. *The Journal of Clinical Endocrinology & Metabolism*, 86(12), pp.5658–5671. doi:https://doi.org/10.1210/jcem.86.12.8070. Deng, F. (2019a). Medullary thyroid cancer (staging) | Radiology Reference Article | Radiopaedia.org. [online] Radiopaedia. Available at: https://radiopaedia.org/articles/medullary-thyroid-cancer-staging Elisei, R., Romei, C., Cosci, B., Agate, L., Bottici, V., Molinaro, E., Sculli, M., Miccoli, P., Basolo, F., Grasso, L., Pacini, F. and Pinchera, A. (2007). RET Genetic Screening in Patients with Medullary Thyroid Cancer and Their Relatives: Experience with 807 Individuals at One Center. *The Journal of Clinical Endocrinology & Metabolism*, 92(12), pp.4725–4729. doi:https://doi.org/10.1210/jc.2007-1005. Frank-Raue, K., Rybicki, L.A., Erlic, Z., Schweizer, H., Winter, A., Milos, I., Toledo, S.P.A., Toledo, R.A., Tavares, M.R., Alevizaki, M., Mian, C., Siggelkow, H., Hüfner, M., Wohllk, N., Opocher, G., Dvořáková, S., Bendlova, B., Czetwertynska, M., Skasko, E. and Barontini, M. (2011). Risk profiles and penetrance estimations in multiple endocrine neoplasia type 2A caused by germline RET mutations located in exon 10. *Human Mutation*, [online] 32(1), pp.51–58. doi:https://doi.org/10.1002/humu.21385. Kebebew, E., Ituarte, P.H.G., Siperstein, A.E., Duh, Q.-Y. and Clark, O.H. (2000). Medullary thyroid carcinoma. *Cancer*, 88(5), pp.1139–1148. doi:https://doi.org/10.1002/(sici)1097-0142(20000301)88:5%3C1139::aid-cnrcr26%3E3.0.co;2-z. Kim, M. and Kim, B.H. (2021). Current Guidelines for Management of Medullary Thyroid Carcinoma. *Endocrinology and Metabolism*. Moline, J. and Eng, C. (2011). Multiple endocrine neoplasia type 2: An overview. *Genetics in Medicine*, 13(9), pp.755–764. doi:https://doi.org/10.1097/gim.0b013e318216cc6d.

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DARK TRIAD TRAITS AND THE BLUES OF DEPRESSION

Background. Mental health is important amongst all healthcare specialists. This presents new challenges for all physicians. The Dark Triad personality traits (Machiavellianism, psychopathy, narcissism) were in the past associated with depressive disorders and their severity. An interest in research into this field has reappeared because a lack of evidence on links between the personality types and depression severity is seen.

Aim. The aim of this study was to assess the association between Dark Triad personality types and depression severity, amount of hospitalizations, anxiety levels.

Methods. In this cross sectional study 30 patients who were enrolled in a subacute psychiatric ward were willingly interviewed. These patients did not have significant psychiatric comorbidities. The patients were all diagnosed with recurrent depression (F33;ICD-10). An interview was conducted after 2-3 weeks of the patient being stationed at the ward. These patients were analyzed via Dark Triad test^[1] and PHQ-9 (Patient Health Questionnaire-9, a depressive symptom questionnaire), TEMPS (Temperament Evaluation of Memphis, Pisa, Paris and San Diego) tests. A statistical analysis using t-tests and z-tests was conducted.

Results. The statistical analysis concluded, that severity of depression by the PHQ-9 scale, anxiety levels by GAD-7 when compared to Dark Triad personality types did not yield any statistical significance. Patients were diagnosed with all possible diagnoses from PHQ-9 scale, GAD-7, although they weren't equally represented.

Results show that there is a link between different action types in certain personality types, such as working as a coping mechanism is observed in Machiavellian patients. ($p=0.047$)

Conclusion. Results showed, that there are links between personality types and coping mechanisms. Severity or hospitalization amounts did not statistically importantly differ.

[1] Short Dark Triad[SD3], Jones&Paulhus 2013) by Jekaterina Kuharenoka un Inese Jokste,2023(RSU)

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DIFFERENT TYPE OF THYROID IMAGING AND REPORTING DATA SYSTEM (TIRADS) COMPARISON IN CLINICAL THYROID NODULE MALIGNANCY RISK DETERMINATION

Introduction. Thyroid Imaging and Reporting Data System (TIRADS), originally devised by ACR in 2009, while retaining core aspects, has undergone multiple variations and its use spanned the whole world over. Its significance in determining the need for a fine needle aspiration (FNA) biopsy is invaluable but despite that none of the TIRADS variations covers all requirements for each use.

Aim. To assess select TIRADS variations for their sensitivity and accuracy, specifically ones used in Latvia, Europe and Korea.

Materials and Methods. Retrospective study including 179 patients from Pauls Stradins Clinical University Hospital Institute of Diagnostic Radiology and Riga East Clinical University Hospital Department of Radiology was analysed with IBM SPSS 30.0 and MS Excel (February 2025 Update) were used to gather data, analyse it with descriptive statistics, frequency analysis, AUC by ROC curve analysis.

Results. Analysis included 179 patients, of which 152 (85.0%) were female and 27 (15.0%) were male, and 190 nodules, of which 136 (71.5%) were benign, 8 (4.3%) were under suspicion of malignancy and 17 (8.9%) were malignant; 29 (15.3%) of the nodules were non-diagnostic according to the Bethesda system. All three TIRADS systems have 100% sensitivity however L-TIRADS (SPE=67.5%, PRE=41.7%, AUC=66.6%) had the highest specificity of all - EU-TIRADS (SPE=33.1%, PRE=41.7%, AUC=66.6%), K-TIRADS (SPE=42.9% %, PRE=50.3%, AUC=71.5%).

Conclusions. L-TIRADS has is more specific and accurate in nodule evaluation than EU-TIRADS and K-TIRADS and as such L-TIRADS proves itself a higher quality system in the given sample as evidenced by highest specificity of 67.5% versus 33.1% and 42.9% respectively.

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EVALUATION OF MODIFIABLE RISK FACTORS AND HEALTH AWARENESS AMONG MEDICAL AND NURSING STUDENTS AT THE UNIVERSITY OF LATVIA

Introduction. The global prevalence of chronic diseases rises significantly each year, accounting for up to 70% of deaths worldwide, with studies identifying an unhealthy lifestyle and risk factor exposure as the primary causes.

Aim. The objective of the following research was to obtain modifiable risk factors for chronic diseases distribution amongst the students of the University of Latvia as well as to evaluate the awareness and informativeness relatively to lifestyle traits impact on chronic disease development in the medical student's environment.

Methodology. Anonymous research questionnaires which consisted of 57 questions on student lifestyle traits as well as the knowledge of prevention major role towards chronic disease development were carried out and handed out. All 151 respondents were divided into two groups: one-having had no chronic disease cases, and another one-having had chronic issues. The results of the research have been analysed by IBM SPSS Statistics 25.0 version software.

Results. The major identified risk factors were smoking at 32,67% respondents, 30,43% of which had no chronic diseases and over 58,33% recipients, which is over a half, continued to consume tobacco despite having had chronic diseases. As for using alcohol, those who choose wine or champagne, 74% overconsume a daily

recommended intake, although 32,10% choose high spirits. 40 – 50% recipients complained on bad quality of night sleep as they had not felt relaxed and energetic. 17,39% were recognised as overweight and 8% recipients had obesity conditions. 30% admitted the chronic lack of physical activities in their daily routine. 43,38% do not consume fruit on daily basis, whereas 18,67% do not consume 200g vegetables per day. Recommended daily amount of wholegrain products is not consumed by 10,67% recipients, 51,33% sometimes consume ones, though. 51,05% overconsume meat, whereas butchery production is consumed by 52,45% recipients, a chocolate bar as the most common snack is consumed by utter 70,68% recipients. 23,33% were not aware of recommended intakes of fish either once or twice a week, 16,67% respondents had no knowledge of the beneficial impact of olive oil, 24,6% were not informed of max daily amount of salt consumption as 5g. 59,33% of all recipients would be able to inform patients about the potential benefits of leading a healthy lifestyle. 12 respondents which is 7,95% of the whole number of participants had already been diagnosed with chronic diseases, however, continued to submit the risks.

Conclusions. Summarising the results of the research, it has been concluded that the vast majority of the medical students lack knowledge as well as awareness of healthy life principles. Moreover, they assume multiple risks which potentially leads to chronic disease developing in the long run.

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EXPLORATION OF THE EFFECTS OF CROSS-MODAL NEUROPLASTICITY IN CONGENITALLY BLIND CHILDREN COMPARED TO SIGHTED CHILDREN AGES 12-18 ON SPATIAL ORIENTATION AND PITCH DIFFERENTIATION

Introduction: Cross-modal neuroplasticity refers to the brain tissue's ability to reorganize neuronal synapses across different cortical sensorial areas to compensate for sensory deprivation by enhancing the functionality of the remaining senses. The critical period for auditory cortex's development and neuroplastic rearrangement are the first two years of life. In congenitally blind children auditory processing is often heightened which affects areas of spatial orientation and tone pitch differentiation. This presentation explores these effects in congenitally blind children compared to their sighted counterparts.

Methods: An experimental study with 19 participants (9 congenitally blind, 10 sighted controls) from Riga Strazdumuiža middle school and Riga State gymnasium No. 1 aged 12 – 18 was performed. Two auditory tasks were conducted. In the spatial orientation task participants identified a sound source location from 8 stereos placed 45 degrees apart. The accuracy of localization was measured as difference in degrees from the correct location. In pitch differentiation task participants determined whether an interval is rising or falling with 8 levels of difficulty (decreasing tone duration and frequency difference). Statistical significance was evaluated with the Student t-test with statistical significance of $p < 0.05$.

Results: Congenitally blind group had a significantly higher accuracy in spatial orientation (avg. deviation in degrees binaurally – 18.5 vs 31.0 control, $p < 0.0001$; monaurally right – 36.6 vs 66.0, $p < 0.0001$; left – 35.9 vs 63.6, $p < 0.0005$), and in pitch differentiation (avg. accuracy – 97.2% vs 82.8%, $p < 0.0005$).

Conclusions: Cross modal neuroplasticity has a measurable impact in heightening auditory functions regarding spatial orientation and tone distinction in congenitally blind children compared to control. These results underscore the brain's adaptive potential and have implications for rehabilitative opportunities.

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FACTORS AFFECTING 5-YEAR SURVIVAL IN PATIENTS WITH OPERATED PANCREATIC CANCER

Introduction: Pancreatic cancer is an oncological disease with an aggressive course and a poor long-term survival prognosis. According to the WHO, pancreatic cancer ranks 12th in the global incidence of cancer in

2022. In terms of mortality, it ranks 7th. Looking only at Latvia, it ranks twelfth in incidence and fifteenth in mortality worldwide. Radical surgery is considered the main treatment for pancreatic cancer.

Aim: To evaluate the 5-year survival of pancreatic patients according to histological diagnosis, length of hospital stay and extent of surgery.

Methods: A retrospective study was performed including patients who received radical surgery for pancreatic cancer between 1 January 2018 and 31 December 2023. All patients were hospitalised at Riga Clinical University Hospital, "Latvian Oncology Centre". Operative tactics, long-term survival and mortality were analysed. Additionally, the correlation of risk factors with patient mortality was determined.

Results: A total of 196 patients received surgical treatment, 158 (80.61%) for adenocarcinoma and 38 (19.39%) for neuroendocrine tumour. When patient mortality was evaluated, there was a strong correlation with length of ICU hospitalisation ($p=0.013$), tumour stage ($p=0.002$), presence of postoperative complications ($p=0.003$) and tumour histological diagnosis ($p=0.001$). Five-year survival was 15.1% in the adenocarcinoma group and 82.4% in the neuroendocrine tumour group. Additionally, comparing mesopancreas excision (MPE) and standard lymphadenectomy, we found that MPE results in longer hospital stays in the ICU and oncology department, but more lymph nodes are examined, which is a positive indicator of radicality and good prognosis.

Conclusions: The study demonstrates that the long-term survival of patients in the adenocarcinoma and neuroendocrine tumour groups at the Latvian Oncology Centre is comparable to that reported in other studies. Nevertheless, the incidence of postoperative complications is high, indicating a need for improvement in postoperative care.

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FACTORS INFLUENCING THE COVERAGE OF COLORECTAL CANCER SCREENING: BARRIERS AND FACILITATORS FROM THE PERSPECTIVE OF FAMILY DOCTORS IN LATVIA

Keywords: colorectal cancer screening, family doctors, barriers, facilitators, preventive medicine

Objectives: Colorectal cancer (CRC) remains a major health problem and it is the second leading cause of cancer-related deaths worldwide. In Latvia, CRC is especially worrying because the participation rate in screening programs is low. In 2022, only 19.1% of individuals between the ages of 50 to 74 underwent CRC screening.

This study aims to identify the key factors affecting CRC screening coverage in Latvia from the perspective of family doctors. Understanding these factors is essential for increasing participation and advancing public health outcomes.

Methods: A cross-sectional survey via "Google Forms" and platform "Facebook" was conducted among family doctors in Latvia to report their perspectives on factors affecting colorectal cancer screening coverage. Data were analysed to assess trends in their knowledge, attitudes, and practices related to CRC screening.

Results: The study collected responses from 42 family doctors regarding factors influencing colorectal cancer screening coverage in Latvia. The survey revealed key barriers to colorectal cancer screening, including fear of the procedure and unwillingness to participate (76.2%, $n=32$), lack of patient knowledge about screening (64.3%, $n=27$), and reluctance to learn about a potential negative diagnosis (52.4%, $n=22$). Despite these challenges, respondents highlighted the importance of broader public awareness campaigns (78.6%, $n=33$), reminder systems for patients (64.3%, $n=27$) and effective patient education (64.3%, $n=27$).

Conclusions: The most significant barriers identified were fear of procedure and hesitation to participate, insufficient patient knowledge and fear of receiving a negative diagnosis, which highlights the need for improved patient education and psychological support. Furthermore, the lack of knowledge about screening accentuates the importance of increasing public understanding.

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FACTORS RELATED TO MEDICATION ADHERENCE IN MULTIMORBID PATIENTS IN GULBENE AND RIGA

WHO data shows that about 50% of patients fail to follow medical instructions for chronic disease treatment, leading to poorer health, increased costs, higher utilization of healthcare services, and greater risks of hospitalization and mortality.

The aim of the study was to identify factors affecting multimorbid patients' adherence to medication use from a subjective perspective and to compare the results between patients in Riga and Gulbene.

Nine semi-structured interviews were conducted with multimorbid patients living in Gulbene. The interviews were recorded, transcribed, coded, and analyzed using inductive content analysis. The data obtained in this study were compared to those from a similar study done in 2023 involving nine multimorbid patients living in Riga.

Summarizing and analyzing the collected data, two groups of patients were identified: adherent and non-adherent patients. For adherent patients living in Gulbene, the primary motivation was fear for their health and pain. Factors influencing non-adherent patients included the cost of medications, difficulties accessing general practitioners from rural areas, and a lack of knowledge about the necessity of medications. For adherent patients living in Riga, the main motivation was improving their well-being. In contrast, the factors influencing non-adherent patients included ignorance, unwillingness, and fear of medications. In both studies, non-adherent patients highlighted forgetfulness and a lack of knowledge as significant factors, while adherent patients demonstrated better theoretical knowledge about medication use and emphasized the importance of establishing a routine as a helpful strategy.

According to the study data, adherence could be improved by simplifying medication regimens, using medications that contain more than one active ingredient and providing patients with more information about the importance of taking their medications.

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FAMILY PHYSICIANS' SELF-ASSESSMENT OF THEIR KNOWLEDGE ON THE BASICS OF MILITARY MEDICINE AND OPINIONS ON IMPLEMENTING TRAINING IN CONTINUING EDUCATION

Keywords: military medicine, family physicians, knowledge assessment, training

Introduction. Amid growing global and regional crises, it is crucial to assess the knowledge of military medicine among Latvia's primary healthcare professionals and their readiness to acquire specialized skills in this field.

Aim. This study aimed to determine Latvian family physicians' self-assessment of their knowledge on the basics of military medicine and gain their opinions regarding the need for training to support the development of continuing education programs.

Methods. This quantitative cross-sectional study collected data via an anonymous Google Forms survey from January 9th to February 4th, 2025. Family physicians and residents provided demographic information, including age, gender, length of experience in family medicine, regional location of practice, previous experience in military medicine, and self-assessed their knowledge of 10 military medicine topics based on NATO standards for tactical medicine using a five-point Likert scale. Participants also answered questions about the importance, frequency, and format of military medicine training. Data analysis was performed using Jamovi, with significance set at $P < 0.05$.

Results. In this study of 154 respondents (110 certified family physicians and 44 residents), 78.6% reported no prior military medicine experience, while 21.4% confirmed some previous experience. The average self-assessment on 10 military medicine topics was 1.95 points (SD=0.69). Family physicians with more than 20 years of experience demonstrated lower self-assessed knowledge compared to those with fewer years in practice—a statistically significant trend observed in three areas: triage ($r = -0.215$, $p < 0.05$), recognition of

military injuries ($r = -0.285$, $p < 0.001$), and treatment ($r = -0.191$, $p < 0.05$). Most respondents (81.8%) supported the need for military medicine training, and 90.9% believed it could improve their emergency response. More than half (53.2%) preferred training every five years, while 32.5% chose a single session during a career. The most popular training formats were practical simulations (79.2%) and online courses (51.9%).

Conclusions. Most family physicians rate their military medicine knowledge as low. At the same time, the majority believe that military medicine training would improve their emergency response skills and prefer practical workshops every five years or as a one-time course. This highlights the potential benefits of incorporating military medicine topics into continuing education programs for family physicians.

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FOURTH SEMESTER HEALTH SCIENCES STUDENTS' KNOWLEDGE OF ADULT INITIAL RESUSCITATION

Introduction. The topic of initial resuscitation in adults is of great importance due to the high prevalence of heart disease, especially in adults. Sudden cardiac arrest is the leading cause of death worldwide and often occurs outside of hospitals, in locations where immediate professional medical care is unavailable. In such cases, the knowledge and application of initial resuscitation techniques can save many lives.

Aim. To reveal fourth semester health sciences students' knowledge of adult initial resuscitation.

Materials and methods. The following methods were used in organizing and conducting the study: analysis of scientific literature; quantitative research - questionnaire survey; graphic and descriptive analysis of the study results. The prepared questionnaire was posted on the online platform *apklausa.lt*. and the link was sent to the e-mails of the groups of the Faculty of Biomedical Sciences. A total of 97 questionnaires were collected. During the research, the principles of research ethics were observed.

Results. The majority of respondents knew about the initial resuscitation of adults. Initial CPR for an adult includes checking for responsiveness, confirming no breathing, and prompt chest compressions and re-establishment of breathing with external oxygen. Students knew the steps to initiate adult CPR when the person is unresponsive and indicated that the person should be checked for responsiveness and breathing. The main consequences of inadequate initial resuscitation were rib fractures and internal injuries, respiratory complications and spinal injuries. And the main technologies used for initial resuscitation of adults were named by students of biomedical sciences as automatic external defibrillators, portable devices, telemedicine, smartphone applications.

