



8. HRVATSKI KONGRES MEDICINE RADA S MEĐUNARODNIM SUDJELOVANJEM „MEDICINA RADA – SUOČAVANJE S BUDUĆNOSTI“ SPLIT, 7.–11. STUDENOGA 2024.

8. Hrvatski kongres medicine rada s međunarodnim sudjelovanjem pod nazivom „Medicina rada – suočavanje s budućnosti“ održan je u Splitu od 07. do 11. studenog 2024. godine za preko stotinu sudionika iz Republike Hrvatske i šire regije. Od našeg prethodnog kongresa održanog 2019. godine bili smo svjedoci iznimnih događanja na svjetskoj razini. Godine 2020. zadesila nas je pandemija COVID-19 koja je u mnogome promijenila načine života, poslovanja i rada, a kontinuirano prisutne krize u različitim dijelovima svijeta pridonose migracijama ljudi, pa tako i zapošljavanju sve više stranih radnika.

Moderni načini poslovanja sa sveprisutnom digitalizacijom, robotizacijom i psihosocijalnim pritiscima suočavaju nas sa potrebom stalnih prilagodbi i razvoja doktrine medicine rada kako bi i dalje odgovarajuće doprinosili glavnom cilju naše struke – očuvanju zdravlja radnika. Ključan je u tome i daljnji razvoj multidisciplinarnog timskog rada sa drugim strukama u području zaštite zdravlja i sigurnosti pri radu, prvenstveno stručnjacima zaštite na radu, medicinskim sestrama, psiholozima i doktorima medicine – specijalistima obiteljske medicine i kliničkih struka. O svim ovim aspektima raspravljano je tijekom kongresa kroz uvodna predavanja, usmena izlaganja i posterska priopćenja. Olakotnu okolnost za našu struku i njenu budućnost čini značajan broj mladih kolega, specijalizanata medicine rada i sporta, koji su s početkom 2024. godine osnovali Sekciju specijalizanata i mladih liječnika medicine rada i sporta u sklopu Hrvatskog društva za medicinu rada Hrvatskog liječničkog zbora. Važan zadatak za sve nas je njihova što bolja edukacija, kako tijekom specijalizacije, tako i kasnije kroz programe trajnog usavršavanja.

Kongres je dodatno pridonio njihovoj edukaciji kroz praktične radionice u područjima funkcionalne dijagnostike, psihologije rada i sportske medicine. U radu Kongresa su, uz specijaliste i specijalizante medicine rada i sporta, sudjelovali ostali dionici u području zaštite zdravlja radnika, medicinske sestre, psiholozi, stručnjaci zaštite na radu. U ime znanstvenog odbora 8. Hrvatskog kongresa medicine rada s međunarodnim sudjelovanjem zahvaljujemo svima na sudjelovanju, prenošenju znanja i razmjeni iskustava.

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Emerging topics in occupational medicine in south-eastern European (SEE) countries

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The South-East European Network on Workers' Health (SEENWH) is a network of experts in the field of occupational health from nine countries in the SEE subregion (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Montenegro, R.N. Macedonia, Romania, Serbia, and Türkiye). It was established in 2006, aimed at strengthening occupational health systems in the SEE subregion through strong collaboration with the WHO Regional Office for Europe. The objectives of the SEENWH as a sustainable and international framework are: improvement of workers' health and well-being; strengthening of OH systems, policies, and services; and building of human/institutional capacities in the SEE subregion. SEENWH provides a forum for exchanging information and knowledge, developing training programmes in the field of occupational health, promoting research, developing and sharing good practices, and collaboration through joint projects. The emerging issues on which the SEENWH experts are focused involve, among others, occupational health system and policy, universal health coverage, verification and reporting of occupational diseases, vulnerable groups of workers (including persons with disabilities), health and well-being of health workers, mental health at work, occupational skin diseases, work-related musculo-skeletal disorders, new and emerging occupational risks, climate change and workers' health, and evidence syntheses in occupational health. During the COVID-19 pandemic (October-December 2021), more than 1,600 health workers from SEENWH countries have been trained in occupational health and safety in the context of COVID-19 through a project supported by WHO/Europe. In addition, the SEENWH conducted an online survey on job stress in health workers during the COVID-19 pandemic (over 4,600 respondents), and found significant differences between SEENWH countries related to burnout, job engagement, as well as job demands and job resources. As a conclusion, SEENWH should be continuously used as a platform for collaboration at subregional level, to work together towards workers' health, and to translate research into practice.

KEY WORDS: network; occupational health; policy; training programme

Nove teme u medicini rada u zemljama jugoistočne Europe

Zdravstvena mreža jugoistočne Europe (engl. South-East European Network on Workers' Health, SEENWH) mreža je stručnjaka iz područja medicine rada iz devet država podregije jugoistočne Europe (Albanija, Bosna i Hercegovina, Bugarska, Crna Gora, Hrvatska, Rumunjska, Sjeverna Makedonija, Srbija i Turska). Osnovana je 2006. godine s ciljem jačanja sustava medicine rada u podregiji Jugoistočne Europe kroz snažnu suradnju s Regionalnim uredom Svjetske zdravstvene organizacije za Europu. Ciljevi SEENWH-a kao održivog međunarodnog okvira su: poboljšanje zdravlja i dobrobiti radnika; jačanje sustava medicine rada, politika i usluga te izgradnja ljudskih/institucionalnih kapaciteta u podregiji jugoistočne Europe. SEENWH pruža forum za razmjenu informacija i znanja, razvoj programa obuke u području zdravlja na radu, promicanje istraživanja, razvoj i razmjenu dobrih praksa te suradnju kroz zajedničke projekte. Nova pitanja na koja su usredotočeni stručnjaci SEENWH uključuju, između ostalog, sustav i politiku zdravlja na radu, univerzalnu pokrivenost zdravstvenom skrbi, verifikaciju i prijavljivanje profesionalnih bolesti, ranjive skupine radnika (uključujući osobe s invaliditetom), zdravlje i dobrobit zdravlja radnika, mentalno zdravlje na radu, profesionalne kožne bolesti, mišićno-koštane poremećaje povezane s radom, nove i nadolazeće profesionalne rizike, klimatske promjene i zdravlje radnika te sinteze dokaza u području medicine rada. Tijekom pandemije COVID-19 (listopad-prosinac 2021.), više od 1600 zdravstvenih radnika iz država članica SEENWH prošlo je obuku o zdravlju i sigurnosti na radu u kontekstu COVID-19 kroz projekt koji podržava Svjetska zdravstvena organizacija / Europa. Osim toga, SEENWH je proveo online istraživanje o stresu na poslu u zdravstvenih radnika tijekom pandemije COVID-19 (na preko 4.600 ispitanika) i otkrio značajne razlike između država članica SEENWH-a u vezi s izgaranjem (burnout), zaduženjima na poslu, kao i zahtjevima i resursima na radnim mjestima. Kao zaključak, SEENWH treba kontinuirano koristiti kao platformu za suradnju na podregionalnoj razini, kako bi se zajednički radilo na unaprjeđenju zdravlja radnika i ostvario prijenos rezultata istraživanja u praksu.

KLJUČNE RIJEČI: medicina rada; politika; programi obuke; zdravstvena mreža jugoistočne Europe

Advancing cooperation between occupational health specialists and work safety experts by new digital tools

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Cooperation between occupational medicine specialists and occupational health and safety specialists is essential for creating a safe and healthy working environment. Occupational medicine specialists bring medical knowledge about the impact of working conditions on workers' health, while occupational safety experts apply technical and organizational solutions to reduce risks. Primarily, they achieve joint cooperation when creating a risk assessment, when implementing preventive measures, educating workers and monitoring their health status. This interdisciplinary collaboration enables a comprehensive approach that increases the effectiveness of occupational health and safety protection, contributes to reducing the number of injuries and occupational diseases, and improves the overall productivity and satisfaction of workers. The application of digital technologies can greatly contribute to the improvement of cooperation between occupational medicine specialists and occupational safety experts. Digital technologies enable advanced methods of monitoring, analyzing and improving working conditions, thereby increasing the efficiency and precision of medical care in the work environment. In this sense, the Ministry of Labour, Pension System, Family and Social Policy, as part of its Occupational Safety Information System, will develop and digitize a referral for determining the worker's health capacity (RA-1 form), the worker's health certificate (RA-2 form) and the Request for Reimbursement form for costs incurred by preventive examinations by specialists in occupational medicine. It will also be possible for occupational medicine specialists to see the worker's medical record in order to make it easier to assess their health. Digitization enables the creation of safer and healthier working environments, which contributes to a better quality of life for workers and higher productivity of organizations. Safety at work in the context of the digital transition is becoming increasingly important due to the changes brought by new technologies, digitization, and automation. Ensuring safe working conditions for workers who work with automated systems and robots is one of the key activities of employers, as well as adapting work spaces to enable safe work with new technologies. In order to reduce the number of work-related injuries and occupational diseases due to the digital transition, it is necessary to provide continuous education of workers on the safe use of new technologies, the ergonomics of computer work and the recognition of cyber-risks.

KEY WORDS: digitalisation; occupational health; safety at work; standardisation

Unaprjeđenje suradnje medicine rada i stručnjaka zaštite na radu kroz uspostavu digitalnih alata

Suradnja specijalista medicine rada i stručnjaka zaštite na radu ključna je za stvaranje sigurnog i zdravog radnog okruženja. Specijalisti medicine rada donose medicinsko znanje o utjecaju radnih uvjeta na zdravlje radnika, dok stručnjaci zaštite na radu primjenjuju tehnička i organizacijska rješenja za smanjenje rizika. Prvenstveno ostvruju zajedničku suradnju prilikom izrade procjene rizika, pri implementaciji preventivnih mjera, edukaciji radnika i praćenju njihovog zdravstvenog stanja. Ova interdisciplinarna suradnja omogućava sveobuhvatan pristup koji povećava učinkovitost zaštite zdravlja i sigurnosti na radu, doprinosi smanjenju broja ozljeda i profesionalnih bolesti te poboljšava ukupnu produktivnost i zadovoljstvo radnika. Primjenom digitalnih tehnologija uvelike se može doprinijeti unaprjeđenju suradnje specijalista medicine rada i stručnjaka zaštite na radu. Digitalne tehnologije omogućuju napredne metode praćenja, analize i poboljšanja radnih uvjeta, čime se povećava učinkovitost i preciznost medicinske skrbi u radnom okruženju. U tom smislu Ministarstvo rada, mirovinskoga sustava, obitelji i socijalne politike u sklopu svog Informacijskog sustava zaštite na radu razviti će i digitalizirati uputnicu za utvrđivanje zdravstvene sposobnosti radnika (RA-1 obrazac), uvjerenje o zdravstvenoj sposobnosti radnika (RA-2 obrazac) te obrazac Zahtjeva za refundacijom troškova nastalih preventivnim pregledima specijalista medicine rada. Također će se omogućiti uvid specijalistima medicine rada u medicinski karton radnika radi lakšeg donošenja ocjene o zdravstvenoj sposobnosti. Digitalizacija omogućuje stvaranje sigurnijih i zdravijih radnih okruženja, što doprinosi boljoj kvaliteti života radnika i većoj produktivnosti organizacija. Zaštita na radu u kontekstu digitalne tranzicije postaje sve važnija zbog promjena koje donose nove tehnologije, digitalizacija i automatizacija. Osiguranje sigurnih radnih uvjeta za radnike koji rade s automatiziranim sustavima i robotima jedna je od ključnih aktivnosti poslodavaca kao i prilagodba radnih prostora kako bi se omogućio siguran rad s novim tehnologijama. Kako bi se smanjio broj ozljeda na radu i profesionalnih oboljenja usljed digitalne tranzicije potrebno je osigurati kontinuiranu edukaciju radnika o sigurnom korištenju novih tehnologija, ergonomiji rada za računalom i prepoznavanju kiber-rizika.

KLJUČNE RIJEČI: digitalizacija; medicina rada; standardizacija; zaštita na radu

Interactions between human and environmental health: determinants for health preservation (HumEnHealth): overview of a research project

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The living environment is increasingly burdened with various chemical and physical pollutants, which can reach environment either as a result of natural processes or anthropogenic activities. Excessive input of chemical pollutants into aquatic and terrestrial habitats can have negative effects on the health of individuals and populations of animals and plants, biological diversity, ecosystem balance, and human health. Optimizing health and preserving a sustainable balance between the above components (humans, animals and ecosystems) is the goal of the One Health approach of the World Health Organization. This project will combine research with the aim of better understanding the health status of certain environmental and animal systems, and their impact on human health, as well as research into possible ways of early detection of human and environmental health disorders, and ways to prevent them. Research will also include the potential interaction of genetic, nutritional and psychosocial factors in the occurrence of human health disorders caused by environmental pollutants from the living and working environment. Additionally, the possibilities of improving (harmonizing) the methodology of epidemiological studies and improving statistical methods of data processing will be investigated. Research in this project will be focused on: 1) chemical pollutants (metal(oids), pyrethroid and organophosphorus pesticides, biocides, skin allergens and irritants); 2) physical pollutants (noise); 3) psychosocial factors (personal and organizational stressors and stressors of the wider social context). Project activities will be presented through 7 work packages: 1) environmental health; 2) food & health; 3) human biomonitoring & (epi)genetics; 4) mental health; 5) health & safety at work; 6) noise; 7) research methodology. The project has been funded from the National Recovery and Resilience Plan 2021-2027 (Funded by: European Union – Next Generation EU, Program Contract of 8 December 2023, Class: 643-02/23-01/00016, Reg. no. 533-03-23-0006).

KEY WORDS: chemical pollutants; physical pollutants; psychosocial risks

Međudjelovanje zdravlja ljudi i okoliša: odrednice očuvanja zdravlja (HumEnHealth): prikaz znanstvenog projekta

Životni okoliš je sve više opterećen različitim kemijskim i fizikalnim zagađivačima, koja u okoliš dospijevaju bilo kao rezultat prirodnih procesa ili antropogenih aktivnosti. Prekomjerni unos kemijskih zagađivala u vodena i kopnena staništa može imati negativne učinke na zdravlje jedinki i populacija životinja i biljaka, biološku raznolikost, ravnotežu ekosustava te zdravlje ljudi. Upravo je optimizacija zdravlja i očuvanje održive ravnoteže između navedenih sastavnica (ljudi, životinja i ekosustava) cilj One Health pristupa Svjetske zdravstvene organizacije. Ovim projektom objedinit će se istraživanja s ciljem boljeg upoznavanja statusa zdravlja određenih okolišnih i životinjskih sustava, te njihovog utjecaja na zdravlje ljudi, kao i na istraživanja mogućih načina ranog otkrivanja poremećaja zdravlja ljudi i okoliša, te načina za njihovu prevenciju. Istraživanja će pri tome uključivati i potencijalna međudjelovanja genetskih, nutritivnih i psihosocijalnih čimbenika u pojavi poremećaja zdravlja ljudi uzrokovanih okolišnim zagađivačima iz životnog i radnog okoliša. Dodatno će se istraživati mogućnosti unaprjeđenja (harmonizacije) metodologije epidemioloških studija, te unaprjeđenja statističkih metoda obrade podataka. Istraživanja će u ovom projektu biti usmjerena na: 1) kemijska zagađivala (metal(oid)i, piretroidni i organofosforni pesticidi, biocidi, kožni alergeni i iritansi); 2) fizikalna zagađivala (buka); 3) psihosocijalne čimbenike (osobni i organizacijski stresori te stresori šireg društvenog konteksta). Rad projekta prikazat će se kroz 7 radnih paketa: 1) zdravlje okoliša; 2) hrana i zdravlje; 3) biološki monitoring ljudi i (epi)genetika; 4) mentalno zdravlje; 5) sigurnost i zdravlje na radu; 6) buka; 7) metodologija znanstvenog rada. Projekt je financiran u sklopu Nacionalnog plana oporavka i otpornosti 2021.-2027.

KLJUČNE RIJEČI: fizikalna zagađivala; kemijska zagađivala; psihosocijalni rizici

Occupational exposure to metals: how (un)safe are we at the workplace?

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Metals are present in diverse industrial sectors, including agriculture, forestry, energy, manufacturing, pharmaceuticals, and food production. Toxic metals from the working environment may reach the body by inhalation, ingestion, and dermal absorption. Prolonged occupational exposure to metals presents a significant risk to human health and may cause occupational diseases. Biological indicators or biomarkers of metal exposure in the workplace reflect the interaction of the biological system with hazardous chemicals. The acceptable workplace exposure levels, known as the Occupational Exposure Limits (OEL), are prescribed by government regulations (OG, 91/18, 1/21, and 148/23). For many years, our laboratory has measured metal concentrations in blood/urine of occupationally exposed workers as biomarkers of exposure, which are typically 3-6 times greater than in the general population. Exposure to inorganic lead (Pb) occurs in the industry of lead-acid batteries, motor oils, paint pigments, clay, and refractory products. The highest concentration of Pb in the blood measured in battery industry workers was 809 µg Pb/L (OEL 400 µg Pb/L). We also had a case of acute Pb poisoning during restoration work (505 µg Pb/L), which was manifested by gastrointestinal disturbance and a gingival lead line appearance. Workers in the glass and oil industry and those working with Hg-based electrodes are exposed to elemental mercury (Hg), and Hg level in urine is a biomarker of exposure. The highest recorded concentration of Hg in urine was 8.17 µg Hg/g creatinine (OEL 30 µg Hg/g creatinine) in a glass industry worker. Notably, no symptoms of poisoning were observed, despite the fact that such symptoms may develop after chronic exposure to low doses. Our data has highlighted the significance of regular monitoring and health screening to implement a wide range of effective measures to reduce worker exposure and protect their health. (Funded by: European Union – Next Generation EU, Program Contract of 8 December 2023, Class: 643-02/23-01/00016, Reg. no. 533-03-23-0006).

KEY WORDS: lead; mercury; Occupational Exposure Limit; whole blood

Profesionalna izloženost metalima: koliko smo (ne)sigurni na radnom mjestu

Metali su prisutni u mnogim djelatnostima, uključujući poljoprivredu, šumarstvo, energetiku te prerađivačku, prehrambenu i farmaceutsku industriju. Štetni metali iz radnog okoliša u organizam dospijevaju inhalacijom, ingestijom i apsorpcijom kroz kožu. Izloženost metalima na radnom mjestu kroz dulje vremensko razdoblje predstavlja opasnost za ljudsko zdravlje te može dovesti do razvoja profesionalnih oboljenja. Objektivni pokazatelji zdravstvenog stanja ili biomarkeri izloženosti metalima na radnom mjestu odraz su interakcije biološkog sustava i kemijskog štetnog čimbenika. Zakonske vrijednosti koje označavaju sigurnu razinu izloženosti na radnom mjestu (biološke granične vrijednosti, BGV) propisane su pravnim propisom (NN 91/18, 1/21 i 148/23). U našem laboratoriju dugi niz godina određujemo koncentracije metala u krvi/urinu kod profesionalno izloženih radnika kao biomarkere izloženosti, koje su 3 do 6 puta veće u odnosu na opću populaciju. Olovu (Pb) su izloženi radnici u industriji akumulatora, motornih ulja, pigmenta za boje te glinenih i vatrostalnih proizvoda. Najveća koncentracija Pb u krvi koju smo izmjerili kod radnika iz industrije akumulatora iznosila je 809 µg Pb/L (BGV 400 µg Pb/L). Također smo imali slučaj akutnog otrovanja Pb pri restauracijskim poslovima (505 µg Pb/L) koje se manifestiralo poremećajem funkcije gastrointestinalnog sustava i pojavom gingivalnog ruba. Elementarnoj živi (Hg) izloženi su zaposleni u industriji stakla i nafte, te oni koji rade sa Hg-elektrodama, pri čemu kao biomarker izloženosti služi koncentracija Hg u urinu. Najveću koncentraciju Hg u urinu od 8,17 µg Hg/g kreatinina (BGV 30 µg Hg/g kreatinina) izmjerili smo kod radnika iz industrije stakla kod kojega nisu zamijećeni simptomi otrovanja iako je poznato da se oni mogu manifestirati nakon niske kronične izloženosti. Podatci ističu važnost redovitih kontrola i strogo provedenja mjera zaštite na radu u svrhu zaštite zdravlja radnika.

KLJUČNE RIJEČI: biološka granična vrijednost; olovo; puna krv; živa

Setting occupational exposure limit values for harmful chemicals

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The occupational exposure limit (OEL) value represents the limit of the time-weighted average of the concentration of a substance in the air to which a worker can be exposed over a specified period without experiencing any harmful consequences. OELs could be set at the European Union (EU) or at a national/international level. Both binding and indicative OELs set at the EU level must be implemented into the national legislation of EU countries. EU OELs are presently based on the scientific opinion of the European Chemicals Agency's (ECHA) Committee for Risk Assessment (RAC) and were formerly derived by the Scientific Committee on Occupational Exposure Limits (SCOEL). The setting of OEL values is covered by the Chemical Agents Directive (98/24/EC), the Carcinogens and Mutagens Directive (2004/37/EC), and the Directive 2009/148/EC on the protection of workers from asbestos exposure. The procedure is initiated by the European Commission (EC), which decides which substances need new or updated OELs. A final decision on an OEL value is made at the EC level and is based on the scientific recommendation of ECHA/RAC and feasibility issues. OELs could be derived for non-carcinogenic substances, and for carcinogenic substances for which a health-based threshold can be identified. For carcinogenic and non-carcinogenic substances without health-based threshold, exposure-response relationship curve (ERR) and risk estimates are derived. In these cases, an OEL can be defined by the decision makers at the EU level. During the past 7 years, 18 RAC opinions were adopted. In 8 cases, an OEL was proposed, and in 10 cases, ERR was derived. For five out of eight cases for which an OEL value was proposed by RAC, older (SCOEL-derived) values previously existed. Compared to RAC-proposed values, SCOEL values were higher for inorganic lead and its compounds (25 times), benzene (20 times), and 1,4-dioxane (10 times); they were equal for cadmium and its inorganic compounds, and respirable fraction of nickel and its compounds, and lower (by 70 %) for inhalable fraction of nickel and its compounds. An overview of the OELs/ERRs proposed by RAC will be presented, as well as the process of deriving OEL/ERR based on scientific data.

KEY WORDS: health risk assessment; threshold limit values

Određivanje graničnih vrijednosti izloženosti za štetne kemikalije

Granična vrijednost izloženosti na radu (GVI) granica je od prosjeka vremenski izmjerenih koncentracija tvari u zraku na mjestu rada u zoni disanja radnika, kojoj radnici mogu biti izloženi tijekom određenog razdoblja bez štetnih učinaka na zdravlje. GVI se može definirati na razini Europske Zajednice (EZ) ili na nacionalnoj/međunarodnoj razini. Obvezujuće i indikativne GVI postavljene na razini EZ-a moraju se implementirati u nacionalno zakonodavstvo europskih zemalja. Europske GVI u današnje vrijeme temelje se na znanstvenom mišljenju Odbora za procjenu rizika (engl. *Risk Assessment Committee*, RAC) Europske agencije za kemikalije (ECHA), dok ih je u prošlosti donosio Znanstveni odbor za granice profesionalne izloženosti (engl. *Scientific Committee on Occupational Exposure Limits*, SCOEL). Postavljanje GVI-a obuhvaćeno je Direktivom o kemijskim tvarima (98/24/EZ), Direktivom o karcinogenima i mutagenima (2004/37/EZ) i Direktivom 2009/148/EZ o zaštiti radnika od izloženosti azbestu. Postupak pokreće Europska komisija (EK), koja odlučuje koje tvari trebaju novi ili ažurirani GVI. Konačna odluka o GVI vrijednosti donosi se na razini EK-a i temelji se na znanstvenim preporukama ECHA/RAC-a i na aspektima izvedivosti. GVI se može izvesti za nekancerogene tvari i za kancerogene tvari za koje se može utvrditi prag pri kojem se ne očekuju štetni učinci na zdravlje. Za kancerogene i nekancerogene tvari bez praga izvodi se krivulja izloženost-odgovor (engl. *exposure-response relationship*, ERR) i procjenjuje rizik. U tim slučajevima GVI mogu definirati nadležna tijela na razini EZ-a. U proteklih 7 godina usvojeno je 18 mišljenja RAC-a. U 8 slučajeva predložena je GVI, a u 10 slučajeva izveden je ERR. Za pet od osam slučajeva za koje je RAC predložio GVI vrijednost, već su od ranije postojale vrijednosti koje je odredio SCOEL. U usporedbi s vrijednostima koje je predložio RAC, vrijednosti GVI-a koje je donio SCOEL-a bile su više za anorgansko olovo i njegove spojeve (25 puta), benzen (20 puta) i 1,4-dioksan (10 puta); bile su jednake za kadmij i njegove anorganske spojeve te respirabilnu frakciju nikla i njegovih spojeva, a manje (za 70 %) za inhalacijsku frakciju nikla i njegovih spojeva. Prikazat će se pregled GVI/ERR-ova koje je predložio RAC, kao i postupak izvođenja GVI/ERR-a na temelju znanstvenih podataka.

KLJUČNE RIJEČI: granične vrijednosti izloženosti; procjena rizika za zdravlje

The reliability of a self-reported questionnaire for eczema signs in Croatian hairdressing apprentices

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Hairdressers are at high risk for developing hand eczema (HE) due to their prolonged exposure to harmful chemicals and wet work. However, many HE cases remain unrecognized at the stage of vocational education, leading to earlier hairdressing career exit. Thus the aim of this study was to assess the properties of a self-reported questionnaire as a simple and cost-effective method for identifying HE cases in hairdressing apprentices. In this longitudinal study, 408 apprentices participated. At each of the four visits covering all three years of their training, apprentices completed the questionnaire (based on the Nordic Occupational Skin Questionnaire) and underwent clinical skin examination of hands and wrists. They also received information about the disease and its prevention. Although sensitivity increased gradually from baseline (7 %) to last visit (37 %), self-reported prevalence of current HE signs was at all times lower (5, 6, 14, and 18 % at the first, second, third, and fourth visit, respectively) than prevalence determined by clinical examination (18, 20, 45, and 48 %). On the other hand, the majority of apprentices without present HE signs correctly identified the absence of signs (specificity 95-99 %). Among apprentices with objective HE signs, those who correctly identified their symptoms had a higher eczema severity score (Osnabrueck Hand Eczema Severity Index, OHSI) compared to those who reported no current HE signs at second (median [interquartile range] of 2 [2-4] vs. 2 [1-2], $p=0.017$) and third visit (OHSI of 5 [2-7] vs. 2 [1-3], $p=0.001$). Furthermore, they were three to four times more likely to have more severe symptoms (fissures, vesicles, papules, or scaling; p -values of 0.005 at first and 0.004 at third visit). To conclude, although self-reported questionnaire became more reliable at older ages, after repeated clinical examination and in those with more severe symptoms, the majority of HE cases would remain unrecognized even in the last year of their vocational education. However, due to its high specificity, it may be used as an estimate of the lower bound of the true prevalence for apprentices who already received educational intervention for HE. (Funded by: European Union – Next Generation EU, Program Contract of 8 December 2023, Class: 643-02/23-01/00016, Reg. no. 533-03-23-0006.)

KEY WORDS: hand eczema; self-report; sensitivity; specificity

Pouzdanost upitnika za samoprocjenu znakova ekcema u hrvatskih frizerskih učenika

Frizeri imaju povećan rizik za razvoj ekcema na rukama zbog dugotrajne izloženosti štetnim kemikalijama i radu s vodom. Međutim, mnogi slučajevi ekcema ostaju neprepoznati tijekom strukovnog obrazovanja, što dovodi do ranijeg prekida karijere. Stoga je cilj ovog istraživanja bio ispitati svojstva upitnika za samoprocjenu kao jednostavne i isplative metode za prepoznavanje slučajeva ekcema na rukama kod frizerskih učenika. U ovom longitudinalnom istraživanju sudjelovalo je 408 učenika. U svakom od četiri posjeta koji su obuhvatili sve tri godine njihovog školovanja, učenici su ispunili upitnik (temeljen na upitniku Nordic Occupational Skin Questionnaire) i prošli klinički pregled kože šaka i zapešća. Također su dobili informacije o bolesti i njezinoj prevenciji. Iako se osjetljivost upitnika postupno povećavala od početnog (7 %) do posljednjeg posjeta (37 %), samoprijavljena prevalencija trenutnih znakova ekcema na rukama bila je niža (5, 6, 14 i 18 % na prvom, drugom, trećem i četvrtom posjetu) od prevalencije utvrđene kliničkim pregledom (18, 20, 45 i 48 %). S druge strane, većina učenika bez prisutnih znakova ekcema ispravno je identificirala odsutnost simptoma (specifičnost 95-99 %). Među učenicima s objektivnim znakovima ekcema na rukama, oni koji su točno identificirali svoje simptome imali su viši indeks za težinu ekcema (Osnabrueck Hand Eczema Severity Index, OHSI) u odnosu na one koji nisu prijavili znakove ekcema na drugom (medijan s interkvartilnim rasponom 2 [2-4] naspram 2 [1-2], $p=0,017$) i trećem posjetu (OHSI 5 [2-7] naspram 2 [1-3], $p=0,001$). Nadalje, imali su tri do četiri puta veću učestalost ozbiljnijih simptoma (fisure, vezikule, papule ili deskvamacija; p -vrijednosti 0,005 za prvi i 0,004 za treći posjet). Zaključno, iako je upitnik za samoprocjenu postao pouzdaniji u starijoj dobi, nakon ponovljenih kliničkih pregleda i kod onih s težim simptomima, većina slučajeva ekcema na rukama ostala bi neprepoznata čak i u posljednjoj godini školovanja. Međutim, zbog svoje visoke specifičnosti, može se koristiti kao procjena donje granice stvarne prevalencije za učenike koji su prethodno prošli obrazovnu intervenciju za ekcem. (Financirano od: European Union – Next Generation EU, Program Contract of 8 December 2023, Class: 643-02/23-01/00016, Reg. no. 533-03-23-0006.)

KLJUČNE RIJEČI: ekcem šaka; osjetljivost; samoprocjena; specifičnost

Occupational poisoning with acids, alkalis, and organic solvents recorded in the Croatian Poison Control Centre

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Croatian Poison Control Centre (CPCC) is a 24-hour information service at the Institute for Medical Research and Occupational Health that receives inquiries from health professionals and other persons in the Republic of Croatia regarding cases of acute poisoning. Every year, part of the calls refers to occupational poisoning. Objective: To detect the main characteristics of cases of occupational poisoning with acids and alkalis and organic solvents in order to define measures to prevent such poisonings. Methods: By reviewing the calls to the CPCC in the period from 2010 to 2022, the characteristics of poisoning with acids and alkalis and organic solvents were determined. Results: Occupational poisonings with acids and alkalis constituted 20 % of total reported occupational poisonings. Inhalation was the most common route of exposure (57 %), followed by ingestion (19 %) and dermal contact (18 %). Similarly, organic solvents were implicated in 20 % of occupational poisoning cases, with inhalation accounting for 56 % and ingestion for 24 %. Male workers were affected in 59 % of acid and alkali poisoning cases and 80 % of organic solvent poisoning cases. Most poisonings resulted in mild symptoms or were asymptomatic, but severe clinical presentations were consistently observed, especially following ingestion and dermal exposure to acids and alkalis. Conclusion: A high proportion of inhalation as the main route of intake of acids, alkalis and organic solvents indicates a deficiency in wearing protective equipment. A high proportion of accidental ingestion as a route of chemical intake in the workplace is worrying, pointing to failures in occupational safety measures (e.g. the use of old pipetting techniques, improper chemical transfer procedures, storage of chemicals in unlabeled and inappropriate packaging). Increased caution and the use of adequate protective equipment when handling acids and alkalis and organic solvents are required, as well as the implementation of employee education on the possible adverse effects of these chemicals and occupational safety measures. Funded by: European Union – Next Generation EU, Program Contract of 8 December 2023, Class: 643-02/23-01/00016, Reg. no. 533-03-23-0006.

KEY WORDS: corrosives; dermal exposure; ingestion; inhalation; injury at work; occupational safety

Profesionalna otrovanja kiselinama i lužinama te organskim otapalima zabilježena u Centru za kontrolu otrovanja

Centar za kontrolu otrovanja (CKO) je 24-satna informacijska služba pri Institutu za medicinska istraživanja i medicinu rada koja prima upite zdravstvenih radnika i drugih osoba na području Republike Hrvatske u vezi slučajeva akutnih otrovanja. Svake godine se dio poziva odnosi na profesionalna otrovanja. Cilj: Detektirati glavna obilježja slučajeva profesionalnih otrovanja kiselinama i lužinama te organskim otapalima kako bi se mogle definirati mjere za sprječavanje ovakvih otrovanja. Metode: Pregledom poziva CKO-u u periodu od 2010. do 2022., utvrdile su se karakteristike otrovanja kiselinama i lužinama te organskim otapalima. Rezultati: Profesionalna otrovanja kiselinama i lužinama zabilježena su u 20 % od ukupnog broja profesionalnih otrovanja, s time da se u 57 % slučajeva radilo o inhalaciji kiselina ili lužina, a slijedi ingestija u 19 % i dermalni kontakt u 18 % slučajeva. Organska otapala bila su uzrok profesionalnih otrovanja u 20 % slučajeva u navedenom trinaestogodišnjem periodu, od čega se u 56 % slučajeva radilo o inhalaciji kao putu unosa, dok je ingestija organskih otapala zabilježena u 24 % slučajeva. Radilo se o radnicima muškog spola u 59 % slučajeva otrovanja kiselinama i lužinama te u 80 % slučajeva otrovanja organskim otapalima. Većina slučajeva ovih otrovanja bila je povezana s razvojem blažih simptoma otrovanja ili simptoma nije bilo, no teže kliničke slike bilježe se kontinuirano i to posebice kod slučajeva ingestije i dermalne izloženosti kiselinama i lužinama. Zaključak: Visok udio inhalacije kao glavnog puta unosa kiselina, lužina i organskih otapala ukazuje na manjkavost nošenja zaštitne opreme. Zabrinjava visok udio slučajnih ingestija kao puta unosa kemikalija na radnom mjestu ukazujući na propuste u mjerama zaštite na radu (npr. korištenje stare tehnike pipetiranja, nedozvoljeni postupci pretakanja kemikalija, čuvanje kemikalija u neoznačenoj i neprikladnoj ambalaži). Potreban je pojačan oprez i korištenje adekvatnih zaštitnih sredstava prilikom rukovanja kiselinama i lužinama te organskim otapalima, ali i provođenje edukacije radnika o mogućim štetnim učincima navedenih kemikalija i mjerama zaštite na radu. Financirano od: European Union – Next Generation EU, Program Contract of 8 December 2023, Class: 643-02/23-01/00016, Reg. no. 533-03-23-0006.

KLJUČNE RIJEČI: ingestija; inhalacija; kontaktna izloženost; korozivi; ozljeda na radu; zaštita na radu

Influence of recreational noise on hearing in the young adult population

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According to the World Health Organization, approximately 1.1 billion young people are at risk of hearing loss due to the unsafe use of personal audio devices, which includes smartphones, and exposure to noisy entertainment venues such as clubs, sports events, etc. also contributes to the risk. Long-term exposure to high volume levels has a harmful effect on hearing, so it is important to have data on the hearing condition of young people who use headphones from an early age. Previous research indicates a connection between exposure to high levels of sound intensity and the appearance of symptoms of hearing damage. The aim of the research was to determine the habits of recreational use of headphones in young people aged 18 to 25, to determine the volume of sound in headphones, to determine hearing sensitivity by audiometry, and to determine the connection between the way headphones are used and possible hearing damage. 111 respondents, final year high school students and students of the University of Zagreb, participated in the research. The tests included filling out a questionnaire, a doctor's examination (otoscopic examination and medical history), audiometry and measuring the sound volume in headphones. Preliminary results on 50 subjects indicate that 29.7 % of women and 14.3 % of men had a marginal deviation of the hearing threshold in the range of 20 to 40 dB, while 74.6 % had a normal audiometry finding. Of the reported hearing difficulties, 59.3 % of respondents said that they had problems with tinnitus at least once in their life, most often associated with exposure to high levels of noise in public places. As for the daily exposure to the use of headphones, it is an average of 2.5 hours on weekdays and 3 hours on weekends. Based on the obtained results, we conclude that the established hearing impairments are not clinically significant, but may represent a risk for later significant impairments.

KEY WORDS: audiometry; headphones; physical pollutants

Utjecaj rekreativne buke na sluh u mlađoj odrasloj populaciji

Prema podacima Svjetske zdravstvene organizacije otprilike 1,1 milijarda mladih osoba u opasnosti je od gubitka sluha zbog nesigurne upotrebe osobnih audio uređaja, što uključuje pametne telefone, a riziku doprinosi i izloženost na bučnim mjestima za zabavu kao što su klubovi, sportski događaji i sl. Dugotrajno izlaganje visokim razinama jačine zvuka ima štetan utjecaj na sluh, te je važno imati podatke o stanju sluha mladih koji od ranih godina života koriste slušalice. Dosadašnja istraživanja ukazuju na povezanost izlaganja visokim razinama jakosti zvuka i pojave simptoma oštećenja sluha. Cilj istraživanja bio je utvrditi navike rekreativnog korištenja slušalica u mladih osoba dobi 18 do 25 godina, odrediti jačinu zvuka u slušalicama, odrediti osjetljivost sluha audiometrijom te utvrditi povezanost načina korištenja slušalica s mogućim oštećenjem sluha. U istraživanju je sudjelovalo 111 ispitanika učenika završnih razreda srednjih škola te studenti Sveučilišta u Zagrebu. Ispitivanja su uključivala popunjavanje upitnika, pregled liječnika (otoskopski pregled i anamneza), audiometriju te mjerenje jačine zvuka u slušalicama. Preliminarni rezultati na 50 ispitanika ukazuju da granično odstupanje praga čujnosti u rasponu od 20 do 40 dB ima 29,7 % žena i 14,3 % muškaraca, dok 74,6 % ima uredni nalaz audiometrije. Od prijavljenih poteškoća sa sluhom 59,3 % ispitanika je reklo da je imalo probleme sa tinitusom barem jednom u životu najčešće povezanim s izlaganjem visokim razinama buke na javnim mjestima. Što se tiče dnevne izloženosti korištenja slušalica ona je u prosjeku 2,5h radnim danom i 3h vikendom. Na temelju dobivenih rezultata zaključujemo da utvrđena oštećenja sluha nisu klinički značajna no mogu predstavljati rizik za kasnija značajnija oštećenja što ukazuje potrebu za daljnjim istraživanjima. (Financirano od: European Union – Next Generation EU, Program Contract of 8 December 2023, Class: 643-02/23-01/00016, Reg. no. 533-03-23-0006.)

KLJUČNE RIJEČI: audiometrija; fizikalna zagađivala; slušalice

Microplastics as an environmental pollutant – quantification and chemical identification in indoor environments

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Plastic pollution is one of the most pressing issues of today. Once plastics enter the environment, they degrade into microplastic (MP) fragments which are transported over long distances and are widespread in oceans, soil, air, drinking water, and food. Apart from the potential harmful effects on biological systems by MP themselves, MP can act as vector of various contaminants, harmful chemicals and pathogens, imposing additional threat to human health. Potential effects of chronic exposure to MP via inhalation and ingestion on human health are still unclear. In its recent reports on MP (2019 and 2021), the World Health Organization calls for increased research to assess human exposure to MP and, as a basic prerequisite, for the standardization of methods for MP identification and quantification. Research on exposure to MP in indoor environment started very recently and is important from the perspective of occupational exposure and medicine. Here we present the optimization of a method for analyzing MP using laser direct infrared spectroscopy (LDIR) chemical imaging system and our preliminary results of MP analysis in indoor deposition samples collected in a bottling plant at two separate beverage filling lines. The total deposited particles ranged from 10-250 μm in size, and the majority were natural polymers (cellulose, chitin, and polyamides) and carbonates (77-82 %), along with rubber particles (5-15 %) and polyurethane (3-7 %). The percentage of other MP particles (PET, PTFE, PP, PE, and PVC) was 3-5 %. Although there was no difference in the percentage of MP between the sampling locations, there were differences in MP deposition concentrations near line L2 (8398-12242 MP particles/ m^2/day) and line L3 (37175-42746 MP particles/ m^2/day), associated with the varying working intensity of the filling lines. The LDIR method proved suitable for analyzing MP particles in the air and can be applied in investigation of sources of airborne MP and the assessment of occupational exposure. (Funded by the European Regional Development Fund, OP Competitiveness and Cohesion project “Development of a functional beverage in sustainable packaging” – JamINNO+ (KK.01.2.1.02.0305).

KEY WORDS: air; deposited particles; LDIR; occupational exposure

Mikroplastika kao okolišno zagađivalo – kvantifikacija i kemijska identifikacija u unutarnjem radnom okolišu

Onečišćenje okoliša plastičnim otpadom je rastući problem današnjice. Kada jednom uđe u okoliš, plastika degradira i usitnjuje se u mikroplastiku (MP) koja se prenosi na velike udaljenosti i postaje sveprisutna u oceanima, tlu, zraku, pitkoj vodi i hrani. Čestice MP u okolišu različitog su kemijskog sastava i fizikalnih svojstava. Osim mogućih štetnih učinaka samih čestica MP na biološke sustave, MP može biti vektor za prijenos različitih onečišćivača, toksičnih kemikalija i patogena što je čini dodatno škodljivom po zdravlje. Posljedice kronične izloženosti MP udisanjem i prehranom na zdravlje ljudi još uvijek nisu sasvim jasne te Svjetska zdravstvena organizacija potiče znanstvenu zajednicu na podrobnija istraživanja procjene izloženosti ljudi česticama MP te na standardizaciju i razvoj pouzdanih metoda identifikacije i kvantifikacije MP. Istraživanja o MP u unutarnjem okolišu su započela unazad par godina, a osobito su važna iz aspekta profesionalne izloženosti radnika. Prikazat će se optimizacija metode analize MP kemijskim oslikavanjem infracrvenom spektroskopijom s kvantnim kaskadnim laserom (LDIR) i preliminarni rezultati mjerenja MP u uzorcima taložne tvari iz zraka koji su prikupljeni u punionici pića uz dvije različite proizvodne linije. Prikupljene čestice taložne tvari bile su veličine 10-250 μm i u najvećem udjelu bile su prirodni polimeri (celuloza, hitin i poliamidi) i karbonati (77-82 %) te čestice gume (5-15 %) i poliuretana (3-7 %). Udjel čestica ostale MP (PET, PTFE, PP, PE i PVC) bio je 3-5 %. Iako nije bilo razlike u udjelu te MP u uzorcima između lokacija uzorkovanja, nađene su razlike između koncentracije u taložnoj tvari u zraku uz linije L2 (8398-12242 čestica MP/ m^2/dan) i L3 (37175-42746 čestica MP/ m^2/dan), što je povezano s različitim intenzitetom rada linija. LDIR metoda pokazala se prikladnom za analizu čestica MP u zraku i može se primijeniti u istraživanju izvora i procjeni profesionalne izloženosti. (Financirao Europski fond za regionalni razvoj, OP Konkurentnost i kohezija u sklopu projekta Razvoj funkcionalnog pića u održivoj ambalaži – JamINNO+, KK.01.2.1.02.0305. Prezentaciju rada financira Europska unija – NextGenerationEU kroz Programski ugovor s MZO RH od 8. prosinca 2023., Klasa: 643-02/23-01/00016, UR broj: 533-03-23-0006).

KLJUČNE RIJEČI: LDIR; profesionalna izloženost; taložna tvar; zrak

Metal(loid)s as contaminants in food

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Metal(loid)s are present in the general and work environment. The main source of human exposure in the ambient environment is diet. Metal(loid)s occur in food and drinking water from the soil, water, and air, and as a result of farming, food processing, the use of fossil fuels, food preparation, and food storage. Main metal(loid)s as food contaminants are mercury (Hg), lead (Pb), cadmium (Cd), and arsenic (As). They can affect virtually all organ systems and interact with essential elements. Their adverse effects depend on the metal(loid) levels and the frequency of particular food consumption. The levels of contaminants including metal(loid)s in food are regularly monitored to protect consumer health. The presentation will give a brief overview of the results from previous studies on element levels in fish and rice, two staple foods that are also the main dietary sources of Hg and As. We carried out a multi-element analysis in the samples of the most commonly consumed fish species from the Adriatic Sea, tuna fillets of oceanic origins, canned fish, and white and brown rice available on the Croatian market, including As speciation analysis in the rice samples. Levels of Hg, Cd, and Pb in all analyzed samples and levels of inorganic As (iAs) in rice were below the maximum levels (ML) in food set by the Commission Regulation EU 2023/915. Only common pandora and wild-caught seabream had Hg levels above the regulatory limits. Metal(loid)s in fish varied by species, fish habitat, and trophic level. Demersal species (e.g. mullets and common pandora) had higher levels of Hg and As than small pelagic species (e.g. European pilchard). Levels of iAs in rice differ by rice origins. Based on the exposure assessments of the main toxic elements found in food, guidelines for the consumption of certain types of fish and rice were proposed for the most sensitive population groups, women during reproductive age and young children. Research on metal(loid)s in food will continue on a larger number of samples of animal and plant origins as a part of the work package "Food and Health" during the ongoing research project HumEnHealth (EU-NextGenerationEU, Program Contract of December 8, 2023; Class: 643-02/23-01/00016, Reg. No.: 533-03-23-0006). The obtained data will contribute to the metal(loid)s dietary exposure assessment in the Croatian population.

KEY WORDS: arsenic; dietary exposure; mercury; risk assessment

Metal(oid)i kao onečišćivači u hrani

Metali i metaloidi prisutni su u općem i radnom okolišu. Glavni izvor izloženosti u općem okolišu je prehrana. U hranu i vodu za piće dopijevaju iz tla, vode i zraka, kao posljedica aktivnosti povezanih s proizvodnjom i preradom hrane, uporabom fosilnih goriva te pripremom obroka i čuvanjem hrane. Najznačajniji metal(oid)i koji onečišćuju hranu jesu živa (Hg), olovo (Pb), kadmij (Cd) i arsen (As). Oni mogu štetno djelovati na većinu organskih sustava i međudjeluju s esencijalnim elementima. Nepovoljni učinci metal(oid)a ponajviše ovise o njihovim razinama u hrani i učestalosti unosa hrane. Kako bi se zaštitilo zdravlje potrošača, u hrani se sustavno nadziru razine onečišćivača uključujući metal(oid)e. U izlaganju će se ukratko iznijeti pregled rezultata dosadašnjih istraživanja sadržaja elemenata u ribi i riži, dvjema osnovnim namirnicama koje su ujedno i glavni izvori Hg i As. Provedena je multielementna analiza u uzorcima najčešće konzumiranih vrsta ribe iz Jadranskoga mora, filetima tune oceanskoga podrijetla, konzerviranoj ribi te rižama bijelog i smeđeg tipa dostupnima na hrvatskom tržištu, a u riži dodatno i specijacija spojeva As. Razine Hg, Cd i Pb u svim uzorcima te razine anorganskog As u riži bile su niže od najvećih dopuštenih količina (NDK) u hrani utvrđenih Uredbom EU 2023/915. Izuzetak su arbuni i orade iz divljeg ulova s razinama Hg iznad NDK. Razine metal(oid)a u ribljim uzorcima razlikovale su se prema vrsti, staništu i položaju ribe u hranidbenom lancu. Pridnene vrste (pr. trlja i arbun) imale su veće razine Hg i As od sitnih pelagičkih vrsta (pr. srdela). Razine anorganskog As razlikovale su se prema podrijetlu riže. Na temelju procjena izloženosti glavnim toksičnim elementima koji se mogu nalaziti u hrani predložene su smjernice za konzumaciju pojedinih vrsta ribe i riže za najosjetljivije skupine stanovništva, žene u fertilnoj dobi i malu djecu. Istraživanja metal(oid)a u hrani nastaviti će se u sklopu Radnoga paketa „Hrana i zdravlje“ istraživačkoga projekta HumEnHealth (EU-NextGenerationEU, Programski ugovor od 8. prosinca 2023., Klasa: 643-02/23-01/00016, Ur. broj: 533-03-23-0006) na većem broju uzoraka namirnica životinjskoga i biljnoga podrijetla. Dobiveni rezultati pridonijet će procjeni prehrane izloženosti metal(oid)ima u hrvatskom stanovništvu.

KLJUČNE RIJEČI: analiza hrane; arsen; izloženost ljudi prehranom; procjena rizika; živa

Measurement of skin barrier parameters as a biomonitoring tool for the prevention of occupational skin diseases

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The aim of this workshop is to familiarize congress participants with measurement of skin barrier parameters as a tool for early detection of work-related skin changes. The skin barrier function of workshop participants will be assessed by measuring transepidermal water loss (TEWL), skin hydration and stratum corneum skin pH (SC pH) using commercial non-invasive probes. In addition, the participants will be informed of the recent scientific advances in the field of occupational skin biomonitoring. In short, the development of work-related skin diseases begins already during vocational training for high-risk occupations, due to exposure to specific occupational chemicals such as products for hair dyeing, washing and styling (hairdressers), skin care products (beauticians) and detergents and disinfectants (nurses). Of particular concern is the finding that about half of the nursing apprentices already at the end of their vocational training have compromised skin barrier function on hands judging by the elevated values of TEWL (>25 g/m²/h in 48 % of them) and SC pH (>5.5 ; in 57 %). Furthermore, frequent hand washing and disinfecting by physicians and dentists, especially surgeons, contributes significantly to the damage of their skin barrier and consequently to the development of irritant contact dermatitis. We observed the worst condition of the skin barrier in dental surgeons, where a critical condition (TEWL >30 g/m²/h) was found in 43 % of study participants. Quick and painless skin bioengineering methods can be used for detecting pre-clinical skin barrier damage and timely prevention of fully manifested occupational dermatitis, but the observed influence of age, gender and ambient conditions during measurement still prevent their widespread use. The SC pH has so far proven to be the most robust parameter under field conditions. Funded by the European Union – Next Generation EU, Program Contract of 8 December 2023, Class: 643-02/23-01/00016, Reg. no. 533-03-23-0006.

KEY WORDS: high risk occupations; skin hydration; skin pH; transepidermal water loss; workshop

Mjerenje parametara zaštitne kožne barijere kao alata za prevenciju profesionalnih bolesti kože

Cilj: sudionike kongresa upoznati s parametrima kožne barijere kao alatima za ranu detekciju kožnih promjena povezanih s radom. Materijal i metode: funkcija kožne barijere kod sudionika radionice procijenit će se određivanjem gubitka vode kroz kožu (engl. transepidermal water loss, TEWL), hidracije kože i površinskog (stratum corneum) pH kože (SC pH) korištenjem komercijalnih neinvazivnih sondi. Uz to će se sudionicima izložiti rezultati dosadašnjih istraživanja Zavoda za medicinu rada IMI-ja. Ukratko, razvoj kožnih bolesti povezanih s radom počinje već tijekom strukovnog školovanja za visokorizična zanimanja, zbog izloženosti specifičnim profesionalnim kemikalijama poput proizvoda za bojanje, pranje i oblikovanje kose (frizeri), proizvodima za njegu kože (kozmetičari) te deterdžentima i dezinficijensima (med. sestre/tehničari). Posebno zabrinjavaju podaci da oko polovice učenika za zanimanje medicinske sestre/tehničara već na kraju školovanja ima kompromitiranu funkciju kože šaka sudeći po nađenim povišenim vrijednostima TEWL-a (>25 g/m²/h kod 48 %) i SC pH ($>5,5$ kod 57 %). Nadalje, često pranje i dezinficiranje kože kod doktora medicine i zubara, pogotovo kirurških specijalizacija, značajno pridonosi oštećenju kožne barijere i posljedično razvoju iritativnog kontaktnog dermatitisa i kod ovih djelatnika. Najgore stanje kožne barijere smo uočili kod oralnih kirurga, kod kojih je kritično stanje kožne barijere (TEWL >30 g/m²/h) nađeno u 43 % ispitanika. Zaključak: navedene brze i bezbolne metode mogu se koristiti za brzu procjenu oštećenja kožne barijere i ranu prevenciju klinički izraženih kožnih promjena kod radnika, ali primjećeni utjecaj dobi, spola i ambijetalnih uvjeta tijekom mjerenja još uvijek sprečavaju njihovu široku upotrebu. SC pH se dosad pokazao kao najrobusniji parametar u terenskim uvjetima.

KLJUČNE RIJEČI: hidracija kože; pH kože; radionica; TEWL; visokorizična zanimanja

Functional diagnostics of the respiratory system in the outpatient clinic of occupational and sports medicine: spirometry with a bronchodilator test

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Spirometry is the most commonly performed pulmonary function test that measures the ventilation function of the lungs, i.e. volume and flow of air on inhalation and exhalation. The most common indications for performing spirometry are the detection and monitoring of the course of obstructive and restrictive pulmonary disorders (for example, asthma, COPD, pulmonary fibrosis), and the distinction between the respiratory and cardiac causes of shortness of breath. Spirometry is a regular part of preventive examinations in occupational and sports medicine clinics. It is performed with a device that displays a graphical representation of the breathing maneuver, most often in the form of a flow-volume curve, for which it is necessary to perform a maneuver of maximum strong inhalation followed by a maximum strong exhalation of at least 6 seconds. The result of the measurement is significantly dependent on the cooperation of the examinee, and the proper management of the measurement procedure by the nurse/technician. Therefore, the aim of this workshop is to present to nurses/technicians the physiological and pathophysiological basis for measuring the ventilation function of the lungs, the correct technique of performance, the parameters measured by spirometry, the basics of interpretation of measured values, and contraindications for performing this test. In addition to the presentation and practical education of spirometry, the procedure for performing a bronchodilator test will be presented as a simple procedure for the early detection of subjects at risk of developing obstructive pulmonary disorders.

KEY WORDS: flow-volume curve; preventive medical examinations; pulmonary function; workshop

Funkcionalna dijagnostika dišnog sustava u ambulanti medicine rada i sporta: izvođenje spirometrije s bronhodilatatornim testom

Spirometrija je najčešće izvođen test plućne funkcije koji mjeri ventilacijsku funkciju pluća, tj. volumen i protok zraka pri udahu i izdahu. Najčešće indikacije za izvođenje spirometrije su otkrivanje i praćenje tijeka opstruktivnih i restriktivnih plućnih poremećaja (na primjer, astma, KOPB, plućna fibroza), te razlikovanje respiratornog i kardijalnog uzroka zaduhe. Spirometrija je redoviti dio preventivnih pregleda u ambulantama medicine rada i sporta. Izvodi se uređajem koji prikazuje grafički prikaz manevara disanja najčešće u obliku krivulje protok-volumen, za što je potrebno izvesti manevar maksimalnog snažnog udaha praćenog maksimalnim snažnim izdahom trajanja najmanje 6 sekundi. Rezultat mjerenja je značajno ovisan o suradnji ispitanika, te pravilnom vođenju procedure mjerenja od strane medicinske sestre/tehničara. Stoga je cilj ove radionice medicinskim sestrama/tehničarima prezentirati fiziološku i patofiziološku osnovu mjerenja ventilacijske funkcije pluća, pravilnu tehniku izvođenja, parametre mjerene spirometrijom, osnove interpretacije izmjerenih vrijednosti, te kontraindikacije za izvođenje ovog testa. Uz prikaz i praktičnu edukaciju izvođenja spirometrije, prezentirat će se i postupak izvođenja bronhodilatatornog testa kao jednostavnog postupka za rano otkrivanje ispitanika s rizikom za razvoj opstruktivnih plućnih poremećaja.

KLJUČNE RIJEČI: krivulja protok-volumen; plućna funkcija; preventivni pregledi; radionica

Occupational safety in pregnant Croatian healthcare workers during the Covid-19 pandemic

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Healthcare workers (HCWs) are one of the most exposed groups to the severe acute respiratory syndrome coronavirus 2 infection. The aim of this study was to explore occupational safety in pregnant Croatian HCWs during coronavirus disease 2019 (Covid-19) pandemic. Questionnaire (pregnancy data, risk assessment and mitigation, workplace intervention) was created by authors using the Microsoft Forms[®] and filled in anonymously by subjects approached via Croatian social media closed groups and associations of HCWs. A total of 173 HCWs (71.1 % physicians, 19.7 % nurses, 9.2 % other HCWs) diagnosed with pregnancy in 2020 or 2021 were included. Employers were notified about HCWs' pregnancy at the eighth (IQR 7.0-11.0) week of pregnancy, delaying the end of the workplace risk assessment and mitigation process beyond the first trimester. Such process was carried out individually in only 19.6 % of the participants, mostly on their own initiative (76.5 %). After notifying employers about pregnancy, 37.0 % of participants used health insurance benefit for temporary work incapacity (TWI) due to "pregnancy complications", despite the healthy pregnancy, 16.8 % were granted a pregnant worker's paid leave at the expense of the employer, while 5.8 % continued to work at the same workplace. Workflow of pregnant physicians and nurses differed significantly due to the higher risks at the nurses' workplaces. Nurses used TWI benefit more frequently than physicians (58.8 % vs 30.1 %, $P=0.004$). Results suggest that occupational safety of pregnant HCWs in Croatia lacks systemic approach, forcing HCWs to use unjustified measures of health care system in the absence of clear employers' prevention strategies.

KEY WORDS: biological hazards; occupational exposure; pregnancy; risk assessment; work ability

Sigurnost na radu kod trudnih hrvatskih zdravstvenih radnica tijekom pandemije Covid-19

Zdravstveni radnici jedna su od najizloženijih skupina infekciji koronavirusom 2 s teškim akutnim respiratornim sindromom. Cilj ovog istraživanja bio je istražiti sigurnost na radu kod trudnih hrvatskih zdravstvenih radnica tijekom pandemije koronavirusne bolesti 2019 (Covid-19). Upitnik (podaci o trudnoći, procjena i ublažavanje rizika, intervencija na radnom mjestu) su autori izradili pomoću Microsoft Forms[®], a anonimno su ga ispunili ispitanici kojima se pristupilo putem hrvatskih društvenih mreža zatvorenih skupina i udruga zdravstvenih radnika. Ukupno su uključene 173 zdravstvene radnice (71,1 % liječnica, 19,7 % medicinskih sestara, 9,2 % ostalih zdravstvenih radnica) kojima je dijagnosticirana trudnoća u 2020. ili 2021. godini. Poslodavci su obaviješteni o trudnoći zdravstvenih radnica u osmom (IQR 7.0-11.0) tjednu trudnoće, odgađajući kraj procjene rizika na radnom mjestu i proces smanjenja rizika nakon prvog tromjesečja trudnoće. Takav proces proveden je pojedinačno u samo 19,6 % ispitanica, uglavnom na njihovu inicijativu (76,5 %). Nakon obavještanja poslodavaca o trudnoći, 37,0 % ispitanica iskoristilo je naknadu zdravstvenog osiguranja za privremenu nesposobnost za rad zbog "komplikacija u trudnoći", unatoč zdravoj trudnoći, 16,8 % dobilo je plaćeni dopust trudne radnice o trošku poslodavca, dok je 5,8 % nastavilo raditi na istom radnom mjestu. Radni status trudnih liječnica i medicinskih sestara značajno se razlikovao zbog većih rizika na radnim mjestima medicinskih sestara. Medicinske sestre koristile su naknadu za privremenu nesposobnost za rad češće od liječnica (58,8 % vs 30,1 %; $P=0,004$). Naši rezultati upućuju na nedostatak sustavnog pristupa zaštititi trudnih zdravstvenih radnica u Hrvatskoj, što ih prisiljava da koriste neopravdane mjere zdravstvenog sustava u nedostatku jasnih preventivnih strategija poslodavaca.