Conclusion. After conducting the research, it was found that the knowledge of the fourth semester health science students about the initial resuscitation of adults was sufficiently good.

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HYPERHIDROSIS SURGICAL TREATMENT

Background. Hyperhidrosis is a condition characterized by excessive sweating, caused by overactivity of the sympathetic nervous system that controls sweat gland activity. Current non-surgical treatments offer only temporary relief and are limited by short-term efficacy, high costs, and potential side effects. Thoracoscopic sympathectomy is a minimally invasive surgical procedure that provides a more effective and durable solution for patients with refractory hyperhidrosis.

Aim. This presentation aims to showcase the surgical technique of thoracoscopic sympathectomy performed at Riga 1st Hospital, highlight its effectiveness, and discuss its potential for wider application in other hospitals in Latvia.

Methods. Thoracoscopic sympathectomy is performed exclusively by a specialized team of general surgeons. Two utilization ports are made in the chest wall, one for the video camera and one for the instruments. After visualizing the sympathetic nerve branches behind the parietal pleura, the spinal chain and spinal ganglion are cut at the T2-T5 levels using electrocoagulation, Harmonic scalpel, or endoscopic scissors. Care is taken to avoid injury to surrounding blood vessels, particularly the azygos vein, which could cause complications. If

the ganglion is injured or cut above the T2 level, Horner's syndrome may develop. The operation is performed under general anesthesia and typically lasts around 40 minutes. After surgery, a pleural drain is inserted, and incision wounds are sutured with absorbable sutures. The drain is typically removed the same day or the following day after an X-ray check.

Results. The procedure successfully reduces or eliminates excessive sweating in the targeted areas, providing long-term relief and improving patient satisfaction. The operation is minimally invasive, with a relatively short recovery time. The overall success of the procedure demonstrates its potential as a durable and effective solution for hyperhidrosis patients.

Conclusion. Thoracoscopic sympathectomy offers a minimally invasive solution for patients with refractory hyperhidrosis. Expanding this procedure to other hospitals across Latvia could significantly increase treatment access and improve the quality of life for more patients. The procedure's widespread adoption could also foster a network of skilled practitioners across the country.

Acknowledgements. I would like to acknowledge Riga 1st Hospital for its leadership in performing thoracoscopic sympathectomy and express gratitude to MD Sergejs Klimcuks, Head of General Surgery, and MD Ilmars Tracums for their expertise and contributions in advancing this procedure.

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IMPACT OF DSDNA ANTIBODY LEVELS ON LUPUS NEPHRITIS DEVELOPMENT IN SLE PATIENTS

Background. Systemic lupus erythematosus (SLE) is a rare, genetic, multisystem, and chronic autoimmune disease characterized by the production of antibodies, including anti-double stranded DNA antibodies (dsDNA). When dsDNA is produced, which involve direct binding to self-antigens or indirect binding to immune complexes, they can deposit in the glomeruli and tubular membranes, contributing to the development of lupus nephritis (LN). High positive anti-dsDNA results are associated with more active disease and a higher likelihood of developing LN. If LN is suspected, a biopsy can be performed for further histopathological examination to confirm the diagnosis.

Aim. The aim of the study was to analyze laboratory results of SLE patients treated at Pauls Stradiņš Clinical University Hospital from 2014 to 2024. By analyzing the positive results obtained for dsDNA and their correlation frequency with LN

Methods. A retrospective study conducted at the Pauls Stradiņš Clinical University Hospital Rheumatology Center. The study included 171 patients who were selected from hospital records with the SLE diagnosis from January 1, 2014 to December 31, 2024. Demographic and clinical data were obtained from medical records, including gender, age, diagnosis, and laboratory data (*Autoantibodies – dsDNA*)

Results. Analyzing dsDNA antibodies - 42% of patients have results within the normal range, while 58% of patients have results interpreted as positive. Among highly positive results, which accounts for 31% of all patients, 23% have developed LN. For moderately positive results, which makes up 24% of all patients, LN has been observed in 10% of cases. Meanwhile, among the 3% of patients with weakly positive results, 2% have developed LN.

Conclusion. This study shows the correlation between positive dsDNA antibody results and the development of LN in patients with SLE. The findings suggest that high positive dsDNA antibody levels are associated with an increased risk of developing LN.

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IMPACT OF HARMFUL HABITS ON LDL LEVEL AMONG RESIDENTS OF RIGA WITH INCREASED AND NORMAL LDL LEVEL IN A FAMILY DOCTOR'S PRACTICE

Keywords: LDL, cholesterol, cardiovascular diseases, elevated cholesterol, risk factors, health recommendations, increased LDL level in Riga

Introduction: According to the WHO data from 2018, Latvia ranks first in the EU in terms of mortality from cardiovascular diseases. In 2018, 15,771 people died from circulatory diseases in the country. These diseases remain one of the leading causes of death. They are caused by a combination of factors such as high levels of LDL, TG, elevated blood pressure, and genetic predisposition, which cannot be influenced. However, LDL and TG levels are controllable, and it is important to know how to regulate them to reduce the risk of cardiovascular diseases.

Objectives: The aim of this study is to identify the causes of elevated LDL levels and to determine the most significant factors contributing to it.

Materials and methods: Data for the survey were collected from residents of Riga using an anonymous voluntary questionnaire administered in a family doctor's practice. The collected information was analyzed using SPSS.

Results: The study involved 68 participants (62 women and 6 men) aged between 20 and 79 years. Of these, 55.9% had elevated LDL levels, while 17.6% were taking medication to lower their LDL. Factors contributing to increased LDL included diet, lifestyle, and habits. In terms of diet, 55.9% of those with elevated LDL and 26.5% with normal LDL consumed fatty foods 2–3 times a week. Daily consumption of sauces was reported by 20.6% of those with high LDL and 5.9% with normal LDL. Daily sweets consumption was noted by 14.7% of participants with high LDL and 2.9% with normal LDL, while 55.9% of those with elevated LDL and 35.3% with normal LDL consumed sweets 2–3 times a week. As for sugary drinks, 23.5% of participants with high LDL and 58.8% with normal LDL consumed them frequently. Regarding lifestyle, 47.1% of those with high LDL considered themselves inactive, compared to only 2.9% in the normal LDL group. 70.8% of those with normal LDL engaged in sports at least once or twice a week, while only 35.3% in the high LDL group did so. In terms of habits, 91.2% of participants with normal LDL and 76.5% with high LDL reported not smoking.

Conclusion: The study identified key factors influencing LDL levels. Factors that increase LDL include overconsumption of fatty foods and sauces, frequent consumption of sweets, and a sedentary lifestyle. Factors that lower LDL include medication, choosing lower-fat products, and regular exercise. Recommendations for maintaining healthy LDL levels include engaging in regular physical activity (1–2 times a week for 15–30 minutes), adopting an active lifestyle (such as walking instead of using transport and cycling), and controlling the fat content of food while consuming fatty foods and sweets in moderation (no more than once a week).

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IMPACT OF MATERNAL AGE ON PREGNANCY RISK FACTORS: A RETROSPECTIVE STUDY OF WOMEN AGED <35 AND >35

Keywords: maternal age, gestational diabetes, gestational hypertension, IVF pregnancy, iron deficiency anemia, past abortion count

Objectives: Advanced maternal age (≥ 35) is associated with increased pregnancy risks. Given the rising prevalence of pregnancies in this age group, this study evaluates the impact of maternal age on key pregnancy risk factors, including gestational diabetes, hypertension, and the need for cesarean delivery.

Methods: A retrospective study analyzed medical records of 200 primiparous women (January–December 2023) at Riga Maternity Hospital, divided into two age groups: <35 ($n=100$) and ≥ 35 ($n=100$). Data on demographics, pregnancy outcomes, and risk factors were collected. Statistical analyses were performed using IBM SPSS.

Results: A significant association was found between maternal age and gestational diabetes, with 16% (n=16) of women >35 diagnosed, compared to 7% (n=7) in women <35 ($p=0.046$). No significant link was found between gestational diabetes and macrosomia ($p=0.338$). Pregnancy-induced hypertension was present in 12% (n=12) of women >35, compared to 11% (n=11) of women <35 ($p=0.825$). IVF pregnancies were more common in women >35 24% (n=24) compared to those <35 8% (n=8) ($p=0.002$). Spontaneous abortions occurred in 24% (n=24) of women >35 and 10% (n=10) of women <35, while legal/medical abortions were more common in women <35 15% (n=15) than in women >35 12% (n=12) ($p=0.003$). Iron deficiency anemia was observed in 43% (n=43) of women <35 and 32% (n=32) of women >35 ($p=0.108$).

Conclusions: This study highlights that women aged >35 have a higher prevalence of gestational diabetes, with increased spontaneous abortions and IVF pregnancies, both linked to higher pregnancy risks. While no significant differences were found for hypertension, macrosomia or iron deficiency anemia, the findings stress the need for targeted prenatal care, especially for older women and those with IVF pregnancies.

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IMPACT OF PERITONEAL DIALYSIS ON PATIENTS' WORK ABILITY

Background: Chronic kidney disease (CKD) is one of the most prevalent conditions worldwide. The majority of CKD cases progress to the terminal stage, requiring dialysis to perform the vital function of filtering blood. While life-saving, dialysis affect some aspects of a person's life, such as the ability to work. The topic is relevant since employment is an integral part of the a full-fledged social life.

Aim: The primary objective of this study was to examine the impact of peritoneal dialysis on individuals' work abilities.

Methods: An anonymous survey was conducted among patients with end-stage kidney disease undergoing peritoneal dialysis (PD) procedures at the PSCUH Nephrology Center. Patients were asked to evaluate changes in their work following the initiation of dialysis using a subjective scale (0–10). Furthermore, they were asked to describe changes in their employment status after starting dialysis. Statistical analysis was performed using SPSS Statistic 29.0, with indicative of statistical significance of p-value<0.05.

Results: A total of 24 patients undergoing PD participated in the study. There were 11 men (45,8%) and 13 women (54,2%), with a mean age of 53.8(±17.6).

The first parameter assessed was the Working Ability(WA) scale. The mean WA score before dialysis was 8.2±2.1, which decreased to 5.8±2.3) after the initiation of dialysis. A paired-sample t-test revealed a statistically significant decline in WA scores before and after dialysis (95% CI: 0.99-3.68, $p<0.001$).

Working status evaluation: before dialysis 18(75%) participants were employed, while 6(25%) were not. After starting dialysis, 11 participants (45.8%) remained employed, whereas 13(54.2%) were not. The McNemar test indicated a statistically significant change in employment status following the initiation of dialysis($p=0.016$).

Conclusion: The study's findings indicate a significant decline in self-reported work ability and employment status among patients after initiating PD treatment.

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IMPACT OF VARIOUS FACTORS ON SURVIVAL IN PATIENTS WITH RADICALLY OPERATED GASTRIC CANCER BETWEEN 2019 AND 2023 AT THE LATVIAN ONCOLOGY CENTRE

Background: Gastric cancer is one of the most aggressive malignancies of the digestive tract and is a leading cause of mortality. Despite advances in diagnostic and treatment techniques, patient survival still depends on several prognostic factors that determine the course of the disease and the effectiveness of treatment.

Radical surgery, including gastric resection or total gastrectomy with lymph node dissection, is essential to achieve complete tumour removal and improve the long-term survival of patients. However, the postoperative prognosis depends on several clinicopathological parameters

Aim: To investigate the impact of several factors (age, pathological TNM stage, tumour location, histological type, extent of surgery, limfadenectomy type) on 5 and 3-year survival according to the number of lymph nodes excised in patients with gastric cancer.

Methods: This retrospective study collected data on 319 patients with radically operated gastric cancer at Riga East Clinical University Hospital, Latvian Oncology Centre, between 2019 and 2023. Data were analysed using the Univariate method (Kaplan-Meier). Patients were divided into 3 groups according to the number of lymph nodes dissected: group 1 (more than 15 lymph nodes dissected), group 2 (more than 25 lymph nodes dissected), and group 3 (more than 40 lymph nodes dissected).

Results: In the univariate (Kaplan-Meier) test, 5-year survival in group 1 (more than 15 lymph nodes) was affected by age ($p = 0.008$), pathological TNM stage ($p < 0.001$), type of surgery ($p = 0.016$), but tumor localisation ($p = 0.182$) and histological type ($p = 0.321$) had no statistical significance on survival.

In the univariate (Kaplan-Meier) test, 5-year survival in group 2 (more than 25 lymph nodes) was affected by age ($p = 0.046$), pathological TNM stage ($p < 0.017$), type of surgery ($p = 0.047$), but tumor localisation ($p = 0.296$) and histological findings ($p = 0.879$) had no statistical significance on survival.

In the univariate (Kaplan-Meier) test, 5-year survival in group 3 (more than 40 lymph nodes) was affected by pathological TNM stage ($p < 0.005$) and extent of surgery ($p = 0.043$), but the other factors were not statistically significant.

Conclusion: The results show that the stage of the disease, the extent of surgery and the age of the patient are important prognostic factors for patient survival. The extent of lymph node examination may provide additional information, but its impact depends on other clinical factors. A higher number of lymph nodes excised may provide more accurate staging, which could help to improve treatment tactics and prognosis.

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IMPACT ON SURVIVAL OF GASTRIC CANCER PATIENTS – INTERCONNECTION BETWEEN LOCATION OF THE GASTRIC CANCER, GASTRIC CANCER DIFFERENTIATION GRADE AND TOTAL OR SUBTOTAL GASTRECTOMY

Background. The authors review the use of two surgical methods in practice - total gastrectomy with ROUX en Y reconstruction and subtotal-distal gastrectomy with ROUX en Y reconstruction. The authors examine statistics on correlation between the location of the gastric cancer and the chosen type of surgery, gastric cancer differentiation grade and the chosen type of surgery, and location of the gastric cancer and rate of survival.

Aim. This research aims to comprehensively investigate the gastric cancer patient rate of survival in connection with three factors - location of the gastric cancer, gastric cancer differentiation grade, and chosen type of surgery.

Methods. A retrospective study of patients with gastric cancer who had undergone surgical treatment. The data was collected from medical documents of patients from 2019-2023.

Results. The authors used Crosstab method to statistically cumulate data of tumour location and surgery volume, comparing how many patients underwent total or subtotal gastrectomy, depending on the location of the tumour. The middle third is the most common tumour site, with 264 out of 319 cases. In the middle third total gastrectomy is used for 127 patients, but subtotal gastrectomy is used for 137 patients.

Total gastrectomy is predominant for tumours of the proximal third (30 out of 34 cases). Subtotal gastrectomy is more common for distal third tumours (19 out of 21 cases). Authors found correlation between "G" (level of differentiation) and "Op_apj" (total or subtotal gastrectomy): high differentiation in 25 cases (14 total and 11 subtotal), medium differentiation in 111 cases (48 total and 8 subtotal), low differentiation in 181 cases (97 total and 84 subtotal). The mean survival time is the highest in the proximal third (21.03 months), the lowest in the distal third (16.22 months).

Conclusion. Statistically significant correlation between tumour localisation and surgical volume ($p < 0.05$) is proven. A p-value of 0.190 is not statistically significant relationship between the level of tumour

differentiation and the type of surgery. There is no evidence that survival curves differ significantly between different tumour types based on p-value being over 0.05.

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INCIDENCE OF CHILD SLEEP DISORDERS IN FAMILY DOCTOR'S PRACTICES IN LATVIA

Background. Sleep in childhood is an important factor for full development. Studies show that the quality of sleep in children at a young age affects mood, cognitive functions, memory, learning ability, and motor skill development. Literature data shows that at least a quarter of children under the age of 6 have sleep disorders, which in turn increases the risk of obesity, depression, and hypertension in the future.

The aim of the study was to determine parents' awareness of sleep disorders, their prevalence, and the involvement of family doctors in patient education for children aged 3-6 in Riga and the regions.

Methods. This study corresponds to retrospective cohort study with quantitative data collected with survey on "Google docs". The survey was carried out from November 2023 to March 2025. The analysis of data used frequency tables, graphs, and statistical tests to determine the trends in respondents' responses, as well as whether there was a statistically significant relationship between variables at different points.

This work mainly used three methods for determining dependence: Chi-square test, χ^2 test, Fisher's test, Kruskal-Wallis test, Logistic regression.

Results. The study analyzes sleep disorder incidence in children using 117 survey responses from family doctor practices in Latvia. Respondents, 97.4% mothers, reported on children averaging 4.5 years (SD=1.1), with 37.6% aged 5, 53% girls, and 73.5% living in regions. Most (88%) have no chronic illnesses, 71.8% of the children nap. Sleep disturbances were reported in 20.5%, 70.9% have not sought information and 47.9% have not used medication. Bedtime rituals occur in 70.1%, 48.7% sleep in the same room as parents, and 70.1% sleep separately. Family doctors asked about sleep in 25.6% of cases and provided advice in 12.8%.

Statistical tests found no significant links between sleep disorders and gender ($p=0.5764$), age ($p=0.1701$), napping ($p=0.93237$), or rituals ($p=0.72942$). Chronic illness showed a significant correlation ($p=0.03832$, odds ratio=3.49), with affected kids experiencing more disturbances. Sleeping with parents (room: $p=0.4077$; bed: $p=0.4077$) showed higher disturbance rates (e.g., 29.9% in same bed vs. 20.5% overall) but wasn't significant. Family doctor inquiries ($p=0.7317$) or advice ($p=0.772$) had no significant impact. Regionally, disturbances were higher outside Riga (e.g., 73.5% of sample, ~22% disturbed vs. 26.5% in Riga, ~15%) but not significant ($p=0.3348$).

Conclusion. Most family doctors in Riga and the regions do not ask or provide information about children's sleep. Chronic illness (12% of sample) is the only factor with a statistically significant link to sleep disorders (20.5% of total sample).

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EVALUATION OF CLINICAL PROPERTIES OF KLEBSIELLA SPP. BACTERIOPHAGES FOR THERAPEUTIC USE - PHAGE THERAPY AS A LAST RESORT FOR DRUG-RESISTANT INFECTIONS

KEYWORDS: BACTERIOPHAGES, PHAGE THERAPY, ANTIMICROBIAL RESISTANCE, NOSOCOMIAL INFECTIONS

Introduction: *Klebsiella pneumoniae* is one of the most common causes of nosocomial infections, with an emerging number of antimicrobial-resistant strains. Phage therapy is an alternative way to treat infections using bacteriophages, that represents a promising solution for managing infections caused by antimicrobial-

resistant *Klebsiella spp.*. In this study lytic bacteriophages infecting local *K. pneumoniae* strain were isolated and tested on their ability for therapeutic use.