KLJUČNE RIJEČI: biološke štetnosti; procjena rizika; profesionalna izloženost; radna sposobnost; trudnoća

Professional tricholeukaemia in the conditions of the Covid-19 pandemic

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Introduction: Tricholeukemia is a chronic B-lymphocytic leukemia of low incidence and predominantly indolent type. The development of tricholeukemia is associated with exposure to ionizing radiation and pesticides, which forms the basis for recognizing tricholeukemia as an occupational disease. At the beginning of the 2019 coronavirus disease (COVID-19) pandemic, the number of periodic health examinations in occupational and sports medicine was drastically reduced in accordance with recommended anti-epidemic measures, which made it difficult to diagnose, identify and recognize occupational diseases. **Case report:** During the COVID-19 pandemic, a cardiologist electrophysiologist came for a periodic examination at the occupational and sports medicine clinic to assess his ability to work in the zone of ionizing radiation. The dose of exposure to ionizing radiation was within the permitted limits, and the duration of exposure was 8h through 20 years. Upon inspection of the complete blood count, thrombocytopenia and leukopenia were diagnosed, and after conducting further tests, tricholeukemia was diagnosed. Subsequently, the same worker was also diagnosed with the disease COVID-19. The professional etiology of tricholeukemia and the disease COVID-19 was determined by the Croatian Institute for Public Health, and recognized by the Croatian Institute for Health Insurance. **Conclusion:** The recognized professional etiology of tricholeukemia and the disease COVID-19 is an indicator of the maintained continuity of care for health workers in the pandemic, as well as a well-organized system of reporting occupational diseases despite the limited access to the health system due to the implemented anti-epidemic measures.

KEY WORDS: epidemic; healthcare worker; ionizing radiation

Profesionalna triholeukemija u uvjetima pandemije bolesti Covid-19

Uvod: Triholeukemija kronična je B-limfocitna leukemija niske pojavnosti i dominantno indolentnoga tijeka. Razvoj triholeukemije povezan je s izloženošću ionizirajućem zračenju i pesticidima, što čini osnovu za priznavanje triholeukemije kao profesionalne bolesti. Na početku pandemije koronavirusne bolesti 2019 (COVID-19), broj periodičnih zdravstvenih pregleda u medicini rada i sporta bio je drastično smanjen sukladno preporučenim protuepidemijskim mjerama, što je otežalo dijagnosticiranje, utvrđivanje i priznavanje profesionalnih bolesti. **Prikaz slučaja:** Tijekom pandemije bolesti COVID-19, kardiolog elektrofiziolog došao je na periodički pregled u ambulantu medicine rada i sporta radi ocjene sposobnosti za rad u zoni ionizirajućeg zračenja. Doza izloženosti ionizirajućem zračenju bila je unutar dozvoljenih granica, a trajanje izloženosti iznosilo je kroz osmosatno radno vrijeme tijekom 20 godina. Uvidom u kompletnu krvnu sliku, dijagnosticirana je trombocitopenija i leukopenija, a provedbom daljnjih pretraga i triholeukemija. Naknadno je u istoga radnika dijagnosticirana i bolest COVID-19. Profesionalna etiologija triholeukemije i bolesti COVID-19 utvrđena je na Hrvatskom zavodu za javno zdravstvo, te priznata na Hrvatskom zavodu za zdravstveno osiguranje. **Zaključak:** Priznata profesionalna etiologija triholeukemije i bolesti COVID-19 pokazatelj je održanog kontinuiteta skrbi za zdravstvene radnike u pandemiji, kao i dobro organiziranog sustava prijave profesionalnih bolesti usprkos ograničenosti pristupa zdravstvenom sustavu zbog provedenih protuepidemijskih mjera.

KLJUČNE RIJEČI: epidemija; ionizirajuće zračenje; zdravstveni radnik

Health problems experienced by nurses professionally exposed to cytostatics

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Aim: Nurses in the haematology and oncology departments are responsible for the care of patients with malignant diseases, as well as the preparation and administration of chemotherapy. Nurses and pharmaceutical technicians form a group of healthcare workers most exposed to the effects of cytostatics. Although the exposure is not as direct as in patients, due to frequent exposure they may be affected by their effects. The aim of this paper is to examine the occurrence of health issues that nurses subjectively associate in work with cytostatics. **Methods:** The respondents of this research are nurses employed at the haematology and oncology departments at the University Hospital Centre Zagreb. The research was conducted in May 2022, and 130 out of a possible 210 respondents participated, representing a response rate of 61.9 %. For the research a survey was designed and divided into several categories. For this paper we extracted data related to questions about the health status of the respondents. **Results:** A total of 8 % of respondents associate the certain health issues with professional exposure to cytostatics. The reported health issues include: irritating cough, watery eyes, nasal bleeding, fatigue, hair loss, eye irritation, skin itching, bone pain, arthritis and dermatitis, eye damage from the fume hood, absence of menstruation in earlier years of life, early onset of menopause and thyroid problems. **Conclusion:** The health issues reported by the respondents have already been described in the literature. An interesting information is that most respondents haven't had their issues medically verified. Since the survey relies on the subjective assessment of the respondents themselves, it cannot be asserted that these health issues were exclusively due to professional exposure. It is necessary to conduct more detailed research and to explore the reasons behind the lack of reporting health issues.

KEY WORDS: antineoplastic drugs; occupational exposure

Zdravstvene tegobe medicinskih sestara profesionalno izloženih citostaticima

Cilj rada: Medicinske sestre na hematološkim i onkološkim odjelima zadužene su za skrb o maligno oboljelom pacijentu, što uključuje pripremu i primjenu kemoterapije. Uz farmaceutske radnike čine skupinu zdravstvenih radnika profesionalno najizloženijih djelovanju citostatika. Iako izlaganje citostaticima nije direktno, istraživanja su pokazala da zbog česte izloženosti mogu doći pod utjecaj njihovog djelovanja. Cilj rada je ispitati pojavnost zdravstvenih tegoba koje medicinske sestre subjektivno povezuju s radom s citostaticima. **Materijal i metode:** Ispitanici istraživanja su medicinske sestre i tehničari Kliničkog bolničkog centra Zagreb zaposleni na hematološkim i onkološkim odjelima. Istraživanje je provedeno tijekom svibnja 2022. godine a u njemu je sudjelovalo 130 od mogućih 210 ispitanika, što čini odaziv od 61,9 %. Za provedbu istraživanja osmišljena je anketa podijeljena u nekoliko kategorija a za ovaj rad izdvojeni su podaci koji se odnose na pitanja o zdravstvenom stanju ispitanika. **Rezultati:** Ukupno 8 % ispitanika povezuje pojavnost određenih zdravstvenih tegoba s profesionalnom izloženosti citostaticima. Tegobe koje su naveli uključuju: nadražajni kašalj, suženje očiju, sukrvicu iz nosa, umor, ispadanje kose, iritacija očiju, svrbež kože, kostobolja, artritis i dermatitis, oštećenje očiju od digestora, izostanak mjesečnice u ranijim godinama života, rani ulazak u klimakterij te probleme sa štitnjačom. **Zaključak:** Zdravstvene tegobe koje su ispitanici naveli dosad su već opisane u literaturi, a ono što je zanimljiv podatak jest to da većina ispitanika nije medicinski verificirala svoje tegobe. S obzirom na to da se anketa oslanja na subjektivnu procjenu ispitanika, ne može se tvrditi da su te tegobe nastale isključivo profesionalnom izloženosti te je potrebno provesti detaljnija istraživanja ali i ispitati koji su razlozi neprijavlivanja zdravstvenih tegoba.

KLJUČNE RIJEČI: antineoplastični lijekovi; profesionalna izloženost

Work ability and its determinant among Tunisian female nurses working in public hospital

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Background and goal: Work ability reflects the balance between individual physical and mental capacities and job demands. This balance may be influenced by work conditions and age-related changes in health conditions. Multifactorial determinants of work ability should be closer investigated, in heavy workload sectors such as caregiving. This study aims to assess factors influencing work ability among female nurses in Tunisian hospitals. Methods: A cross-sectional study was conducted among a representative sample of female nurses working in two Tunisian public hospitals (N=156). A form, including the SF12 questionnaires for quality of life (QoL) was administered. The work ability was evaluated using the Work ability index (WAI). The physical strength and endurance were explored with the peak expiratory flow rate, the one leg test, the grip Strength and the 30 s sit-to-stand test. A neuropsychological test battery was used to explore cognitive functions (time reaction, Corsi test, O'Connor test, Stroop Victoria test) Results: The response rate was equal to 91.02 % with a mean age of 39.63±10.83 years. The average WAI was 39.9±5. A poor mental QoL was noted among 51 % of the sample. The average level of grip strength was equal to 42.92±16.92 kg and the average number of stand-sit completed times was 18±6. The average time required to fulfill O'Connor test instructions was equal to 115.02±23.62 s with better performance in nurses aged lower than 45 years. The work ability worsened significantly among nurses aged over 45 years (P=0.007), women having heavier domestic activity (P=0.003) and those with lower mental QoL (P=0.006). Moreover, a significant negative association was noted between the WAI and elevated level of perceived stress (P=0.01), lower grip strength (P=0.001) and Corsi test performances (P=0.017). Conclusion: To safely and efficiently complete their occupational tasks, health workers need to maintain their work ability throughout a long professional life. Promoting overall health, improving working conditions, and adapting job demands is crucial to prevent decreases in work ability, especially with age and notably among female caregivers.

KEY WORDS: health workers; quality of life

Radna sposobnost medicinskih sestara zaposlenih u javnim bolnicama u Tunisu

Radna sposobnost odražava ravnotežu između individualnih fizičkih i mentalnih sposobnosti i zahtjeva radnog mjesta. Na ovu ravnotežu mogu utjecati uvjeti rada i promjene u zdravstvenim sposobnostima uvjetovane starenjem. Potrebna su detaljnija istraživanja višefaktorskih determinanata radne sposobnosti, osobito u sektorima s velikim radnim opterećenjem, kao što je onaj za njegu. Cilj ovog istraživanja bio je procijeniti čimbenike koji utječu na radnu sposobnost medicinskih sestara zaposlenih u tuniškim bolnicama. Metode: presječna studija provedena je na reprezentativnom uzorku medicinskih sestara zaposlenih u dvije javne bolnice u Tunisu (N=156). Primijenjen je obrazac koji uključuje SF12 upitnike za kvalitetu života (QoL). Radna sposobnost procijenjena je indeksom radne sposobnosti (WAI). Fizička snaga i izdržljivost ispitivane su vršnom ekspiratornom brzinom protoka, testom jedne noge, snagom stiska i 30 s testom sjedi-ustani. Baterija neuropsiholoških testova korištena je za istraživanje kognitivnih funkcija (vremenska reakcija, Corsijev test, O'Connorov test, Stroop Victoria test) Rezultati: Stopa odgovora bila je jednaka 91,02 % s prosječnom dobi od 39,63±10,83 godina. Prosječni WAI bio je 39,9±5. Loša mentalna kvaliteta života zabilježena je u 51 % ispitanica. Prosječna razina snage stiska iznosila je 42,92±16,92 kg, a prosječan broj dovršenih vremena stajanja i sjedenja bio je 18 ± 6. Prosječno vrijeme potrebno za ispunjavanje uputa O'Connorovog testa bilo je 115,02±23,62 s, s boljim učinkom u medicinskih sestara mlađih od 45 godina. Radna sposobnost značajno se pogoršala kod medicinskih sestara starijih od 45 godina (P=0,007), žena koje imaju veće kućne aktivnosti (P=0,003) i onih s nižom mentalnom kvalitetom života (P=0,006). Stoviše, primijećena je značajna negativna povezanost između WAI i povišene razine percipiranog stresa (P=0,01), niže snage stiska (P=0,001) i izvedbe Corsijeva testa (P=0,017). Zaključak: za sigurno i učinkovito obavljanje svojih profesionalnih zadataka, zdravstveni radnici trebaju održavati svoju radnu sposobnost tijekom dugog profesionalnog života. Promicanje općeg zdravlja, poboljšanje uvjeta rada i prilagodba zahtjeva posla ključni su za sprječavanje smanjenja radne sposobnosti tijekom starenja što je osobito uočeno među negovateljicama.

KLJUČNE RIJEČI: zdravstveni radnici; kvaliteta života

The motivation of healthcare workers to work in clinical settings

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The health profession is recognized as a profession with a high level of stress. Employee motivation for work acts as a stress modulator, affecting well-being at work and health services. The goal of this research is to determine the most important motivators of employees for working at the clinic setting. All employees working at clinical departments in the hospital were invited to the research, which was conducted in May 2022 using an anonymous questionnaire to assess motivation for work in healthcare. Twenty statements are offered, intrinsic and extrinsic motivators. Respondents rated the statements on a scale from 1 to 5. Intrinsic aspects of work related to internal satisfaction include interesting and challenging work that encourages independent learning, while vacation, good working hours, salary, opportunity for status advancement and a pleasant environment belong to extrinsic aspects. The survey was completed by 553/5338 (10.4 %) employees of KBC Zagreb. The participants were doctors, nurses, other health professionals and administrative staff at the clinic. In the top ten, employees marked 4 intrinsic and 6 extrinsic motivators. The first two are intrinsic: interesting work and helping sick people. Then there are extrinsic motivators: salary, good working conditions, secure employment status, the possibility of harmonizing work and private life, demand for the profession and future earning potential. Of the other intrinsic motivators, a responsible and challenging job was selected in the top ten. This research confirmed the results from the European Values Study; analysis of the relationship between work values and socio-demographic characteristics in Croatia, which showed that people with higher education have more often intrinsic motives. The most important motivators for working at the clinic are the interesting work and the desire to help sick people, which is in line with this profession. Analysis of motivators for work can be a good guideline for the employer for measures to strengthen the stress resistance of employees in healthcare.

KEY WORDS: clinic; health professionals; stress

Motivacija zdravstvenih radnika za rad u kliničkom okruženju

Zdravstvena profesija prepoznata je kao profesija s visokom razinom stresa. Motivacija zaposlenika za rad djeluje kao modulator stresa, utječe na dobrobit na poslu i kvalitetu zdravstvenih usluga. Cilj ovog istraživanja bio je utvrditi najvažnije motivatore zaposlenika za rad u kliničkom okruženju. U istraživanje koje je provedeno u svibnju 2022. anonimnim upitnikom za procjenu motivacije za rad u zdravstvu pozvani su svi zaposlenici na kliničkim odjelima KBC-a Zagreb. Ponuđeno je dvadeset tvrdnji, intrinzičnih i ekstrinzičnih motivatora. Ispitanici su tvrdnje ocjenjivali ocjenama od 1 do 5. Intrinzični aspekti posla vezani uz unutarnje zadovoljstvo uključuju zanimljiv i izazovan posao koji potiče samostalno učenje, dok godišnji odmor, dobro radno vrijeme, plaća, mogućnost statusnog napredovanja i ugodno okruženje pripadaju ekstrinzičnim aspektima. Anketu je ispunilo 553/5338 (10,4 %) djelatnika KBC-a Zagreb. Sudionici su bili liječnici, medicinske sestre, drugi zdravstveni djelatnici i administrativno osoblje klinike. U prvih deset zaposlenici su označili 4 intrinzična i 6 ekstrinzičnih motivatora. Prva dva su intrinzična: zanimljiv posao i pomoć bolesnima. Zatim, tu su i ekstrinzični motivatori: plaća, dobri radni uvjeti, siguran radni status, mogućnost usklađivanja poslovnog i privatnog života, potražnja za zanimanjem i buduća zarada. Od ostalih intrinzičnih motivatora, u prvih deset odabran je odgovoran i izazovan posao. Ovo istraživanje je potvrdilo rezultate Europske studije vrijednosti; analiza odnosa vrijednosti rada i sociodemografskih obilježja u Hrvatskoj, koja je pokazala da osobe s visokim obrazovanjem češće imaju intrinzične motive. Najvažniji motivatori za rad u kliničkom okruženju su zanimljivost rada i želja za pomaganjem oboljelim osobama, što je i u skladu s ovom profesijom. Analiza motivatora za rad može biti dobra smjernica poslodavcu za mjere jačanja otpornosti zaposlenika u zdravstvu na stres.

KLJUČNE RIJEČI: klinika; stres; zdravstveni djelatnici

Guidelines for implementing psychological support at work for healthcare workers

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Patient and worker safety in the healthcare system is a priority for healthcare system. The aims of this work are presenting the management of adverse events in Croatian hospital UHC Zagreb, and the improving psychological resilience of healthcare workers (HCW) after adverse events. Methods: Analyze Register of adverse events in UHC Zagreb and results of the team for psychological help in hospital. Results: UHC Zagreb has clear procedures for reporting and managing adverse events; hospital Register of adverse events; and the Quality committee of UHC Zagreb to analyze adverse events and propose preventive measure. In Croatia, not enough attention is given to the negative impact of adverse events on the healthcare providers involved in adverse events, to how healthcare professionals feel after an adverse event. In the world, there are specific support programs that provide “psychological first-aid” in the days and weeks that follow the adverse events and incidents. UHC Zagreb is a member of the EU COST project, leading by the ERNST Consortium, with the aim of exchanging knowledge and experience in developing multidisciplinary support programs for second victims in healthcare. Support programs are focused on reducing emotional distress and enhancing coping strategies for healthcare workers who are traumatized with the adverse events. The first stage is the support provided by the trusted colleague or mentor. This stage consists of the immediate support after the adverse event, so called emotional first aid. The second stage is a trained peer who support HCW in the days and weeks after the adverse event to ensure their wellbeing, and referral for further support as needed. The third and final stage is emotional support by mental health professionals. In the framework of the ERNST, the checklist for the implementation of the psychological support was created for the health-care institution. Conclusion: Hospitals need a clear documented procedure for management adverse events as well as clear procedure and education for the healthcare workers peer support for psychological help after the adverse events.

KEY WORDS: adverse events; collateral victims

Smjernice za provedbu psihološke podrške na radu za zdravstvene radnike

Sigurnost pacijenata i radnika u zdravstvenom sustavu prioritet je svakog zdravstvenog sustava. Ciljevi ovog rada su prikazati upravljanje štetnim događajima u hrvatskoj bolnici KBC Zagreb, te poboljšanje psihološke otpornosti zdravstvenih djelatnika (ZR) nakon štetnih događaja. Metode: Analiziran je Registar nuspojava u KBC Zagreb i rezultati tima za psihološku pomoć u bolnici. Rezultati: KBC Zagreb ima jasne postupke za prijavu i upravljanje štetnih (neželjenih) događaja; bolnički registar neželjenih događaja te Povjerenstvo za kvalitetu za analizu štetnih događaja i predlaganje preventivnih mjera. U Hrvatskoj se ne pridaje dovoljno pažnje negativnom utjecaju štetnih događaja na zdravstvene djelatnike uključene u takve događaje, te se sustavno ne prati kako se zdravstveni djelatnici osjećaju nakon štetnog događaja. U svijetu postoje specifični programi podrške koji pružaju „prvu psihološku pomoć“ u danima i tjednima koji slijede nakon štetnih događaja i incidenata. KBC Zagreb član je EU COST projekta koji vodi konzorcij ERNST s ciljem razmjene znanja i iskustava u razvoju multidisciplinarnih programa podrške za druge žrtve u zdravstvu. Programi podrške usmjereni su na smanjenje emocionalnog stresa i poboljšanje strategija suočavanja za zdravstvene radnike koji su traumatizirani štetnim događajima. Prva faza je podrška koju pruža kolega od povjerenja ili mentor. Ova faza se sastoji od neposredne podrške nakon neželjenog događaja, takozvane emocionalne prve pomoći. U drugoj fazi obučeni suradnik pruža podršku zdravstvenim radnicima u danima i tjednima nakon štetnog događaja kako bi osigurao njihovu dobrobit i upućivanje za daljnju podršku prema potrebi. Treća i posljednja faza je emocionalna podrška stručnjaka specijaliziranog za mentalno zdravlje. U okviru ERNST-a izrađen je kontrolni popis za provedbu psihološke podrške za zdravstvenu ustanovu. Zaključak: Bolnice trebaju razraditi jasni i dokumentirani postupak za upravljanje štetnim događajima, kao i jasne postupke i edukaciju zdravstvenih radnika za podršku kolegama za psihološku pomoć nakon štetnih događaja.

KLJUČNE RIJEČI: kolateralne žrtve; neželjeni događaji

The impact of adverse events on psychological stress in healthcare – healthcare workers as collateral victims

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Introduction: Acute stress following an adverse event (AE) in health care may affect the health of healthcare workers. The patient is the first victim of AE, while the second victim is a health care worker who was traumatized by an unanticipated adverse patient event, unintentional healthcare error, or patient injury. The objective of this article is to raise awareness of support for second victims in the field of health care. **Methods:** A literature review and panel discussions with European experts working on second victims were conducted. **Results:** European research shows that around 72 % of healthcare workers in hospitals and 62 % in primary care stated that they have suffered the experience of a second victim in the last five years. A healthcare worker involved in an adverse patient event, often experiences increased stress, anxiety and guilt, increasing the likelihood of further errors and suboptimal care in the hours and days following the event. In the world, there are several programs that provide psychological assistance for second victims. **Discussion:** In order to maintain mental health, health care workers need a protocol for psychological support after an adverse event. There are specific support programs worldwide that provide psychological first aid in the days and weeks following an adverse patient event. A second victim's experience in health care can be assessed using self-assessment questionnaires which include the most common symptoms that can arise after an adverse event and the support offered by the second victims environment. The training of healthcare professionals on managing adverse events should include the safety and just culture and development of emotional skills to build resilience to stress events at work. **Conclusion:** Supporting health care workers after experiencing the second victim phenomenon is important for well-being at work and occupational mental health.

KEY WORDS: managing adverse events; second victims; support programs

Utjecaj štetnih događaja na psihički stres u zdravstvu – zdravstveni radnici kao kolateralne žrtve

Uvod: Akutni stres nakon štetnog događaja u zdravstvenoj njezi može utjecati na zdravlje zdravstvenih radnika. Pacijent je prva žrtva AE, dok je druga žrtva zdravstveni radnik koji je bio traumatiziran neočekivanim štetnim događajem za pacijenta, nenamjernom zdravstvenom pogreškom ili ozljedom pacijenta. Cilj ovog prikaza je podizanje svijesti o podršci drugim žrtvama u području zdravstvene zaštite. **Metode:** Proveden je pregled literature i panel rasprave s europskim stručnjacima koji rade na drugim žrtvama. **Rezultati:** Europsko istraživanje pokazuje da je oko 72 % zdravstvenih radnika u bolnicama i 62 % u primarnoj zdravstvenoj zaštiti izjavilo da su pretrpjeli iskustvo druge žrtve u posljednjih pet godina. Zdravstveni radnik uključen u štetni događaj za pacijenta često doživljava povećani stres, tjeskobu i krivnju, povećavajući vjerojatnost daljnjih pogrešaka i neoptimalne skrbi u satima i danima nakon događaja. U svijetu postoji nekoliko programa koji pružaju psihološku pomoć drugim žrtvama. **Rasprava:** Kako bi održali mentalno zdravlje, zdravstveni radnici trebaju protokol za psihološku podršku nakon štetnog događaja. Diljem svijeta postoje posebni programi podrške koji pružaju prvu psihološku pomoć u danima i tjednima nakon neželjenog događaja za pacijenta. Iskustvo druge žrtve u zdravstvenoj skrbi može se procijeniti pomoću upitnika za samoprocjenu koji uključuju najčešće simptome koji se mogu pojaviti nakon štetnog događaja i podršku koju nudi okruženje druge žrtve. Osposobljavanje zdravstvenih djelatnika o upravljanju štetnim događajima treba uključivati kulturu sigurnosti i pravednosti te razvoj emocionalnih vještina za izgradnju otpornosti na stresne događaje na radnom mjestu. **Zaključak:** Podrška zdravstvenim radnicima nakon iskustva s fenomenom druge žrtve važna je za dobrobit na radnom mjestu kao i za mentalno zdravlje u radnoj sredini.

KLJUČNE RIJEČI: druga žrtva; programi podrške; upravljanje štetnim događajima

Cardiovascular diseases in seafarers

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Cardiovascular diseases (CVD) are the leading cause of mortality and disability worldwide and are the leading cause of mortality in seafarers. Seafarers are faced with much more difficult working and living conditions than workers on land and the specifics of their working conditions greatly affect their health. In seafarers, we encounter several risk factors for CVD development associated with the workplace. The most important influenceable risk factors for CVD development in seafarers can be related to stressful situations specific to the ship, malnutrition, and lack of physical activity on board. Furthermore, the prognosis of CVD often depends on the measures taken in the first hours after the onset of symptoms. Because of the lack of health workers on board and limited treatment options, the outcome of CVD is worse compared to those on land. Preventive examinations of seafarers are important for early identification of risk factors for CVD development and prevention of the complications occurrence on board. In this way, primary and secondary prevention should be carried out, and medical examinations should serve for the early detection of diseases in order to reduce the risk of developing the disease or its exacerbation.

KEY WORDS: cardiovascular risk; occupation

Kardiovaskularne bolesti u pomoraca

Kardiovaskularne bolesti (KVB) vodeći su uzrok smrtnosti i invaliditeta u svijetu te su glavni uzrok smrtnosti kod pomoraca. Pomorci su suočeni s mnogo težim radnim i životnim uvjetima nego radnici na kopnu te specifičnosti radnih uvjeta uvelike utječu na njihovo zdravlje. Kod pomoraca nailazimo na brojne rizične faktore za nastanak KVB povezane s radnim mjestom. Najvažniji promjenjivi čimbenici rizika za nastanak KVB kod pomoraca odnose se na stresne situacije specifične za brod, malnutriciju i manjak fizičke aktivnosti na brodu. Prognoza KVB često ovisi o mjerama poduzetima u prvim satima nakon nastanka simptoma. Zahvaljujući nedostatku zdravstvenih radnika na brodu i ograničenim opcijama liječenja ishod KVB je lošiji u usporedbi s onima na kopnu. Preventivni pregledi pomoraca su važni kako bi se pokušalo na vrijeme uočiti čimbenike rizika za nastanak KVB. Na ovaj način trebala bi se provoditi primarna i sekundarna prevencija, a liječnički pregledi služiti ranoj detekciji bolesti kako bi se smanjio rizik od nastanka bolesti ili njenog pogoršanja.

KLJUČNE RIJEČI: čimbenici rizika za nastanak kardiovaskularnih bolesti; radno mjesto

Tick-borne meningoencephalitis

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Tick-borne meningoencephalitis (TBE) is a viral disease caused by a virus of the same name from the flavivirus family. The reservoir of TBE virus are forest rodents, but also some domestic animals. In Croatia, the area with the highest prevalence of the disease is northwestern Croatia, but the causative agent has also spread to other regions, e.g. Gorski kotar. The main way of transmission of the disease is through the bite of an infected tick. There is no post-exposure prophylaxis, but there is pre-exposure prophylaxis with repellents and vaccine. The forester is engaged in the cultivation, protection, arrangement and exploitation of forests. In addition to the risk of injury at work, staying in nature and the forest increases the risk of infectious diseases caused by zoonoses, such as TBE, hantavirus, *B. burgdorferi*. In the register of occupational diseases of the Occupational Medicine Service of the Croatian Institute of Public Health in the period between 2017 and 2023, one case of TBE was recorded in 2017 and one more in 2022. The objective was to show cases recorded in Osijek-Baranja County in the period from 2017 to 2024. The show individual cases of two infected individuals who were professionally exposed to the causative agent. To warn about the importance of prevention of TBE. Retrograde data were collected from 11 patients hospitalized in Clinical Hospital Center Osijek, in the period between 2017 and 2024, who had a proven infection caused by TBE. Of the 11 analyzed patients, 2 were occupationally exposed to the causative agent of the disease. They presented with high fever, headache, nausea, vomiting and feeling of general weakness. Basic laboratory indicators in blood and cerebrospinal fluid (CSL) were analyzed. In CSL of the patients, predominantly mononuclear pleocytosis was verified, and in the blood, only a minimal increase in inflammatory indicators. Also, serological analysis of serum and CSL for TBE virus was performed. A sample of urine and CSL was tested by the PCR method for the presence of the virus. TBE is a viral disease to which people who spend time in nature and forests are most exposed. People who are professionally engaged in agriculture and forestry are at increased risk of diseases. It is necessary to carry out pre-exposure prophylaxis with repellents before every stay in nature, and to vaccinate people who are more exposed to the causative agent of the disease.