Methods: ESBL-producing *Klebsiella pneumoniae* strain RSU-KP-L was isolated from the patient with chronic osteomyelitis due to phlegmon, and bacteriophages from existing RSU collection were tested for susceptibility. Wastewater from Riga's sewage and hospitals was used to isolate novel phages infecting RSU-KP-L. Microbiological characterization of novel phages included determination of plaque morphology, TEM, host-range testing, lysis, adsorption, and one-step growth curve. Whole genome sequencing was performed and analysed

Results: An existing collection of 32 (previously isolated and sequenced in RSU) of *K. pneumoniae* infecting phages showed no susceptibility for the patient's culture. Three novel phages: F4L, F9L and F10L were isolated, purified, and propagated from Riga wastewater samples. They showed lytic properties against the patient's culture both in a liquid environment and on agar plates. The lysis curve for different MOIs, adsorption rate and time of burst were measured and expressed in diagrams. Susceptibility of three novel phages was tested on 58 *K. pneumoniae* strains from RSU laboratory collection both in a liquid environment and on agar plates; phage F4L showed lytic properties in the liquid environment on *K. pneumoniae* strain RSU-Z1 isolated previously from a local hospital patient's biological fluids and bacteriophage F9L showed lytic properties against RSU-ST219-1 clinical strain. Genetical testing revealed that all of three phages are novel, differ from one another and their life cycle is 99% virulent.

Conclusion: The microbiological and genetical properties of three novel bacteriophages are consistent with the ability to potentially be used for phage therapy. More microbiological investigation is needed before applying them for therapeutic use.

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MANAGEMENT CHALLENGES IN NETHERTON SYNDROME: INSIGHTS FROM CLINICAL EXPERIENCE

Keywords: Netherton syndrome, ichthyosis, SPINK5, LEKTI-1, failure to thrive, thrombocytopenia

Objectives: Netherton Syndrome (OMIM: 256500) is a rare autosomal recessive disorder characterized by impaired skin barrier function, hair abnormalities, and immune dysregulation. It results from pathogenic variants in the SPINK5 gene, leading to increased protease activity, premature desquamation, and elevated inflammatory cytokine production. This study aims to analyze the clinical variability, rare complications, and management challenges associated with Netherton

syndrome by combining evidence from prior studies with clinical insights.

Methods: A comprehensive literature review was conducted to analyze the clinical variability, complications, and management strategies of Netherton syndrome. Data from previously published studies were evaluated to identify trends in disease presentation and treatment approaches. Additionally, a retrospective analysis was performed, incorporating medical history data of an 11-month-old patient diagnosed with Netherton syndrome to illustrate key findings from the literature. Institutional approval was obtained from the Education and Science Department of the Children's Clinical University Hospital, and written informed consent was secured from the patient's legal guardian.

Results: Severe Netherton syndrome is characterized by generalized ichthyosiform erythroderma, enteropathy, recurrent life-threatening infections, and significant failure to thrive. In addition to well-documented complications, emerging evidence suggests that rare manifestations, including severe thrombocytopenia, primary hypothyroidism, and focal seizures, may occur.

Conclusion: This study highlights the phenotypic heterogeneity of Netherton syndrome and the potential for severe, uncommon complications. The findings emphasize the necessity of an individualized, multidisciplinary treatment approach to improve patient outcomes.

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KNOWLEDGE AND AWARENESS OF HUMAN PAPILLOMA VIRUS (HPV) INFECTION AND ITS PREVENTIVE VACCINATION AMONG PARENTS OF CHILDREN AGED 12 TO 17 YEARS OLD IN LATVIA

Introduction. Human papillomavirus (HPV) is a common virus with over 150 known types. HPV infection affects equally men and women. The best prevention is vaccination against HPV specific types. Since 2022, HPV vaccination has been included in the Latvian immunization schedule for both girls and boys starting at the age of 12, and it is state-funded. Unfortunately, parents still refuse to vaccinate their children.

Aim of the study was to determine parents' knowledge and awareness of HPV infection and its related diseases, vaccination against HPV in Latvia for children aged 12 to 17 years old. Additionally, to analyze the factors influencing parents' decision to either vaccinate or not vaccinate their children against HPV.

Methods. A cross-sectional online survey was carried out among participants from January to March 2025. Statistical analyses were done by Chi-square test, G-test, Logistic regression.

Results. The study analyzed 215 survey responses from parents in Latvia. The majority (n=179, 83.3 %) of respondents were women, aged between 36 and 45, with higher education and from urban areas. The responses were given for children (mean age 14.2 ($\pm$ 1.6 years) of which 115 were girls (53.5%) and 110 were boys (46.5%), most of which (n=164, 76.3%) have received other vaccination according to the children's vaccination schedule in Latvia, but have not received HPV vaccination 47.4 % (n=102). Study shows statistically significant association between child's HPV vaccination status and child's age, also parent's education, knowledge of the HPV high risk types, and whether the source of information about HPV is a doctor or another ($p < 0.05$).

Conclusion. Parent's knowledge and awareness of the human papillomavirus (HPV) affects vaccination coverage. Parents who received information about HPV from a doctor or parents with higher education vaccinated their children against HPV. The information provider must be trustworthy to ensure vaccination coverage.

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KNOWLEDGE OF DISEASE RECOGNITION, MANAGEMENT, AND FIRST AID AMONG PEOPLE WITH TYPE 1 DIABETES

Introduction. Almost two thousand patients with this disease are newly diagnosed every day. Approximately 46.5 % of patients do not even know that they are sick, so this news is very unexpected for patients, some patients refuse to treat it. The patient's attitude, knowledge and skills determine his ability to manage the disease.

Aim. To reveal the knowledge of disease recognition, management, and first aid among people with type 1 diabetes.

Materials and methods. The following methods were used in organizing and conducting the study: analysis of scientific and professional literature; quantitative research - questionnaire survey; graphic and descriptive analysis of the study results. The prepared questionnaire was posted on the online platform apklausa.lt. The principles of research ethics were followed during the study. 254 respondents participated in the study, but 6 questionnaires were incompletely filled out. Therefore, 2 percent. respondents were excluded from the study.

Results. It was determined that the main causes of type 1 diabetes were heredity, nutrition and obesity, and the symptoms were thirst, drinking a lot of water day and night, frequent and abundant urination, increased appetite, but decreasing weight. Most respondents indicated that when managing their illness, they avoid products and drinks high in sugar if they suspect hypoglycemia, measure blood glucose levels before each meal, measure blood sugar levels before and after physical exertion, count carbohydrates and try to eat at the

same time. Respondents said that the best skills in managing the disease are: the ability to inject insulin, to know all the symptoms of hyperglycemia and hypoglycemia. When providing first aid, the majority of respondents incorrectly indicated what needs to be done.

Conclusion. Respondents correctly described the recognition, management of type 1 diabetes but could not correctly name the order of first aid actions.

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LYME BORRELIOSIS IN OUTPATIENT PRACTICE

Background: Every year, several hundred cases of Lyme borreliosis are registered in Latvia. Diagnosis includes a characteristic clinical picture, epidemiological anamnesis and serological examination. Basing the diagnosis solely on positive serological results may involve false positives and false negatives.

The purpose of the Thesis: To evaluate whether the diagnosis of Lyme borreliosis in Latvia is not exaggerated, whether there is a correlation between clinical symptoms and the results of laboratory examinations.

Materials and methods: The retrospective study was conducted in the archives of the Latvian Center for Infectology. The medical charts of 188 patients diagnosed with Lyme borreliosis who visited the LIC outpatient department in the period from 2020 to 2023 were analyzed. Demographic, epidemiological, clinical and laboratory indicators were analyzed, as well as the medication used and its duration of its effectiveness. The most significant results: 30% (N=57) of men and 70% (N=131) of women participated in the study. Average age 51.7 years. Patients from the Riga region make up 60% (N=113). The most epidemiologically significant results: 64% (N=121) confirm a tick bite. 27% (N=50) in the age group of 45-64 years. The most significant results of clinical symptoms: 21% (N=40) no characteristic redness, 19% (N=35) redness up to 5 cm in diameter. 68% (N=127) no joint symptoms, 24% (N=45) pain in 2 or more joints. In the age group from 45 to 64 years, 24% (N=19) have more pronounced joint symptoms, i.e. pain in 2 or more joints. In all age groups, 59-79% have no other symptoms. In the age group of 45-64 years, weakness and fatigue are more pronounced; in the age group from 30-44 years - headache; in the age group from 18-29 years - ↑Temperature + headache. Serological results: IgM ELISA 60% (N=112) positive, 26% (N=49) in the age group of 45-64 years. IgG ELISA 52% (N=97) positive, 22% (N=41) in the age group of 45-64 years. IgM IB 69% (N=129) no data, while 20% (N=37) positive, 9% (N=17) in the age group of 45-64 years. IgG IB 62% (N=116) no data, while 23% (N=43) positive, 10% (N=18) in the age group of 45-64 years. For Borrelia DNA, 65% (N=123) have no data, 34% (N=64) have a negative result. Selected therapy: In all age groups, the active substance of the therapy medication is doxycycline. Duration of treatment 30% (N=56) 21 days.

Conclusions: The study of the relationship between clinical symptoms and the results of laboratory tests proves that there is an insignificant (weak) relationship between clinical symptoms (redness, joint symptoms, other symptoms) and laboratory tests (IgM, IgG ELISA, IB and Borrelia DNA).

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LIFE-THREATENING COMPLICATIONS IN PATIENTS WITH ACUTE CORONARY SYNDROME WITH ST SEGMENT ELEVATIONS DURING THE PRE-HOSPITAL CARE

Background: Diseases affecting the cardiovascular system remain the leading cause of death worldwide, despite the advancements of modern medicine. Each year, approximately 17.3 million people around the world die from cardiovascular diseases.

Aim: To determine the frequency, types, and correlation of life-threatening complications with myocardial injury localization in cases of acute coronary syndrome with ST-segment elevation (STEMI).

Methods and the object of research: An quantitative retrospective data analysis of 118 patients medical records with STEMI of Riga East Clinical University Hospital, Emergency Medicine and Patient Admission Clinic was conducted.

Results: In cases of STEMI, the following three life-threatening complications are most commonly observed:

- Clinical death, occurring in 22% of cases (26 patients);
- Pulmonary oedema, observed prehospitally in 9% of cases (10 patients);
- Cardiogenic shock, developing in only 4% of cases (5 patients).

The risk of clinical death is proportionally higher when both the left anterior descending (LAD) and left circumflex (LCX) arteries are affected simultaneously, occurring in 33% of cases (2 patients).

Pulmonary edema most frequently develops in patients with STEMI when LAD artery is affected, occurring in 13% of cases (8 patients).

Cardiogenic shock most commonly develops when both (LAD and LCX arteries are involved, occurring in 17% of cases (1 patients).

Conclusion: Analyzing and summarizing the study data, it can be stated that the localization of myocardial infarction and the affected coronary artery significantly influences the probability of life-threatening complications in patients with acute coronary syndrome with ST-segment elevation during the prehospital care.

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METABOLIC PROFILING OF CYSTIC FIBROSIS NEGATIVE NEONATES

Introduction. Cystic fibrosis (CF) is an inborn autosomal recessive genetic disorder that affects various organ systems (Radlović et al, 2012). Newborn screening (NBS) for CF allows early identification of CF patients, which leads to better survival because of successful early therapeutic interventions (Hanssens et al, 2021).

Detection of serum immunoreactive trypsinogen (IRT) is used as the initial screening test for CF and is sensitive but not specific enough due to other pathological conditions which can also cause increase of IRT levels in blood of neonates (Kharrazi et al, 2016).

Metabolites play a significant role in control of gene and protein activity. Thereby profiling of metabolites has a potential to provide clinicians with biomarkers which could be used as a new diagnostic tool for CF patients (Cobián Güemes et al, 2019).

Aim. The aim of this study was to analyse metabolites that could affect level of IRT using tandem mass spectrometry in dried blood spots (DBS) extracts of neonates included in newborn screening. As well detect those metabolites which could be used as biomarkers for CF screening.

Materials and methods. 110 newborn DBS specimens were collected from NBS samples kept in the Rīga Children's Clinical University Hospital laboratory and put in the Eppendorf tubes for further transportation. After that a special solvent was added to the specimens for metabolite extraction and further tandem mass spectrometry analysis performance to detect metabolites.

Results. Metabolites were identified with targeted liquid chromatography-mass spectrometry (LC-MS) analysis. Between control and study groups, there was a significant difference ($p < 0.05$) in concentration of nine metabolites such as amino acids and acylcarnitines. Measured proportion of Glutamic acid/Creatinine: L-Glutamine and Glutamic acid: Creatinine provide good predictive accuracy (AUC = 0.80 and AUC = 0.78 respectively) to differentiate real CF cases from false positive screening results.

Conclusions. Understanding of metabolomic phenotype difference between healthy newborns and neonates with elevated first IRT measurement can help to increase specificity of CF NBS in the future by expanding or replacing some stages with specific biomarker panel analysis performed by LC-MS.

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METASTASIS AND HUMAN PAPILLOMAVIRUS PREVALENCE IN BASE OF TONGUE CANCER PATIENTS BY GENDER

Background. Base of tongue cancer is an oropharyngeal cancer, and its incidence has increased in recent years. A risk factor that often affects the development of base of tongue cancer is human papillomavirus (HPV).

Aim. The aim of the study is to analyze whether the presence of human papillomavirus affects the metastatic spread of base of tongue cancer, considering the patient's gender in Riga East University Hospital (Oncology Centre of Latvia).

Methods. The study used a retrospective study analysis of patients with base of tongue cancer in the Riga East University Hospital (Oncology Centre of Latvia) from 2022 to 2023. The study included 29 patients, and the data were taken from the platform "Doctor's Office" and processed in MS Excel. Positive or negative HPV in patients was assessed by immunohistochemical testing.

Results. The study included 29 patients with base of tongue cancer, of whom 83% (n=24) were men and 17% (n=5) were women. HPV-positive patients totaled 41% (n=12), and HPV-negative were 59% (n=17). Cervical lymph node metastases were present in 75% (n=6) of men in HPV-positive cases. Cervical lymph node metastases were present in 100% (n=4) of women in HPV-positive cases. There were no metastases in 25% (n=2) of all HPV-positive men. 94% (n=15) of HPV-negative men had cervical lymph node metastases, of which 27% (n=4) had distant metastases to the lungs. One woman who was HPV-negative had cervical lymph node metastases. 6% (n=1) of HPV-negative men had no metastases.

Conclusion. Of the patients with a base of tongue cancer, HPV-positive was detected almost twice as often in men (67%) as in women (33%). Cervical lymph node metastases were 25% more common in women than in men. HPV-positive or negative men were more likely to have no metastases compared to women. All HPV-positive and negative women had cervical lymph node metastases (n=5). Distant metastases were to the lungs in 25% (n=4) of HPV-negative men.

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MORPHOLOGY AND EPIDEMIOLOGY OF FATAL ELECTRICAL INJURIES IN LATVIA

Keywords: electrocution, electrical sign, forensic medicine, autopsy, skin

Introduction: Electric shock is a significant public health problem worldwide and in Latvia. In addition to epidemiological research to identify injury mechanisms and improve patient outcomes, understanding the morphology of electrocution is also important, as it can provide valuable information to clinicians and researchers.

Objectives: To epidemiologically characterize electrocution cases. To determine the factors that influence the occurrence of electrocution. To investigate the morphological diversity of electrocution signs.

Materials and methods: A retrospective study was conducted at Valsts Tiesu Medicīnas Ekspertīzes Centrs, including data on 62 cases of fatal electrotrauma that occurred between 2013 and 2022. The data analysis includes information on forensic conclusions, histological results, blood alcohol concentration and other intoxicating substances in the blood, circumstances of fatal electrotrauma, physiological factors (gender, age), epidemiology of incidents and seasonality. On the basis of the obtained data, the correlation between the type of injury and the season was evaluated using the chi-square test and the Mann-Whitney test.

Results: All cases of electrotrauma were accidental. Men accounted for 82,2% (N=51) of victims, with an average age of 44. 27,4% (N=17) of fatal electrocution cases occurred in the Pierīga region. Alcohol was detected in the blood of 33,8% of the victims. A statistically significant difference in alcohol concentration was found between the deceased individuals from electrocution cases that occurred in domestic and work environments (Mann-Whitney test, $p < 0.05$). 48% (N=30) of cases occurred during the summer period. There was no significant association between the type of injury and the season (Chi-square test, $p = 0,47$). More frequent localization of electrocution signs (51,6% N=32) was on the left palm. The typical histological finding in 85,4% (N=53) of cases was the elongation of the Malpighian layer and skin gland cells and nuclei.

Conclusion: Between 2013 and 2022, a total of 62 forensic autopsies with histological examinations were conducted, where the cause of death was determined to be electrocution, averaging 3,1 cases per year per one million people in Latvia. Alcohol intoxication is a significant factor contributing to lethal electrocution in a domestic environment. Both in domestic and work environments, males are more susceptible to fatal electrocution. When determining the cause of death as electrocution, forensic experts rely on the identification

of electrocution signs during autopsy, typical histopathological findings, along with considering the circumstances of the case and conducting a detailed investigation of the incident location.

References

- Spkc.gov.lv (2016). *Starptautiskā statistiskā slimību un veselības problēmu klasifikācija*. 10th ed. [online] Pasaules Veselības organizācija. Available at: https://ssk10.spkc.gov.lv/rsc/SSK_1_Ievads_20190507.pdf. stat.gov.lv. (2020). *Kas skaitliski raksturo katru no Latvijas 6 reģioniem?* [online] Available at: <https://stat.gov.lv/lv/statistikas-temas/iedzivotaji/iedzivotaju-skaits/preses-relizes/5828-kas-skaitliski-raksturo-katru> Veselības statistikas datubāze (2021). *TRAU020. Reģistrēto ievainojumu skaits sadalījumā pēc ievainojuma veida, dzimuma un vecuma grupām-PX-Web*. [online] PX-Web. Available at: https://statistika.spkc.gov.lv/pxweb/lv/Health/Health__Saslimstiba_Slimibu_Izplatiba__Traumas_un_i evainojumi/TRAU020.%20Ievainojuma%20veidi_dzimums_vecums.px/ Arkuszewski, P., Meissner, E. and Szram, S. (2014). Autoerotic death due to electrocution. *Archives of Forensic Medicine and Criminology*, 1, pp.44–49. doi:<https://doi.org/10.5114/amsik.2014.44589>. Bellini, E., Gambassi, G., Nucci, G., Benvenuti, M., Landi, G., Gabbrielli, M. and Vanezis, P. (2016). Death by electrocution: Histological technique for copper detection on the electric mark. *Forensic Science International*, 264, pp.24–27. doi:<https://doi.org/10.1016/j.forsciint.2016.03.013>. Blumenthal, R. (2009). A retrospective descriptive study of electrocution deaths in Gauteng, South Africa: 2001–2004. *Burns*, 35(6), pp.888–894. doi:<https://doi.org/10.1016/j.burns.2009.01.009>. Campbell, R. (2022). *FATAL ELECTRICAL INJURIES AT WORK*. [online] www.nfpa.org. Available at: <https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics-and-reports/Electrical/osFatalElectricalInjuries.pdf>. Cherington, M., Olson, S. and Yarnell, P.R. (2003). Lightning and Lichtenberg figures. *Injury*, 34(5), pp.367–371. doi:[https://doi.org/10.1016/s0020-1383\(02\)00313-3](https://doi.org/10.1016/s0020-1383(02)00313-3). Dokov, W. and Dokova, K. (2011). *Epidemiology and Diagnostic Problems of Electrical Injury in Forensic Medicine*. [online] www.intechopen.com. IntechOpen. Available at: <https://www.intechopen.com/chapters/19164> Eurostat (2022). *Accidents and injuries statistics*. [online] ec.europa.eu. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Accidents_and_injuries_statistics

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PATIENT SAFETY IN THE CLINICAL PRACTICE OF MEDICAL COLLEGE STUDIES

Introduction: Patient safety and prevention of adverse events remain important issues in healthcare. In developed countries, an average of 1 in 10 patients is exposed to adverse events while receiving healthcare (WHO, 2021). The aim of the research: To describe the aspects of patient safety observed in the clinical practice of medical college students.