KEY WORDS: forestry; ticks; vaccination

Krpeljni meningoencefalitis

Uvod: Krpeljni meningoencefalitis (KME) je virusna bolest uzrokovana istoimenim virusom iz porodice flavivirusa. Bolest zahvaća središnji živčani sustav. Rezervoar su šumski glodavci, ali i neke domaće životinje. U Hrvatskoj je područje najveće prevalencije bolesti sjeverozapadna Hrvatska, međutim uzročnik se proširio i na ostale krajeve, npr. Gorski kotar. Osnovni način prijenosa bolesti je ubodom zaraženog krpelja. Postekspozicijska profilaksa ne postoji, ali postoji preekspozicijska profilaksa repelentima i cjepivom. Šumar se bavi uzgojem, zaštitom, uređivanjem i iskorištavanjem šuma. Osim opasnosti od ozljede na radu, boravak u prirodi i šumi povećava rizik od oboljenja od infektivnih bolesti uzrokovanim zoonozama, npr. virus krpeljnog meningoencefalitisa, hantavirus, *B. burgdorferi*. U registru profesionalnih bolesti Službe za medicinu rada Hrvatskog zavoda za javno zdravstvo u razdoblju između 2017. te 2023. g. zabilježeni su oboljeli od KME, jedan 2017. i jedan 2022. g. Cilj rada: Prikazati oboljele od KME u KBCO u razdoblju 2017.-2024. g. Prikazati slučajeve dvije oboljele osobe koje su bile profesionalno izložene uzročniku. Upozoriti na važnost prevencije KME-a. Materijali i metode: Retrogradno su prikupljeni podaci 11 bolesnika hospitalno liječenih KBCO, u razdoblju između 2017. i 2024. g., koji su imali dokazanu infekciju KME. Od 11 bolesnika, 2 ih je bilo profesionalno izloženo uzročniku bolesti. Analizirani su laboratorijski pokazatelji u krvi i likvoru. U likvoru oboljelih verificirane se dominantno mononuklearne pleocitoze, a u krvi tek minimalno povišenje upalnih pokazatelja. Također, učinjena je serološka analiza seruma i likvora na KME. Uzorak urina i cerebrospinalnog likvora je testiran PCR metodom na prisutnost virusa. Zaključak: KME je virusna bolest kojoj su najizloženije osobe koje provode vrijeme u prirodi i šumama. Osobe koje se profesionalno bave poljoprivredom i šumarstvom su u pojačanom riziku od oboljenja. Potrebno je provoditi preekspozicijski profilaksu repelentima prije svakog boravka u prirodi, a cijepiti osobe koje su pojačano izložene uzročniku bolesti.

KLJUČNE RIJEČI: cijepljenje; krpelji; šumarstvo

The effect of eye disease on the quality of vision

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Aim: Show the impact of the most common eye diseases on visual acuity and quality of vision. To present cases of patients in whom eye diseases affected the quality of vision. To warn about the importance of ophthalmological examinations, prevention and early detection of eye diseases. **Materials and Methods:** Visual impairment can cause loss of central or peripheral vision, diplopia, blurred vision, impaired near or far vision, flashes or flying blurs, loss of depth perception, color blindness or photophobia. In case of symptoms of weakening vision or reduced quality of vision, it is necessary to undergo an examination by an ophthalmologist. The examination consists of determination of visual acuity, measurement of intraocular pressure, examination of the anterior and posterior segments of the eye. Depending on the findings, other diagnostics are needed, especially optical coherence tomography for the diagnosis of macular disease. Eye diseases reduce visual acuity and field of vision, which is extremely important in certain professions. In the Republic of Croatia, the Ordinance on medical examinations of drivers, which determines the required visual acuity and field of vision for driving a motor vehicle. The most common eye diseases that cause vision loss and blindness today are cataracts, glaucoma, senile macular degeneration and diabetic retinopathy. Maculopathies and glaucoma are the main causes of visual field defects. **Conclusion:** Eye diseases cause acute or chronic visual impairment and reduce the quality of vision. Reduced quality of vision significantly affects the patient's quality of life and ability to work. Eye diseases are often diagnosed only in an advanced stage because they can be asymptomatic and the patient does not notice the symptoms until the visual acuity is significantly reduced. Studies have shown very low awareness of eye diseases, especially in the population of working people. Regular ophthalmological examinations are essential for early detection of eye diseases and adequate treatment, especially for working people, for whom it is important to preserve the quality of vision and ability to work. Regular occupational medicine specialist examinations are essential for early detection of reduced visual acuity and quality of vision and referral to an ophthalmologist.

KEY WORDS: drivers; maculopathies; ophthalmologist

Utjecaj bolesti oka na kvalitetu vida

Cilj rada: Prikazati utjecaj najčešćih bolesti oka na vidnu oštrinu i kvalitetu vida. Prikazati slučajeve pacijenata kod kojih su bolesti oka utjecale na kvalitetu vida. Upozoriti na važnost oftalmoloških pregleda, prevenciju i rano otkrivanje bolesti oka. **Materijali i metode:** Slabljenje vida može uzrokovati gubitak centralnog ili perifernog vida, dvoslike, mutan vid, oslabljen vid na blizinu ili daljinu, pojavu bljeskova ili letećih mutnina, gubitak percepcije dubine, neraspoznavanje boja ili fotofobiju. Kod simptoma slabljenja vida ili smanjene kvalitete vida potrebno je učiniti pregled oftalmologa. Pregled se sastoji od određivanja vidne oštrine, mjerenja intraokularnog tlaka, pregleda prednjeg i stražnjeg segmenta oka. Ovisno o nalazu potrebna je i druga dijagnostika, osobito optička koherentna tomografija za dijagnostiku bolesti makule. Bolesti oka smanjuju vidnu oštrinu i vidno polje što je kod određenih zanimanja iznimno bitno. U Republici Hrvatskoj postoji Pravilnik o zdravstvenim pregledima vozača kojim je određena potrebna vidna oštrina i vidno polje za upravljanje motornim vozilom. Najčešće bolesti oka koje danas uzrokuju gubitak vida i sljepoću su katarakta, glaukom, senilna makularna degeneracija i dijabetička retinopatija. Makulopatije i glaukom najviše uzrokuju ispade u vidnom polju. **Zaključak:** Bolesti oka uzrokuju akutno ili kronično slabljenje vida i smanjuju kvalitetu vida. Smanjena kvaliteta vida znatno utječe na kvalitetu života i radnu sposobnost pacijenta. Bolesti oka se često dijagnosticiraju tek u uznapredovalom stadiju jer mogu biti asimptomatske i pacijent ne primjećuje simptome sve dok vidna oštrina nije značajno smanjena. Studije su pokazale vrlo slabu osvještenost o bolestima oka, osobito u populaciji radno aktivnih ljudi. Redoviti oftalmološki pregledi su bitni za rano otkrivanje bolesti oka i adekvatno liječenje, osobito kod radno aktivnih ljudi kod kojih je bitno očuvati kvalitetu vida i radnu sposobnost. Redoviti specijalistički pregledi medicine rada su bitni za rano otkrivanje smanjene vidne oštrine i kvalitete vida te upućivanje na pregled oftalmologa.

KLJUČNE RIJEČI: makulopatija; oftalmolog; vozači

Optimal control of type 1 diabetes with continuous glucose monitoring and insulin pump: a case report

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Background and Aim: Type 1 Diabetes Mellitus (T1DM) management poses significant challenges, particularly in maintaining euglycemia and preventing hypoglycemia, which are crucial for improving quality of life and work productivity. Continuous Subcutaneous Insulin Infusion (CSII) and Continuous Glucose Monitoring (CGM) have shown promise in achieving these goals. For optimal T1DM management, time in range (TIR) should be >70 %, time below range (TBR) <5 %, and time above range (TAR) <25 %. We report a case of a 35-year-old female with T1DM, diagnosed at age 16, who demonstrated remarkable improvement in glycemic control with CSII and CGM technologies. **Case Presentation:** The patient initially presented with a regimen of glargine insulin (36 IU in the evening) and aspart insulin (approximately 10 IU with three main meals). The initial CGM report indicated suboptimal glycemic control: TIR of 60 %, TBR of 15 %, and TAR of 25 %. The patient noted several severe hypoglycemic episodes during the previous month, coinciding with extreme private and professional stress. First, the patient was re-educated on hypoglycemia management and insulin titration and was advised to maintain an activity and food diary. Despite that, the CGM report at the two-week follow-up showed TIR at 56 %, TBR at 17 %, and TAR at 27 %, indicating further deterioration in glycemic control. Consequently, the patient was offered the opportunity to transition to CSII, which she accepted. After only one adjustment of total daily and bolus insulin doses, her glycemic control significantly improved with a TIR of 79 %, TBR of 1 %, and TAR of 20 %. The patient reported no severe hypoglycemia and was feeling much better. **Conclusions:** The integration of CSII and CGM in the diabetes management of this patient led to substantial improvement in glycemic control. Reaching TIR, TBR and TAR target levels upon transitioning to CSII demonstrates the efficacy of these technologies in managing T1DM. This case underscores the importance of advanced diabetes management tools in achieving optimal glycemic outcomes and improving patient quality of life and work ability.

KEY WORDS: :glycemic control; Continuous Subcutaneous Insulin Infusion

Kontinuiranim praćenjem glukoze i inzulinskom pumpom do optimalne kontrole šećerne bolesti tipa 1: prikaz slučaja

Cilj rada: Liječenje osoba sa šećernom bolesti tipa 1 (engl. *type 1 diabetes mellitus*, T1DM) nerijetko je praćeno izazovima u održavanju euglikemije i sprječavanju hipoglikemije, ključnih ishoda povezanih s poboljšanjem kvalitete života i radne produktivnosti. Kontinuirana potkožna infuzija inzulina (engl. *continuous subcutaneous insulin infusion*, CSII) i kontinuirano praćenje glukoze (engl. *continuous glucose monitoring*, CGM) pokazali su obećavajuće rezultate u postizanju ovih ciljeva. Optimalno liječenje T1DM podrazumijeva vrijeme u rasponu (engl. *time in range*, TIR) >70 %, vrijeme ispod raspona (engl. *time below range*, TBR) <5 %, a vrijeme iznad raspona (engl. *time above range*, TAR) <25 %. Cilj je prikazati slučaj 35-godišnje bolesnice, kojoj je T1DM dijagnosticiran u dobi od 16 godina, a koja je pokazala značajno poboljšanje u glukoregulaciji pomoću tehnologija CSII-a i CGM-a. **Prikaz slučaja:** Početni terapijski režim u bolesnice uključivao je inzulini glargin (36 i.j. uvečer) i inzulini aspart (oko 10 i.j. uz tri glavna obroka). Izvješće CGM-a kod prvog pregleda pokazalo je suboptimalnu glukoregulaciju na toj terapiji: TIR od 60 %, TBR od 15 % i TAR od 25 %. Bolesnica je prijavila nekoliko teških hipoglikemijskih događaja tijekom prethodnog mjeseca, što je povezivala s izrazitim privatnim i profesionalnim stresom. Bolesnica je re-educirana o kupiranju i prevenciji hipoglikemija, titraciji inzulina te joj je preporučeno vođenje dnevnika aktivnosti i prehrane. Unatoč tome, izvješće CGM-a na kontroli nakon dva tjedna pokazalo je TIR od 56 %, TBR od 17 % i TAR od 27 %, što ukazuje na daljnje pogoršanje kontrole glikemije. Radi toga je bolesnici ponuđena mogućnost prelaska na CSII te je ona istu prihvatila. Nakon samo jedne prilagodbe ukupne dnevne i bolusne doze inzulina, kontrola glikemije značajno se poboljšala na TIR od 79 %, TBR od 1 % i TAR od 20 %. Bolesnica je potvrdila da nije imala teških hipoglikemija i da se bolje osjeća nakon prelaska na CSII. **Zaključci:** Integracija CSII i CGM u liječenje šećerne bolesti kod ove bolesnice dovela je do značajnog poboljšanja glukoregulacije. Postizanje ciljnih vrijednosti TIR-a, TBR-a i TAR-a nakon prelaska na CSII svjedoči o učinkovitosti ovih tehnologija u liječenju bolesnika s T1DM. Ovaj slučaj naglašava važnost naprednih alata u postizanju optimalnih rezultata glukoregulacije i poboljšanju kvalitete života i radne sposobnosti osoba sa šećernom bolesti.

KLJUČNE RIJEČI: glukoregulacija; kontinuirana potkožna infuzija inzulina

Communication skills in the work environment

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The aim of this workshop is to familiarize the participants with the basics of communication skills in the working environment with an emphasis on generic skills and some specifics in working with patients. Accordingly, the workshop will address the fundamental core principles of communication, including clarity, precision, and active interaction. The differences between verbal (words, tone of voice) and non-verbal communication (body language, gestures, facial expressions) will be explained, and how both aspects shape interpersonal relationships in the workplace. Furthermore, participants will have the opportunity to theoretically and practically learn about basic communication skills – active listening and asking questions. Active listening involves focused attention on the speaker, showing interest and giving constructive feedback. Asking questions is another important skill, which enables understanding of information, clarifications and encouraging open dialogue. In addition, the specifics of communication between members of the healthcare team, the principles of effective communication between colleagues and team members, such as cooperation, respect and adaptability, will be covered. Effective communication within the team helps prevent misunderstandings and encourage teamwork. Finally, participants will learn how to recognize signs of low health literacy in patients, which includes limited understanding of medical instructions and difficulty asking questions. Communication strategies that doctors have at their disposal when working with patients will be presented, such as plain language, use of visual aids and checking for understanding, to ensure that patients have access to information in a way that is understandable to them. The workshop is aimed at developing practical skills that improve professional relationships and the quality of patient care.

KEY WORDS: interaction; non-verbal communication; verbal communication

Komunikacijske vještine u radnoj sredini

Cilj radionice je upoznati sudionike s osnovama komunikacijskih vještina u radnoj sredini s naglaskom na generičke vještine te neke specifičnosti u radu s pacijentima. Shodno tome, radionica će se baviti temeljnim temeljnih načelima komunikacije, uključujući jasnoću, preciznost i aktivnu interakciju. Pojasnit će se razlike između verbalne (riječ, ton glasa) i neverbalne komunikacije (govor tijela, geste, izrazi lica), te kako oba aspekta oblikuju međuljudske odnose na radnom mjestu. Nadalje, sudionici će imati prilike teorijski i praktično naučiti o osnovnim komunikacijskim vještinama – aktivnom slušanju i postavljanju pitanja. Aktivno slušanje uključuje fokusirano praćenje govornika, pokazivanje interesa i davanje konstruktivnih povratnih informacija. Postavljanje pitanja je druga važna vještina, koja omogućava razumijevanje informacija, pojašnjenja i poticanje otvorenog dijaloga. Osim toga, bit će obrađene i specifičnosti komunikacije među članovima zdravstvenog tima, načela učinkovite komunikacije među kolegama i članovima tima, poput suradnje, poštovanja i prilagodljivosti. Učinkovita komunikacija unutar tima pomaže u sprječavanju nesporazuma i poticanju timskog rada. Na kraju, sudionici će naučiti kako prepoznati znakove niske zdravstvene pismenosti kod pacijenata, što uključuje ograničeno razumijevanje medicinskih uputa i teškoće u postavljanju pitanja. Predstaviti će se komunikacijske strategije koje liječnici mogu koristiti u radu s pacijentima, kao što su jednostavan jezik, korištenje vizualnih pomagala i provjera razumijevanja, kako bi se pacijentima osigurao pristup informacijama na način koji im je razumljiv. Radionica je usmjerena na razvoj praktičnih vještina koje poboljšavaju profesionalne odnose i kvalitetu skrbi pacijenata.

KLJUČNE RIJEČI: interakcija; neverbalna komunikacija; verbalna komunikacija

The specificity of healthcare and medical classification in parathletes

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Parasport is a term that refers to all sports disciplines adapted to people with disabilities, from beginners to top athletes, while paralympic sport is where top paraathletes (paralympic athletes) compete at the summer and winter Paralympic Games. Parasports are adapted to allow athletes with different types of physical, sensory or intellectual disabilities to participate in competitions. For people with disabilities to be able to participate in parasports, they must go through a classification system. The classification of athletes in parasports is a key aspect that ensures fair and equal competition. This system allows athletes with different types of disability to compete in a way that is adapted to their individual abilities. Each sport has a specific classification. It must be specific because any impairment affects the ability to play certain sports. Thus, an athlete can meet the criteria in one sport, but does not have to meet the criteria in another. Each athlete must pass certain medical examinations to participate in the competition. Classifiers are experts, usually physicians or physiotherapists by profession, who must have the necessary knowledge about injuries and their effects on the performance of activities in certain sports. The classification is based on the functional ability of the athlete, not only on the medical diagnosis of disability. This includes assessing how the disability affects key elements of the sport, such as strength, range of motion, coordination or visual perception. This evaluation may include medical examinations, motor skills tests, and technical evaluation of sports performance. There are different categories of disabilities involved in parasports, such as physical disabilities (amputations, cerebral palsy, spinal cord lesions), visual disabilities, and intellectual disabilities. Classification in parasports is vital to the integrity and fairness of parasport. It is a complex process that requires a high level of expertise and constant evaluation to ensure that all athletes are properly classified according to their functional abilities.

KEY WORDS: categories of disabilities; competition; persons with disabilities

Specifičnosti zdravstvene skrbi i medicinske klasifikacije u parasportaša

Parasport je termin koji se odnosi na sve sportske discipline prilagođene osobama s invaliditetom, od početnika do vrhunskih sportaša dok je paraolimpijski sport vrhunski sport u kojem se vrhunski parasportaši (paraolimpijski sportaši) natječu na ljetnim i zimskim Paraolimpijskim igrama. Parasportovi su prilagođeni kako bi omogućili sportašima s različitim vrstama fizičkih, senzornih ili intelektualnih invaliditeta da sudjeluju u natjecanjima. Kako bi osobe s invaliditetom mogle sudjelovati u parasportovima, moraju proći kroz sustav klasifikacije. Klasifikacija sportaša u para sportovima ključan je aspekt koji osigurava pošteno i jednakopravno natjecanje. Ovaj sistem omogućuje sportašima s različitim vrstama invaliditeta da se natječu na način koji je prilagođen njihovim individualnim sposobnostima. Svaki sport ima specifičnu klasifikaciju. Mora biti specifična jer svako oštećenje utječe na sposobnost bavljenja pojedinim sportovima. Tako sportaš može ispuniti kriterije u jednom sportu, ali ne mora zadovoljiti kriterije u nekom drugom. Svaki sportaš mora proći određene liječničke preglede da bi sudjelovao na natjecanju. Klasifikatori su stručnjaci, po zanimanju najčešće liječnici ili fizioterapeuti, koji moraju imati potrebno znanje o oštećenjima i njihovim utjecajima na izvođenje aktivnosti u pojedinim sportovima. Klasifikacija se temelji na funkcionalnoj sposobnosti sportaša, a ne samo na medicinskom dijagnozom invaliditeta. To uključuje procjenu kako invaliditet utječe na ključne elemente sporta, poput snage, opsega pokreta, koordinacije ili vizualne percepcije. Ova procjena može uključivati medicinske preglede, testove motoričkih sposobnosti, i tehničku procjenu izvedbe u sportu. Postoje različite kategorije invaliditeta uključene u parasportove, kao što su fizički invaliditet (amputacije, cerebralna paraliza, lezije kralježnične moždine), vizualni invaliditeti i intelektualni invaliditeti. Klasifikacija u parasportovima je vitalna za integritet i pravičnost parasporta. To je složen proces koji zahtijeva visoku razinu stručnosti i stalnu evaluaciju kako bi se osiguralo da su svi sportaši pravilno kategorizirani prema njihovim funkcionalnim sposobnostima.

KLJUČNE RIJEČI: kategorije invaliditeta; natjecanje; osobe s invaliditetom

Building muscles, breaking hearts: a literature review of steroid-induced cardiomyopathy

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Aims: Anabolic Androgenic Steroids (AAS), synthetic derivatives of testosterone, are widely used for their muscle-building and performance-enhancing effects. However, their use has been associated with a range of cardiovascular complications, including cardiomyopathy. This study aims to synthesize the current knowledge on the impact of AAS on heart disease, with a specific focus on cardiomyopathy, and explore the mechanisms, risk factors, and clinical outcomes associated with AAS use. **Materials and Methods:** A PubMed search was conducted using the MeSH terms (“Anabolic Androgenic Steroids”[MeSH] OR “Testosterone Congeners”[MeSH]) AND “Heart Diseases”[MeSH]. Filters applied included free full text, human studies, and English language. The review includes studies that provide clinical, observational, and mechanistic insights into AAS-induced cardiomyopathy. **Results:** The literature indicates a significant correlation between AAS use and the development of cardiomyopathy. Key findings highlight that AAS users exhibit structural and functional cardiac abnormalities, including left ventricular hypertrophy, myocardial fibrosis, and impaired systolic and diastolic function. The pathophysiological mechanisms implicated include oxidative stress, apoptosis, and altered myocardial gene expression. Risk factors identified for AAS-induced cardiomyopathy include dosage, duration of use, and pre-existing cardiovascular conditions. Clinical outcomes vary, with some users experiencing severe heart failure and arrhythmias, necessitating medical intervention or even leading to sudden cardiac death. **Conclusion:** Anabolic Androgenic Steroid use is a significant risk factor for the development of cardiomyopathy. The findings underscore the importance of cardiovascular health awareness and monitoring in individuals using AAS. Further research is necessary to elucidate the precise mechanisms and to develop targeted interventions to mitigate the cardiovascular risks associated with AAS use.

KEY WORDS: anabolic androgenic steroids; heart diseases; testosterone; testosterone congeners

Jačanje mišića, slabljenje srca: pregled literature o kardiomiopatiji izazvanoj steroidima

Ciljevi: Anabolički androgeni steroidi (AAS), sintetski derivati testosterona, naširoko se koriste zbog svojih učinaka na izgradnju mišića i poboljšanje performansi. Međutim, njihova je uporaba povezana s nizom kardiovaskularnih komplikacija, uključujući kardiomiopatiju. Ova studija ima za cilj sintetizirati trenutno znanje o utjecaju AAS na bolesti srca, s posebnim naglaskom na kardiomiopatiju, te istražiti mehanizme, čimbenike rizika i kliničke ishode povezane s uporabom AAS. **Materijali i metode:** Pretraživanje baze PubMed provedeno je korištenjem pojmova MeSH (“Anabolički androgeni steroidi” [MeSH] ILI “Kongeneri testosterona” [MeSH]) I “Bolesti srca” [MeSH]. Primijenjeni filtri uključivali su besplatni puni tekst, studije na ljudimai engleski jezik. **Pregled** uključuje studije koje daju kliničke, opservacijske i mehanističke uvide u kardiomiopatiju izazvanu AAS-om. **Rezultati:** Literatura upućuje na značajnu korelaciju između primjene AAS i razvoja kardiomiopatije. Ključni nalazi ističu da korisnici AAS-a pokazuju strukturne i funkcionalne srčane abnormalnosti, uključujući hipertrofiju lijeve klijetke, fibrozu miokarda i oslabljenu sistoličku i dijaštoličku funkciju. Patofiziološki mehanizmi uključuju oksidacijski stres, apoptozu i promijenjenu ekspresiju gena u stanicama miokarda. Čimbenici rizika utvrđeni za kardiomiopatiju izazvanu AAS-om uključuju dozu, trajanje upotrebe i postojeća kardiovaskularna stanja. Klinički ishodi variraju, pri čemu neki korisnici dožive ozbiljno zatajenje srca i aritmije, što zahtijeva medicinsku intervenciju ili čak dovodi do iznenadne srčane smrti. **Zaključak:** upotreba anaboličkih androgenih steroida značajan je čimbenik rizika za razvoj kardiomiopatije. Nalazi naglašavaju važnost svijesti o kardiovaskularnom zdravlju i praćenja kod pojedinaca koji koriste AAS. Potrebna su daljnja istraživanja kako bi se razjasnili precizni mehanizmi i razvile ciljane intervencije za ublažavanje kardiovaskularnih rizika povezanih s uporabom AAS.

KLJUČNE RIJEČI: anabolički androgeni steroidi; bolesti srca; testosteron; kongeneri testosterona

Anabolic androgenic steroid-induced liver injury

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Anabolic androgenic steroids (AASs) are a group of molecules including endogenous testosterone and synthetic derivatives that have both androgenic and anabolic effects. These properties make them therapeutically beneficial in medical conditions such as hypogonadism. However, they are commonly bought illegally and misused for their anabolic, skeletal muscle building, and performance-enhancing effects. Supraphysiologic and long-term use of AASs affects all organs, leading to cardiovascular, neurological, endocrine, gastrointestinal, renal, and hematologic disorders. Hepatotoxicity is one of the major concerns regarding AASs treatment and abuse. Testosterone and its derivatives have been most often shown to induce a specific form of cholestasis, peliosis hepatis, and hepatic benign and malignant tumors. It is currently believed that mechanisms of pathogenesis of these disorders include disturbance of antioxidative factors, upregulation of bile acid synthesis, and induction of hepatocyte hyperplasia. Most toxicity cases are treated with supportive measures and liver function normalizes with discontinuation of AAS. However, some long-term consequences are irreversible. AAS-induced liver injury should be taken in consideration in patients with liver disorders, especially with the increasing unintentional ingestion of supplements containing AAS. We will present the most current knowledge about AAS-associated adverse effects on the liver, and their clinical presentations, prevalence, and pathophysiological mechanisms.

KEY WORDS: AAS; hepatotoxicity; liver function

Ozljeda jetre izazvana anaboličkim androgenim steroidima

Anabolički androgeni steroidi (AAS) su skupina molekula uključujući endogeni testosteron i sintetske derivate koji imaju i androgene i anaboličke učinke. Ova svojstva ih čine terapijski korisnima u medicinskim stanjima kao što je hipogonadizam. Međutim, oni se obično kupuju ilegalno i zlorabe zbog svojih anaboličkih učinaka, učinaka na izgradnju skeletnih mišića i učinaka poboljšanja performansi. Suprafiziološka i dugotrajna primjena AAS utječe na sve organe, dovodeći do kardiovaskularnih, neuroloških, endokrinih, gastrointestinalnih, bubrenih i hematoloških poremećaja. Hepatotoksičnost je jedan od glavnih problema u vezi s liječenjem i zlouporabom AAS. Za testosteron i njegove derivate najčešće se pokazalo da induciraju određeni oblik kolestaze, peliosis hepatis te benigne i maligne tumore jetre. Trenutno se vjeruje da mehanizmi patogeneze ovih poremećaja uključuju poremećaj antioksidativnih čimbenika, pojačanu regulaciju sinteze žučne kiseline i indukciju hiperplazije hepatocita. Većina slučajeva toksičnosti liječi se potpornim mjerama, a funkcija jetre se normalizira s prekidom uzimanja AAS. Međutim, neke dugoročne posljedice su nepovratne. Oštećenje jetre izazvano AAS-om treba uzeti u obzir kod bolesnika s jetrenim poremećajima, osobito uz sve češće nenamjerno uzimanje dodataka koji sadrže AAS. Prikazi ćemo pregled najnovijih saznanja o štetnim učincima na jetru povezanim s AAS-om, njihovoj kliničkoj prezentaciji, prevalenciji i patofiziološkim mehanizmima.

KLJUČNE RIJEČI: AAS; hepatotoksičnost; jetrena funkcija

Restrictions and contraindications for physical activity in patients with internal diseases

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Physical activity is very important in the prevention of the most important cardiovascular, endocrinological, and other internal diseases, as well as their treatment and rehabilitation. There are several restrictions and even contraindications to physical activity in these patients. When talking about physical activity in the context of internal medicine patients, it is very important to distinguish between different types, doses, and intensities of physical activity. Although moderate and high-intensity aerobic physical activity is preferred most of the time, competitive and strength training can be allowed in some internists and under certain conditions. There are guidelines for the latter in the professional literature, but sometimes the approach must be individual based on the characteristics of the disease and physical activity. Preparticipation and systematic examinations are the best prevention of complications, even the most difficult ones, of physical activity in internist patients, and organization and knowledge of fast and optimal medical assistance is the way to solve them when they appear.

KEY WORDS: cardiovascular diseases; chronic diseases; prevention

Ograničenja i kontraindikacije za tjelesnu aktivnost kod internističkih bolesti

Tjelesna aktivnost je vrlo važna u prevenciji najvažnijih kardiovaskularnih i endokrinoloških, te drugih internističkih bolesti kao i njihovom liječenju i rehabilitaciji. Postoji niz ograničenja pa i kontraindikacija za tjelesnu aktivnost u ovih bolesnika. Kada se govori o tjelesnoj aktivnosti u kontekstu internističkih bolesnika vrlo je važno razlikovati različite vrste, dozu i intenzitete upražnjavane tjelesne aktivnosti. Mada se najčešće preferira umjerena aerobna tjelesna aktivnost i ona visokog intenziteta, natjecateljska te trening snage se mogu dozvoliti kod nekih internističkih bolesnika i pod nekim uvjetima. U stručnoj literaturi postoje smjernice za potonje, no ponekad pristup mora biti individualan zasnovan na karakteristikama bolesti i tjelesne aktivnosti. Preparticipacijski i sistematski pregledi najbolja su prevencija komplikacija, pa i onih najtežih, tjelesne aktivnosti u internističkih bolesnika, a organizacija i znanja iz brze i optimalne medicinske pomoći način kako ih riješiti kada se pojave.

KLJUČNE RIJEČI: kardiovaskularne bolesti; kronične bolesti; prevencija

Occupational and sports medicine – a preventive profession

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Occupational and sports medicine is one of the preventive professions in medicine. Although the profession is fundamentally dedicated to the assessment of health capacity for work and sports activities, its general sense and purpose of action is to preserve the health of the working and sports population. The first meeting, as well as the subsequent periodic examinations of the subject by taking a thorough history, medical examination and diagnostic processing, provide a series of information that is necessary in monitoring the health of the subject, early detection of health disorders and timely initiation of treatment. A large part of the respondents in occupational and sports medicine clinics are younger respondents (workers, athletes) who come for examinations before employment or starting sports activities, where they first encounter a more comprehensive health examination. The examination often diagnoses difficulties for the first time in the examinee, which point to a disorder in the state of health that needs to be treated. The examinee is then provided with instructions and guidelines for further treatment, along with a basic assessment of health capacity for work or sports activity, thus preventing the further development of the disease. The preventive possibilities of occupational and sports medicine will be presented through two case reports. The first case is related to a younger respondent who, as part of the previous examination before employment, was diagnosed with an inflammatory kidney disease that was previously unknown, and the respondent was referred for specialist treatment. The second case is about a worker with a chronic liver lesion, whose health condition is controlled by periodic examinations that include monitoring of the functional state of the liver and the possibility of early intervention in case of worsening of the condition. In occupational and sports medicine clinics, preventive activities are not and should not be reduced only to the assessment of health capacity for a certain type of work or sports activities. They necessarily include activities related to early detection and monitoring of health disorders with counseling of respondents about the results of treatment and further necessary preventive, diagnostic, and therapeutic procedures in order to preserve health and the quality of life and work.

KEY WORDS: occupational medicine; periodic examinations; pre-employment examinations; sports medicine

Medicina rada i sporta – preventivna struka

Medicina rada i sporta jedna je od preventivnih struka u medicini. Iako je struka temeljno posvećena ocjeni zdravstvene sposobnosti za rad i sportske aktivnosti, njen opći smisao i svrha djelovanja jest očuvanje zdravlja radne i sportske populacije. Prvi susret, kao i kasniji periodični pregledi ispitanika uzimanjem temeljite anamneze, liječničkim pregledom i dijagnostičkom obradom donose niz informacija koje su neophodne u praćenju zdravlja ispitanika, ranom otkrivanju poremećaja zdravlja i pravovremenom početku liječenja. Veliki dio ispitanika čine mladi ispitanici (radnici, sportaši) koji dolaze na preglede prije zapošljavanja ili početka sportske aktivnosti u ordinacije medicine rada i sporta gdje se prvi puta susretnu s opsežnijim zdravstvenim pregledom. Učinjenim pregledom često se prvi puta kod ispitanika dijagnosticiraju poteškoće koje upućuju na poremećaj u zdravstvenom stanju koje je potrebno liječiti. Ispitaniku se tada, uz temeljnu ocjenu zdravstvene sposobnosti za rad ili sportsku aktivnost, dostave upute i smjernice za dalje postupanje te se tako sprječava daljnji razvitak bolesti. Preventivne mogućnosti struke medicine rada i sporta prikazat će se kroz dva prikaza slučaja. Prvi slučaj vezan je uz mlađeg ispitanika kojemu je u sklopu prethodnog pregleda prije zapošljavanja otkrivena upalna bolest bubrega za koju se ranije nije znalo, te je ispitanik usmjeren prema specijalističkom liječenju. U drugom slučaju radi se o radniku sa kroničnom lezijom jetre čije zdravstveno stanje se kontrolira periodičnim pregledima koji uključuju praćenje funkcionalnog stanja jetre i mogućnost rane intervenciju u slučaju pogoršanja stanja. U ordinacijama medicine rada i sporta, preventivne aktivnosti nisu i ne smiju biti svedene samo na ocjenu zdravstvene sposobnosti za određenu vrstu poslova ili sportskih aktivnosti. One nužno uključuju aktivnosti vezane uz rano otkrivanje i praćenje zdravstvenih poremećaja sa savjetovanjem ispitanika o rezultatima obrade i daljnjim potrebnim preventivnim, dijagnostičkim i terapijskim postupcima u cilju očuvanja zdravlja, kvalitete života i rada.

KLJUČNE RIJEČI: medicina rada; periodski pregledi; prevencija; prethodni pregledi; sportska medicina

The importance of promoting health at the workplace within the context of demographic changes

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The decline in the birth rate and the increase in life expectancy in Europe, including in Croatia, led to a growing proportion of older people. According to a report from the State Statistical Office, in 2021, the average age of the population of the Republic of Croatia was 44.3 years, which ranks Croatia among the oldest nations in Europe. The increase in the number of older individuals, along with the modern lifestyle characterized by computerization and automation, as well as a sedentary lifestyle, unhealthy eating habits, and exposure to stress, all contribute to the rise in chronic non-communicable diseases. It is known that most chronic diseases are preventable and that they have common risk factors and determinants that lead to them. Therefore, promoting health at the workplace and building a healthy lifestyle contributes to preserved years of life, preserved quality of life, and extended functional and working ability of the individual, and contributes to reducing the total costs of health care. Creating a healthy workplace is not only a matter of concern for the health of workers but also for the community in general. To improve health in the workplace, the Ministry of Health and the Croatian Institute of Public Health within the framework of the National Program Healthy living, implement the component Health and Workplace, and the activity Health-Friendly company. The Health-Friendly Company activity is aimed at working organizations to encourage the introduction of special labels for work environments that enable employees to adopt healthy lifestyle habits, promote health at the workplace, and show positive concern for employees' health.

KEY WORDS: Health-Friendly company; improvement of health in the workplace; National Program Healthy Living

Važnost promicanja zdravlja na radnom mjestu u kontekstu demografskih promjena

Pad nataliteta i produženja očekivanog životnog vijeka u Europi pa tako i u Hrvatskoj doprinosi povećanju udjela osoba starije životne dobi. Prema podacima Državnog zavoda za statistiku, u 2021. godini prosječna starost stanovništva Republike Hrvatske iznosila je 44,3 godine, što Hrvatsku svrstava među najstarije nacije Europe. Porast udjela starijih osoba uz suvremeni načina života koji je obilježen informatizacijom i automatizacijom, uz sjedilački način života, nepravilne prehrambene navike i izloženost stresu, pridonosi porastu kroničnih nezaraznih bolesti. Poznato je da je većina kroničnih bolesti preventabilna, da imaju zajedničke čimbenike rizika i determinante koje do njih dovode. Promicanje zdravlja na radnom mjestu i izgradnja zdravog životnog stila pridonosi očuvanim godinama života, očuvanoj kvaliteti života i produženoj funkcionalnoj i radnoj sposobnosti pojedinca te pridonosi smanjivanju ukupnih troškova zdravstvene zaštite. Stvaranje zdravog radnog mjesta nije samo pitanje brige za zdravlje radnika već i zajednice općenito. S ciljem unaprjeđenja zdravlja na radnom mjestu Ministarstvo zdravstva i Hrvatski Institute of public health su u okviru Nacionalnog programa Živjeti zdravo osmislili komponentu Zdravlje i radno mjesto i unutar nje aktivnost Tvrtka prijatelj zdravlja. Aktivnost Tvrtka prijatelj zdravlja je usmjerena radnim organizacijama te potiče uvođenje posebnih oznaka za radna okruženja koja zaposlenicima omogućuju usvajanje zdravih životnih navika, promiču zdravlje na radnom mjestu i iskazuju pozitivnu brigu o zdravlju zaposlenika.

KLJUČNE RIJEČI: promicanje zdravlja na radnom mjestu; Nacionalni program Živjeti zdravo; Tvrtka prijatelj zdravlja

Health promotion at the workplace

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The aim of the work is to make aware employers and employees about the effectiveness of health promotion in the primary prevention of chronic diseases as the most common diseases among the working population. The obtained results of the intervention are indicators of the current situation and further needs for health interventions for the purpose of protecting the health of employees. The subjects were employees aged 30 to 65, of both genders, who had at least one risk factor for peripheral arterial disease and cardiovascular disease. We conducted three health interventions. The first was the measurement of the ankle index in 20 employees at risk for peripheral arterial disease. The second was the measurement of cardiovascular risk factors in 50 employees of sedentary occupations. The third intervention was the measurement of cardiovascular risks in 19 employees who are in positions of leadership. The results showed that in the first intervention, 15 % of the employees had an elevated ankle index and were referred for further diagnostic treatment. In the second intervention, the risk factors for cardiovascular diseases were: body mass index ($\bar{x}=26.71$), cholesterol ($\bar{x}=5.51$ mmol/L), triglycerides ($\bar{x}=2.18$ mmol/L). In the third intervention, we obtained increased values of body mass index ($\bar{x}=25.80$), systolic ($\bar{x}=142$ mmHg) and diastolic ($\bar{x}=84$ mmHg) blood pressure, cholesterol ($\bar{x}=5.78$ mmol/L), triglycerides ($\bar{x}=2.22$ mmol/L) and glucose ($\bar{x}=5.8$ mmol/L). The subjects received written and oral instructions on the necessary measures and were included in further diagnostic and therapeutic procedures. Health promotion at the workplace is a simple, effective and accessible method of primary prevention of chronic diseases. It needs to be carried out continuously and long-term with the aim of detecting chronic diseases as early as possible and thorough health care of employees of all age groups.

KEY WORDS: body mass index; cardiovascular risk factors; cholesterol; diabetes

Promicanje zdravlja na radnom mjestu

Cilj ovog istraživanja bio je osvijestiti poslodavce i zaposlenike o učinkovitosti promicanja zdravlja u primarnoj prevenciji kroničnih bolesti kao najčešćih bolesti radno sposobnog stanovništva. Dobiveni rezultati intervencije pokazatelj su postojećeg stanja i daljnjih potreba za zdravstvenim intervencijama u svrhu zaštite zdravlja zaposlenika. Ispitanici su bili zaposlenici u dobi od 30 do 65 godina, oba spola, koji su imali barem jedan čimbenik rizika za perifernu arterijsku bolest i kardiovaskularnu bolest. Provedene su tri zdravstvene intervencije. Prvo je bilo mjerenje indeksa gležnja kod 20 zaposlenika s rizikom od periferne arterijske bolesti. Drugi je bio mjerenje čimbenika kardiovaskularnog rizika kod 50 zaposlenika sjedilačkih zanimanja. Treća intervencija bila je mjerenje kardiovaskularnih rizika kod 19 zaposlenika koji su na rukovodećim pozicijama. Rezultati su pokazali da je u prvoj intervenciji 15 % zaposlenika imalo povišen indeks gležnja te su upućeni na daljnju dijagnostičku obradu. U drugoj intervenciji čimbenici rizika za kardiovaskularne bolesti bili su: indeks tjelesne mase ($\bar{x}=26,71$), kolesterol ($\bar{x}=5,51$ mmol/L), trigliceridi ($\bar{x}=2,18$ mmol/L). U trećoj intervenciji dobili smo povišene vrijednosti indeksa tjelesne mase ($\bar{x}=25,80$), sistoličkog ($\bar{x}=142$ mm Hg) i dijastoličkog ($\bar{x}=84$ mm Hg) krvnog tlaka, kolesterola ($\bar{x}=5,78$ mmol/L), triglicerida ($\bar{x}=2,22$ mmol/L) i glukoze ($\bar{x}=5,8$ mmol/L). Ispitanici su dobili pismene i usmene upute o potrebnim mjerama te su uključeni u daljnje dijagnostičke i terapijske postupke. Promicanje zdravlja na radnom mjestu je jednostavna, učinkovita i dostupna metoda primarne prevencije kroničnih bolesti. Potrebno ju je provoditi kontinuirano i dugoročno s ciljem što ranijeg otkrivanja kroničnih bolesti i temeljite zdravstvene zaštite zaposlenika svih dobnih skupina.

KLJUČNE RIJEČI: čimbenici kardiovaskularnog rizika; dijabetes; indeks tjelesne mase; kolesterol

An underestimated disease and the importance of preventive examination: multicystic echinococcosis – a case report

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Aim: present a case of advanced echinococcosis with cysts in the abdomen in a worker undergoing a preventive examination. **Materials and Methods:** A 43-year-old worker from Bosnia and Herzegovina with a history of close contact with dogs at home and at work had a feeling of heaviness in the left side of his abdomen for a long time. A complete laboratory work-up, ultrasound examination of the abdomen and MSCT of the abdomen, and examination by an infectologist were performed. **Results:** Multicystic formations were diagnosed in the left hemiabdomen along with cyst in the liver. The patient was treated with preoperative albendazole. **Conclusion:** Ultrasound diagnostics is extremely important for the diagnosis of multivisceral echinococcosis and confirmation of the justification of using orientational ultrasound imaging in the occupational medicine office.

KEY WORDS: parasitic disease; ultrasound imaging

Podcijenjena bolest i važnost preventivnog pregleda: multicistična ehinokokoza – prikaz bolesnika

Cilj: prikazati slučaj uznapredovale ehinokokoze s cistama u abdomenu kod radnika na preventivnom pregledu. **Materijali i metode:** 43-godišnji radnik iz Bosne i Hercegovine s poviješću bliskog kontakta s psima kod kuće i na radnom mjestu imao je dulje vremena osjećaj težine u lijevoj strani trbuha. Napravljena je kompletna laboratorijska obrada, ultrazvučni pregled abdomena i MSCT abdomena te pregled infektologa. **Rezultati:** Dijagnosticirane su multicistične tvorbe u lijevom hemiabdomenu i cista na jetri. Prije kirurškog zahvata pacijent je liječen albendazolom. **Zaključak:** Ultrazvučna dijagnostika je od izuzetne važnosti za dijagnozu multivisceralne ehinokokoze i potvrda opravdanosti primjene orijentacijskog ultrazvučnog snimanja u ordinaciji medicine rada.

KLJUČNE RIJEČI: parazitska bolest; ultrazvuk

Prevalence of metabolic syndrome among professional drivers in Rijeka, Croatia

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The metabolic syndrome (METS) is an assemblage of risk factors that includes obesity, dyslipidemia, hypertension, and diabetes and it has become a major public health problem in developed countries. According to some studies the prevalence of METS in the European population is around 24.3 %, and the prevalence of METS in the Croatian population is less than 1 % in people aged 34 or less, 15,2 % in male population between 35 and 64 years and 7.7 % in male population of 65 years and above. The purpose of this review is to determine if professional drivers, given their specific working conditions, are more susceptible to develop metabolic syndrome in comparison to the overall population. We reviewed the medical documentation of 150 unrelated professional drivers (between ages 21 and 72) around the city of Rijeka to determine the prevalence of metabolic syndrome. Metabolic syndrome was assessed following the next criteria, a body mass index (BMI) above 30 and/or a waist ratio above 102 cm plus at least 2 of the following 3 criteria; high blood sugar or treatment for diabetes; systolic blood pressure above 130 mmHg, diastolic blood pressure above 90 mmHg or treatment for high blood pressure; dyslipidemia or treatment for high cholesterol. Results for this specific group of people overall showed that prevalence of obesity is around 55 %, of which 46.6 % complies with the diagnosis of METS. Overall prevalence of METS in professional drivers in Rijeka is 38.57 %, which is substantially higher than in the general population in Croatia.

KEY WORDS: epidemiology

Prevalencija metaboličkog sindroma među profesionalnim vozačima u Rijeci, Hrvatska

Metabolički sindrom je skup čimbenika rizika koji uključuju pretilost, dislipidemiju, hipertenziju i dijabetes, a postao je veliki javnozdravstveni problem u razvijenim zemljama. Prema nekim istraživanjima, njegova prevalencija u europskoj populaciji je oko 24,3 %. Prevalencija metaboličkog sindroma u hrvatskoj populaciji manja je od 1 % u ispitanika u dobi do 34 godine, 15,2 % u muškoj populaciji između 35 i 64 godina i 7,7 % u muškoj populaciji od 65 i više godina. Svrha ovog pregleda je utvrditi jesu li profesionalni vozači, s obzirom na svoje specifične uvjete rada, podložniji razvoju metaboličkog sindroma u odnosu na ukupnu populaciju. Kako bismo utvrdili prevalenciju metaboličkog sindroma, pregledali smo medicinsku dokumentaciju 150 profesionalnih vozača (u dobi između 21 i 72 godine) s područja grada Rijeke. Metabolički sindrom procijenjen je prema sljedećim kriterijima: indeks tjelesne mase (BMI) iznad 30 i/ili omjer struka iznad 102 cm, uz ispunjavanje najmanje 2 od sljedeća 3 kriterija: visoka razina šećera u krvi ili liječenje dijabetesa; sistolički krvni tlak iznad 130 mm Hg, dijastolički krvni tlak iznad 90 mm Hg ili liječenje visokog krvnog tlaka; dislipidemija ili liječenje visokog kolesterola. Rezultati za ovu specifičnu skupinu ispitanika ukupno su pokazali da je prevalencija pretilosti oko 55 %, od čega 46,6 % odgovara dijagnozi metaboličkog sindroma. Ukupna prevalencija metaboličkog sindroma u profesionalnih vozača u Rijeci je 38,57 %, što je znatno više nego u općoj populaciji u Hrvatskoj.

KLJUČNE RIJEČI: čimbenici rizika; epidemiologija; javno zdravstvo

Foreign workers in Croatia: do we need active tuberculosis screening?

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Tuberculosis among foreign workers with work and residence permits in the Republic of Croatia represents a risk for the entire resident population, not only an immediate danger to the health of the sick worker. It is essential to define a unique, active tuberculosis screening and diagnosis program for foreign workers. Objective: Analysis of work and residence permits issued to foreign workers and the incidence of tuberculosis in the general population and among foreign workers from 2022 to March 31, 2024 in Varaždin and Međimurje counties. Methods: Statistical data were obtained from the websites of the Ministry of the Interior of the Republic of Croatia, the Croatian Employment Service, the Croatian Public Health Service and the State Statistics Service. Results: There is an increased trend of issuing work and residence permits to foreign workers from home countries with an increased incidence of tuberculosis (>40/100,000). In both counties, 5 foreign workers with tuberculosis were registered through passive screening, with the highest incidence per 100,000 inhabitants in 2023. (Varaždin County – 9.36, Međimurje County – 7.6). Conclusion: The observed sample of tuberculosis patients in both counties was not large, but we cannot ignore the public health implications of the incidence of tuberculosis. We recommend revising existing laws and by-laws with clearly defined tools for tuberculosis screening and diagnosis, which would ensure a comprehensive, non-selective, targeted and unified health program for active screening of foreign workers.

KEY WORDS: work and residence permits; health examinations

Strani radnici u Hrvatskoj: treba li nam aktivan probir na tuberkulozu?

Svrha: Tuberkuloza među stranim radnicima sa dozvolom za rad i boravak u Republici Hrvatskoj predstavlja rizik za cjelokupno domicilno stanovništvo, a ne samo neposrednu opasnost za zdravlje oboljelih. Bitno je definirati jedinstveni, aktivni program probira i dijagnostike tuberkuloze kod stranih radnika. Cilj: Analiza izdanih dozvola za rad i boravak stranim radnicima i pojavnost tuberkuloze u općoj populaciji i kod stranih radnika od 2022. do 31. ožujka 2024.godine u Varaždinskoj i Međimurskoj županiji. Metode: Statistički podaci dobiveni su s internetskih stranica Ministarstva unutarnjih poslova Republike Hrvatske, Hrvatskog zavoda za zapošljavanje, Hrvatskog zavoda za javno zdravstvo i Državnog zavoda za statistiku. Rezultati: Bilježi se povećani trend izdavanja dozvola za rad i boravak stranim radnicima iz matičnih država s povećanom incidencijom tuberkuloze (>40/100 000). U obje županije pasivnim probirom registrirano je 5 oboljelih stranih radnika od tuberkuloze, s najvišom incidencijom na 100 000 stanovnika u 2023.g. (Varaždinska županija – 9,36, Međimurska županija – 7,6). Zaključak: Promatrani uzorak oboljelih od tuberkuloze u obje županije nije bio velik, no ne možemo zanemariti javnozdravstvene implikacije pojavnosti tuberkuloze. Preporučujemo revidiranje postojećih zakonskih i podzakonskih akta uz jasno definirane alate za probir i dijagnostiku tuberkuloze koji bi osigurao sveobuhvatan, neselektivan, ciljani i unificirani zdravstveni program aktivnog probira stranih radnika.

KLJUČNE RIJEČI: dozvole za rad i boravak; zdravstveni pregledi

Extenuating circumstances during examinations of migrants

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Introduction: The work of foreigners (persons who are not citizens of Croatia), working conditions and rights of workers in Croatia are determined in accordance with the provisions of Article 54 of the Occupational Safety Act (Official Gazette 71/14, 118/14, 94/18, and 96/18), which stipulates that foreign workers must, in addition to the conditions prescribed by special regulations, also meet the conditions prescribed by the provisions of this Act and the regulations adopted on its bases. According to the provisions of Articles 63 and 64 of the Occupational Safety and Health Act, the employer is obligated to provide the worker with health care appropriate to the safety and health risks to which he is exposed at work, in accordance with special regulations governing health protection measures related to work. **Case study:** In the Health institution Euromedica, the most represented medical examinations of migrants are those for employment. The most represented nationalities are Filipinos, Egyptians, Indians, and Uzbeks, while according to the representation on job types the most represented professions are unskilled workers in construction, masons and as of the beginning of 2023, bus drivers. During the medical examinations, the lack of knowledge of Croatian and English language and the lack of a translator are often a problem. In order to facilitate the medical examination, the doctor and psychologist created a sign-in and medical questionnaires in foreign languages and for psychological assessments open source validated questionnaires in different languages. If there is further misunderstanding, the “audio translator” on mobile phones is used. In addition to the language barrier, a complicating factor is the lack of understanding of cultural norms, whereby people of other nationalities are unwilling to answer certain questions that are considered inappropriate. **Conclusion:** To facilitate the examination, the employer should provide a translator accompanying the employee. In addition, it would be desirable for employees to come to the examination with a form containing their medical history. The employer should potentially ensure that the employees learn Croatian or English language, which would contribute better performance of work tasks, lead to fewer injuries at work as well as reducing occupational diseases.

KEY WORDS: questionnaires; translator

Otežane okolnosti pri pregledu migranata

Uvod: Rad stranaca (osoba koje nisu hrvatski državljani), uvjeti rada i prava upućenih radnika u Republici Hrvatskoj, određuju se u skladu s odredbom članka 54. Zakona o zaštiti na radu (Narodne novine br. 71/14, 118/14, 94/18 i 96/18), kojom je propisano da strani radnici moraju, uz uvjete propisane posebnim propisima, ispunjavati i uvjete propisane odredbama ovoga Zakona i propisa donesenih na temelju njega. Prema odredbi članaka 63. i 64. Zakona o zaštiti na radu, poslodavac je obavezan osigurati radniku zdravstvenu zaštitu primjerenu rizicima za sigurnost i zdravlje kojima je izložen na radu, u skladu s posebnim propisima koji uređuju mjere zdravstvene zaštite u vezi s radom. **Prikaz:** U zdravstvenoj ustanovi Euromedica najzastupljeniji su prethodni pregledi stranica različitih nacionalnosti. Najzastupljenije nacionalnosti su: Filipinci, Egipćani, Indijci i Uzbekistanci, a po zastupljenosti radnih mjesta najzastupljenija zanimanja su: pomoćni radnici u građevini, zidari te od početka 2023. godine vozači autobusa. Tijekom medicinskog pregleda često je otežana okolnost nepoznavanje hrvatskog ili engleskog jezika te nedostatak prevoditelja. Kako bi se olakšao medicinski pregled, specijalist medicine rada i sporta zajedno s psihologom su izradili prijavni i anamnestički upitnik na različitim jezicima te za psihološku procjenu validirane upitnike slobodno dostupne na internetu. Ukoliko dođe do daljnjeg nerazumijevanja, koristi se “zvučni prevoditelj” na mobitelu. Otežana okolnost osim nepoznavanja jezika je i nerazumijevanje kulturalnih normi, pri čemu osobe drugih nacionalnosti nisu voljne odgovoriti na određena pitanja koja se smatraju neprimjerena. **Zaključak:** Za olakšan rad u ambulanti, poslodavac bi trebao osigurati prevoditelja u pratnji zaposlenika. Osim toga, bilo bi poželjno da zaposlenici na pregled dolaze s ispunjenim upitnikom koji sadrži anamnestičke podatke. Poslodavac bi eventualno trebao osigurati zaposlenicima učenje hrvatskog ili engleskog jezika, što bi osim lakšeg razumijevanja pri pregledu, omogućilo i bolje razumijevanje pri obavljanju radnih zadataka, doprinjelo manjem broju ozljede na radu kao i smanjenju profesionalnih oboljenja.

KLJUČNE RIJEČI: prevoditelj; rad; upitnici

The influence of different modalities of conservative therapy of lumbar pain syndrome on the length of temporary inability to work

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The aim of this prospective, observational, and analytical study was to examine the effect of different modalities of analgesic therapy on the degree of pain reduction and the duration of temporary work disability in patients with lumbar pain syndrome (LPS). Efficacy was evaluated by measurement of pain on a visual-analog scale, while the length of the temporary inability to work was evaluated through the data records in the e-database of the Institute of Occupational Medicine of Sarajevo Canton and EmedIT health platform. The results of our research, conducted on 200 patients, showed that the group treated with classical analgesic therapy was the most frequent (86 or 43 %). The second most frequent was the group treated with a combination of classical analgesic therapy + anticonvulsants (67 or 33.5 %), while the smallest number of patients was in the group treated with classical analgesics + anticonvulsants + antidepressants (47 or 3.5 %). We found that subjects treated with combined analgesic therapy, i.e. drugs from the group of analgesics + anticonvulsants, have a 2.2 times greater chance of a better effect on the degree of pain reduction compared to subjects who were treated only with classical analgesic therapy, and that they had the highest average improvement between the first and control examination (2.94 ± 0.89). By monitoring the duration of temporary inability to work, we found that it is most common for a period of 2-4 months, and then over 6 months, with all treatment modalities. The results of this analytical study indicated that analgesics with a different pharmacodynamic profile could be effective and safe in the treatment LPS over treatment with only classical analgesic therapy and should be further evaluated as a treatment option in this condition.

KEY WORDS: combined analgesic therapy; work ability

Utjecaj različitih modaliteta konzervativne terapije lumbalnog bolnog sindroma na duljinu privremene nesposobnost za rad

Cilj ovog prospektivnog, opservacijskog i analitičkog istraživanja bio je ispitati učinak različitih modaliteta analgetske terapije na stupanj smanjenja boli i trajanje privremene nesposobnosti za rad u bolesnika s lumbalnim bolnim sindromom (LBS). Učinkovitost metode procijenjena je mjerenjem boli na vizualno-analognoj ljestvici, dok je duljina privremene nesposobnosti za rad procijenjena kroz evidenciju podataka u e-bazi podataka Zavoda za medicinu rada Kantona Sarajevo i zdravstvene platforme EmedIT. Rezultati našeg istraživanja, provedenog na 200 bolesnika, pokazali su da je najzastupljenija skupina liječena klasičnom analgetskom terapijom (86 ili 43 %). Druga po učestalosti bila je skupina liječena kombinacijom klasična analgetska terapija + antikonvulzivi (67 ili 33,5 %), dok je najmanji broj bolesnika bio u skupini liječenoj klasičnim analgeticima + antikonvulzivi + antidepresivi (47 ili 3,5 %). Utvrdili smo da ispitanici liječeni kombiniranom analgetskom terapijom, odnosno lijekovima iz skupine analgetika + antikonvulziva, imaju 2,2 puta veću vjerojatnost boljeg učinka na stupanj smanjenja boli u odnosu na ispitanike koji su liječeni samo klasičnom analgetskom terapijom, a da su imali najveće prosječno poboljšanje između prvog i kontrolnog pregleda: $2,94 \pm 0,89$. Praćenjem trajanja privremene nesposobnosti za rad utvrdili smo da je ona najčešće trajala od 2-4 mjeseca, a zatim preko 6 mjeseci, uz sve načine liječenja. Rezultati ove analitičke studije pokazali su da bi analgetici različitog farmakodinamičkog profila mogli biti učinkoviti i sigurni u liječenju LBS-a u odnosu na liječenje samo klasičnom analgetskom terapijom te bi ih trebalo dalje evaluirati kao opciju liječenja u ovom stanju.

KLJUČNE RIJEČI: kombinirana analgetska terapija; radna sposobnost

Prolonged sitting at the workplace – an underestimated risk that can be prevented

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Sedentary behaviour (most often in the form of prolonged sitting) has been steadily increasing over the last 50 years. It has been considered to be an independent risk factor for most common chronic diseases and all disease mortality. In 2017, it was declared as a risk factor that contributes to mortality more than smoking, but despite that, not enough attention is paid to it. With the introduction of modern technologies, sedentary behavior is also increasing in the workplace. The aim of this paper is to show, to what extent sedentary behavior in the workplace, increases the risk of developing the most common chronic diseases and all disease mortality, including prevention methods that have proven successful in reducing sedentary behaviour at work. Prolonged sitting in the workplace contributes to higher all disease mortality, with the risk increasing with the number of hours we spend sitting. Also, every hour of sitting increases the risk of cardiovascular disease, cardiovascular incidents and mortality from cardiovascular disease, while physical activity has the opposite effect, and reduces risk. Sedentary behavior affects glucose metabolism, decreases insulin sensitivity and increases risk of developing type 2 diabetes mellitus. Short interruptions of continuous sitting have a beneficial effect on postprandial glucose metabolism in physically inactive individuals and patients with type 2 diabetes mellitus. Prolonged sitting also contributes to increased risk from colon, breast, and endometrial cancer. Contrary to previous research, studies in the last 20 years point out that sedentary behavior in the form of prolonged sitting is not in itself a cause of back pain, but if other risk factors such as vibration (for example when driving), forced body position or increased stress at work are present, prolonged sitting contributes to their negative effect on back pain. Preventive measures that have been shown to be effective in reducing the time a worker spends sitting are: sit-stand tables, breaks or interruptions of continuous sitting every 30 minutes for 1-2 minutes, and education. These measures have the best effect if combined together.