Methods: Quantitative sample data analysis on the implementation of patient safety during the clinical practice of students in the 2023/2024 academic year. Research instrument – a survey questionnaire developed by the authors. The survey was conducted using the Google Forms document website. Microsoft Excel program was used to collect data. The study was attended by 66 (n=66, which corresponds to 100%) respondents, 1st and 2nd year students of the P. Stradins Medical College of the University of Latvia study program "Medicine". Respondents provided answers about the practice based on both observations and their own activities. Research period – 30.05.2024. – 30.06.2024.

Results: The results of the study showed that patient identification was always performed in 94% (n=62) of cases, in 62% (n=41) of cases the identification procedure was performed correctly, while in 10% (n=7) of cases identification was not performed before each procedure or manipulation. Only in 62% (n=41) of cases did healthcare staff perform hand hygiene, in 12% (n=8) of cases did not always change procedure gloves after contact with the patient or biological fluids, while in 17% (n=11) of cases the same gloves were used for several patients. Disinfection of reusable equipment after each procedure was performed in 82% (n=54) of cases. 49% (n=32) of respondents indicated that informational materials were available when preparing medications or special equipment at the workplace. 35% (n=23) of respondents indicated that in the event of identification, medication or care errors, they were discussed. 48% (n=32) of respondents indicate that during their practice, healthcare staff did not always act in accordance with guidelines.

Conclusions: In almost half of the cases, healthcare staff did not always act in accordance with guidelines, in some cases hand hygiene was not performed, gloves were not changed, and equipment was not disinfected after each patient, which indicates the need to improve infection control measures in practice settings.

Literature: WHO, (2021). Global patient safety action plan 2021-2030. Towards eliminating avoidable harm in health care. Available: <https://iris.who.int/bitstream/handle/10665/343477/9789240032705-eng.pdf?sequence=1> Accessed 23.01.2025.

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PHYSICAL ACTIVITY MONITORING IN PEDIATRIC ONCOLOGY PATIENTS: LITERATURE REVIEW

Keywords: *Physical activity monitoring, pediatric oncology patients.*

Relevance: Each year approximately 400 000 children develop cancer. Cancer itself and its treatment cause significant side effects and complications. It is known that physical activity has positive effects, decreasing treatment side effects and improving children's future health. For developing effective physical activity program and to help future studies on physical activity effects- physical activity monitoring tools are needed.

Objectives: The aim of this study was to identify existing physical activity monitoring tools in pediatric oncology patients.

Materials and methods: Analysis of scientific literature in the following databases: PubMed, Google Scholar, ProQuest, Ebsco, Web Of Science, Science Direct, Scopus, and Cochrane Library. The search was limited to publications in English during the period of 2000 to 2024.

Results: Currently there are two main tools for physical activity measurement in pediatric oncology patients- subjective self-assessment questionnaires or care-giver proxy reports, and objective accelerometry that measures step counts and gait cycles. There is no one united protocol that could be used internationally - each study used individualized methods - different accelerometers, measurements and questionnaires.

Conclusion: Currently there are limited possibilities in physical activity measurement in children with cancer. There is a need in one united protocol for physical activity measurement, future research in exploring most effective methods for measuring physical activity in pediatric oncology patients.

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POST LOWER EXTREMITY AMPUTATION MOBILITY-A WHODAS 2.0 BASED ASSESSMENT

Keywords. Lower limb amputation, mobility, WHODAS 2.0., post-amputation functioning, rehabilitation

Objectives. To determine the level of mobility of post lower extremity amputation patients. To contribute recommendations for improving post-amputation care and rehabilitation Strategies.

Methods. Telephone interview swere conducted with 24 post-lower extremity patients from the purulent surgery clinic of Riga Eastern university hospital. The world Health Organization Disability Assessment Schedule 2.0(WHODAS 2.0) was used to assess patient's mobility after lower extremity amputation. This study analyses the domain of mobility which consists of 5 question sections each determining the level of difficulty in the last 30 days. Descriptive statistics in Excel were used to analyze functioning difficulties in these areas and determine mean score, median score, standard deviation, interquartile range and severity of difficulty in percentage.

Results. The highest percentage of severe difficulty and level of problems was found in the area "walking a long distance such as a kilometer". With the mean score of 4,34, median score 5.0, severe difficulty percentage 90.4%, standard deviation 1.2. The lowest level of severe difficulty meaning the highest level of functioning was found in the areas of "Moving around home" with values of mean score 2,27, median score of 2 and level of severe difficulty of 53,33%, standard deviation 1,24.

Conclusions. The results show that after surgery most of the patients can gain mobility enough to move around their home and familiar environments but the function of mobility does not cover longer distances, which can cause a considerate strain on persons independence and managing of their daily needs.

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PRESCRIBING HABITS OF ANTIBACTERIAL THERAPY IN CHILDREN WITH ACUTE INFECTIONS IN PRIMARY CARE

Keywords: antibiotic prescription; children; primary care; acute infections;

Objectives: Most children seek help at the emergency room with acute signs of infectious diseases; however, these are most often self-limiting respiratory tract infections (RTIs), for which antibacterial therapy is not required. The aim of the study was to understand and analyze antibacterial prescribing habits for children with acute illnesses at the Children's Clinical University Hospital Emergency Room Primary Care department.

Methods: The retrospective study involved 746 pediatric patients (1 month to 17 years) with acute infections from the Children's Clinical University Hospital Emergency Room Primary Care department.

Results: In total, 746 children with acute infections were enrolled in the study, 74.0% (N=552) had acute upper RTIs, and 16.1% (N=119) had lower RTIs. Antibacterial therapy was prescribed in 46.5% of all cases. Antibiotics were prescribed to 43.3%(N=239) of patients with upper RTIs and 89.1% (N=106) with lower RTIs and in 49.3% cases of acute bronchitis. Diagnostic tests, including point of care tests, were performed in 52,8% (N=354) cases with RTIs. Among those tested with upper RTIs, 39.3% received antibacterial therapy. For lower RTIs, 68.9% (N=82) underwent diagnostic testing, and 92.7% of those received antibiotics. Antibacterial therapy was prescribed without diagnostic tests in 73.0% (N=27) of patients with lower RTIs. The CRP test was performed in 20,4% (N=137) of all RTIs cases. The median CRP in patients with antibacterial therapy was 31.0 mg/L.

Conclusions. Acute upper respiratory tract infections are the most common localization of infection in children, with the most frequent patients seeking medical help being aged 3-6 years. The prescription of antibacterial therapy for upper respiratory tract infections and in acute bronchitis remains high. As the patient's age increases, antibacterial therapy is initiated at higher CRP levels.

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PREVALENCE OF HEART FAILURE SYMPTOMS AND NATRIURETIC PEPTIDES DETECTION IN PATIENTS REFERRED FOR PLANNED CORONARY ANGIOGRAPHY

Keywords: Heart failure, natriuretic peptides, coronary angiography, prevalence, echocardiography, diagnosis.

Background: Heart failure with reduced ejection fraction (HFrEF) is a well-recognized condition; however, many patients with heart failure symptoms remain undiagnosed before undergoing planned coronary angiography (CAG). Natriuretic peptides (NPs) are crucial biomarkers for heart failure assessment but are not consistently measured. This study investigates the prevalence of heart failure symptoms and the utilization of diagnostic tools in this patient group.

Objective: To determine how frequently patients referred for planned CAG without a known diagnosis of HFrEF have symptoms suggestive of heart failure and whether these patients undergo appropriate diagnostic evaluation.

Methods: This is a cross-sectional, prospective study including adult patients (≥18 years) referred for elective CAG. Inclusion criteria require patients to have heart failure-related symptoms (dyspnea, fatigue, or oedema) for at least one month and the ability to complete a heart failure screening questionnaire. Patients with a previously known left ventricular ejection fraction (LVEF) <40%, recent acute coronary syndrome, severe comorbidities affecting NP levels, or recent hospitalization for acute cardiovascular disease were excluded. Data collection includes demographic and clinical characteristics, heart failure symptoms, NP levels, echocardiographic findings, and coronary angiography results. Statistical analyses include prevalence estimates, correlation assessments (Pearson or Spearman tests), and group comparisons (Chi-square, Fisher's exact, Student's t-test, Mann-Whitney U test). Multivariate regression adjusts for confounders.

Results: Primary outcomes include the prevalence of echocardiographic assessment and NP measurement in symptomatic patients. Secondary outcomes include the proportion of patients with confirmed heart failure who receive appropriate therapy and correlations between NP levels, echocardiographic findings, and questionnaire scores.

Conclusion: This study aims to identify gaps in heart failure recognition and diagnostic evaluation in patients undergoing planned CAG. Findings will help optimize screening strategies and improve early diagnosis and management of heart failure in this population.

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PSOAS ABSCESS IN PATIENTS WITH CHRONIC KIDNEY DISEASE AND CONFIRMED URINARY TRACT INFECTION: A RETROSPECTIVE COHORT ANALYSIS

Keywords: Chronic Kidney Disease, microbiological spectrum, psoas abscess, sepsis, urinary tract infection

Background. Retroperitoneal psoas abscess (PA) is a rare but serious clinical condition, especially when accompanied by chronic kidney disease (CKD) and urinary tract infection (UTI). Patients with CKD have an elevated risk of infection due to compromised immunity and altered renal clearance. Moreover, UTI may serve as a possible source of retroperitoneal infection, potentially leading to PA. Understanding the microbiological

spectrum and clinical presentation of PA in CKD patients is crucial for prompt diagnosis and effective treatment.

Aim. To investigate microbiological profiles and clinical characteristics of psoas abscess among patients with chronic kidney disease and a confirmed urinary tract infection.

Methods. A retrospective analysis was conducted on 124 patients diagnosed with retroperitoneal psoas abscess from 2012 to 2022. Demographic data, CKD stage, microbiological results from abscess, blood, and urine cultures, as well as clinical outcomes (including presence of sepsis), were collected. Statistical analysis was performed to compare cases of matching flora in abscess and urine, and CKD and sepsis rates.

Results. Of the 124 patients, median age 67 (IQR 57-76) years, 29.8% had confirmed chronic kidney disease. Urine cultures were positive in 22.6% of cases, most frequently *Escherichia coli*. *Staphylococcus aureus* dominated psoas abscess cultures (54.1% among positive results). In 15.3% of patients, the same microorganism was isolated from both abscess and urine, indicating a strong association ($p < 0.01$) with higher sepsis risk. Notably, patients with advanced CKD (stage III-IV) and matching abscess-urine flora had a greater likelihood of severe infection and complications.

Conclusion. Psoas abscess in CKD patients with confirmed UTI presents a distinct microbiological profile, featuring frequent *Staphylococcus aureus* in abscess cultures and *E. coli* in urine. The overlap of organisms and higher sepsis rates underscore the importance of early identification and aggressive management. Further research is needed to optimize prevention and treatment strategies in this high-risk population.

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QUALITY OF LIFE OF INDIVIDUALS WHO HAVE UNDERGONE BRAIN SURGICAL INTERVENTIONS IN LITHUANIA

Introduction. Quality of life is one of the parameters describing the success of brain tumor treatment. Patients who have undergone brain surgical interventions face changes in the quality of life not only due to health, but also due to social and economic factors.

Aim. To assess quality of life of individuals who have undergone brain surgical interventions in Lithuania.

Materials and methods. The following methods were used in organizing and conducting the study: analysis of scientific and professional literature; quantitative research - questionnaire survey; graphic and descriptive analysis of the study results. The study was conducted using a World Health Organization abbreviated questionnaire WHOQOL – Bref Quality of Life Questionnaire (modified questionnaire scores converted as a percentage). The questionnaire was placed on the Internet platform www.manoapklaus.lt, sending a link to Facebook groups: „Association of Lithuanian patients with brain tumors and their guardians“ and „Aneurysm“. 125 respondents took part in the study. During the research, the principles of research ethics were observed.

Results. The respondents rated their physical health badly after the brain intervention, as there was a very strong limitation of movement and physical pain. Also, the respondents were dissatisfied with their ability to work, ability to perform daily tasks. Meanwhile, they assessed the need for medical assistance and the sufficiency of the strength to live. Respondents assessed their psychological health poorly, because they felt sadness, anxiety, disappointment and depression. They were also dissatisfied with their life and themselves. And when assessing the area of social relations, it was found that the respondents were dissatisfied with their living conditions and relationships with others. However, they were quite satisfied with their sex life. The respondents had a bad assessment of their environment after the brain intervention. They also usually spent their leisure time unpleasantly.

Conclusion. All areas of quality of life after brain surgery interventions were rated poorly by all respondents.

RADIOTHERAPY AND SYSTEMIC THERAPIES IN METASTATIC CANCER: IMPACT ON PROGRESSION-FREE SURVIVAL

Background. Brain metastases impact survival and quality of life for cancer patients, with radiotherapy being a key treatment option. However, its effect on progression-free survival (PFS) varies based on treatment modality, patient and tumor biology. Additionally, systemic therapies like immunotherapy and targeted therapy may influence the progression-free survival, but their role in combination with radiotherapy remains not fully understood.

Aim. Evaluate progression-free survival (PFS) in patients with brain metastases treated with stereotactic radiosurgery (SRS), whole-brain radiotherapy (WBRT) and both treatments in combination. Assess the impact of gender, age, primary cancer origin, and systemic therapies on outcomes.

Methods. This retrospective cohort study analyzed 74 patients with brain metastases. Treatments included WBRT, SRS or both. Time to local progression was defined as the interval between the last therapy date and the first MRI-confirmed progression. Survival and progression-free intervals were analyzed using Kaplan-Meier estimates.

Results. Among 74 participants, 67.6% (n=50) were women and 32.4% (n=24) were men. 24.3% (n=18) underwent radiosurgery, 18.9% (n=14) underwent hypofractionated radiotherapy, and 56.8% (n=42) underwent whole-brain radiotherapy. The overall median PFS was 7.3 months. The median PFS was 8.8 months for radiosurgery, 7.2 months for hypofractionated radiotherapy, and 6.2 months for whole-brain radiotherapy. (p=0,054) The median PFS was 5.5 months for men and 8.1 months for women. The median PFS for melanoma was 8.1 months, breast cancer 7.7 months, lung cancer 8.8 months and other cancer types 6.2 months. (p=0,156) The median PFS with immunotherapy was 8.1 months, without 7.2 months. The median PFS with target therapy was 7.7 months, without 6.9 months.

Conclusion. In this retrospective study, treatment modality influenced progression-free survival. Stereotactic radiosurgery had the longest PFS (8.8 months), followed by hypofractionated radiotherapy (7.2 months) and whole-brain radiotherapy (6.2 months). These differences may be attributed to selection bias, as patients receiving SRS typically have better performance status and lower disease burden compared to those undergoing HFRT or WBRT. Differences in progression-free time depending on cancer origin, immunotherapy, or targeted therapy; were not statistically significant (p < 0.05). Further research is needed to assess the impact of systemic therapies in combination with radiotherapy on PFS and to validate these findings in larger, prospective cohorts.

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RESULTS OF COLONOSCOPY PERFORMED AFTER POSITIVE COLORECTAL SCREENING IN GENERAL PRACTITIONER PRACTICE

Keywords: Colorectal cancer, faecal occult blood test (FOBT), colonoscopy

Introduction. Colorectal cancer is the 3rd most common cancer worldwide and the 2nd leading cause of cancer-related deaths. It is commonly diagnosed in a late stage, which complicates treatment. In Latvia, for colorectal screening, FOBT test is used given by general practitioner (GP) to patients by age of 50-74 years once per 2 years. Of all 4 cancer screening programs available in Latvia, colorectal cancer screening has the worst coverage. Poor statistic data available to evaluate the screening, e.g., how many patients who had positive FOBT has any kind of disease in the large intestines.

Aim. Evaluate the results of colonoscopy after the FOBT test and time from given test until it is brought to the laboratory and from the laboratory test result until the colonoscopy, if necessary.

Materials and methods. Data were collected from patient history in general practitioner practice "Titurgas doktorāts". The results were collected about period from 2019 to 2024. The data was analysed in Microsoft Excel.

Results. Totally 565 tests were analysed out of which 11,5% (n=65) were positive and 88,1% (n=498) negative, 2 of them were collected in inappropriate way. Of the 65 positive FOBT tests only 53 completed the following colonoscopy. Out of those 53: 2 - visual malignancy; 27 - any size and type of polyps; 17 - diverticulosis, 7 - hemorrhoids; 1 - colon ulceration; 1 - lipoma and 12 - normal endoscopic findings.

The average time from receiving the FOBT test to bringing it to the laboratory was 26 days, and time from the FOBT positive result to the performed colonoscopy was 33 days. The average time from receiving the GP test to completion of the colonoscopy was 64 days.

Conclusion. More research is needed to compare and evaluate the results of the screening and colonoscopy done after FOBT test. Also, further studies to found out the reasons why it takes a long time to complete the test could be useful.

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RESULTS OF NEOADJUVANT TREATMENT IN LOCALLY ADVANCED RECTAL CANCER: A SINGLE CENTRE EXPERIENCE

Background. Neoadjuvant chemoradiation therapy, followed by surgery is widely used treatment method in treatment of locally advanced rectal adenocarcinoma. This kind of study has not been conducted in the Oncology Centre of Latvia.

Aim. The goal of this study was to evaluate the response subsequent to neoadjuvant chemoradiation therapy in locally advanced rectal adenocarcinoma and share the experience of this strategy in the Oncology Centre of Latvia.

Methods. A retrospective review of patients with locally advanced rectal adenocarcinoma treated in Oncology Centre of Latvia between November 2021 and December 2023 was performed. Altogether 125 patients with histologically proven rectal adenocarcinoma were treated with radiotherapy and concurrent 5-fluorouracil (5-FU), and 101 of these patients then went on to receive curative surgery. Pathologic response to neoadjuvant treatment was evaluated by comparing pathological staging (yp) with pre-treatment clinical staging (cTN).

Results. Altogether 125 patients with a mean age of 64 years received neoadjuvant chemoradiation therapy for histologically proven rectal adenocarcinoma. 64,8% (81 patients) were men and 35,2% (44 patients) were women. 93,6% (117 patients) were diagnosed by magnetic resonance imaging and 6,4% (8 patients) by computer tomography.

The majority of patients showed some response to neoadjuvant treatment. After chemoradiation therapy 81,6% (102 patients) went on to have surgery and 18,4% (23 patients) didn't receive surgery.

From the 102 people who received surgery 16,8% (17 patients) had a pCR, 69,3% (70 patients) showed downstaging and 13,9% (14 patients) had no change in staging.

From the 23 people who did not go on to surgery 39% (9 patients) did not receive surgery because of progression, 22% (5 patients) went into *watch and wait* and 39% (9 patients) did not go into surgery for other causes.

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RETROSPECTIVE ANALYSIS OF METASTATIC HORMONE-POSITIVE BREAST CANCER: RELATIONSHIP BETWEEN BREAST CANCER TYPE AND METASTASIS LOCATION

Introduction: Breast cancer ranks first among oncological diseases in women. It is a malignancy that has the ability to metastasize to various organs and tissues throughout the body. This process occurs when cancer cells detach from the primary tumor and spread through the lymphatic system or bloodstream, reaching distant sites such as the bones, liver, lungs, or brain. Additionally, it can metastasize to multiple sites simultaneously.

Aim. The aim of the study was to determine whether there is a statistically significant association between the site of tumor metastasis in hormone-positive metastatic breast cancer patients and the type of cancer (lobular or ductal carcinoma).

Methods. The selection of patients was carried out based on the conclusions of the multi-disciplinary tumor board of the Oncology Clinic at Pauls Stradins Clinical University Hospital from 2019 to 2024. A total of 98 patients with hormone-positive stage IV breast cancer were included. Then, using the laboratory data of the selected patients and the DataMed system, the sites of tumor metastasis were determined. Additionally, information about the cancer type was obtained from the doctor's office. After selecting the necessary data, the SPSS program and the Chi-square test were used to determine the correlation between the cancer type and the site of tumor metastasis.

Results. The results showed that there is a statistically significant association between ductal carcinoma and brain metastasis ($p=0.001$), lobular carcinoma and liver metastasis ($p=0.002$), and pleura ($p=0.002$). However, no statistically significant association was found between ductal carcinoma and bone metastasis ($p=0.457$), lungs ($p=0.86$), liver ($p=0.457$); peritoneum ($p=0.234$), bone and liver ($p=0.205$), bone and brain ($p=0.432$); lungs and liver ($p=0.884$); bone and lungs ($p=0.345$), pleura ($p=0.567$), skin ($p=0.967$). For lobular carcinoma, no significant correlation was found with brain metastasis ($p=0.447$), skin ($p=0.767$), bone and lungs ($p=0.623$), lungs and liver ($p=0.454$), bone and brain ($p=0.192$), bone and liver ($p=0.112$), peritoneum ($p=0.967$), lungs ($p=0.346$), and bones ($p=0.997$).

Conclusions. A statistically significant association was found between ductal carcinoma and brain metastases, lobular carcinoma and liver metastases, as well as pleural metastases. The results suggest that different types of breast cancer may be associated with metastases in specific locations, which could help predict the progression of the disease and guide the selection of appropriate treatment.

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RIGHT VENTRICULAR MYOCARDIAL INFARCTION- INCIDENCE, IMPACT ON HOSPITALIZATION TIME, COMPLICATIONS, LABORATORY FINDINGS. EXPERIENCE OF A SINGLE CENTER

Coronary artery disease (CAD) is the leading cause of death worldwide, and its impact is particularly significant when it comes to myocardial infarction (MI). Right ventricular myocardial infarction (RVMI) which, according to studies, accompanies ST-segment elevation MI (STEMI) in the inferior leads in up to 40% cases, is often overlooked.

Aim: to analyze the incidence of RVMI in patients with LV inferior wall STEMI, the impact of RVMI on the intensive care unit and hospital stay length, as well as on laboratory biomarkers reflecting MI and it's caused complications severity.

Methods: A retrospective, descriptive case series study was performed at the RAKUS Cardiovascular Disease Clinic. Cases of 176 patients, admitted with diagnosis codes I21.1, I21.2, I21.3, I21.9 between 01.07.2023 and 31.01.2024, were analyzed. RVMI diagnosis was based on echocardiography findings. Data was collected and analyzed using Microsoft EXCEL and IBM SPSS

Results: RVMI was found in 42 (23%) cases. During index hospitalization 3 patients died, 2 of them were in RVMI group. The length of hospitalization was significantly higher in patients with accompanying RVMI compared to those with only LVMI ($p=0.01$), as well as patients with RVMI spent more days in the intensive care unit (ICU) ($p=0.03$). In patients with RVMI the maximum Troponin T value was significantly higher compared to patients with only LVMI ($p=0.004$). Also, in LVMI patients with RV involvement significantly higher levels of ASAT ($p=0.02$), ALAT ($p=0.001$) INR ($p=0.01$), NT-proBNP ($p=0.01$), creatinine ($p=0.02$) were found. Diagnosis of RVMI appeared in only 12 (28.6%) of final (discharge) diagnoses.

Conclusions: RV involvement in LV inferior wall STEMI is associated with longer ICU and hospital stays. Laboratory findings are consistent with more severe myocardial damage and heart failure in patients with

RVMI accompanying LVMI. Despite the significant impact of RV involvement on complication development and the duration of hospitalization, it is still not properly recognized and diagnosed early.

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RISK FACTORS FOR URINARY TRACT INFECTIONS IN CHILDREN AGES FROM 1 TO 7 YEARS

Background: Urinary tract infection (UTI) is one of the most common illnesses among children from age 1-7 years old worldwide. Understanding the risk factors for this condition can help reduce the incidence of acute urinary tract infections in children.

The aim of the work: To assess parents' awareness of the risk factors associated with acute urinary tract infections in children.

Methods: This practical study employed a quantitative method. The research tool was a survey distributed to parents of preschool-aged children. The study was conducted from January 1, 2017, to December 1, 2017, involving 55 respondents—parents of children from ages 3-7 years. The research base consisted of two preschool education institutions.

Results: A total of 55 respondents participated in the study. Among them, 56% (n=31) were female, and 44% (n=24) were male. 78% (n=43) reported that their child had not experienced an urinary tract infection, while 18% (n=10) indicated their child had, and 4% (n=2) stated their child had experienced kidney inflammation. Among children who had experienced acute urinary tract infections, 98% (n=11) had been ill 1-2 times in their lifetime, 2% (n=1) had experienced 1-2 infections per year, and none had experienced more than 3 infections per year. The survey revealed that 65% (n=36) of parents knew improper intimate hygiene is a risk factor, while 35% (n=23) were unaware of this risk. Additionally, 52% (n=29) acknowledged improper toilet paper use as a risk factor, while 29% (n=16) believed it was not significant, 4% (n=2) did not view it as a risk, and 15% (n=8) did not answer. 48% (n=26) were unaware that improper toilet paper use could contribute to infections. Regarding soap selection, 45% (n=25) believed inappropriate soap choice could lead to infections, 35% (n=19) thought it had minimal impact, and 11% (n=6) believed it had no effect. In total, 55% (n=30) were unaware that improper soap selection could be a risk factor. 75% (n=41) identified infrequent underwear or diaper changes as a risk factor, while 25% (n=14) believed it only had a partial effect. Furthermore, only 51% (n=28) recognized insufficient fluid intake as a contributing factor, 6% (n=3) believed it had no effect, and 7% (n=4) had no opinion. Regarding cold feet, 23 respondents considered it a contributing factor, 21 believed it had a partial impact, and 3 thought it had no effect. When asked about pinworms, 10 respondents believed they were a significant risk factor, 20 thought they had a minor influence, and 2 believed they had no effect. For frequent viral or bacterial infections, 14 respondents believed they contributed, while 8 thought the influence was minor. 80% (n=44) were aware that genital inflammation is a risk factor, whereas 20% (n=11) believed it had minimal influence.

Conclusion: The author concludes that a significant portion of parents are not fully informed about all risk factors that may cause acute urinary tract infections in children.

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SMALL CELL LUNG CANCER TREATMENT RESULTS AT PCSUH ONCOLOGY CLINIC IN 2022

Introduction: Small cell lung cancer is the most aggressive type of lung cancer, although the response to chemotherapy according to literature is around 70% and it prolongs survival and quality of life of the patients significantly. Without treatment the median survival is 1-3 months. There are around 30 primary SCLC patients annually in PCSUH. Most of them are assigned to specific treatment, but many are lost from follow up due to rapid performance status deterioration.

Aim: Aim of this study was to evaluate treatment results of primary diagnosed SCLC patients – how many of them did not receive specific treatment or died early from the progression of disease or any other causes.

Material and Methods: A retrospective analysis of the year 2022 lung cancer multidisciplinary team (MDT) records was done. Inclusion criteria were newly diagnosed patients and histologically confirmed diagnosis of SCLC. Clinical data were evaluated (age, stage, specific treatment received, response to treatment, date of progression, date of death). For those of whom exact death dates were not known, we considered them lost to follow up/deceased 1 month from the date of last contact/examination at medical data bases.

Results: In total, 13 patients (n=13) were identified with SCLC in the year 2022 at PCSUH MDT records. Three of these patients (n=3) were not newly diagnosed and therefore excluded from the analysis. From 10 patients 3 were women and 7 men. 8 patients have stage 4 disease and 2 patients - stage 3 disease. Average age was 68.5 years (63-75). For the three of these patients (n=3) only best supportive care was assigned by MDT due to bad performance status or uncontrolled concomitant diseases. From the remaining patients (n=7), only three (n=3) received chemotherapy at PCSUH - 2 patients responded to treatment with stable disease as a best response to the first line treatment and 1 have died from chemotherapy complications after first cycle. Four patients (n=4) lost to follow up or died within 1-4 weeks after MDT meeting. 3 were hospitalized in Daugavpils Regional Hospital with deterioration due SCLC progression/COVID/pneumonia, 1 died at PCSUH cardiology department due to decompensation of concomitant diseases.

Conclusions: Only 3 from 7 (43%) SCLC patients received at least one chemotherapy cycle and only 2 (66%) of these 3 patients achieved survival more than 3 months with stable disease as a best response to the first line treatment. 1 patient died after 6 months from COVID infection, another lost from follow up after 5 months. 1 year survival is 0% for the SCLC patients in 2022. The number of SCLC patients and treatment results are inferior in 2022 than previously reported in 2012¹ at PCSUH, most probably due to Covid-19 pandemia.

References: KOZIROVSKIS V., BĒRZIŅA V., GERIŅA-BĒRZIŅA A., SKUJA E., ŠORUBALKO A. & PURKALNE G. 2012. Small cell lung cancer treatment in Pauls Stradins Clinical University Hospital (Riga, Latvia) 2013. Update after 3 year follow up.

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STUDY OF METASTATIC BREAST CANCER PATIENTS: A DESCRIPTIVE APPROACH

Introduction: Breast cancer can manifest in various forms, including hormone receptor-positive, HER2-positive, or triple-negative, each requiring a tailored treatment approach. Treatment often involves a combination of methods, such as surgery, chemotherapy, radiation therapy, and targeted therapy, depending on the cancer type and stage. Targeted therapy and immunotherapy are modern approaches that help specifically target tumor cells, improving treatment outcomes.

Methods: Patient selection was carried out based on the conclusions of the multi-disciplinary tumor board at Pauls Stradins Clinical University Hospital Oncology Clinic in 2022. A total of 43 patients with stage IV breast cancer were enrolled in the study, selected from an initial pool of 692 patients, using laboratory data from the selected patients and the DataMed system. After selecting the necessary data, the SPSS program was used, as well as the physician's office program for data retrieval.

Results: Stage 4 is found in 6.21% of patients. The average age of patients with breast cancer is 61.91 years. The most common type of tumor was ductal, accounting for 81.23% of cases, while lobular cancer was found in 18.77% of patients. The most frequently observed tumor grade was Grade 2, indicating a moderate level of tumor differentiation. Ki-67 and its quartiles provide important information about the tumor cell proliferation rate. Q1 (15%) indicates that 25% of the tumor cells have Ki-67 expression of 15% or lower. Q2 (20%), the median, shows that 50% of the tumor cells have Ki-67 expression of 20% or lower. Q3 (30%) indicates that 75% of the tumor cells have Ki-67 expression of 30% or lower. The breakdown of the ECOG (Eastern Cooperative Oncology Group) performance status is as follows: 53.85% of patients have an ECOG score of 0, indicating they are fully healthy and capable of performing all daily activities without limitations. 25.64% of patients have an ECOG score of 1, suggesting mild activity limitations but still able to perform most daily activities. 7.69% of patients have an ECOG score of 2, signifying moderate limitations and a need for more rest or assistance with some activities. 7.69% of patients have an ECOG score of 3, showing severe limitations and the need for help with most daily activities. Finally, 5.13% of patients have an ECOG score of 4, meaning they are completely dependent on others for help and unable to perform any daily activities on their own.

Conclusion: Metastatic breast cancer is more commonly diagnosed in older patients, with an average age of 61.91 years, and the most frequent type of tumor is ductal (81.23%). The majority of patients have moderate tumor differentiation (Grade 2), and only a small percentage (6.21%) are diagnosed with stage 4 metastatic cancer. Ki-67 expression levels range from 15% to 30%, indicating the tumor cell proliferation rate, which helps assess tumor aggressiveness and guide treatment strategies.

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STUDY ON IMPACTING FACTORS OF LOW RESPONSE TO COLORECTAL CANCER SCREENING IN TARGET GROUP IN LATVIA

Background. Colorectal cancer screening is an effective method of identifying cancer on early stage of disease, before the symptoms are present, due to that it is possible to start timeous cancer treatment. Colorectal cancer screening test were introduced to Latvian Health care system in year 2009, almost 16 years ago, yet screening coverage remain low, 26,5% in year 2024 referring to National Health Service of Latvia, what lower than average European coverage.

Objective. To evaluate patients' knowledge about colorectal cancer screening test FOBT (Fecal Occult Blood Test), patients' understanding of importance and main goal of screening test. To identify potential impact factors of colorectal screening low response in Latvian target group patients.

Methods. Data of 94 patients' questionnaires were analysed. Data were collected in ambulatory care clinic – 51,06% (n=48), in general practitioner (GP) doctor's office – 40,43% (n=38), online – 8,51% (n=8). Respondents were aged 50 – 74, median age – 62 years, average age – 62,46 ± 6,78 years, 26,6% male (n=25) with no significant prevalence in any age group. Questionnaire form consisted of 18 questions about colorectal cancer screening test (FOBT).

Results. 74,5% of respondents know about screening, but only 27,6% do it regularly. Respondents with higher education tend to know about screening more often, 85% of respondents with higher education knew (p=0,0438). To 73,6% goal of screening is completely clear, to 8,33% – mostly clear, 7,14% – neutral, to 10,71% mostly or completely unclear. 92,9% respondents with gastrointestinal (GI) disease valued importance of screening as high or extremely high, that is more often than respondents without GI disease 73% (p=0,0317). The goal of screening is also more often evaluated as clear by respondents with existent GI disease (p=0,04). Female respondents valued importance of screening significantly higher than men (p=0,0196). In total we got 46 answers where respondents shared their opinion about lack of regularity, the most prevalent answer 34,8% was non-acquaintance about the test, second prevalent answers 15,2% each – forgetfulness and conviction of unnecessary of test personally for them, 13,04% – lack of GP regular attendance. As a primary and secondary source of information most frequently mentioned answer was – GP, 60,6% (n=57) as primary, 86,2% (n=81) as secondary source of information.

Conclusions. Patients with higher education know about existence of screening more frequent, but it doesn't affect the regularity of test. Patients with existent GI disease and females value the importance of screening higher. Goal of screening test is more clear to patients with existent GI disease. However, some findings of study are under significance level it might be valuable to continue study with greater number of participants.

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SURGICAL TREATMENT OPTIONS FOR ACUTE COMPLICATED DIVERTICULITIS – A RETROSPECTIVE STUDY AT RIGA EAST CLINICAL UNIVERSITY HOSPITAL FROM 2019 TO 2024.

Background: Diverticulosis of the colon is an increasingly common pathology, largely due to lifestyle factors, including rapid changes in dietary habits and the effects of aging. Acute complicated diverticulitis represents a significant clinical challenge due to its variable presentation and potential for severe complications such as abscess formation, perforation, or peritonitis. The choice of surgical treatment options depends on the severity

of the disease, patient comorbidities, and institutional protocols. Currently, various surgical treatment methods for acute complicated diverticulitis are being increasingly promoted and compared.

Aim: aims to analyze and compare the surgical treatment options applied for acute complicated diverticulitis.

Methods: A retrospective study of patients with acute complicated diverticulitis who had undergone surgical treatment. The data was collected from medical documents of patients from 2019 until 2024.

Results: Between 2019 and 2024, a total of 61 patients met the inclusion criteria. Of these, 54.1% (n=33) were female and 45.9% (n=28) were male (p=0.522). The mean age was 64.75 years (p=0.178). The length of hospital stay ranged from a minimum of 5 days to a maximum of 57 days. The average duration was 16.95 days. In 95.08% of cases (n=58), the lesion was located in the sigmoid colon. In 6.56% (n=4), the damage was identified at the rectosigmoid junction, and in 1.64% (n=1), it was located in the descending colon. For surgical approach laparotomy was performed in 98.41% of cases (n=60), while a laparoscopic approach was used in only 1.59% (n=1). Of the surgical interventions- 73.33% (n=45) underwent bowel resection using the Hartmann procedure, 13.33% (n=8) had a primary anastomosis, 8.33% (n=5) had a colostomy due to segmental bowel defect and 5% (n=3) had a colostomy performed as a standalone procedure. Among the 53 colostomies created: sigmoid colostomy was the most common at 83.02% (n=44), transverse colostomy was performed in 13.21% (n=7) and descending colon colostomy accounted for only 3.77% (n=2). Out of the 53 patients eligible for bowel reconstruction following initial surgery, reconstruction was performed in 52.83% of cases (n=28), while 47.17% (n=25) did not undergo reconstruction. Among the latter group, 8% (n=2) are planned for future reconstructive surgery. For the 28 patients who underwent bowel reconstruction, the time to procedure ranged from 105 to 592 days, with a mean of 229.07 days.

Conclusions: Based on the analyzed data, the most frequent site of colonic injury is the sigmoid colon. The predominant surgical intervention is laparotomy with bowel resection following the Hartmann procedure. A significant portion of patients undergo subsequent bowel reconstruction, which contributes to an improvement in their quality of life.

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SURGICAL TREATMENT OUTCOMES FOR ACUTE SPINAL CORD INJURIES IN PATIENTS AT RIGA EAST CLINICAL UNIVERSITY HOSPITAL FROM 2017 TO 2024

Background. Acute spinal cord injuries (SCI) are severe medical conditions often caused by trauma. Surgical intervention plays a critical role in stabilizing the spine, decompressing the spinal cord, and improving recovery outcomes. Riga East Clinical University Hospital is a leading center in Latvia for SCI treatment, utilizing advanced decompression and stabilization techniques. This study evaluates surgical outcomes at the hospital from 2017 to 2024, focusing on injury severity, surgical approaches, recovery, hospital stay duration, and complications, aiming to enhance treatment strategies and patient care.