KEY WORDS: cardiovascular diseases; Diabetes mellitus Type II; mortality, sedentary behaviour

Dugotrajno sjedenje na radnome mjestu – podcijenjeni radni rizik i mogućnosti prevencije

Sedentarno ponašanje (najčešće u obliku dugotrajnog sjedenja) se kontinuirano povećava u zadnjih 50 godina. Smatra se neovisnim faktorom rizika za razvoj najčešćih kroničnih nezaraznih bolesti i povećanu smrtnost. U 2017. godini proglašen je faktorom rizika koji doprinosi smrtnosti više od samoga pušenja, no usprkos tome ne pridaje mu se dovoljno pažnje. Uvođenjem modernih tehnologija sedentarno ponašanje je sve više prisutno na radnome mjestu. Cilj ovoga rada je prikazati u kojoj mjeri sedentarno ponašanje na radnom mjestu utječe na povećanje rizika obolijevanja od najčešćih kroničnih bolesti i na smrtnost od svih bolesti, te metode prevencije koje su se pokazale uspješne u smanjenju sedentarnog ponašanja na poslu. Dugotrajno sjedenje na radnome mjestu pridonosi većoj smrtnosti od svih bolesti, pri čemu rizik raste s brojem sati koje provedemo sjedeći. Također svaki sat sjedenja povećava rizik od kardiovaskularnih bolesti, kardiovaskularnih incidenata i smrtnosti od kardiovaskularnih bolesti, dok fizička aktivnost ima suprotan učinak, te smanjuje navedeni rizik. Sedentarno ponašanje utječe na poremećaj metabolizma glukoze, povećanje inzulinske neosjetljivosti i povećanje rizika za razvoj dijabetesa melitusa tipa 2, a kratki prekidi kontinuiranog sjedenja imaju povoljan učinak na postprandijani metabolizam glukoze u fizički nedovoljno aktivnih osoba i oboljelih od dijabetesa melitusa tipa 2. Također pridonosi povećanom riziku obolijevanja od karcinoma kolona, dojke i endometrija. Suprotno prijašnjim istraživanjima, studije u zadnjih 20 godina ističu da sedentarno ponašanje u obliku dugotrajnog sjedenja samo po sebi nije uzrok boli u leđima, ali ukoliko su prisutni drugi rizični faktori kao što su vibracije (na primjer kod voženje) ili prisilni položaj tijela, povećani stres na poslu, dugotrajno sjedenje pridonosi njihovom negativnom učinku na bol u leđima. Preventivne mjere koje su se pokazale učinkovite u smanjenju vremena kojeg radnik provede sjedeći na poslu su: stolovi za kojima se sjedi i stoji, pauze odnosno prekidi kontinuiranog sjedenja svakih 30 minuta u trajanju od 1-2 minute, te edukacija na radnome mjestu. Navedene mjere imaju najbolji učinak ukoliko se međusobno kombiniraju.

KLJUČNE RIJEČI: kardiovaskularne bolesti; sedentarno ponašanje; smrtnost; šećerna bolest tipa II

Mortality, cancer incidence, and disability among metal industry workers in Slovenia

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Introduction: Metal industry workers are exposed to various harmful conditions and stresses at work resulting from both non-ergonomic and chemical risk factors. Some chemicals they are exposed to are known carcinogens. Research has shown a higher incidence of lung cancer among foundry workers. **Objectives:** The objective of this retrospective cohort study was to examine the health risks of metal industry workers in Slovenia (N=7,458) between 1997 and 2016. **Methods:** Workers' health risks were defined using three indicators – general and specific mortality, cancer incidence, and occupational disability – for which the standardized mortality ratio (SMR), standardized cancer incidence ratio (SIR), and standardized disability ratio (SDR) were calculated. **Results:** General mortality and cancer incidence among metal industry workers were significantly lower than expected in men (SMR=0.72; 95 % CI=0.63–0.82; SIR=0.72; 95 % CI=0.63–0.83); they were higher in women, but the results are uncertain (SMR=1.24; 95 % CI=0.66–2.12; SIR=1.12; 95 % CI=0.73–1.64). In men, an indicated increase in lung cancer incidence was observed with length of employment (SIR<10 years=1.11; 95 % CI=0.57–1.94, SIR10–19 years=1.26; 95 % CI=0.63–2.26, SIR≥ 20 years=1.14; 95 % CI=0.73–1.70), and applying a latency period of 5 and 10 years (SIR5 years=1.22; 95 % CI=0.89–1.63; SIR10 years=1.30; 95 % CI=0.95–1.75). Both men and women showed an increased risk of occupational disability (SDR men=1.17; 95 % CI=1.07–1.28, SDR women=2.61; 95 % CI=2.04–3.29). A high disability risk due to nervous system diseases (SDR=8.78; 95 % CI=5.20–13.88) and circulatory disease (SDR=5.12; 95 % CI=2.20–10.09) was observed among women. **Conclusion:** A probable dose-response effect on lung cancer was established among men. In general, metal industry workers in Slovenia primarily run the risk of developing musculoskeletal disorders and respiratory diseases, which is manifested through a high risk of occupational disability. The mortality results were influenced by the healthy worker effect.

KLJUČNE RIJEČI: lung cancer; standardised cancer incidence ratio; standardised disability ratio; standardised mortality ratio

Smrtnost, incidencija raka i invalidnost među radnicima metaloprerađivačke industrije u Sloveniji

Uvod: Radnici u metaloprerađivačkoj industriji izloženi su različitim štetnostima i stresovima na radu koji proizlaze iz neergonomskih i kemijskih čimbenika rizika. Neke kemikalije kojima su izloženi potvrđene su kao kancerogene. Istraživanja su pokazala veću učestalost raka pluća među radnicima u ljevaonicama. **Ciljevi:** Cilj ove retrospektivne kohortne studije bio je ispitati zdravstvene rizike radnika metaloprerađivačke industrije u Sloveniji (N=7458) između 1997. i 2016. **Metode:** Zdravstveni rizici radnika definirani su pomoću tri pokazatelja: opće i specifične smrtnosti, učestalosti raka, nesposobnosti za rad, za koje su izračunati standardizirani omjer smrtnosti (SMR), standardizirani omjer incidencije raka (SIR) i standardizirani omjer invaliditeta (SDR). **Rezultati:** Opća smrtnost i incidencija raka među radnicima u metaloprerađivačkoj industriji bili su značajno niži od očekivanog u muškaraca (SMR=0,72; 95 % CI=0,63–0,82; SIR=0,72; 95 % CI=0,63–0,83); bili su viši u žena, ali su rezultati nepouzdaniji (SMR=1,24; 95 % CI=0,66–2,12; SIR=1,12; 95 % CI=0,73–1,64). U muškaraca je primijećen indicirani porast incidencije raka pluća s duljinom zaposlenja (SIR< 10 godina=1,11; 95 % CI=0,57–1,94, SIR10–19 godina=1,26; 95 % CI=0,63–2,26, SIR≥ 20 godina=1,14; 95 % CI=0,73–1,70) i primjenom razdoblja latencije od 5 i 10 godina (SIR5 godina=1,22; 95 % CI=0,89–1,63; SIR10 godina=1,30; 95 % CI=0,95–1,75). I muškarci i žene pokazali su povećan rizik od profesionalne invalidnosti (SDR muškarci=1,17; 95 % CI=1,07–1,28, SDR žene=2,61; 95 % CI=2,04–3,29). Kod žena je uočen visok rizik od invaliditeta zbog bolesti živčanog sustava (SDR=8,78; 95 % CI=5,20–13,88) i bolesti cirkulacije (SDR=5,12; 95 % CI=2,20–10,09). **Zaključak:** za muškarce je utvrđen vjerojatni učinak doze i odgovora na pojavnost raka pluća. Općenito, radnici u metaloprerađivačkoj industriji u Sloveniji primarno su izloženi riziku od razvoja bolesti mišićno-koštanog sustava i bolesti dišnog sustava, što se očituje kroz visok rizik od nesposobnosti za rad. Na rezultate mortaliteta utjecao je učinak zdravog radnika.

KLJUČNE RIJEČI: rak pluća; standardizirani omjer incidencije raka; standardizirani omjer invaliditeta; standardizirani omjer smrtnosti

Exoskeletons at the workplace

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Exoskeletons are structures that support and aid movement or increase the ability of the human body. Different models have targeted applications, so they can be used at work for the prevention of musculoskeletal disorders (MSD) of workers, but also in rehabilitation medicine. So-called professional or industrial exoskeletons provide external support to the joints and muscles of the worker's body in order to reduce physical effort and fatigue during manual work at the workplace. Medical exoskeletons are designed to help people with mobility problems walk again. The aim of this presentation is to provide an overview of literature data on the use of various exoskeletons currently available on the market, stating their advantages and disadvantages. The main focus will be on professional exoskeletons.

KEY WORDS: musculoskeletal disorders; professional exoskeletons

Egzoskeleti na radnim mjestima

Egzoskeleti su nosive strukture koje podržavaju i pomažu kretanje ili povećavaju sposobnost ljudskog tijela. Različiti modeli imaju ciljane primjene pa se tako mogu koristiti na poslu za prevenciju mišićno-koštanih poremećaja radnika (MSD), ali i u rehabilitacijskoj medicini. Takozvani profesionalni ili industrijski egzoskeleti daju vanjsku potporu zglobovima i mišićima tijela radnika kako bi se smanjio fizički napor i umor tijekom obavljanja manualnih poslova na radnom mjestu. Medicinski egzoskeleti dizajnirani su kako bi pomogli osobama s poteškoćama u pokretljivosti da ponovno hodaju. Cilj ove prezentacije je dati pregled literaturnih podataka o uporabi različitih egzoskeleta koji su trenutno dostupni na tržištu, navodeći pri tom njihove prednosti i nedostatke. Glavni fokus bit će na profesionalnim egzoskeletima.

KLJUČNE RIJEČI: mišićno-koštani poremećaji; profesionalni egzoskeleti

Implementing ergonomics into the education of nurses

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The Curriculum for obtaining the general care nurse/general care medical technician qualification replaced the curriculum for the education of nurses in 2010. The program is relatively new, but it does not include contents from the field of ergonomics, which are necessary for the preservation of health during the professional work of nurses and technicians. The Nursing school Mlinarska has been the holder of the Regional Competence Center project in the Health Sector since 2019. The Center for Ergonomics and Salutogenesis is also part of RCK Mlinarska. Vocational education and training teachers involved in the work of the Center for Ergonomics developed the interdisciplinary theme Ergonomics in preserving and improving students' health in the Health sector. The basic educational outcomes of the interdisciplinary theme of Ergonomics are to develop a positive attitude about preserving one's health, recognize risks and choose strategies to preserve one's health, acquire knowledge and skills to achieve a safer, more pleasant, and healthier work atmosphere, and apply the acquired knowledge and health preservation skills in everyday professional work. Education of students entering the profession is the basic method of preventing work-related diseases. Curriculum domains of the interdisciplinary theme of Ergonomics are physical, cognitive, and organizational ergonomics. The interdisciplinary theme is implemented in all subjects throughout the years of professional education of healthcare workers. Five VET teachers at the Nursing School Mlinarska had two professional trips to Denmark, where they received additional education in the field of ergonomics, got acquainted with the way of education during the schooling of nurses and related professions, and saw the implementation of ergonomics in health and social institutions. They transfer the acquired knowledge and skills to the students, applying them during practical work. Additional workshops are organized for teachers to adopt and transfer ergonomic principles in their work.

KEY WORDS: interdisciplinary studies; health preservation and advancement in the health sector

Implementacija ergonomije u obrazovanje medicinskih sestara

Strukovni kurikulum za stjecanje kvalifikacije Medicinska sestra opće njege/Medicinski tehničar opće njege 2010. godine zamijenio je nastavni plan i program za obrazovanje medicinskih sestara. Program je relativno novi, ali u njemu nisu zastupljeni sadržaji iz područja ergonomije koji su neophodni za očuvanje zdravlja tijekom profesionalnog rada medicinskih sestara i tehničara. Škola za medicinske sestre Mlinarska nositelj je projekta Regionalni centar kompetentnosti Mlinarska od 2019. godine. Sastavnica RCK Mlinarska je i Centar za ergonomiju i salutogenezu. Strukovni nastavnici uključeni u rad Centra za ergonomiju razvili su međupredmetnu temu Ergonomija u očuvanju i unaprjeđenju zdravlja učenika u sektoru Zdravstvo. Osnovni odgojno-obrazovni ishodi međupredmetne teme Ergonomija su razviti pozitivan stav o očuvanju vlastitog zdravlja, prepoznati rizike i odabrati strategije kojima će očuvati svoje zdravlje, usvojiti znanja i vještine za postizanje sigurnije, ugodnije i zdravije atmosfere na poslu te primijeniti stečeno znanje i vještine očuvanja zdravlja u svakodnevnom profesionalnom radu. Edukacija učenika na ulasku u profesiju osnovna je metoda prevencije bolesti vezanih uz rad. Domene kurikulumu međupredmetne teme Ergonomija su fizikalna ergonomija, kognitivna ergonomija i organizacijska ergonomija. Međupredmetna tema se ostvaruje u svim predmetima kroz sve godine strukovnog obrazovanja zdravstvenih djelatnika. Pet nastavnika strukovnih predmeta Škole za medicinske sestre Mlinarska realiziralo je dva stručna boravka u Danskoj gdje su prošli dodatne edukacije iz područja ergonomije, upoznali se s načinom edukacije tijekom školovanja medicinskih sestara i srodnih zanimanja i vidjeli implementaciju ergonomije u zdravstvenim i socijalnim ustanovama. Stečeno znanje i vještine prenose učenicima primjenjujući ih prilikom praktičnog rada. Za nastavnike se organiziraju dodatne radionice kako bi usvojili i prenosili ergonomijske principe u svom radu.

KLJUČNE RIJEČI: međupredmetna tema Ergonomija; očuvanje i unaprjeđenje zdravlja učenika u sektoru zdravstva

Workshop: exercise and ergonomics at the work desk

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This workshop aims to demonstrate effective exercises for the spine, shoulders, arms, pelvis, and legs that can be performed in the workplace, and to instruct participants on workplace ergonomics using pictorial examples and demonstrations of optimal body positioning at work desk. Participants are encouraged to wear comfortable clothing. The annual prevalence of neck and back pain among office workers is increasing globally. Also, spinal pain is associated with reduced productivity among office workers. It should be in the interest of employers of office workers to minimise the potential negative impact of musculoskeletal pain that affects workers' productivity. Workplace health promotion shows encouraging effects, but the scope of workplace health promotion interventions is diverse and encompasses different physical and psychosocial aspects. The best results are achieved through combined interventions such as educational strategies along with ergonomic modifications and workplace exercises. Exercises for the spine are of great importance because they help stretch stiff muscles and preserve muscle mass, and with just a few short exercises a day, it is possible to reduce pain and prevent stiffness. It is important to stretch the spine in all three body planes and stretch the lumbar part of the back. Also, proper breathing is important when performing exercises. Optimizing workplace ergonomics can positively impact office workers' health. Key adjustments include chair height, backrest position, and monitor placement at eye level. Proper sitting posture ensures even distribution of pressure forces on the intervertebral discs. General tips to mitigate the negative effects of sedentary work include daily workplace exercises, walking during breaks, standing up every 30 minutes to an hour, and using stairs instead of elevators. (Funded by: European Union – Next Generation EU, Program Contract of 8 December 2023, Class: 643-02/23-01/00016, Reg. no. 533-03-23-0006.)

KEY WORDS: health promotion; musculoskeletal disorders; prevention; work-related diseases; workplace

Radionica: tjeļovjeŹba i ergonomija za radnim stolom

Cilj radionice: sudionicima kongresa demonstrirati izvođenje vjeŹbi za kraljeŹnicu, ramena, ruke, zdjelicu i noge koje mogu izvoditi na radnom mjestu te ih uputiti u ergonomiju na radnom mjestu slikovnim primjerima i demonstracijom najpovoljnijeg poloŹaja tijela za radnim stolom. PoŹeljno je da sudionici budu u udobnoj odjeći. Godišnja prevalencija bolova u vratu i leđima među uredskim djelatnicima je svake godine sve veća u svijetu. Također, bol u kraljeŹnici povezana je sa smanjenom produktivnošću među uredskim radnicima. Poslodavcima uredskih radnika trebalo bi biti u interesu minimizirati potencijalni negativni utjecaj bolova mišićno-koštanog sustava koji utječe na produktivnost kod radnika. Promicanje zdravlja na radnom mjestu pokazuje ohrabrujuće učinke, no opseg intervencija za promicanje zdravlja na radnom mjestu raznolik je i obuhvaća različite fizičke i psihosocijalne aspekte. Najbolji rezultati postiŹu se kombiniranim intervencijama poput obrazovnih strategija zajedno s ergonomskim izmjenama i vjeŹbama na radnom mjestu. VjeŹbe za kraljeŹnicu od velike su vaŹnosti jer pomaŹu istegnuti ukoćene mišiće i očuvati mišićnu masu, a sa samo nekoliko kratkih vjeŹbi dnevno moŹe se smanjiti bolnost i prevenirati ukoćenost. KraljeŹnicu je vaŹno razgibati u sve tri tjelesne ravnine te istegnuti lumbalni dio leđa. Također, kod izvođenja vjeŹbi vaŹno je i pravilno disanje. Upravljanje ergonomijom na radnom mjestu moŹe optimizirati okruŹenje uredskih radnika s pozitivnim utjecajem na zdravlje. Bitno je prilagoditi visinu stolice i poloŹaj naslona, a monitor namjestiti u visinu oćiju. Pravilnim sjedenjem osigurava se da se sile pritiska na međukraljeŹnićne diskove ravnomjerno raspoređuju. Neki od općenitih savjeta za smanjenje negativnog utjecaja sjedilaćkih poslova su: svakodnevno izvoditi vjeŹbe na radnom mjestu, prošetati se tijekom pauze, ustati svakih pola sata do sat vremena iz sjedećeg poloŹaja, koristiti stepenice umjesto dizala. (Financirano od: European Union – Next Generation EU, Program Contract of 8 December 2023, Class: 643-02/23-01/00016, Reg. no. 533-03-23-0006.)

KLJUĆNE RIJEĆI: bolesti vezane uz rad; mišićno-koštani poremećaji; prevencija; promocija zdravlja; radno mjesto

Correlation between auditory and non-auditory noise effects in young adult workers with a normal audiogram

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Aim: To investigate the correlation between stress hormones and the characteristics of auditory brainstem response in young adult workers exposed to noise. **Materials and Methods:** Study participants (N=50), aged 19-30 years, worked for 1-2 years in noise at equivalent intensity level ≥ 85 dB(A). Non-auditory effects – morning salivary cortisone (KN) and cortisol (KL) levels – were determined by high-performance liquid chromatography. Auditory brainstem response was evoked by a click at intensity levels of 80 and 90 dB, and examined on the side of the ear with a normal audiogram and tympanogram. The examined characteristics were: amplitudes and amplitude ratios of the first (A1) and fifth (A5) wave. **Results:** A significant and negative correlation was observed between KL and the A1/A5 ratio at the click intensity level of 90 dB, $\rho = -0.344$, $P = 0.043$. Despite strong, positive and significant correlation between KN and KL ($\rho = -0.692$, $P < 0.001$), no correlation was observed between KN and the same ratio, nor between other examined characteristics and both hormones. **Conclusion:** The direction of the relationship between auditory and non-auditory effects is consistent with previous research, and indicates simultaneous effect of noise on the inner ear and the hypothalamus-pituitary-adrenal axis in young adult workers at the beginning of work in noise. The weakness of the observed correlation between KL and A1/A5 confirms the calculated coefficient, as well as the absence of correlation between KN or KL and A1 at the click of both intensity levels. The lack of correlation is contributed by the variability and non-specificity of the investigated noise effects, which need to be evaluated in the context of exposure to noise outside the workplace, as well as other stressors that can increase cortisol secretion.

KEY WORDS: amplitude; auditory brainstem response; cortisol; cortisone; hearing; high-performance liquid chromatography

Korelacija auditivnih i ekstraauditivnih učinaka buke u mladim odraslim radnicima s urednim audiogramom

Cilj: Utvrditi povezanost hormona stresa sa značajkama evociranih slušnih potencijala moždanoga debla u mladim odraslim radnicima izloženih buci. **Materijali i metode:** Sudionici istraživanja (N=50), u dobi 19-30 godina, radili su 1-2 godine u buci ekvivalentne razine intenziteta ≥ 85 dB(A). Ekstraauditivni učinci – jutarnje koncentracije kortizona (KN) i kortizola (KL) u slini – bili su određene tekućinskom kromatografijom visoke djelotvornosti. Slušni potencijali moždanoga debla bili su pobuđeni klikom razina intenziteta 80 i 90 dB, te ispitani na strani uha s urednim audiogramom i timpanogramom. Ispitane značajke bile su: amplituda i omjeri amplituda prvog (A1) i petog (A5) vala. **Rezultati:** Uočena je značajna i negativna korelacija između KL i omjera A1/A5 uz klik razine intenziteta 90 dB, $\rho = -0,344$, $P = 0,043$. Uprkos uočenoj snažnoj, pozitivnoj i značajnoj korelaciji između KN i KL, $\rho = -0,692$, $P < 0,001$, nije uočena korelacija između KN i istoga omjera, kao ni između drugih ispitivanih značajki i obaju hormona. **Zaključak:** Smjer korelacije između auditivnih i ekstraauditivnih učinaka u skladu je s prethodnim istraživanjima, te ukazuje na istovremeno djelovanje buke na unutarnje uho i os hipotalamus-hipofiza-nadbubrežna žlijezda u mladim odraslim radnicima na početku rada u buci. Slabost uočene korelacije između KL i A1/A5 potvrđuje izračunati koeficijent, kao i odsustvo korelacije između KN ili KL i A1 uz klik obiju razina intenziteta. Odsustvu korelacije doprinose varijabilnost i nespecifičnost ispitanih učinaka buke, koje je potrebno ocijeniti u kontekstu izloženosti buci izvan mjesta rada, kao i drugim stresorima koji mogu povećati izlučivanje kortizola.

KLJUČNE RIJEČI: amplituda; evocirani potencijali; kortizol; kortizon; sluh-tekućinska kromatografija visoke djelotvornosti

Occupational airborne allergic contact dermatitis: a new challenge for occupational health specialists

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Airborne occupational allergic contact dermatitis (AKD) is a dermatological disease that manifests itself on exposed parts of the body, most often the face, neck and hands. It is caused by substances from the air that settle on the skin exposed to the work environment. Recently, two cases of occupational airborne AKD have been presented. The first case was in a 54-year-old female patient who has been working in the pharmaceutical industry as a chemical technician for the last 14 years. The second case was in a 63-year-old male pharmaceutical worker in a manufacturing plant with 37 years of service. The skin lesions that presented in the workers were eczematous-type changes, erythemas with vesicles with thickening and scaling of the skin. The distribution of lesions was primarily on the hands, neck and face. On the head, changes were localized around the nose and chin, on the scalp and in the ear. In both cases, the skin lesions diminished during vacation and/or sick leave. Diagnostic processing proved an allergy to substances from the working process with a skin patch test, a late reaction to the test. Patch test was for a female patient positive to omeprazole (a proton pump inhibitor), and for a male patient to olanzapine (an antipsychotic) and saxagliptin (an oral antidiabetic). The substances used in the drug production, and the drugs themselves are known as possible allergens. Therefore, the places where these allergens are found (e.g. in the pharmaceutical industry, health care facilities, elderly care facilities, etc.) are also places where occupational allergies that are transmitted through the air occur. After the diagnosis of occupational AKD, the biggest challenge for an occupational health specialist is the assessment of work ability. In most cases, workers with contact dermatitis can continue to work at their workplace with protective measures. Workers with airborne AKD are forced to change workplaces where they will not be exposed to the allergen. Changing to workplaces where the concentration of allergens will be extremely low is usually not enough, because even a small exposure to the allergen causes the occurrence of an allergic reaction.

KEY WORDS: occupational exposure; olanzapine; omeprazole; saxagliptin

Profesionalni aerogeni alergijski kontaktni dermatitis: novi izazov za specijaliste medicine rada

Profesionalni alergijski kontaktni dermatitis (AKD) koji se prenosi zrakom je dermatološka bolest koja se manifestira na otkrivenim dijelovima tijela najčešće licu, vratu i rukama. Uzrokovana je tvarima iz zraka koje se talože na koži izloženoj radnom okruženju. Nedavno su se prezentirala 2 slučaja profesionalnog AKD koji se prenosi zrakom. Prvi slučaj je bio u 54-godišnje pacijentice koja radi u farmaceutskoj industriji na mjestu kemijske tehničarke zadnjih 14 godina. Drugi slučaj je bio u 63-godišnjeg farmaceutskog radnika u proizvodnom pogonu s radnim stažom od 37 godina. Kožne eflorescence koje su se prezentirale kod radnika su bile morfe ekcematoznog tipa, eriteme s vezikulama uz zadebljanje i luskanje kože. Distribucija morfi je bila prvenstveno po rukama, na vratu i licu. Na glavi su promjene bile lokalizirane oko nosa i brade, na vlasištu i u uši. U oba slučaja kožne promjene su se regradirale za vrijeme godišnjeg odmora i/ili bolovanja. Obradom je dokazana alergija na tvari iz radnog procesa kožnim epikutanim testom, kasna reakcija na test. Epikutani test kod pacijentice je bio pozitivan na omeprazol (inhibitor protonске pumpe), kod pacijenta na olanzepin (antipsihotik) i saksagliptin (oralni antidiijabetik). Tvari koje se koriste u proizvodnji lijekova i sami lijekovi poznati su mogući alergijski agensi. Stoga, mjesta gdje se ti alergeni nalaze (npr. u farmaceutskoj industriji, zdravstvenim ustanovama, ustanovama za skrb starijih osoba i sl.) su ujedno i mjesta gdje se pojavljuju profesionalne alergije koje se prenose zrakom. Nakon postavljanja dijagnoze profesionalnog AKD najveći je izazov specijaliste medicine rada predstavlja procjena radne sposobnosti. Radnici s kontaktnim dermatitisom u većini slučajeva mogu nastaviti raditi na svom radnom mjestu uz mjere zaštite. Radnici s kontaktnim iritativnim dermatitisom koji se prenosi zrakom su primorani na promjenu radnog mjesta gdje neće biti izloženi iritansu. Promjena alergijskog kontaktnog dermatitis airborn na radno mjesta gdje će koncentracija alergena biti izrazito mala obično nije dovoljna jer i mala ekspozicija alergenu izaziva pojavu alergijske reakcije.

KLJUČNE RIJEČI: profesionalna izloženost; olanzapin; omeprazol; saksagliptin

The significance of pulmonary function parameters in the diagnosis of pleural asbestosis

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Aim: to determine the significance of spirometric parameters and their role in the diagnostic algorithm in patients with pleural asbestosis
Materials and Methods: The patients were 43 workers, who worked at the asbestos-cement factory. A retrospective survey of workers was carried out. Pearson's correlation coefficient (R), Student's t test, Mann-Whitney test, chi-square test were used in data processing. **Results:** 1. FVC values are clinically significantly lower in subjects with X-ray visible changes on the pleura compared to subjects without X-ray visible changes on the pleura ($t=3.3$; $p=0.002$). 2. DLCO values are lower in subjects with X-ray visible changes on the pleura compared to subjects without X-ray visible changes on the pleura, but they are of no clinical significance ($t=1.95$; $p=0.039$). **Conclusion:** 1. Spirometric testing is the method of choice for assessing lung function and work ability and disability. 2. DLCO is an insufficiently sensitive parameter in the functional diagnosis of pleural changes compared to X-ray and spirometric testing. Its significance remains in the assessment of lung function and assessment of work ability and disability.

KEY WORDS: retrospective survey; spirometric testing; X-ray

Značaj parametara plućne funkcije u dijagnostici azbestoze pleure

Cilj: odrediti značaj spirometrijskih parametara i njihovu ulogu u dijagnostičkom algoritmu kod oboljelih od azbestoze pleure. **Materijali i metode:** Istraživanje je provedeno na skupini od 43 radnika, koji su radili u tvornici azbestno-cementnih proizvoda. Izvršeno je retrospektivno istraživanje radnika. U obradi podataka korišten je Pearsonov koeficijent korelacije (R), Studentov t test, Mann-Whitney test te chi-kvadrat test. **Rezultati:** 1. Vrijednosti FVC su klinički značajno niže kod ispitanika s RTG vidljivim promjenama na pleuri u odnosu na ispitanike bez RTG vidljivih promjena na pleuri ($t=3.3$; $p=0.002$). 2. Vrijednosti DLCO su niže u ispitanika s RTG vidljivim promjenama na pleuri u odnosu na ispitanike bez RTG vidljivih promjena na pleuri, ali su bez kliničkog značaja ($t=1.95$; $p=0.039$). **Zaključak:** 1. Za procjenu plućne funkcije i ocjenu radne sposobnosti i invalidnosti spirometrijsko testiranje je metoda izbora. 2. DLCO je nedovoljno osjetljiv parametar u funkcionalnoj dijagnostici promjena na pleuri u odnosu na RTG i spirometrijsko testiranje. Njegov značaj ostaje u procjeni plućne funkcije i ocjeni radne sposobnosti i invalidnosti.