Aim. This study assesses the outcomes of surgical treatment for acute SCI at Riga East Clinical University Hospital, evaluating the effectiveness of different surgical methods in promoting recovery and identifying common complications.

Methods. This retrospective study includes 70 patients who underwent surgery for acute SCI at Riga East Clinical University Hospital between 2017 and 2024. Data were collected from patient records, including age, gender, injury details, surgical interventions, neurological and functional outcomes, hospital stay duration, and complications.

Results. The study involved 70 patients, with a median age of 42 years, 65% male. Traffic accidents were the leading cause of injury (50%), and cervical spine injuries accounted for 50% of cases. Surgical treatments included decompression alone (45%), decompression with stabilization (35%), and stabilization alone (20%). Neurological recovery, assessed by the ASIA scale, showed that 30% of patients improved, 55% remained unchanged, and 15% worsened. Functional recovery, measured by the Rankin scale, indicated 10% were independent, 40% had severe impairments, and 40% were fully dependent. The average hospital stay was 21 days. Postoperative complications occurred in 25%, with infections being the most common.

Conclusion. This study emphasizes the vital role of surgical intervention in the management of acute SCI. While some patients experienced neurological improvement, many had limited or no functional recovery, and a significant number faced complications. These findings highlight the variability in recovery outcomes and

underscore the need for ongoing improvements in surgical techniques, postoperative care, and infection prevention to optimize long term recovery.

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SURGICALLY ASSISTED RAPID MAXILLARY EXPANSION (SARME) - EFFECTS ON SKELETAL, DENTAL AND NASAL STRUCTURES

Introduction. An essential component of stable and functional occlusion is proper transverse skeletal relationship of the jaws. Approximately one-third of all adult orthodontic patients are affected by skeletal maxillary transverse deficiency. Transverse maxillary hypoplasia is characterized by unilateral or bilateral crossbite, a narrow palatal vault, pronounced buccal corridors, and dental crowding. Its etiology is multifactorial, involving genetic predisposition, developmental disturbances (including premature tooth loss and parafunctional habits), asymmetrical jaw growth, trauma, and iatrogenic causes. In children and adolescents, RME is a treatment that shows successful results; however, it is ineffective for skeletally mature patients in whom the midpalatal suture has fused. In such cases, separation of the midpalatal suture must be achieved through surgically assisted rapid maxillary expansion (SARME), which disrupts suture resistance and allows for maxillary expansion without side effects.

Objective. To determine the impact of surgically assisted rapid maxillary expansion on skeletal, dental, and nasal structures using CBCT in patients over the age of 15, based on studies published in the scientific literature.

Methods. A scientific literature analysis was conducted using medical information databases subscribed by Rīga Stradiņš University (EBSCOhost, PubMed, ScienceDirect, Wiley Online Library, ClinicalKey). The literature review included 12 scientific articles relevant to the research topic, published between 2014 and 2024.

Conclusions. SARME is an effective treatment method for achieving skeletal and dentoalveolar expansion in adult patients when the midpalatal suture has fused. Both tooth-borne, bone-borne, and hybrid appliances demonstrate successful expansion of dental and skeletal structures. Regardless of the type of appliance used, undesirable buccal tipping of dental and skeletal structures is observed following SARME. Tooth borne appliances cause greater dental tipping. Additionally, an expansion of the nasal skeletal and soft tissues, including increased nasal width and nasal base width, is noted.

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SURVIVAL OUTCOMES IN SURGICAL TREATMENT OF BRAIN METASTASES IN COMBINATION WITH RADIOTHERAPY

Background. Brain metastases are becoming more common due to longer cancer patient survival. Surgery in combination with radiotherapy is an important treatment part for these patients. Research on the best treatment combinations is still being examined.

Aim. The objective of this study is to investigate how survival varies among patients with brain metastases depending on the treatment modality used after surgery, including radiotherapy, radiosurgery and both therapies together, while also exploring the influence of factors such as patient age, gender, primary cancer origin, and treatment combinations.

Methods. This retrospective cohort study analyzed 262 patients with brain metastases (2016–2024) at Riga East Clinical University Hospital. Overall survival was measured from diagnosis to death or last follow-up. Factors like age, gender, metastasis count, primary cancer origin, and treatment were assessed. Descriptive statistics summarized baseline data, and Kaplan-Meier curves compared survival outcomes.

Results. Among 262 participants, 37.8% (n=99) men, 62.2% (n=163) women, the most common cancers were lung 39.3% (n=103), breast 29.8% (n=78), and melanoma 8.4% (n=22). Surgery was performed in 33.7% (n=62)

of cases. The median survival for patients who received surgery was 12,1 months, those who didn't receive surgery 7 months. ($p < 0,001$). Patients who received whole brain radiotherapy after surgery had a median survival of 6,7 months, radiosurgery 8,2 months and both therapies together 11,1 months. ($p = 0,006$). There was no difference between genders in the median survival time with surgery. Women median survival time without surgery was 8,9 months, men 5,7 months. ($p = 0,002$). The median survival time was longer with surgery for skin, breast and lung cancer separately. ($p = 0,001$). There was no difference in survival time depending on age. ($p = 0,115$).

Conclusion. Surgery significantly improves the median survival time compared to patients without surgery. The combination of surgery with both radiotherapy and radiosurgery had the longest median survival (11.1 months). This highlights the importance of multimodal treatment after surgery, surgical candidate selection and individual treatment plans. For patients who didn't undergo surgery, women had longer survival time than men. Further research is needed to explore the underlying mechanisms driving these disparities.

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TENDENCIES IN THE USE OF PAIN MEDICATIONS AMONG THE ELDERLY - PATIENT COMPLIANCE AND AWARENESS

Introduction: According to the World Health Organization (WHO), individuals over 65 represent a rapidly growing population segment. Effective pain management is crucial among this demographic due to the high prevalence of chronic pain, emphasizing the need for understanding patterns of analgesic medication use in elderly patients.

Objectives: To analyze trends in analgesic medication use among elderly patients, evaluating patient compliance and awareness. To identify their understanding of the necessity of medication usage.

Methods: A quantitative study using a structured questionnaire survey involved individuals aged over 65 ($n = 50$) attending healthcare institutions and using analgesics. Data were analyzed with IBM SPSS Statistics 22 and Microsoft Excel.

Results: Analgesics were primarily used for back and joint pain (64%) and headaches (52%). Ibuprofen (48%) and Paracetamol (42%) were most commonly used. Ibuprofen usage was significantly associated with medication usage regularity ($p = 0.006$). Women significantly more frequently used analgesics than men ($p = 0.022$). Patients with chronic illnesses used analgesics regularly significantly more often ($p = 0.014$). Specialist recommendations strongly influenced medication choice, especially Diclofenac ($p = 0.0003$) and Ibuprofen ($p = 0.039$). Opioid usage correlated significantly with higher pain intensity ($p = 0.040$). No significant association was found between analgesic use frequency and awareness of side effects ($p = 0.092$). Stress was significantly related to analgesic use for headaches ($p = 0.002$), and trauma was associated with acute pain ($p = 0.010$).

Conclusions: Elderly patients primarily select safe, over-the-counter analgesics for periodic symptom relief. Patient awareness of safe medication usage and potential side effects remains inadequate. Healthcare provider recommendations significantly influence medication selection.

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THE APPLICATION OF INTRAOPERATIVE FLUORESCENCE CHOLANGIOGRAPHY IN THE EVALUATION OF EXTRAHEPATIC BILE DUCT ANATOMY IN ACUTE CHOLECYSTITIS IN PATIENTS WITH NORMAL BODY WEIGHT AND OBESITY

Keywords: fluorescence cholangiography, laparoscopic cholecystectomy, acute cholecystitis, critical view of safety

Background. Laparoscopic cholecystectomy is the gold standard for treatment of acute cholecystitis, often utilizing different intraoperative imaging techniques to visualize the extrahepatic bile ducts. Intraoperative fluorescence cholangiography with indocyanine green is increasingly utilized for this purpose. This study evaluates its effectiveness in assessing biliary anatomy before and after dissection across different body weight groups, following the principles of the critical view of safety.

Methods. The study included 30 patients with mild acute cholecystitis, following the 2018 Tokyo Guidelines for the diagnosis of acute cholecystitis. Patients were divided into two equal groups based on their BMI: patients with a BMI <25 kg/m² and patients with a BMI of 30-39,9 kg/m². All patients received 10 mg of indocyanine green intravenously 12 hours before laparoscopic cholecystectomy.

Results. The fluorescence effect showed better extrahepatic bile duct visualization rate in the group with normal BMI, especially in the visualization of the cystic duct and common bile duct (80% and 73.33% of cases). In patients with increased body weight, the visibility of all analyzed extrahepatic biliary structures was lower both before and after CVS using fluorescence. In patients with a normal BMI, 66.67% completed 8 critical view of safety (CVS) steps on average, whereas only 53.33% of obese patients achieved the same, with a p-value of 0.209. Background liver fluorescence disturbance was more often observed after CVS in patients with increased BMI, particularly affecting the visualization of the common bile duct (6.67% before CVS vs. 13.33% after CVS), the confluence of the cystic duct and the common bile duct (13.33% vs. 20%), the common hepatic duct (13.33% vs. 26.67%) and the place of entry of the cystic duct into the gallbladder (20% vs. 26.67%). However, statistical analysis did not show significant differences between the study groups. The average duration of surgery in patients with increased BMI was longer than in patients with normal BMI (64.33 minutes vs. 53.67 minutes). Obese patients tended to have a longer hospital stay – 8 days (min-max 5-18) versus 7 days in the control group (min-max 3-10). Also, patients with increased BMI had a longer length of stay postoperatively – 3 days (min-max 1-7) versus 2 days in the control group (min-max 1-4), p=0.09. No biliovascular injuries or postoperative complications were observed in any of the groups.

Conclusion. Fluorescence cholangiography is a technique that can enhance visualization of extrahepatic biliary structures during laparoscopic cholecystectomy, especially in patients with a normal BMI, potentially reducing the risk of biliovascular injuries. However, in obese patients, the visualization rate using fluorescence cholangiography is limited due to increased intra-abdominal obesity.

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THE ASSOCIATION BETWEEN HEMORRHAGIC PANCREATIC PSEUDOCYST SIZE AND PERIOPERATIVE LABORATORY PARAMETERS IN PATIENTS UNDERGOING ENDOVASCULAR EMBOLIZATION

Background. Hemorrhagic pancreatic pseudocyst (HPP) is a rare but potentially life-threatening complication of acute or chronic pancreatitis. It arises due to inflammation, leading to enzymatic activity and vascular alterations that disrupt pancreatic structure and blood vessel integrity. Exposure to pancreatic proteolytic enzymes can cause the rupture of arteries supplying the pancreas (gastroduodenal, splenic, superior mesenteric, and their smaller branches), resulting in arterial bleeding within the pseudocyst cavity. Endovascular embolization (EVE) is a minimally invasive treatment approach that offers several advantages over traditional surgical drainage methods.

Aim. The aim of this study was to investigate the association between hemorrhagic pancreatic pseudocyst (HPP) size and various perioperative laboratory parameters in patients undergoing EVE, to identify potential biomarkers associated with severity of the disease and to evaluate the impact of HPP size.

Methods. This retrospective, single-center study analyzed the association between hemorrhagic pancreatic pseudocyst (HPP) size and perioperative laboratory parameters in patients undergoing endovascular embolization (EVE) at the Department of Interventional Radiology, Riga East University Hospital from 2014 to 2024. Blood tests were evaluated at three time points: on the day of admission, on the day of the procedure, and on the day of discharge. The following laboratory parameters were assessed: red blood cell count (RBC), hemoglobin (HGB), white blood cell count (WBC), platelet count (PLT), lipase, C-reactive protein (CRP), glucose, creatinine, and glomerular filtration rate (GFR). Correlation analysis was performed using IBM SPSS software.

Results. The study included 72 patients (mean age: 48.04 ± 1.46 years), $n=58$ (80.6%) were male. A statistically significant correlation was observed between HPP size and lipase levels on the day of admission ($p=0.022$, Spearman's correlation), with a mean interval of 7.44 ± 1.55 days between CT scan and ER admission. No significant associations were found between HPP size and other laboratory parameters (RBC, HGB, WBC, PLT, CRP, glucose, creatinine, and GFR) at any of the measured time points ($p>0.05$).

Conclusions. This study highlights a significant association between HPP size and lipase levels at the time of admission, supporting the potential of lipase as a marker for HPP. Despite the lack of correlation with other laboratory parameters, these findings underscore the importance of early lipase measurements in patients with suspected HPP.

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THE EFFECT OF PHYSICAL ACTIVITY ON ANXIETY IN PATIENTS WITH PSYCHIATRIC DISORDERS

Objective: The beneficial effects of regular physical activity on health are indisputable in the field of modern medicine. Exercise is often the first step in lifestyle modifications for the prevention and management of chronic diseases. The aim of this study was to evaluate the effects of exercise intervention on improving and alleviating anxiety symptoms in patients with psychiatric disorders.

Methods: Several databases (e.g. PubMed, Embase and Cochrane Library) were used to search for randomized controlled trials of physical exercise or aerobic exercise interventions in patients with anxiety symptoms. A qualitative method - class observation - and a quantitative method - Generalized Anxiety Disorder Scale-7 were used.

Results: The study included 52 patients. The analyzed data before the survey showed that almost all patients had severe anxiety - 51 (98%) and one patient had moderate anxiety. Among the symptoms of anxiety, patients noted mainly fear, nervousness, worry or tension, inability to calm down or control anxiety, irritability and excessive worry about various things. After physical activity, half of the patients had moderate anxiety - 26 (50%) and 26 (50%) patients had mild anxiety.

Conclusion: The study showed that physical activity had a significant effect on reducing anxiety.

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THE IMPACT OF BLOOD PRESSURE FLUCTUATIONS IN THE FIRST 24 HOURS AFTER INTRAVENOUS THROMBOLYSIS ON THE PATIENT'S FUNCTIONAL STATUS USING THE MODIFIED RANKIN SCALE

Introduction. Acute ischemic stroke patients often experience elevated blood pressure (BP), its fluctuations can influence treatment outcomes, especially after intravenous thrombolysis (IVT). This study analysed systolic, mean, and diastolic BP variability 24 hours post-IVT, its association with functional status changes during hospitalisation, discharge outcomes.

Methods. The study included hospitalised (01.09.-01.12.2024) acute ischemic stroke patients who received IVT. BP measurements were taken multiple times post-IVT. Coefficient of variation (CV) for systolic, diastolic, and mean BP over a 24h period was calculated. Functional status was assessed with the modified Rankin Scale

(mRS) at hospital admission and discharge, classifying outcomes as favourable (mRS 0–1), unfavourable (mRS ≥ 2). Data was analysed with IBM SPSS, Microsoft Excel.

Results. Initially, 100 patients were included, 93 remained after selection. Of these, 57% were female, 43% male, with a mean age of 76.44 years (SD=10.78). The average hospital stay was 7.19 days (SD=3.09). There was no statistically significant difference in hospital stay duration between genders or age. Spearman's analysis identified a weak but statistically significant positive correlation between BP CV over 24h and mRS score at discharge ($r=0.289$, $p=0.005$, $N=93$). Mann-Whitney U test correlation analysis did not show a statistically significant association between BP CV and functional status changes during hospitalisation. This indicates that BP fluctuations within the 24h post-IVT are not significantly associated with changes in functional outcomes during hospitalisation. Binary logistic regression did not show a statistically significant association between BP CV and unfavourable functional outcomes (mRS >1).

Conclusions. Although a higher 24h post-IVT BP CV is associated with functional status at discharge, it is not a strong enough independent predictor of unfavourable outcomes. These findings are consistent with previous studies.

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THE IMPACT OF HPV ON THE SPREAD OF HEAD AND NECK TUMORS: TREATMENT APPROACHES AND CLINICAL OUTCOMES IN HPV+ AND HPV- PATIENTS WITH OROPHARYNGEAL CANCER

Background. HPV is a major risk factor for oropharyngeal cancer, influencing disease progression and treatment response. HPV-positive and HPV-negative tumors differ in prognosis and therapeutic approaches. As oropharyngeal cancer is often diagnosed at an advanced stage, optimizing treatment strategies is essential to improve survival.

Aim. This study compares treatment approaches and clinical outcomes in HPV-positive and HPV-negative oropharyngeal cancer patients diagnosed with primary or recurrent cancer at the Latvian Oncology Center in 2022–2023 to identify factors influencing treatment effectiveness.

Methods. A retrospective analysis was conducted on 83 patients diagnosed with primary or recurrent oral cavity and oropharyngeal malignancies (ICD-10 codes C04, C05, C06, C09, and C10) at the time of their medical evaluation in 2022–2023. Data were collected from patient medical documents.

Results. This study analyzed 83 patients, including 23 (27.71%) with HPV-associated malignancies and 60 (72.29%) with non-HPV-associated malignancies. Among HPV-positive patients, 5 (6.02%) died: 3 due to disease progression after chemo-radiotherapy, 1 from an unrelated illness after receiving surgery and chemotherapy, and 1 from an unknown cause following chemo-radiotherapy. Disease progression was observed in 3 patients (3.61%), and 1 (1.20%) experienced recurrence after chemo-radiotherapy. Remission was confirmed in 14 patients (16.87%), treated with chemo-radiotherapy (4), radiotherapy (2), or surgery with adjuvant therapy (8).

Among HPV-negative patients, 13 (15.66%) died, including 6 (7.23%) due to the primary disease (5 after surgery and 1 after palliative care), 4 (4.82%) from other illnesses unrelated to cancer treatment, and 3 (3.61%) from unknown causes. Disease progression was recorded in 11 patients (13.25%), treated with chemo-radiotherapy (5), surgery with radiotherapy (1), primary chemotherapy (2), radiotherapy (1), or palliative care (2). Remission was achieved in 37 patients (44.58%), treated with surgery (25, including 11 with adjuvant therapy), chemo-radiotherapy (7), radiotherapy (2), or multimodal therapy (1). Most patients in remission remain under medical supervision with follow-ups every 3–6 months.

Conclusion. HPV-positive patients had a higher overall survival rate, with remission observed in 60.9%, compared to HPV-negative patients, where remission was 42.53%. HPV-positive cases were more frequently treated with chemo-radiotherapy, while HPV-negative patients more often underwent surgery. Disease progression and mortality were more common in HPV-negative cases. These findings highlight the need for individualized treatment strategies based on HPV status to improve patient outcomes.

THE IMPACT OF PATIENTS' INITIAL EXPECTATIONS ON DROPOUT FROM PSYCHODYNAMIC PSYCHOTHERAPY: A QUALITATIVE STUDY

Background. Dropout is a common clinical issue in psychotherapy, defined as the unilateral and unexpected discontinuation of treatment. Approximately 20% of patients drop out of psychotherapeutic treatment prematurely, regardless of the treatment method and the patient's psycho-emotional difficulties. Various reasons for dropout from psychotherapy are being studied, but there are few predictors that are consistent across studies, populations and treatment contexts.

Aim. The aim of the current study was to identify the psychodynamic psychotherapy patients' initial expectations and feelings about the therapeutic process, and to describe how these relate to the psychotherapy dropout.

Methods. The therapist approached patients who had attended at least one session of psychodynamic psychotherapy at an outpatient clinic but had suddenly dropped out. A semi-structured telephone interview was conducted, allowing the interviewer to explore the patients' subjective experiences. Five patients responded, each having attended between 2 to 10 sessions. The interview recordings were transcribed, and thematic and interpretative phenomenological analysis (IPA) was used.

Results. The thematic analysis of subjective expectations revealed difficulties in clearly defining therapy goals, as well as a desire for guidance, advice, simple solutions, rapid change, and an ideal, active, all-knowing therapist. The thematic analysis of dropout revealed challenges in trusting the therapist, ambivalence and confusion about the therapy process, fear and caution regarding psychotherapy's ability to help, feelings of disappointment with initial expectations, and external factors such as financial constraints and poor timing for therapy. Summarizing the themes, several key phenomena affecting dropout were identified: fear, caution, and lack of trust were associated with resistance to psychotherapeutic treatment; confusion and ambivalence suggested identity diffusion; a desire for an ideal therapist, along with expectations of simple solutions and rapid change, reflected idealized expectations of psychotherapy; and financial constraints and poor timing were identified as external factors influencing dropout.

Conclusion. The thematic and interpretative phenomenological analysis revealed that patients' initial expectations of psychotherapy significantly influenced their experiences and decision to discontinue treatment. Key phenomena associated with dropout included resistance to psychotherapeutic treatment, identity diffusion, the desire for an ideal therapist, idealized expectations, and external factors. Further qualitative research could explore the phenomenon of dropout across different patient and therapist groups.

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THE INFLUENCE OF ADVANCED MATERNAL AGE ON PRENATAL SCREENING, MEDICATION USE, AND DELIVERY OUTCOMES: A RETROSPECTIVE ANALYSIS

Keywords: maternal age, screening tests, aspirin, mode of delivery, intrauterine growth restriction

Objectives: Pregnancies in women aged ≥ 35 carry increased risks, leading to greater use of prenatal screening, aspirin therapy, and C-sections. This study evaluates the impact of screening tests, medication use, and delivery mode on maternal and neonatal outcomes in this age group

Methods: A retrospective analysis of medical records from Riga Maternity Hospital (January–December 2023) was conducted. A total of 200 primiparous women were randomly selected ($n=100$ aged ≥ 35 ; $n=100$ aged <35). Data on demographics, pregnancy outcomes, medication use, screening tests, delivery mode were collected. Statistical analysis was performed using IBM SPSS.

Results: A significant association was found between maternal age and gestational diabetes screening ($p=0.003$), with 82% ($n=82$) women aged ≥ 35 undergoing screening compared to 63% ($n=63$) women aged <35 and also between maternal age and the use of non-invasive prenatal testing (NIPT) ($p<0.001$), with 28% ($n=28$)

women aged ≥ 35 undergoing NIPT, only 8% ($n=8$) women aged <35 . Maternal age was significantly associated with aspirin use ($p=0.017$), with 21% ($n=21$) women ≥ 35 using aspirin, compared to 9% ($n=9$) women <35 . A significant association was found between aspirin use and intrauterine growth restriction (IUGR) ($p=0.008$), with 11,5% ($n=23$) women using aspirin without IUGR, and 3,5% ($n=7$) of women using aspirin with IUGR. No significant association was found between maternal age and IUGR ($p=0.637$). A significant association was found between maternal age and the mode of delivery ($p<0.001$), with 41% ($n=41$) of women ≥ 35 delivering via cesarean section, compared to 17% ($n=17$) in the <35 group.

Conclusions: Advanced maternal age is linked to increased prenatal screening, aspirin use, and C-section. While aspirin use correlated with IUGR, maternal age did not. These findings emphasize the need for personalized prenatal care strategies for older mothers.

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THE INFLUENCE OF MENTAL HEALTH STIGMA ON PATIENTS

Introduction. Despite increasing awareness and efforts to promote mental well-being, stigma remains a powerful force that perpetuates misunderstanding and marginalization of individuals with mental health conditions. The consequences of this stigma can be profound, affecting not only the emotional and psychological well-being of patients but also their ability to access appropriate treatment and support.

Aim. To reveal the influence of mental health stigma on patients.

Materials and methods. A quantitative research strategy was chosen based on the stated objective of the study. The method of collecting survey data was used, and the method of analyzing the data was the calculations of descriptive statistics, by averages, in percent. The study involved 114 nurses. During the research, the principles of research ethics were observed.

Results. The stigma of mental health does not allow patients to seek help, so the treatment is delayed or even interrupted from the fear of standing out from the crowd, and the positive experience of specialists helps to overcome this stigma and promotes the continuity of treatment. The results of the study revealed that there is a lack of tools in health facilities to help reduce the stigma of mental health. Most of the respondents felt that additional training on the topic for nurses and other members of the health care team would be very useful. Mental health stigma negatively affects patients, and staff education, training, and the correct portrayal of mental health disorders in the media could help reduce it.

Conclusion. The majority of respondents agreed that mental health problems are as real as physical health problems. Patients feel more comfortable seeking help with physical health problems than with mental health problems. Under respondents effective the following key strategies for reducing mental health stigma: raising public education and awareness of mental health status, and encouraging the media to accurately.

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THE INFORMATIVE VALUE OF ECG RECIPROCAL CHANGES IN THE DIAGNOSIS OF RIGHT VENTRICULAR MYOCARDIAL INFARCTION

Keywords: Right ventricular myocardial infarction (RVMI), ECG reciprocal changes, ST segment depressions

Objective: RVMI mostly (30-50% of cases) presents together with left ventricle (LV) inferior wall myocardial infarction (MI), isolated RVMI is rare (~3%). Diagnosis is confirmed by echocardiogram and heart MRI. 12 lead electrocardiogram (ECG) mainly assess the LV and gives little to no information about the RV. Nevertheless, there are specific signs in ECG that can raise suspicion of RVMI. European Society of Cardiology (ESC) guidelines recommend to register extended ECG with right leads in case of LV inferior wall MI to look for ST segment elevations in leads V3R-V4R. Unfortunately, this recommendation is often overlooked in clinical setting, leading to late or even missed diagnosis of RVMI, inappropriate treatment and worsened prognosis.

The aim of this study is to analyze incidence of reciprocal ST segment depressions, their informative value in diagnostics of RVMI, to raise awareness of RVMI early diagnostics based on typical ECG findings.

Methods: The study at Riga East University Hospital included 103 acute MI patients with newly diagnosed RV systolic dysfunction (global/segmental) on echocardiography. Data from the first ECG, coronary angiography, and discharge summaries were analyzed using MS Excel and IBM SPSS.

Results: Six RV involvement ECG criteria were analyzed in patients with LV inferior wall MI (elevations in II/III/aVF, elevation III>II, elevation in V1>=1mm, depressions I+aVL >=2mm, depression in V2 >=1mm, aVF elevation >V2 depression), 53.5% met 4–6 criteria, 36.8% had 1–3, and 9.7% had none. (Fisher's Exact test $p<0,001$). No RVMI were diagnosed early using extended ECG with right leads.

RV global systolic function was reduced in 65,1% of participants, 83,6% of them had at least one ST segment depression >=1mm in leads I, aVL, V2, V5, V6 on first ECG (Pearson Chi-Square $p=0,049$).

The culprit arteries were proximal right coronary artery (RCA) in 61,2%, mid/distal RCA in 34,0%, other coronary arteries in 4,8% of cases.

Conclusion: Majority of patients with RVMI showed reciprocal ST segment depressions on first recorded ECG ($p<0,05$).

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THE ROLE AND MANAGEMENT OF UTERINE SEPTUM IN INFERTILITY AND RECURRENT MISCARRIAGE

Background: It is widely believed that a uterine septum can negatively impact reproductive outcomes in women. The condition has been associated with an increased risk of miscarriage, premature delivery, malpresentation, and infertility. Several studies have suggested that treating a uterine septum may improve live-birth rates in women with a history of pregnancy loss, recurrent miscarriage, or infertility. While the surgical resection of the uterine septum was initially recommended for patients with recurrent miscarriages and infertility, the multicenter randomized controlled trial published by J.F.W. Rikken et al. in 2021 called into question the validity of these recommendations.

Objectives: The primary objectives of this study are to evaluate and verify the impact of uterine septum on infertility and recurrent pregnancy loss, assess the improvement in reproductive outcomes for patients undergoing hysteroscopic metroplasty to correct a complete septate uterus, and determine whether the sectioning of the cervical septum should be recommended in clinical practice.

Methods: A comprehensive literature review was conducted to gather information on the significance and treatment of uterine septum in infertility and recurrent miscarriage. Several databases, including Google Scholar, PubMed, and ScienceDirect, were utilized. The search terms included phrases such as "Septate uterus," "Uterine septum," "Recurrent miscarriages," "Recurrent pregnancy loss," "Reproductive outcomes," "Hysteroscopic metroplasty," and "Uterine septum treatment." The search was limited to publications and guidelines in English from 2017 to 2024.

Conclusion: Uterine septum resection could potentially be an effective treatment for women with recurrent pregnancy loss and infertility, although the results from currently published studies remain contradictory. To establish definitive guidelines, larger-scale controlled randomized trials are necessary.

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THE ROLE OF IMMUNOTHERAPY AND TARGETED THERAPY IN IMPROVING SURVIVAL FOR CANCER PATIENTS

Background. Brain metastases (BM) cause of morbidity and mortality in cancer patients. The incidence of BM is caused by longer survival times of cancer patients due to improved treatment options. The main treatment options for BM are surgery and radiotherapy, but for some patients this treatment can be combined with immunotherapy and targeted therapy. Both have shown potential in controlling BM, but the best ways to combine these therapies with local treatments are still being studied.

Aim. The objective of this study is to investigate how median survival (MS) varies among patients with BM depending on the treatment modality used, including immunotherapy and targeted therapy, while also exploring the influence of factors such as patient age, gender, primary cancer origin, and treatment combinations.

Methods. This retrospective cohort study analyzed 233 patients with brain metastases (2016–2024) at Riga East Clinical University Hospital. Overall survival was measured from diagnosis to death or last follow-up. Factors like age, gender, primary cancer origin, and treatment were assessed. Descriptive statistics summarized baseline data, and Kaplan-Meier curves compared survival outcomes.

Results. Among 233 participants 38.6%, (n=91) men, 60.9% (n=142) women. Treatments included immunotherapy 16.4% (n=43), targeted therapy 38.6% (n=101). The MS time for patients with immunotherapy was 11.1 months, without 7.9 months ($p=0.057$). With targeted therapy, the MS was 10.8 months, without it 6.9 months ($p<0.001$). Patients who had immunotherapy, women had a MS of 20.8 months, men had 9.2 months. Patients who had targeted therapy, women had a MS of 12.4 months, men had 8.8 months. Patients without immunotherapy and targeted therapy, men had shorter MS than women. ($p<0.001$). There was no difference in MS based on age. ($p=0.163$). There was no difference in MS, depending on primary cancer origin. ($p=0.246$).

Conclusion. The results highlight the potential benefits of immunotherapy and targeted therapy in improving MS for patients with brain metastases. Women consistently had longer MS than men across treatment groups. Age and primary cancer origin did not significantly influence survival outcomes. Further research with larger patient groups are needed to optimize the use of systemic therapies in combination with local treatments.

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THE ROLE OF PATIENT EDUCATION IN RECOGNIZING UTERINE FIBROID SYMPTOMS BASED ON LOCATION

Keywords: Uterine fibroids, patient education, symptom awareness, fibroid location, menorrhagia, anemia, reproductive health.

Background. Uterine fibroids are among the most common benign growths in women of reproductive age. While some fibroids remain asymptomatic, others cause significant symptoms that impact quality of life. Symptom presentation is closely linked to fibroid location within the uterine wall. Understanding these differences is crucial for patient education, as many women remain unaware of how fibroids can affect their health, leading to delayed medical consultations and potential complications.

Aim. This study aims to analyze the correlation between fibroid location and symptom presentation, emphasizing the importance of patient education in recognizing warning signs and seeking timely medical care.

Methods. A retrospective analysis of 115 patients diagnosed with uterine fibroids was conducted. Patients were categorized based on fibroid location (intramural, subserosal, submucosal) and symptom presence. The prevalence of symptoms, including menorrhagia, secondary anemia, dysmenorrhea, metrorrhagia, and urinary incontinence, was compared among location groups. Patients were further classified into symptomatic

and asymptomatic groups, and statistical analysis was used to assess the relationship between location and symptoms.

Results. Out of 115 patients, subserosal fibroids were the most asymptomatic (61.5%), followed by intramural (51.6%) and submucosal (25.0%). Submucosal fibroids had the highest symptom severity (75.0%), with 50.0% of patients experiencing secondary anemia and 25.0% menorrhagia. Menorrhagia was most frequent in intramural fibroids (41.9%), followed by subserosal (25.6%) and submucosal (25.0%). Secondary anemia was more common in submucosal fibroids (50.0%) compared to intramural (21.0%) and subserosal (14.6%). Menorrhagia in menopause affected 6.1% of subserosal cases, 3.2% of intramural cases, and 12.5% of submucosal cases. Patients with multiple fibroids (n=32) had more frequent and severe symptoms. Overall, 47 patients (40.9%) had symptomatic fibroids, while 68 patients (59.1%) were asymptomatic. These findings highlight the need for better patient education on fibroid symptoms and location, encouraging earlier medical consultations to prevent complications like anemia and reduced quality of life.

Conclusion. The findings indicate that fibroid location plays a crucial role in symptom manifestation, reinforcing the importance of educating women on how different fibroid types impact health. Women should be informed that while subserosal fibroids often remain asymptomatic, submucosal and intramural fibroids are more likely to cause significant bleeding and anemia. Increased awareness can encourage earlier diagnosis, improved treatment outcomes, and better reproductive health management.

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TYPES AND INDICATIONS OF COLOSTOMY IN EMERGENCY AND ELECTIVE COLORECTAL SURGERY

Keywords: colorectal surgery, colostomy, indications

Objectives: Stoma creation is applied as a surgical treatment stage or as definitive treatment in cases of various pathological conditions, such as colon obstruction, inflammatory bowel disease, or malignant colon conditions.

Methods: A retrospective study was performed and it included patients who were treated at the Surgery Clinic of Pauls Stradiņš Clinical University Hospital (PSCUH) from January 1 to December 31, 2023, who underwent colorectal surgery resulting in stoma creation. Patients were divided into two groups: acute surgery group (ASG) and elective surgery group (ESG). Data analysis was performed using IBM SPSS version 29.0.

Results: In 2023, 92 surgeries at PSCUH resulted in stoma creation: 61 (66.30%) in ASG and 31 (33.70%) in ESG. Among the patients, 48 (52.5%) were women, and 44 (47.8%) were men. The highest number of surgeries leading to stoma creation occurred in the 71-80 age group (28.3%). The most common indication in ASG was ileus 38 (62.3%), peritonitis 8 (13.1%), colon perforation 8 (13.1%), and colonic abscess 4 (6.6%). In ESG, the prevalent reason was oncology 23 cases (74.2%). The most frequent extent of the surgery was isolated colostomy (CS) in 30 cases (49.2%), bowel resection with CS 22 (36.1%), adhesion division with CS 5 (8.2%). In ESG, the most common procedures were: rectosigmoid colectomy 8 (25.8%), sigmoid colectomy 7 (22.6%), right-sided hemicolectomy 6 (19.4%), and left-sided hemicolectomy 3 (9.7%). In ASG, the most frequently created stomas were sigmoidostomy 27 (44.2%), cecostomy 13 (21.3%); in ESG sigmoidostomy 14 (45.2%), descendostomy 9 (29.0%). Overall, the mortality rate was 14.13%.

Conclusions: The most common indication for surgery resulting in stoma creation in ASG was ileus, while in ESG, it was oncology. The most common type of colostomy in both groups was sigmoidostomy.

HISTORY AND HISTORY OF CULTURE

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VĒSTURE UN KULTŪRAS VĒSTURE

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OCCUPATIONAL SAFETY AND HEALTH CARE AT THE REZEKNE CANNED MILK PLANT (1957-1990)

Keywords: *industry, occupational safety, health care.*

Working in many factories has always been a rather difficult and sometimes dangerous business. With the help of the workers' labor we received many things and benefits, but it is worth paying attention to the conditions in which the workers worked and what was provided to them in order to protect them from injury and death. To reveal this issue, the purpose of this study will be to reveal the occupational safety and health at a specific plant. To clarify this issue, the Rezekne plant will be used as an example.

The Rezekne Canned Milk Plant, which was built in 1957 on November 6, will be taken as an example. For this, the period from the establishment of the plant until the collapse of the Soviet Union will be taken to see what conditions were provided to workers so that they were safe in their workplace. When examining the documents of this enterprise, the conditions provided to workers will be examined and, no less importantly, the work of the workers' union and what they provided in the collective agreement will be examined. All data obtained from sources and literature should serve to show what was provided to workers for safety and how this safety was ensured during the period under consideration.

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PROPERTY OF THE DEPORTEES FOR THE NEEDS OF LATGALE SCHOOLS, 1949

The deportation of March 25, 1949 was kept secret during the Soviet era, but it lived on in historical memory and is currently being actively studied by historians. However, some questions remain unanswered. Regarding the property of the deportees, the historiography examines the decisions of the authorities on confiscation and the attempts of former deportees to receive compensation after their release in the 1950s and 1960s. The real situation with the property of the deportees has not yet been studied. The decision of the Council of Ministers of the Latvian SSR (24.03.1949) provided for the "transfer of the property of the deported persons without compensation to the collective farms" under the control of local executive committees. A large part of the personal belongings of the deportees "disappeared" - they were looted during the deportation or immediately after it. The buildings were transferred for the needs of the collective farms and other organizations. The aim of the paper is to provide an insight into the redistribution of the property of the deported persons, allocating the confiscated buildings for the needs of local schools. Already in the autumn of 1948, the documents of the Central Committee of the Communist Party of Latvia contained indications that in 1949 the material base of schools would be supplemented with "kulak" houses. When studying the archives of the executive committees of the Daugavpils, Ilūkste and Rēzekne district councils, it was revealed that in the summer of 1949 several dozen such buildings were allocated to schools in these districts for the arrangement of classrooms, teachers' apartments and other needs. In public discourse, through the press, the idea was voiced that the Soviet authorities were investing in education. However, the information obtained clearly shows that the material base of schools was improved at the expense of the local population.