KLJUČNE RIJEČI: retrospektivno istraživanje; RTG; spirometrija

Chemical risk analysis in a screen printing workshop of textile sector

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Introduction and goal: Technical processes of manufacturing and fabric processing (sublimation dye, printing thermofixation, etc.) expose workers to a multitude of chemical mixtures with unknown risks. We aimed to assess chemical risks to which are exposed employees in a screen-printing Tunisian textile workshop. Methodology: the security data sheets (SDS) of chemical substances inventoried as screen-printing workshop products were collected. Actual conditions of these products' use were identified by workstation investigation. Seirich software (system evaluation and information on chemical risks in a professional environment), version 3.4.0, allowed us to assess the chemical risk, depending on the labeling danger mentions (CLP=classification, labeling, packaging), the annual manipulated quantity, and the manipulation conditions. Risk hierarchization was established depending on the impacts on health, safety, and the environment. Residual risks were estimated by a simulation of this software proposed preventive measures. Results: While the SDS of five products were not recovered, 50 emitted and issued products were analyzed by the Seirich software. Analysis have objectified that three manipulated products contain category 1B carcinogens (potential carcinogen for human beings), mutagen and toxic substances (CMR). Prioritization of risks in relation with employee's health concluded that 5 products were to be dealt with very high priority and 12 to deal with a strong priority. Dangerous substances associated with these high-risk products were particularly, formaldehyde, methanol, 1,2-diol, 2-butoxyethanol, titanium dioxide. The Seirich software has modeled some preventive actions to be implemented according to tasks and work area, such as VLEP control type. Conclusion: Screen printing in the textile and clothing sector is associated with considerable risks imposing a strengthening of preventive measures both technical and medical by the occupational physician.

KEY WORDS: occupational exposure; security data sheets; textile workers; toxic chemicals

Analiza rizika od izloženosti kemikalijama u radionici sitotiska tekstilne tvornice

Tehnički procesi proizvodnje i obrade tkanina (sublimacija boja, tiskarska termofiksacija i slični postupci) dovode do izloženosti radnika mnoštvu kemijskih smjesa s nepoznatim rizicima. U ovome istraživanju procjenjivali smo kemijske rizike kojima su izloženi zaposlenici u tuniškoj radionici za sitotisak u tekstilnoj tvornici. Metodologija: prikupljeni su sigurnosni listovi (SDS) kemijskih tvari koje se koriste u radionici za sitotisak. Stvarni uvjeti korištenja ovih proizvoda utvrđeni su istraživanjem u samoj radionici. Primjena softvera Seirich (evaluacija sustava i informacije o kemijskim rizicima u profesionalnom okruženju), verzija 3.4.0, omogućila je procjenu rizika od izloženosti kemikalijama, ovisno o oznakama opasnosti (CLP=klasifikacija, označavanje, pakiranje), godišnjoj količini kojom se rukuje i uvjetima rukovanja. Stupnjevanje rizika uspostavljeno je ovisno o utjecajima na zdravlje, sigurnost i okoliš. Preostali rizici procijenjeni su simulacijom predloženih preventivnih mjera pomoću spomenutog softvera. Rezultati: Dok SDS pet proizvoda nisu pronađeni, za 50 proizvoda provedena je analiza pomoću softvera Seirich. Analizom je utvrđeno da tri proizvoda sadrže kancerogene, mutagene i toksične tvari (CMR) kategorije 1B (potencijalni kancerogen za čovjeka). Određivanjem prioriteta rizika u vezi sa zdravljem zaposlenika zaključeno je da 5 proizvoda kojima rukuju pri radu spada među one s vrlo visokim prioritetom, a 12 visokim prioritetom. Opasne tvari povezane s utvrđenim visokorizičnim proizvodima bile su formaldehid, metanol, 1,2-diol, 2-butoksietanol, titanijev dioksid. Softver Seirich modelirao je neke preventivne radnje koje treba provesti prema zadacima i području rada, kao što su VLEP tip upravljanja. Zaključak: rad na sitotisku u tvornicama tekstila i odjeće povezan je sa značajnim rizicima koji nameću jačanje preventivnih tehničkih i medicinskih mjera, od strane liječnika medicine rada.

KLJUČNE RIJEČI: izloženost na radnom mjestu; sigurnosni listovi kemijskih tvari; tekstilni radnici, toksične kemikalije

The role of occupational health in the education of nurses

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Inclusion in education refers to an approach and practice that allows all students, regardless of their differences, to be equally included in the educational process. This includes students with developmental disabilities, various cultural and socio-economic backgrounds, as well as those with different levels of intellectual abilities. The goal of inclusive education is to ensure that all students have equal opportunities for education and development, and that they feel accepted and supported in the school environment. Students with developmental disabilities have diverse and changing needs and are a very heterogeneous group. Inclusive education is based on several key principles. First, every child has the right to quality education in regular schools, where they will be accepted and valued for their uniqueness. Second, teachers and school staff need to be educated and trained to work with diverse groups of students, using various teaching methods that meet individual needs. Third, school infrastructure and resources should be adapted to enable access and participation for all students. Inclusion in education does not mean just the physical presence of students with special needs in regular schools, but also their active participation in all aspects of school life. This includes adapting curricula, individualized education plans, and peer and community support. The Education sector in Healthcare includes knowledge of natural, humanistic, and medical sciences, all aimed at improving and preserving human health and treatment. In the mentioned educational sector, students can choose a five-year vocational curriculum to obtain the qualification of a general care nurse/general care technician. What happens if a student does not have the abilities for a certain secondary school program? What is the role of occupational medicine in career selection? What happens to a student if they are enrolled in a secondary school program but do not meet the health requirements? Can a student with difficulties successfully meet learning outcomes? All of the above requires consideration and synergy between the health and education systems, which must find a solution within the legal framework, aimed at the best interest of the student.

KEY WORDS: equal opportunities for education and development; inclusive education; school

Uloga medicine rada u obrazovanju medicinskih sestara

Inkluzija u obrazovanju označava pristup i praksu koja omogućuje svim učenicima, bez obzira na njihove različitosti, da budu ravnopravno uključeni u obrazovni proces. Ovo uključuje učenike s teškoćama u razvoju, invaliditetom, različitim kulturnim i socio-ekonomskim pozadinama, kao i one s različitim razinama intelektualnih sposobnosti. Cilj inkluzivnog odgoja i obrazovanja je osigurati da svi učenici imaju jednaku priliku za obrazovanje i razvoj, te da se osjećaju prihvaćeno i podržano u školskom okruženju. Učenici s teškoćama u razvoju imaju različite i promjenjive potrebe te su vrlo heterogena skupina. Inkluzivno obrazovanje temelji se na nekoliko ključnih načela. Prvo, svako dijete ima pravo na kvalitetno obrazovanje u redovnim školama, gdje će biti prihvaćeno i vrednovano zbog svoje jedinstvenosti. Drugo, nastavnici i školsko osoblje trebaju biti educirani i osposobljeni za rad s raznolikim skupinama učenika, koristeći različite metode poučavanja koje zadovoljavaju individualne potrebe. Treće, školska infrastruktura i resursi trebaju biti prilagođeni kako bi omogućili pristup i sudjelovanje svim učenicima. Inkluzija u obrazovanju ne znači samo fizičku prisutnost učenika s posebnim potrebama u redovnim školama, već i aktivno sudjelovanje u svim aspektima školskog života. To uključuje prilagodbu nastavnih planova i programa, individualizirane edukacijske planove, te podršku vršnjaka i zajednice. Obrazovni sektor Zdravstvo i socijalna skrb uključuje poznavanje prirodnih, humanističkih i medicinskih znanosti, a sve u cilju poboljšanja i očuvanja ljudskog zdravlja i liječenja. U spomenutom obrazovnom sektoru učenici mogu izabrati petogodišnji strukovni kurikulum za stjecanje kvalifikacije medicinska sestra opće njege/medicinski tehničar opće njege. Što se događa ukoliko učenik nema sposobnosti za određeni srednjoškolski program? Koja je uloga medicine rada u izboru zanimanja? Što se događa sa učenicom ukoliko je upisan u srednjoškolski program, a ne posjeduje zdravstvene zahtjeve? Može li učenik sa poteškoćama uspješno zadovoljiti ishode učenja? Sve navedeno zahtijeva promišljanje i sinergiju dvaju sustava, zdravstvenog i obrazovnog, koji moraju iznaći rješenje, unutar zakonskog okvira, a koje će biti usmjereno u najboljem interesu učenika.

KLJUČNE RIJEČI: inkluzija; jednake mogućnosti obrazovanja i razvoja; škola

Second-level evaluation committees in occupational medicine – results so far

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Based on the Ordinance on jobs in which a worker can work only after a prior and regular determination of medical fitness (Official Gazette 70/2010), a second-level evaluation committee is defined to which a worker or employer can appeal regarding the issued certificate of medical fitness for work. The committee mentioned above is located at the Division of Occupational and Sports Medicine, Prevention of Disability and Psychosocial Risks at the Workplace. The aim of this paper is to present the work and results of second-level commissions in the last 10 years. The total number of appeals received, those accepted, and the compatibility of grades with the primary level will be displayed. The statistics of the appellants and the type of examination the appellant complained at (previous, unscheduled, periodic, and control) will also be presented. The work procedure (algorithm) of the second-level evaluation committee will be presented, as well as the most frequent deviations noticed during the second level evaluation, all with the aim of improving the quality of providing specific health care for workers.

KEY WORDS: second level evaluation committee; certificate; examinations

Drugostupanjsko povjerenstvo u medicini rada – dosadašnji rezultati

Temeljem Pravilnika o poslovima na kojima radnik može raditi samo nakon prethodnog i redovnog utvrđivanja zdravstvene sposobnosti (NN 70/2010) definirano je drugostupanjsko povjerenstvo kojem se radnik ili poslodavac mogu žaliti obzirom na izdano uvjerenje o zdravstvenoj sposobnosti za rad. Gore navedeno povjerenstvo se nalazi pri Službi za medicinu rada i sporta, prevenciju invalidnosti i psihosocijalne rizike na radnom mjestu. Cilj ovog rada je prikazati rad i rezultate drugostupanjskih povjerenstava u zadnjih 10 godina. Prikazat će se ukupni broj pristiglih žalbi, onih uzetih u rad te usklađenost ocjena sa primarnom razinom. Također će se prikazati statistika podnositelja žalbe i vrsta pregleda na čiju se ocjenu žalitelj žalio (prethodni, izvanredni, periodički i kontrolni). Prikazat će se postupovnik rada drugostupanjskog povjerenstva te najčešća odstupanja primijećena tijekom provođenja postupka, a sve s ciljem unaprjeđenja kvalitete pružanja specifične zdravstvene zaštite radnika.

KLJUČNE RIJEČI: pregledi; uvjerenje

Glaucoma as a contraindication to the security guard's ability to work

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According to the Ordinance on the method of determining the general and special health abilities of security guards and security guards in private protection National Gazette 34/2004, glaucoma is included in the list of contraindications for performing tasks for security guards in private protection. Due to the incomplete statements of the mentioned contraindication, the majority of security guards or people who want to be employed with the mentioned diagnosis, are not able to work for that position despite their visual function being preserved. Glaucoma is a multifactorial disease characterized by typical damage to the visual field and nerve fibers of the optic nerve, i.e. functional and structural damage. Elevated eye pressure is only the main risk factor for glaucoma. In order to assess the working ability, it is necessary to know the type of glaucoma, the degree of the disease or damage in both eyes and the binocular visual function, for which it is necessary to perform a complete glaucoma treatment. For glaucoma, which is listed in the list of contraindications in the performance of work for security guards in private protection, a complete glaucoma treatment with an emphasis on the degree of damage to both eyes and binocular vision functions should be included in the Rulebook on the method of determining the general and special health ability of security guards and security guards in private protection, such as some other eye disorders that affect visual function.

KEY WORDS: assessment of security guard's working ability; glaucoma damage; visual function

Glaukom kao kontraindikacija radne sposobnosti zaštitara

Prema Pravilniku o načinu utvrđivanja opće i posebne zdravstvene sposobnosti čuvara i zaštitara u privatnoj zaštiti (Narodne Novine 34/2004), glaukom je naveden u popis kontraindikacija u obavljanju poslova za zaštitare u privatnoj zaštiti. Zbog nepotpunih navoda navedene kontraindikacije, većina zaštitara ili osoba koja se žele zaposliti sa navedenom dijagnozom, nisu radno sposobni za to radno mjesto unatoč što im je vidna funkcija očuvana. Glaukom je multifaktorijalna bolest karakterizirana tipičnim oštećenjima vidnog polja i živčanih vlakana vidnog živca, odnosno funkcionalnim i strukturalnim oštećenjima. Povišeni očni tlak samo je glavni čimbenik rizika za nastanak glaukoma. Kako bi se procijenila radna sposobnost, potrebno je znati vrstu glaukoma, stupanj bolesti odnosno oštećenja na oba oka i binokularnu vidnu funkciju za što je potrebno učiniti kompletnu glaukomsku obradu. Za glaukom koji je naveden u popis kontraindikacija u obavljanju poslova za zaštitare u privatnoj zaštiti, kompletna glaukomska obrada s naglaskom na stupnjevanje oštećenja na oba oka te binokularne vidne funkcije trebali bi biti uvršteni u Pravilniku o načinu utvrđivanja opće i posebne zdravstvene sposobnosti čuvara i zaštitara u privatnoj zaštiti kao što su navedeni i neki drugi očni poremećaji koji utječu na vidnu funkciju.

KLJUČNE RIJEČI: funkcija vida; glaukomsko oštećenje; ocjena radne sposobnosti

Visual acuity of professional drivers in relation to tear film condition

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Aim: to analyze the effect of preservative-free artificial tear drops on visual acuity in professional drivers ≥ 55 years of age with symptomatic dry eye (SSO) and asymptomatic dry eye (ASO) **Materials and Methods:** the prospective study included 19 subjects (38 eyes) in SSO and 21 subjects (42 eyes) in ASO. Visual acuity at a distance (without correction and with correction) was tested with Snellen optotypes. Visual acuity with and without correction was determined for each patient before and 3 min after instillation of artificial tears. **Results:** 1. there is a difference in uncorrected visual acuity compared to corrected visual acuity in both groups after instillation of artificial tears (ETDRS SSO: ETDRS ASO= 5.2:3.5//significant in the SSO group; $p < 0.001$); 2. there is a statistically significant difference in uncorrected visual acuity in both groups after instillation of artificial tears (ETDRS SSO: ETDRS ASO= 4.4:5.4//significant in the SSO group; $p < 0.001$). **Conclusion:** before determining the visual acuity, it would be advisable for professional drivers to instill artificial tears in order to achieve the best possible result and a more correct assessment of the given criteria.

KEY WORDS: artificial tears; dry eyes

Vidna oštrina vozača profesionalaca u odnosu na stanje suznog filma

Čilj: analizirati učinak kapanja umjetnih suza bez konzervansa na vidnu oštrinu u profesionalnih vozača ≥ 55 godine života sa simptomatskim suhim očima (SSO) i asimptomatskim suhim očima (ASO) **Materijali i metode:** Prospektivna studija je uključivala 19 ispitanika (38 očiju) sa SSO i 21 ispitanika (42 oka) sa ASO. Vidna oštrina na daljinu (bez korekcije i s korekcijom) ispitana je Snellenovim optotipima. Svakom pacijentu je određena vidna oštrina sa i bez korekcije prije kapanja i 3 min nakon kapanja umjetnih suza. **Rezultati:** (1) postoji razlika u nekorigiranoj vidnoj oštrini prema korigiranoj vidnoj oštrini u obje skupine nakon ukapavanja umjetnih suza (ETDRS SSO: ETDRS ASO=5,2:3,5//značajna u SSO skupini; $p < 0.001$); (2) postoji statistički značajna razlika u nekorigiranoj vidnoj oštrini u obje skupine nakon ukapavanja umjetnih suza (ETDRS SSO: ETDRS ASO=4,4:5,4//značajna u SSO skupini; $p < 0.001$). **Zaključak:** prije određivanja vidne oštrine bilo bi uputno vozačima profesionalcima ukapavanje umjetnih suza za postizanje što boljeg rezultata i pravilniju procjenu zadanih kriterija.

KLJUČNE RIJEČI: suhe oči; umjetne suze

Exposure to quarry dust as a cause of occupational skin disease: a case report

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The aim of this paper is to present a case of occupational disease in an unqualified worker aged 53 with 30 years of experience as an auxiliary worker (supervising the operation of a crusher) at a quarry where limestone is processed. The patient has had recurring generalized urticaria at his workplace for the past two years, usually at the end of the working week. The changes first appear on the face and neck in the form of itching, hives, eyelid swelling and facial swelling, and then spread throughout the body, requiring treatment with parenteral therapy. He has no other skin complaints outside of work. A diagnostic workup ruled out atopy, inflammatory foci, hereditary angioedema and systemic autoimmune disease. The patient is additionally receiving post-thyroidectomy treatment and treatment for insulin-dependent type 2 diabetes, gout, hypertension, nephrolithiasis, overuse syndrome of the right shoulder and foot and both index fingers, as well as adjustment disorder. A skin test was performed with a sample of the limestone dust to which the patient had been exposed using the scarification method and 24-hour occlusion. While the testing did not show a positive early skin reaction, a delayed reaction in the form of an urticarial rash developed around the test site after 24 hours. The test results of the two control subjects were negative. A clinical pharmacologist was consulted, whose findings point to occupational urticaria with no known interaction with the medications the patient is taking. Chemical analysis showed that the limestone dust sample was composed of calcite (calcium carbonate) and also contained dolomite, quartz and/or aluminosilicate, iron oxide and manganese oxide. The dust has an irritating effect on the skin, which can be both mechanical and chemical, while some admixtures have a sensitization potential (aluminium compounds). It was determined that the patient suffers from occupational generalized urticaria caused by the components of limestone dust, and an occupational disease reporting procedure has been initiated.

KEY WORDS: contact allergens; occupational disease; quarry dust; skin irritants; urticaria

Izložnost prašini u kamenolomu kao uzrok profesionalne bolesti kože: prikaz slučaja

Cilj ovog rada je prikazati slučaj profesionalne bolesti kod nekvalificiranog radnika dobi 53 godine s ukupnim radnim stažom od 30 godina, sve na poslovima pomoćnog radnika u kamenolomu (nadzor rada drobilice za kamen) u kojem se obrađuje vapnenac. Bolesnik se javlja radi ponavljajuće generalizirane urtikarije koja se pojavljuje unazad 2 godine na radnom mjestu, u pravilu krajem radnog tjedna. Promjene se prvo pojave na licu i vratu u vidu svrbeža, urtika, otoka kapaka i lica, pa se onda šire po tijelu, a zahtijevaju liječenje parenteralnom terapijom. Izvan radne izloženosti bolesnik nema kožnih tegoba. Učinjena je dijagnostička obrada koja je isključila atopiju, upalna žarišta, hereditarni angioedem, sistemsku autoimunu bolest. Bolesnik se dodatno liječi radi stanja iza tiroidektomije, šećerne bolesti tipa 2 ovisne o inzulinu, gihta, hipertenzije, nefrolitijaze, sindroma prenaprezanja desnog ramena i stopala, te oba kažiprsta, poremećaja prilagodbe. Učinjeno je kožno testiranje sa uzorkom prašine vapnenca kojoj je bolesnik izložen metodom skarifikacije i 24-satnom okluzijom. Testiranje nije pokazalo pozitivnu ranu kožnu reakciju, ali se nakon 24 sata razvila odgođena reakcija u obliku urtikarijelnog osipa oko mjesta testiranja. Testirana su i 2 kontrolna ispitanika sa negativnim rezultatom testa. Konzultiran je klinički farmakolog, a nalaz govori u prilog profesionalno uzrokovane urtikarije, bez potvrde interakcije lijekova koje bolesnik uzima. Učinjena je kemijska analiza uzorka prašine vapnenca koja upućuje kako se radi o kalcitu (kalcij karbonat) s udjelom dolomita, kvarca i/ili aluminosilikata, oksida željeza i oksida mangana. Prašina navedenog sastava ima iritativni učinak na kožu koji može biti mehanički i kemijski, a neke primjese imaju i senzibilizacijski potencijal (spojevi aluminija). Obradom je utvrđeno da se radi o profesionalnoj generaliziranoj urtikariji uzrokovanoj sastojcima prašine vapnenca te je pokrenut postupak prijave profesionalne bolesti.

KLJUČNE RIJEČI: kamena prašina; kontaktni alergeni; kožni iritansi; profesionalna bolest; urtikarija

Occupational allergic contact dermatitis in a worker processing construction textile: a case report

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A case of occupational skin disease (OCD) caused by exposure to chemicals at the workplace will be presented. The worker, age 31, has been employed for 4 years as a manager of needlework machines in the production of construction textiles (glass fiber fabrics, mesh for facades and concrete, etc.). For the first 2.5 years, he worked on the maintenance of a weaving machine for making fabric with the addition of glass fibers without any problems. One and a half years ago, it was moved to another facility where, in addition to glass fibers, other chemicals are added to the fabric, which are heated in chambers. After the start of work in this part of the plant, eczematous changes begin to appear around the eyes, face, neck, hands, and if the exposure does not stop, also on the trunk. He claimed no other health disorders, apart from anamnestic data about atopy in childhood. The employer submitted the material safety data sheets (MSDS) of the chemicals used in the work process, according to which a toxicological opinion was made, which established that some chemicals contain contact allergens (isothiazolinones, rubber additives, thiourea, phenoformaldehyde, and epoxy resins, paints, acrylates). Patch testing was performed with commercial preparations with the basic European series of contact allergens and additionally established contact allergens to which the patient was exposed. An extremely positive reaction to isothiazolinones and lanolin was found. Isothiazolinones are widely used preservatives with bacteriostatic and fungistatic action. They are used to prevent the growth of microbes in industrial chemicals (wood preservatives, paints, adhesives), leather, household cleaning products and personal care products. Lanolin is an ubiquitous allergen to which the patient was not exposed at work. The investigation determined the diagnosis of occupational allergic contact dermatitis caused by isothiazolinones, which are components of industrial chemicals to which the worker was exposed at the workplace, and the process of reporting an occupational disease was initiated.

KEY WORDS: contact allergen; isothiazolinones; occupational skin diseases

Profesionalni alergijski kontaktni dermatitis kod radnika u proizvodnji građevinskog tekstila: prikaz slučaja

Prikazat će se slučaj profesionalne kožne bolesti (PKB) uzrokovane s izloženosti kemikalijama na radnom mjestu. Radnik, dobi 31 godinu, 4 godine je zaposlen na mjestu rukovoditelja strojeva za iglanje u proizvodnji građevinskog tekstila (tkanine od staklenih vlakana, mrežice za fasade i beton i sl.). Prve 2,5 godine radio je na održavanju tkalačkog stroja za izradu tkanine s dodatkom staklenih vlakana bez ikakvih tegoba. Pred 1,5 godinu premješten je u drugi pogon u kojem se, osim staklenih vlakana, tkanini dodaju još neke kemikalije koje se zagrijavaju u komorama. Nakon početka rada u ovom pogonu počinju se javljati ekcematozne promjene oko očiju, na licu, vratu, rukama, a ako ne prekine izloženost i po trupu. Drugih zdravstvenih poremećaja nema, osim anamnestičkih podataka o atopiji u djetinjstvu. Poslodavac prilaže sigurnosno tehničke listove (STL) kemikalija koje se koriste u radnom procesu prema kojim je učinjeno toksikološko mišljenje koje je utvrdilo da neke kemikalije sadrže kontaktne alergene (izotiazolinoni, dodaci gumi, tioureja, fenofomaldehid i epoksidne smole, boje, akrilati). Provedeno je epikutano testiranje komercijalnim pripravcima sa osnovnom europskom serijom kontaktnih alergena te dodatno utvrđenim kontaktnim alergenima kojima je bolesnik izložen. Utvrđena je izrazito pozitivna reakcija na izotiazolinone i lanolin. Izotiazolinoni su konzervansi bakteriostatskog i fungistatskog djelovanja široke primjene. Koriste se za sprečavanje rasta mikroba u industrijskim kemikalijama (zaštita drva, boje, ljepila), koži, sredstvima za čišćenje u kućanstvu i proizvodima za osobnu njegu. Lanolin je ubikvitarni alergen kojem bolesnik nije izložen na radnom mjestu. Obradom je utvrđeno da se radi o profesionalnom alergijskom kontaktnom dermatitisu uzrokovanom izotiazolinonima koji su sastojci industrijskih kemikalija kojima je radnik izložen na radnom mjestu te je pokrenut postupak prijave profesionalne bolesti.

KLJUČNE RIJEČI: izotiazolinoni; kontaktni alergen; profesionalne kožne bolesti

Contact allergy to olanzapine and saxagliptin in a pharmaceutical worker: a case report

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Olanzapine is one of the most frequently prescribed antipsychotics, while saxagliptin is used in type-2 diabetes mellitus to improve glycaemic control. A hypersensitivity reaction is a possible adverse effect after oral use of either one of these medications. A case of a 63-year-old male pharmaceutical worker with a total work experience of 37 years, all at the manufacturing site of a pharmaceutical company, is presented. He served and controlled the technological process in drug production. In the last 6 months, worker developed severe eczematous changes (erythema, vesicles, induration, scaling) on the face, eyelids, neck, and hands, which occurred during working and diminished during non-working periods. He reported 3 relapses in the last 6 months, all after returning to work from sick leave or vacation. The company's occupational physician initiated a diagnostic workup for a suspected occupational skin disease. Analysis of safety data sheets for solvents, adsorbing agents, pH controlling chemicals and other components used in production processes by the worker revealed that none had been classified as skin sensitizers. Olanzapine and saxagliptin were reported as drugs manufactured within a relevant period. Worker was patch tested (PT) with European baseline series of contact allergens, and additional in-house 0.5% and 1% preparations of olanzapine and saxagliptin in petrolatum. The worker reacted positive only to both drugs. He had never taken the tested drugs orally. Additional PT with drug preparations was performed in two control subjects with no previous exposure, and the result of PT was negative in both. The examination determined that this was a case of occupational allergic contact dermatitis caused by exposure to dust during the production of specific drugs, and the procedure for reporting an occupational disease was initiated. (Financed by: European Union – Next Generation EU, Program Contract of 8 December 2023, Class: 643-02/23-01/00016, Reg. no. 533-03-23-0006. Case report is published: Huršidić Radulović A et al. Contact Dermatitis;90(6):628-630)

KEY WORDS: airborne contact dermatitis; drugs; occupational skin disease; pharmaceutical industry

Kontaktna alergija na olanzapin i saksagliptin u farmaceutskog radnika

Olanzapin je jedan od najčešće propisanih antipsihotika, dok se saksagliptin koristi kod dijabetesa tipa 2 za kontrolu glikemije. Reakcija preosjetljivosti mogući je štetni učinak nakon oralne primjene oba lijeka. Prikazan je slučaj 63-godišnjeg farmaceutskog radnika s ukupnim radnim stažom od 37 godina, sve u proizvodnom pogonu farmaceutske tvrtke. Op služivao je i kontrolirao tehnološki proces u proizvodnji lijekova. U posljednjih 6 mjeseci kod radnika su se pojavile teške ekcematozne promjene (eritem, vezikule, zadebljanje i ljuskanje kože) na licu, kopcima, vratu i šakama koje su se javljale tijekom rada, a smanjivale tijekom neradnog razdoblja. Zabilježena su 3 recidiva u zadnjih 6 mjeseci, sve nakon povratka na posao s bolovanja ili godišnjeg odmora. Nadležni specijalist medicine rada pokrenuo je dijagnostičku obradu radi sumnje na profesionalnu bolest. Analiza sigurnosno-tehničkih listova za otapala, adsorbense, kemikalije za kontrolu pH i druge komponente koje je radnik koristio pri radu otkrila je da nijedna nije klasificirana kao senzibilizator kože. Olanzapin i saksagliptin bili su lijekovi u proizvodnji u relevantnom razdoblju. Radnik je epikutano testiran (ET) s europskom osnovnom serijom kontaktnih alergena i dodatnim internim 0,5% i 1% pripravcima olanzapina i saksagliptina u vazelinu. Radnik je pozitivno reagirao samo na oba lijeka. Testirane lijekove nikad nije uzimao oralno. Dodatno ET s pripravcima lijekova učinjeno je u 2 kontrolna ispitivanja bez prethodne ekspozicije, a rezultat ET bio je negativan u oba. Obrada je utvrdila da se radi o slučaju profesionalnog alergijskog kontaktnog dermatitisa uzrokovanog izloženosti prašini pri proizvodnji specifičnih lijekova, te je pokrenut postupak prijave profesionalne bolesti. (Financirano od: European Union – Next Generation EU, Program Contract of 8 December 2023, Class: 643-02/23-01/00016, Reg. no. 533-03-23-0006. Prikaz slučaja je objavljen: Huršidić Radulović A et al. Contact Dermatitis 2024;90(6):628-630).