REZEKNE OLD BELIEVERS' CEMETERY MONUMENTS (SECOND HALF OF THE 19TH CENTURY - 20TH CENTURY)

Historically, Old Believers settled in the territory of Latvia as early as the end of the 17th century, fleeing the reforms of the Russian Orthodox Church. The Old Believer community of Rezekne, which became an important Old Believer centre, preserved its religious and cultural identity, which is reflected in the style and symbolism of the tombstones. In the 19th and 20th centuries, the tombstones were influenced both by traditional forms of Old Believer art and by the historical changes of the time - the Russian Empire, the independent Republic of Latvia, the Soviet occupation and the restoration of independence.

The aim of this work is to study and analyse the development of the Old Believers' cemetery monuments in Rezekne from 1859 to 1991, determining their artistic and cultural-historical value. The object of the research is the tombstones of the Rezekne Old Believers' cemetery, which reflect the identity and religious traditions of the local Old Believers' community.

The research is based on archival documents, historical sources and data obtained during field research, which includes the study and photographic documentation of the monuments preserved in the cemetery, analysis of their inscriptions and ornamental decorations.

Keywords: Old Believers' cemetery, burial traditions, grave monuments, iconography, historical changes, preservation of monuments, Rezekne.

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SPECIFICS OF THE FORMATION OF URBAN NEIGHBORHOODS. THE EXAMPLE OF STIRNURAGS IN THE CITY OF JURMALA

Each city in Latvia consists of several microdistricts, neighborhoods or localities. As cities developed and grew, they eventually included individual villages, manor centers and homesteads, and even individual cities. The city of Jūrmala was founded in 1959, when the city of Sloka, the city of Ķemeri and the Jūrmala district of the city of Riga were united. Today, Jūrmala consists of 26 neighborhoods, each of which arose under different historical circumstances.

The aim of the study is to summarize and analyze the circumstances that influenced the emergence of the Stirnurags neighborhood and the influence of Jūrmala on it to the present day. The study uses the historical comparative and descriptive method. The study uses the soul audits of the Bulduri Manor of the Latvian State Historical Archive of the National Library of Latvia, materials from expeditions organized by the Jūrmala Museum and collected memoirs, the collection of the Cartography Department of the National Library of Latvia, as well as information about Stirnurags available in the Latvian press.

The current Stirnurags area is closely connected with Bulduri Manor and its history. Since the Livonian period, this area has been an important traffic route between Riga, Courland and Prussia, as evidenced by the Lielupe money deposit, dating back to the 15th-16th centuries and found near Stirnurags. Stirnurags was formed on the site of two fishing farms "Dūči" and "Klauves", which were mentioned in the 1795 Bulduri Manor soul audit.

In the second half of the 19th century, as Jūrmala developed as a health resort, the construction of manor lands with summer houses, sanatoriums and boarding houses began rapidly. At the beginning of the 20th century, summer houses and houses were also built on the Stirnurags fishing farms for Riga vacationers, although the residents themselves continued to engage in fishing. In 1920, Bulduri with Stirnurags was included in the newly created Riga Jūrmala city territory. After World War II, only a few Stirnurags residents were still engaged in fishing. Today, Stirnurags has become one of the most prestigious districts of the city with a marina.

ENVIRONMENTAL SCIENCE

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VIDES ZINĀTNE

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FACTORS DETERMINING INTER-SPECIES AND INTER-COLONY DIFFERENCES IN HEAVY METAL AND ESSENTIAL ELEMENTS CONCENTRATIONS IN EGGSHELLS OF SYMPATRICALLY NESTING GREAT CORMORANTS PHALACROCORAX CARBO AND GREY HERONS ARDEA CINEREA

Waterbirds like cormorants and herons are top predators as such they exposed to a variety of contaminants, which they are liable to bioaccumulate. Many studies have proved that waterbirds could be a good biomonitor of heavy metal pollution of the environment and local contamination around breeding sites. We studied the concentrations of 17 elements in post-hatching eggshells of the obligate piscivorous great cormorant *Phalacrocorax carbo* and the more omnivorous grey heron *Ardea cinerea* breeding sympatrically in 8 mixed colonies in Poland. Analysis showed significant inter-species and inter-colony differences in the levels of the most of the elements. Cormorants have significantly higher concentrations of Al in eggshells, which can be related to very low stomach pH: an acidic environment favours the release of Al compounds. Differences in Mn, Ni, Cu, Se and Hg concentrations can be related to various contributions of fish and other aquatic organisms to the diet, and to the exploration of different habitats (cormorants exclusively aquatic, herons wider range) and micro habitats (cormorants, in contrast wading herons, dive for food, exploring the whole depth of range water bodies), differently exposed to contamination by those elements from sediments. We found higher levels some elements in the eggshells (Fe, Mn in both species and Cr, Ni and Zn in cormorants) collected in industrialised areas, which may be associated with the negative environmental impact of industrial production.

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APPLICATION OF OPEN-ACCESS SATELLITE DATA AND GEOSPATIAL ANALYSIS IN THE MONITORING OF GRASSLAND HABITATS

Meadows and pastures are an integral part of rural mosaic landscapes in Latvia, which have been formed through a long-term interaction between natural factors and human influence. These semi-natural grassland ecosystems are among the richest habitat types in terms of biodiversity in our country, where more than 500 flowering plant species occur. However, grassland habitats in Latvia have been affected by negative changes, caused by the intensification of agriculture and the decline in the rural population. As a result of replacing traditional management of meadows and pastures with modern farming methods, as well as due to changes in land use, the areas occupied by semi-natural grasslands have decreased and continue to decline. In such a context, both the inventory of grassland habitats and their monitoring are necessary at the national level. A possible solution is the application of remote sensing methods and geospatial analysis, which have been increasingly used for monitoring grassland ecosystems in recent decades. Therefore, at the initial stage of the study, the open-access Sentinel-2 satellite data were selected as a source for monitoring. Since the most frequently identified cause of grassland habitat degradation in Latvia is converting meadows into arable land,

one of the main issues for grassland monitoring with using of satellite data is to correct identification of changes in land cover. To perform it, two RAW data bands from Sentinel-2, i.e. B04 with a mean wavelength of 665 nm and B08 with a mean wavelength of 842 nm were used. These bands were used to calculate the Normalized Difference Vegetation Index and to obtain a derived raster data layer in the ArcGIS Pro environment. The approbation of this method shows that the use of remote sensing data and GIS solutions in identifying grasslands significantly reduces time and human resources compared to conventional field survey methods, hence it can be successfully used in grassland habitat monitoring.

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ASSESSMENT OF THE HEALTHCARE WASTE MANAGEMENT SYSTEM OF DAUGAVPILS REGIONAL HOSPITAL AND RECOMMENDATION FOR ITS IMPROVEMENT

Healthcare waste (HCW) contains potentially harmful microorganisms that can infect hospital patients, health workers and the public. Other potential hazards may include drug-resistant microorganisms that spread from healthcare settings into the environment and sharp objects, e.g. syringe needles, as well as other health hazards due to the release of pathogens and toxic pollutants into the environment during the treatment and disposal of HCW. At the same time, according to the World Health Organization, 75-90% of HCW is not infectious and hazardous. By applying proper sorting and separate collection, HCW can be classified as domestic waste, thus it can be recycled, reused and composted. The typical composition of HCW is the following: 85% non-hazardous waste, 10% infectious (hazardous) waste and 5% chemical and radioactive (hazardous) waste. HCW is all waste generated in healthcare facilities, research centers and laboratories related to medical procedures, healthcare, and in households because of healthcare, regardless of whether they are infectious or non-infectious substances, hazardous or non-hazardous materials or chemicals.

Daugavpils Regional Hospital (DRH) is the largest healthcare institution in the Latgale region and, accordingly, the largest producer of HCW, i.e. 72–85 tons of HCW are generated and managed here annually, which is approximately 3–4% of the total amount of HCW collected in Latvia. However, no assessment of the DRH waste management system has been carried out to date. Therefore, the study analyses and evaluates the HCW management system at DRH and provides recommendations for its improvement and reduction of environmental impact. The results presented in the study are based on analysis of existing documents, survey of employees involved in HCW management, as well as detailed inspection, observations and assessments of all stages (sorting, collection, transportation, storage, pre-treatment and disposal) and sites of HCW management.

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CITIZEN SCIENCE FOR INVASIVE SPECIES MANAGEMENT IN LATVIA. INVASIVE SPECIES MANAGER

The expansion of invasive alien species over recent decades has been identified as one of the major components of global change not only affecting native species and biodiversity but also considered as a serious threat to the economy and human health. Due to increasing globalization and climate change, invasive alien species have become a significant problem also in Latvia, causing threats to native species, communities and ecosystem functions while causing economic loss and health threats.

One of the key points for effective invasive species management is public awareness and involvement. Therefore, as part of LIFE-Integrated project LatViaNature (the Project) implemented via The Nature Conservation Agency of Latvia, a website "Invasive Species Manager" (*Invazīvo sugu pārvaldnieks*, www.invazivs.lv) which was created in May 2021. The website has already proved itself as an essential tool to enhance public awareness, education, and involvement. There are fact sheets about the IAS, including advice how to recognize them, summarized eradication methods, as well as the distribution of these species

in Latvia. It also provides for new data on the spread of IAS in Latvia as it enables recording the discovery of new locations.

By the end of 2024, 27220 IAS locations in Latvia were registered on the website. 11029 of the locations are situated in specially protected nature territories, micro-reserves, protected habitats or in the immediate vicinity of protected species locations. 12401 of the locations are situated in or near populated areas. Among the plant species, the largest number of reports are about *Heracleum Sosnowskyi*, *Solidago canadensis*, *Impatiens glandulifera* and *Lupinus polyphyllus*, while among animal species, it is regarding *Arion vulgaris*.

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DRIVERS OF ZOOPLANKTON TAXONOMICAL AND FUNCTIONAL STRUCTURE IN THE SHALLOW LAKE SAUKAS

Shallow lakes are the most abundant freshwater ecosystems on Earth. In Latvia, shallow lakes are more common than deep ones, and the largest part of lakes (81% of standing freshwater habitats) correspond to habitat Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation according to Habitats Directive 92/43/EEC (Annex I, code 3150). Their status corresponds to unfavourable-inadequate conditions, especially by structural and functional assessment. This indicates environmental challenges for conservation measures to improve the habitat's health and functionality of natural eutrophic lakes. Zooplankton are significant indicators of the structure and function of freshwater lakes' ecosystems and their ecological status because they occupy essential trophic positions and are among the most abundant organisms in freshwater ecosystems. Here, we analyzed how habitat heterogeneity and interspecies competition, predation, and seasonality determine the zooplankton structure (species richness, biomass, abundance and functional traits of zooplankton). The study was done in 2020 and 2022 in the Lake Saukas. The Lake Saukas is included in the specially protected nature territory of Latvia, nature park "Sauka", simultaneously in the European Union network of protected site Natura 2000. The zooplankton communities in Lake Saukas exhibit a diverse range of taxonomic structures and feeding behaviors among littoral and pelagic environments and seasonally. While the littoral zone in Lake Saukas reduces competition and predation, interspecies relationships among zooplankton were more noticeable in the pelagic zone. The zooplankton community analysis of the Lake Saukas indicated slightly eutrophic or mesotrophic lake conditions. Eutrophication, or Lake Sauka's water quality deterioration, is not permitted.

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FOREST HABITATS MAPPING AND FRAGMENTATION ANALYSIS USING REMOTE SENSING AND GIS DATA IN KOMBUĻI PARISH (KRĀSLAVA DISTRICT)

Sustainable management and successful conservation policy of forests largely depend on the availability of precise geospatial data which allows to estimate the changes and spatiotemporal dynamics of this land cover type. These changes can be related to deforestation and fragmentation of forest habitats in Latvia and may be occurring as a result of intensive logging, timber production and wildfires. In addition, forest cover, particularly stands of Norway spruce or European spruce (*Picea abies*), in many places in recent years is declining due to the invasion of bark beetle (*Ips typographus*). The fragmentation and decline in forest areas, whether due to natural causes or human activity, can be assessed through repeated mapping. Remote sensing data and Geographic Information Systems (GIS) may be valuable tools for both mapping and analyzing the geographical distribution of forests and their connectivity within a specific area. Hence, the main objective of this study was to map forest habitats using satellite data and obtain input for landscape analysis in Kombuļi parish as a case study area. A review of scientific literature reveals that landscape metrics would allow to

identify if changes in the degree of fragmentation had occurred as a result of logging clearcuts. In the study, 10 m resolution satellite image datasets were processed and classified by the cloud computing platform Google Earth Engine. Subsequently, obtained data were analysed in a GIS environment. The assessment of changes in geometry and configuration of forest habitat patches between time periods was carried out, using landscape metrics indicators, which were generated using the Patch Analyst software extension for the ESRI GIS. The results obtained at the first stage of the study demonstrate that the using of remote sensing data and GIS analysis can provide an accurate identification of areas affected by deforestation and assessment of vegetation alteration caused by forest habitat fragmentation.

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GEOMORPHOLOGICAL CHARACTERISTICS AND GEOGRAPHICAL DISTRIBUTION OF INLAND DUNES IN DAUGAVPILS

Evidence of aeolian activity in Daugavpils in the Holocene and descriptions that it is a “city on sandy hills” can be found in written sources since the 19th century. More detailed information about wind-formed landforms and aeolian deposits in Daugavpils and the adjacent area can be found on topographic maps and in reports of geological surveys carried out in the late 1970s. However, even today, after 50 years, there is still a lack of information on the geographical distribution of inland dunes, their morphometric characteristics and several other issues. Therefore, the authors carried out geomorphological and geological field surveys, complementing the study with GIS analysis, to obtain data for a better understanding of the paleogeographic situation and climate conditions that contributed to the formation of inland dunes. For these purposes, the GIS mapping of inland dunes was performed with the modified methods described in the scientific literature, using airborne LiDAR-derived high-resolution DEM (1 x 1 m pixel). Considering the low relative height of inland dunes, the vertical scale of DEM was exaggerated 5x to enhance the identification of landform features. Dunes were visually identified by on-screen examination and then manually digitised as vector polygons. The GIS data obtained in that way illustrate the geographical distribution of inland dunes. Furthermore, from a polygon shape, the dune morphologies were recognised and described according to Pye and Tsoar’s classification (2009). The morphology of dunes and their delineated crestlines were used as geomorphic indicators to infer the efficient wind directions under which the formation of these landforms occurred. At the initial stage of the study, the results indicate that aeolian landforms are rather widespread in Daugavpils city, particularly in its northern and eastern parts. Minor patches of inland dunes and associated aeolian sediments occur sporadically also in the western part of Daugavpils.

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OPPORTUNITIES FOR CREATING A NATURE DISCOVERY TRAIL IN THE "ĻUBASTS" NATURE RESERVE

The nature reserve "Ļubasts" is located in the southeastern part of Latvia, in the Līksna parish of Augšdaugavas municipality. Considering that the recommended measures in the nature protection plan were not implemented within the specified timeframe, the "Ļubasts" nature reserve is regarded as a potential site for tourism infrastructure development. During the design process, it is crucial to seek solutions and analyze available information to prevent the influx of tourists from causing high-risk anthropogenic pressure on the biological diversity—species and habitats—of the nature reserve. Given that the primary goal of the nature reserve is to ensure the protection of the area and the preservation of its natural values, it is essential to maintain a balance and minimize interference with the ecosystem. The nature reserve has significant development potential and opportunities. Although the creation of trails is generally considered a positive development, their design must be carefully planned to reduce environmental impact and promote the conservation of biodiversity. A well-designed trail can help control visitor flow and reduce pressure on more fragile ecosystems. A detailed map of the nature trail and a description of the infrastructure will facilitate visitor flow management, reducing the load on natural sites. The trail will provide convenient access to natural values through amenities such as boardwalks, small bridges, and viewing platforms. This ensures a balance between nature conservation and meeting the needs of tourists. The construction of the nature trail and a floating viewing platform will help people become familiar with natural processes, the history of the "Ļubasts"

nature reserve, and understand why such protected areas are necessary. To achieve this effectively, collaboration with educational institutions, tourism information centers in both Daugavpils and Augšdaugava municipality, as well as various service

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OVERFISHING SHAPES FISH COMMUNITIES' CHARACTERISTICS IN LATVIAN LAKES

Fish are crucial to lake food chains, balancing ecosystems and nutrient cycles. In recent years, fish populations in lakes have significantly shifted their roles and functions within the ecosystem (Jeppesen et al., 2012). Top predators – large piscivorous fish – are particularly at risk due to their lower population densities and slower reproduction rates compared to smaller cyprinid fish (Allan et al. 2005). Piscivorous fish are crucial to their ecosystems and are highly prized by both fishers and the public (Kokkonen et al. 2024). Systematic overfishing in freshwater ecosystems often goes unnoticed due to inadequate reporting and declines in fish populations alongside various other stressors. Additionally, the impact of these changes on the size and condition of fish communities is poorly understood (Allan et al. 2005). Therefore, we hypothesized that overfishing shapes fish ecosystem structure in small and shallow temperate lakes in Latvia. Fish feeding guilds and developmental stages respond to overfishing differently.

Specifically, we expected that: a) average perch catch per unit effort (CPUE), condition (K), and length (L) in all age groups are affected by the proportion of large piscivorous fish (PISC%35). A higher proportion of PISC%35 results in a higher average CPUE, K, and L of perch in all age groups, and b) average roach and bream CPUE, K, and L in smaller age groups are not affected by the proportion of PISC%35, while in larger age groups are positively affected by PISC%35.

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SENTINEL-2 DATA AND GIS ANALYSIS FOR FLOOD RISK ASSESSMENT AND DISASTER MANAGEMENT IN RESPECT OF CIVIL PROTECTION IN THE AUGŠDAUGAVAS DISTRICT

Many regions in the EU are exposed to several types of natural risk factors associated with different geohazards. In addition, European countries have experienced an increasing frequency and magnitude of disasters in recent decades. The main causes for such situations can be associated with more often extremes like hydro-meteorological events, most probably induced by climate change, and an increase in vulnerability of citizens. Among these extremes, floods are top-ranked as natural risk factors. Hence more efforts should be done on flood risk assessment and disaster management to reduce socioeconomic losses and negative environmental consequences. Data published in scientific literature shows that the use of satellite data and GIS analysis has become an integrated and successful tool in flood risk management. Thereby, to ensure appropriate planning of civil protection measures at the municipal level in Latvia, and thus to mitigate risks associated with extreme hydro-meteorological events, it is necessary to provide mapping of territories prone to flooding. For this purpose, first of all, high-resolution DEM with pixel size 1m was generated from LiDAR LAS data. Then, information previously compiled by other authors on the recurrence of different levels of floods in the Augšdaugava district and their absolute levels were used. Subsequently, the territories that are flooded at a certain level were identified using the hydrology tools of the ArcGIS Pro and DEM. To verify the precision of the flood areas generated from the DEM, open-access Sentinel-2 satellite false colour images were used. In these images, flooded areas are very easy to identify because water absorbs infrared light and appears black. Obtained results indicate that GIS analysis of Sentinel-2 data allows precise identification of territories prone to flooding in the Augšdaugavas district, hence providing background for flood risk assessment and disaster management in respect of civil protection.