KLJUČNE RIJEČI: aerogeni kontaktni dermatitis; farmaceutska industrija; lijekovi; profesionalna kožna bolest

Cooling emulsion during CNC metal processing as a cause of contact dermatitis: oversights of risk assessment

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Allergic and irritant contact dermatitis (CD) are the most common occupational skin diseases caused by contact with allergens/irritants at the workplace. Workers who work with substances that can cause CD should be referred to preventive examinations in occupational medicine (OM) clinics with a data about substances they come into contact during work, and used personal protective equipment. During the period 2018-2020, a company dealing with CNC metal processing referred workers to preventive examinations in our OM clinic according to point 1 (handling and management of machines and mechanized devices on which protection against mechanical hazards cannot be applied) and point 19 (working in noise) of the Ordinance on jobs with special working conditions. A total of 72 workers were examined for the position of CNC operator, of which 49 examinations were periodic. Of those 49 workers, 9 had skin changes caused by work on the CNC machine. The changes affected one or both hands, and in some cases also forearms (rash, redness, dry, thickened, cracked skin, deep cracks, itching or burning of the skin). By visiting workplaces, we found that although everyone uses protective gloves, during a part of the work process some of the workers take off gloves and check with fingers whether the processed metal part is smooth. So, they come into contact with the cooling emulsion droplets that remain on the surface of the processed metal part. A review of the emulsion safety data sheet reveals that it contains substances that can cause severe skin irritation (amines) and/or allergic skin reaction (mercaptobenzothiazole, carbamates). By educating workers on the importance of using protective gloves during the entire work process, as well as on the skin care after working hours, skin disorders in a majority of workers disappeared or became minimal. Two workers had to change their workplace within the company (exclusion of contact with emulsions). The company has also repeatedly changed the type of cooling emulsions in an attempt to find one that has no harmful effect on worker's skin and is equally effective for the machine's operation. We can conclude that the risk assessment on the basis of which the workers were referred for examination was not complete, ignoring the possible harmful effect of cooling emulsions on the health of workers working on CNC machines.

KEY WORDS: contact allergens, occupational skin diseases; skin irritants

Emulzija za hlađenje pri CNC strojnoj obradi metala kao uzrok kontaktnog dermatitisa: nedostaci procjene rizika

Alergijski i iritativni kontaktni dermatitis su najčešće profesionalne bolesti kože, a posljedica su kontakta sa alergenima i iritansima na radnim mjestima. Radnici koji rade s tvarima koje mogu uzrokovati kontaktni dermatitis trebaju biti upućivani na preventivne preglede u ordinacije medicine rada uz naznaku sa kojim tvarima tijekom radnog procesa dolaze u dodir i koju osobnu zaštitnu opremu koriste. Tijekom razdoblja 2018.-2020. tvrtka koja se bavi CNC obradom metala upućivala je svoje radnike na preventivne preglede u našu ordinaciju medicine rada po točki 1. (rukovanje i upravljanje strojevima i uređajima na mehanizirani pogon na kojima se ne može primijeniti zaštita od mehaničkih opasnosti) i 19. (rad u buci) Pravilnika o poslovima s posebnim uvjetima rada. Ukupno je pregledano 72 radnika za radno mjesto CNC operater od čega su 49 pregleda bili periodični. Od tih 49 radnika njih 9 je imalo kožne promjene za koje su sami rekli da su uzrokovane radom na CNC stroju. Promjene su zahvaćale jednu ili obje šake, a kod nekih i podlaktice (osip, crvenilo, suha, zadebljana, ispućala koža, duboke ragade, svrbež ili pečenje kože). Obilaskom radnih mjesta ustanovili smo da, iako svi koriste zaštitne rukavice, tijekom jednog dijela radnog procesa dio radnika skida rukavice te prstima provjerava da li je obrađeni metalni dio gladak. Na taj način dolaze u kontakt sa kapljicama emulzije za hlađenje koje zaostaju na površini obrađenog metalnog dijela. Uvidom u sigurnosno tehnički list navedene emulzije saznaje se da sadrži tvari koje mogu izazvati jaki nadražaj kože (amini) i/ili alergijsku reakciju kože (mercaptobenzotiazol, karbamati). Edukacijom radnika o važnosti korištenja zaštitnih rukavica tijekom cijelog radnog procesa, kao i o njezi kože šaka nakon radnog vremena, u većeg broja radnika kožne smetnje su se povukle ili postale minimalne. Dva su radnika morala promijeniti mjesto rada unutar tvrtke (isključenje kontakta sa emulzijama). Tvrtka je također u više navrata promijenila vrstu emulzija za hlađenje u pokušaju da nađe emulziju bez štetnog učinka za kožu radnika, a jednako efikasnu za rad stroja. Možemo zaključiti da procjena rizika temeljem koje su radnici upućivani na pregled nije bila potpuna te da je zanemarila mogući štetni učinak emulzija za hlađenje metala na zdravlja radnika koji rade na CNC strojevima.

KLJUČNE RIJEČI: kontaktni alergeni; kožni iritansi; profesionalne kožne bolesti

The role of occupational and sports medicine in the prevention and early detection of skin melanoma

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Aim: Skin melanoma (SM) is the most malignant skin cancer. Exposure to ultraviolet radiation, contributes to the development of melanoma. In the field of occupational exposure, the most common activities are construction, agriculture, military, land and sea transport. Occupational and sports medicine services can be places for prevention and early detection of SM in exposed workers and athletes. In this paper we analyzed and compared the trend of SM incidence in the Republic of Croatia (RC) and Zadar County (ZC) in order to raise awareness of this growing public health problem. **Materials and methods:** In this paper, we used incidence data from the Cancer Registry of the Croatian Institute of Public Health for the diagnosis code C43 - Malignant melanoma of the skin (MKB10) from 2000 to 2021. The rates are calculated per 100,000 inhabitants according to the Croatian Bureau of Statistics. **Results:** In the RC in 2021, 932 new cases of SM were recorded, of which 45% were in the age group 20-65 years old - working population. In the RC and in ZC in the observed period, the incidence of SM recorded an increasing trend in both men and women, and in both observed areas, the incidence rates in men were higher than in women. In the RC rates ranged from 8.9 to 24.1; median 12.6; the average annual percentage change increase (AAPC) was 4.3%. In ZC, rates ranged from 3.7 to 30.0 (median 15.9), AAPC was 6.1%. In men in ZC the rates and AAPC are higher than in men in the RC (median ZC 18, RC 13.7; AAPC in ZC 8.4%, RC 5.1%). In women in ZC, the rates are almost equal to those in the RC (median ZC 11.5; i RC 11.7). **Conclusion:** The number of new cases of melanoma is increasing. Therefore, it is necessary to raise awareness of the possibilities of prevention and the importance of early detection among healthcare professionals and through the education of workers and athletes who are more exposed to ultraviolet radiation, correct use of protective equipment and the conduct of regular check-ups. **KEY WORDS:** education; incidence; skin melanoma; prevention, Republic of Croatia; Zadar County.

KEY WORDS: cancer; education; incidence

Uloga medicine rada i sporta u prevenciji i ranom otkrivanju melanoma

Cilj: Melanom kože (MK) je najzloćudniji tumor kože. Nastanku melanoma doprinosi izloženost ultraljubičastom zračenju, osobito kod osoba svjetlije puti. U području radne izloženosti najzastupljenije su djelatnosti građevinarstva, poljoprivrede, obrane te kopneni i morski promet. Ordinačije medicine rada i sporta mogu biti mjesta za prevenciju i rano otkrivanje MK kod izloženih radnika i sportaša. Cilj ovog rada je prikazati i usporediti kretanje incidencije MK u Republici Hrvatskoj (RH) i u Zadarskoj županiji (Zž) s ciljem podizanja svijesti o ovom rastućem javnozdravstvenom problemu. **Materijali i metode:** U radu su korišteni podaci incidencije Registra za rak RH Hrvatskog zavoda za javno zdravstvo za dijagnozu C43 – Zloćudni melanom kože (MKB10) od 2000. do 2021. godine. Stope su izračunate na 100.000 stanovnika prema popisima Državnog zavoda za statistiku. **Rezultati:** U RH u 2021. zabilježena su 932 nova slučaja MK od čega ih je 45% bilo u dobnoj skupini od 20-65 godina - radno aktivno stanovništvo. U RH i u Zž, u promatranom periodu incidencija MK bilježi trend rasta u muškaraca i u žena, te su u oba promatrana područja u muškaraca stope incidencije veće nego u žena. U RH stope su se kretale od 8,9 do 24,1; medijan 12,6; prosječno godišnje postotno povećanje stope (PGPPS) iznosilo je 4,3%. U Zž stope su se kretale od 3,7 do 30 (medijan 15,9), PGPPS je iznosilo 6,1%. U muškaraca u Zž stope i PGPPS je veće nego u muškaraca u RH (medijan Zž 18, RH 13,7; PGPPS u Zž 8,4%, RH 5,1%). U žena u Zž stope su gotovo izjednačene s onima u RH (medijan Zž 11,5; RH 11,7). **Zaključak:** Broj novooboljelih od melanoma raste. Stoga je potrebno podići svijest o mogućnostima prevencije i važnosti ranog otkrivanja kod zdravstvenih djelatnika te kroz edukaciju radnika i sportaša, koji su pojačano izloženi ultraljubičastom zračenju, treba ukazivati na pravilno korištenje zaštitnih mjera i sredstava te provođenje redovitih kontrolnih pregleda.

KLJUČNE RIJEČI: edukacija; incidencija; rak

Zoonoses as occupational diseases

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The aim of the paper was to present the most common causes of zoonoses as occupational diseases in the Republic of Croatia. Zoonoses are infectious diseases that are transmitted from animals to humans or from humans to animals. Due to the large number of potential causative agents and ways of spreading the disease, zoonoses include a wide range of diseases with different clinical manifestations. Zoonoses are known as occupational diseases in veterinarians and veterinary technicians due to daily contact with different types of sick animals and animal material. Injuries, bites, stabs and scratches from animals and accidental self-injection of vaccines are associated with the risk of zoonotic infection in veterinarians. In addition to veterinary workers, zoonoses can occur as occupational diseases in laboratory workers, slaughterhouse workers, farmers, miners, hunters, fishermen and soldiers. According to the data from The Annual Reports on zoonoses for years 2014 and 2015/16, the most significant zoonoses in Croatia were anthrax, tuberculosis, brucellosis, campylobacteriosis, leptospirosis, listeriosis, Lyme disease, Q fever, rabies, salmonellosis and trichinellosis. Occupational exposure has been reported in brucellosis, leptospirosis and listeriosis. Contact with zoonotic agents during work and the possibility of infection and clinical manifestation of the disease in the worker depends on various factors such as species of animal, the health condition of the animal, the type of animal material, products of animal origin, animal carcasses, the method of performance, the type and extent of work, the frequency and the duration of exposure to the zoonotic agent, the general state of health of the employee, the implementation of protective measures at the workplace and information about possible risks and dangers during work.

KEY WORDS: veterinarians; veterinary technicians; working environment

Zoonoze kao profesionalne bolesti

Cilj rada je prikazati najčešće uzročnike zoonoza kao profesionalnih bolesti u Republici Hrvatskoj. Zoonoze su zarazne bolesti koje se prenose sa životinja na ljude i obratno. Zbog mnoštva različitih uzročnika i načina širenja bolesti, zoonoze obuhvaćaju širok raspon bolesti s različitim kliničkim manifestacijama. Zoonoze su poznate kao profesionalna bolest u veterinaru i veterinarskih tehničara zbog svakodnevnog kontakta s različitim vrstama bolesnih životinja i životinjskim materijalom. Ozljede, ugrizne i ubodne rane, ogrebotine zadobivene od životinja i slučajno samoubrizgavanje cjevica povezani su sa rizikom od nastanka zoonotske infekcije u veterinaru. Osim veterinarskih djelatnika, zoonoze se mogu pojaviti kao profesionalne bolesti u laboratorijskih djelatnika, djelatnika u klaonicama, stočara, poljoprivrednika, rudara, lovaca, ribara i vojnika. Prema podacima iz Godišnjih izvještaja o zoonozama za 2014. i 2015./2016. godinu, najznačajnije zoonoze u Hrvatskoj bile su bedrenica, tuberkuloza, bruceloza, kampilobakterioza, leptospiroza, listerioza, lajmska bolest, Q groznica, bjesnoća, salmoneloza i trihinelozna. Profesionalna izloženost je zabilježena kod bruceloze, leptospiroze i listerioze. Kontakt sa zoonotskim uzročnicima tijekom obavljanja posla i mogućnost nastanka infekcije i kliničke manifestacije bolesti u radnika ovisi o različitim čimbenicima poput vrste životinje, zdravstvenog stanja životinje, vrste životinjskog materijala, proizvodima životinjskog podrijetla, lešine životinja, načina obavljanja, vrste i opsega posla, učestalosti i trajanju izloženosti zoonotskom uzročniku, općem zdravstvenom stanju djelatnika, provedbi mjera zaštite na radnom mjestu i informiranosti o mogućim rizicima i opasnostima tijekom obavljanja posla.

KLJUČNE RIJEČI: radni okoliš; veterinari; veterinarski tehničari

Consequences of professional Covid-19

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Aim: Post Covid-2019 condition is a well-researched sequel of severe acute respiratory syndrome 2 infection. However, the clinical picture of post Covid-19 condition is highly heterogeneous, and the symptoms are non-specific. Therefore, our goal was to investigate the diagnoses related to the sequelae of occupational Covid-19 disease according to the International Statistical Classification of Diseases and Related Health Problems. **Materials and Methods:** This study provides insight into the assessments of the sequelae of occupational Covid-19 disease (Croatian Institute of Public Health) in seventeen workers with identified sequelae of occupational Covid-19 disease evaluated from 2020 to 2024. **Results:** Diagnoses related to the sequelae of the occupational Covid-19 disease included: U09.9 Post Covid-19 condition, unspecified (N=8), G61.0 Guillain-Barré syndrome (N=2), I41.1 Myocarditis in viral diseases classified elsewhere (N=2), J84.8 Pulmonary fibrosis (N=2), I48.0 Atrial fibrillation (N=1), A08.3 Other viral enteritis (N=1), G57.3 Peroneal nerve lesion (N=1), G82.0 Flaccid paraplegia (N=1), J96.1 Chronic respiratory failure (N=1), I26.0 Bilateral pulmonary embolism (N=1), I31.9 Viral pericarditis with pericardial effusion (N=1), J91.0 Pleural effusion (N=1), R18.0 Ascites (N=1), J84.8 Other specified interstitial lung diseases (N=1), R27.0 Unspecified ataxia (N=1), I63.9 Cerebral infarction, unspecified (N=1), G81.9 Left-sided hemiparesis (N=1), M89.0 Left-sided algoneurodystrophy (N=1), and I74.3 Embolism and thrombosis of leg arteries with consequent (N=1) Z89.6 Acquired absence of leg above knee (N=1). **Conclusion:** The clinical picture of the identified sequelae of occupational Covid-19 disease is mostly non-specific, featuring symptoms such as fatigue, shortness of breath and forgetfulness. Less frequently, specific chronic damage to the lungs or acute damage to the central and peripheral nervous system, heart and pericardium, limbs, intestines and abdomen, lungs and pleura were observed.

KEY WORDS: fatigue; post-covid health; safety at work

Posljedice profesionalne bolesti Covid-19

Cilj: Stanje nakon koronavirusne bolesti (Covid-19) dobro je istražena posljedica teškog akutnog respiratornog sindroma 2 uzrokovanog zarazom koronavirusom. Ipak, klinička slika stanja nakon bolesti Covid-19 vrlo je heterogena, a simptomi nespecifični. Stoga je naš cilj bio istražiti dijagnoze prema Međunarodnoj klasifikaciji bolesti i srodnih zdravstvenih problema, koje su povezane s posljedicama profesionalne bolesti Covid-19. **Materijali i metode:** Uvid u mišljenja o posljedicama profesionalne bolesti Covid-19 (Croatian Institute of Public Health) u sedamnaestero radnika s priznatim posljedicama profesionalne bolesti Covid-19 u razdoblju 2020.-2024. **Rezultati:** Dijagnoze povezane s posljedicama profesionalne bolesti Covid-19 bile su: U09.9 Post Covid-19 stanje, nespecificirano (N=8), G61.0 Guillain-Barréov sindrom (N=2), I41.1 Miokarditis u virusnim bolestima svrstanim drugamo (N=2), J84.8 Fibroza pluća (N=2), I48.0 Fibrilacija atrija (N=1), A08.3 Ostali virusni enteritisi (N=1), G57.3 Lezija peronealnog živca (N=1), G82.0 Mlohava paraplegija (N=1), J96.1 Kronična respiracijska insuficijencija (N=1), I26.0 Obostrana plućna embolija (N=1), I31.9 Virusni perikarditis s perikardijalnim izljevom (N=1), J91.0 Pleuralni izljev (N=1), R18.0 Ascites (N=1), J84.8 Druge specificirane intersticijske plućne bolesti (N=1), R27.0 Nespecificirana ataksija (N=1), I63.9 Cerebralni infarkt, nespecificiran (N=1), G81.9 Ljevostrana hemipareza (N=1), M89.0 Ljevostrana algoneurodistrofija (N=1) i I74.3 Embolija i tromboza arterija nogu s posljedičnom (N=1) Z89.6 Amputacijom do iznad koljena (N=1). **Zaključak:** Klinička slika priznatih posljedica profesionalne bolesti Covid-19 većinom je nespecifična – umor, kratkoća daha i zaboravljivost. Rjeđe se radi o specifičnom kroničnom oštećenju pluća ili akutnom oštećenju središnjeg i perifernog živčanog sustava, srca i osrčja, udova, crijeva i potrbušnice, te pluća i poplunice.

KLJUČNE RIJEČI: biološke štetnosti; dijagnoza; radnici; umor

Working in the countryside: agriculture, pesticides, and organic dust

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Working in the countryside includes numerous agricultural activities with the aim of growing food. During such work, workers are exposed to numerous substances that are potentially harmful to health, among which are various dusts of organic origin and plant protection agents, however, working with agricultural machinery itself poses certain health risks if not handled properly. Not only do they present an immediate risk, certain dusts and plant protection products can lead to long-term negative consequences for the health of workers. The aim of the presentation itself is to make listeners aware of possible sources of hazards while working in the countryside, which dusts and plant protection products pose a particular risk to the health of workers, how to properly handle them and how to properly handle agricultural machinery in order to prevent possible injuries while working with the same.

KEY WORDS: acute and long-term health risks; agricultural machinery

Rad na selu: poljoprivreda, pesticidi i organska prašina

Rad na selu obuhvaća mnogobrojne poljoprivredne zahvate s ciljem uzgoja hrane. Tijekom takvog rada, radnici bivaju izloženi mnogobrojnim tvarima koje su potencijalno štetne na zdravlje među kojima su razne prašine organskoga podrijetla, sredstva za zaštitu bilja međutim i sam rad s poljoprivrednom mehanizacijom predstavlja određene rizike za zdravlje zbog nepravilnog rukovanja. Ne samo da predstavljaju trenutačan rizik, određene prašine i sredstva za zaštitu bilja mogu dovesti do dugotrajnih negativnih posljedica za zdravlje radnika. Cilj same prezentacije je osvijestiti slušaće o mogućim izvorima opasnosti tijekom rada na selu, koje prašine i sredstva za zaštitu bilja predstavljaju osobit rizik za zdravlje radnika, kako pravilno rukovati s istima te kako pravilno rukovati s poljoprivrednom mehanizacijom da bi se spriječile moguće ozljede tijekom rada s istim.

KLJUČNE RIJEČI: poljoprivredna mehanizacija; trenutačni i dugotrajni rizici za zdravlje

Occupational medicine for the purpose of protecting and improving the health of workers

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Occupational medicine is a multidisciplinary activity that aims to protect and improve the health of workers by preventing and controlling occupational diseases and injuries at work, to eliminate occupational risks and working conditions that are dangerous for health and safety at work. The role of safety and health protection at work is determined by its goal and scope of rights and obligations of the employer and the employee. The goal is to achieve a high level of health and psychophysical protection in accordance with the law. Dissatisfaction at work leads to employee stress. It is often difficult to distinguish between the following conditions: stress, crisis, trauma, anxiety, conflict, etc. Common basis and cause of stress, crisis and psychological trauma is the existence of an undesirable life event as a cause. The term stress is used in medicine and biology, the term trauma in psychology and the term crisis in social sciences, politics and economics. Mental crisis is characterized by anxiety and depression, and stress by vegetative and neuro-endocrine changes. Crisis is a psychopathological phenomenon, and stress is a normal psychobiological reaction of the organism to extreme stimuli and demands. Conditions and work organization should be adapted to needs of the workers, and workers should be motivated to participate in all activities. Importance of safety and health at work is viewed from three points of view: humane, social, and economic. Working in humane conditions represents satisfaction for the individual, success for the organizer, employer and society as a whole. Social importance is expressed through the number of employees who are injured or lose their lives at the workplace, suffer from occupational and other diseases, which are taken care of by society. Economic dimension of safety and health at work is measured through the consequences of injuries and illnesses at work, and is expressed by certain financial indicators that depend on the number and severity of such cases. Injuries at work and occupational diseases are accompanied by absence from work, costs are created due to production stoppages and large allocations of funds for treatment of workers, compensation of wages and costs that fall on the employer and social insurance funds. Investing in protective measures for the employer is a good investment.

KEY WORDS: health preservation; occupational safety; worker health

Medicina rada u svrhu zaštite i poboljšanja zdravlja radnika

Medicina rada je multidisciplinarna djelatnost koja teži da zaštiti i poboljša zdravlje radnika sprečavanjem i kontrolom profesionalnih bolesti i povreda na radu, da eliminiše profesionalne rizike i uslove na radu koji su opasni po zdravlje i sigurnost na radu. Uloga bezbjednosti i zaštite zdravlja na radu određena je njenim ciljem i obimom prava i obaveza poslodavca i radnika. Cilj je da se u skladu sa zakonom dostigne visok nivo zdravstvene i psihofizičke zaštite. Nezadovoljstvo na radu dovodi do stresa zaposlenih. Često je teško razlikovati sledeća stanja: stres, kriza, trauma, strah, anksioznost, konflikt, napetost, iscrpljenost i sl. Zajednička osnova i uzrok stresa, krize i psihičke traume jeste postojanje nepoželjnog životnog događaja kao uzroka. Termin stres se koristi u medicini i biologiji, termin trauma u psihologiji a termin kriza u društvenim naukama, politici i ekonomiji. Psihičku krizu odlikuje anksioznost i depresija, a stres vegetativne i neuro endokrine promene. Kriza je psihopatološki fenomen, a stres je normalna psihobiološka reakcija organizma na ekstremne draži i zahteve. Uslove i organizaciju rada treba prilagoditi potrebama radnika a radnike treba motivisati za uključivanje u sve aktivnosti. Značaj bezbjednosti i zdravlja na radu se sagledavaju sa tri stanovišta: humanog, socijalnog i ekonomskog. Rad u humanim uslovima predstavlja zadovoljstvo za pojedinca, uspjeh za organizatora, poslodavca i društva u cjelini. Socijalni značaj se izražava kroz broj zaposlenih koji se povrijede ili izgube život na radnom mjestu, obole od profesionalnih i drugih bolesti, o kojima preuzima brigu društvo. Ekonomska dimenzija bezbjednosti i zdravlja na radu mjeri se preko posledica povreda na radu i bolesti, i iskazuje se određenim finansijskim pokazateljima koji zavise od broja i težine takvih slučajeva. Povrede na radu i profesionalne bolesti, praćene su odsustvom sa rada, stvaraju se troškovi zbog zastoja proizvodnje i velikih izdvajanja sredstava za liječenje radnika, nadoknade zarade i troškova koji padaju na teret poslodavca i fondova socijalnog osiguranja. Ulaganje u mjere zaštite za poslodavca je dobra investicija jer bezbjednost i zdravlje na radu utiču na produktivnost i ekonomičnost poslovanja u preduzeću.

KLJUČNE RIJEČI: očuvanje zdravlja; sigurnost na radu; zdravlje radnika

Proposal for a Croatian model of the target scope of laboratory processing in athletes

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History: Exposure of athletes to a structured, regular training load as well as competitions causes numerous physiological and metabolic adaptations of organic systems, which are manifested in deviations of reference intervals and basal values of certain biochemical and hematological parameters of laboratory processing and represent a risk for damage to the sportsman's health. Objective: Instead of broad-band screening, the so-called "shotgun approach", we tried to define the target scope of the most stable biochemical and hematological parameters of laboratory processing, considering general and moderating factors. Methods: The Cochrane systematic review analyzed the literature with the defined mandatory and optional scope of laboratory work in sportsman, as well as the literature on the influence of sports training and competition on basal values and values of reference intervals of biochemical and hematological parameters of laboratory work, as well as the detection of so-called "moderating factors" that contribute to the physiological deviation of laboratory processing in sportsmen. Results: By summarizing the analyzed literature, a proposal was created for the Croatian model of the target scope of biochemical and hematological parameters of laboratory processing in sportsmen, taking into account three important factors: the smallest deviations of biochemical and hematological parameters in the physiological response to the demands of sports training, the availability of implementation and the possibility of financial response at the primary health level protection in the Republic of Croatia. Conclusion: The proposal for a Croatian model of the targeted scope of laboratory processing in sportsmen would optimize the flow of health examination, prevent and identify risk factors key to the development of diseases, chronic stress, inflammation, fatigue, musculoskeletal injuries and sudden cardiac death.

KEY WORDS: laboratory diagnostics; "shotgun approach"; sports medicine

Prijedlog hrvatskog modela ciljanog opsega laboratorijske obrade kod sportaša

Povijest: Izloženost sportaša strukturiranom, redovitom trenažnom opterećenju kao i natjecanjima, izaziva brojne fiziološke i metaboličke prilagodbe organskih sustava koje se očituju u odstupanjima referentnih intervala i bazalnih vrijednosti pojedinih biokemijskih i hematoloških parametara laboratorijske obrade i predstavljaju rizik za oštećenja zdravlja sportaša. Cilj: Umjesto širokopojasnog screeninga tzv. *shotgun approach* nastojali smo definirati ciljani opseg najstabilnijih biokemijskih i hematoloških parametara laboratorijske obrade uvažavajući opće i moderirajuće faktore. Metode: Cochrane sustavnim pregledom analizirana je literatura sa definiranim obveznim i fakultativnim opsegom laboratorijske obrade kod sportaša, te literatura o utjecaju sportskog treninga i natjecanja na bazalne vrijednosti i vrijednosti referentnih intervala biokemijskih i hematoloških parametara laboratorijske obrade kao i detekcija tzv. "moderirajućih faktora" koji pridonose fiziološkom otklonu laboratorijske obrade kod sportaša. Rezultati: Sažimanjem analizirane literature kreiran je prijedlog hrvatskog modela ciljanog opsega biokemijskih i hematoloških parametara laboratorijske obrade kod sportaša, uvažavajući tri bitna faktora: najmanja odstupanja biokemijskih i hematoloških parametara u fiziološkom odgovoru na zahtjeve sportskog treninga, dostupnost provođenja i mogućnosti financijskog odgovora na primarnoj razini zdravstvene zaštite u Republici Hrvatskoj. Zaključak: Prijedlog hrvatskog modela ciljanog opsega laboratorijske obrade kod sportaša, optimizirat će protok zdravstvenog pregleda, prevenirati i identificirati rizične faktore ključne za razvoj bolesti, kroničnog stresa, upale, umora, mišićno-koštanih ozljeda te iznenadne srčane smrti.

KLJUČNE RIJEČI: laboratorijska dijagnostika; „pristup shotgun“; sportska medicina

Injuries at work in the field of mental health

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An injury at work is any injury caused by direct and short-term physical, chemical or mechanical action causally related to the work of a subject. In the Republic of Croatia, records of work-related injuries are kept in accordance with the ESAW classification, and as part of it, there are also injuries related to mental health, that is, those related to mental and emotional disorders directly related to the work process, working environment or working conditions. The aim of this paper is to present data on work injuries from the field of mental health collected in the period from 2019 to 2023. According to existing statistics, the number of occupational injuries from the spectrum of mental health diagnoses is undoubtedly by far the highest in the group under ICD-10 code F 43, Reaction to severe stress and adjustment disorders. From that group, the diagnosis under ICD-10 code F43.0, Acute reaction to stress, stands out the most. Furthermore, it is evident from the available statistics that the largest number of injuries at work are related to mental health in the activity of wholesale and retail trade, repair of motor vehicles and motorcycles. Most of these injuries occur at the workplace, while only less than 10 % of these injuries occur on the way to or from work and form the group of commutative injuries. A higher prevalence can also be seen in women compared to men.

KEY WORDS: acute reaction to stress; sigurnost na radu

Ozljede na radu iz područja mentalnog zdravlja

Ozljeda na radu je svaka ozljeda izazvana neposrednim i kratkotrajnim fizičkim, kemijskim ili mehaničkim djelovanjem uzročno-posljedično vezana uz posao koji osoba radi. U Republici Hrvatskoj se vodi evidencija ozljeda na radu sukladno ESAW klasifikaciji, a u sklopu iste se nalaze i ozljede koje se odnose na mentalno zdravlje dakle one koje se odnose na mentalne i emocionalne poremećaje direktno povezane s procesom rada, radnim okruženjem ili radnim uvjetima. Cilj ovog rada je prikazati podatke o ozljedama na radu iz područja mentalnog zdravlja prikupljene u vremenskom razdoblju od 2019. do 2023. godine. Prema postojećoj statistici, nedvojbeno daleko najviše zastupljeni broj ozljeda na radu iz spektra dijagnoza mentalnog zdravlja je u skupini pod MKB-10 šifrom F 43, Reakcija na teški stres i poremećaji prilagodbe. Iz te skupine po brojnosti se najviše ističe dijagnoza pod MKB-10 šifrom F43.0, Akutna reakcija na stres. Nadalje, iz dostupne statistike vidljivo je da je najveći broj ozljeda na radu vezan ih uz mentalno zdravlje u djelatnosti Trgovina na veliko i na malo, popravak motornih vozila i motocikala. Većina ovih ozljeda se događa na mjestu rada, dok se tek manje od 10 % tih ozljeda događa na putovanju prema ili s posla i čine skupinu komutativnih ozljeda. Također se vidi i veća prevalencija kod žena u odnosu na muškarce.

KLJUČNE RIJEČI: akutna reakcija na stres; worker safety

Use of artificial intelligence in occupational medicine

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The use of Artificial intelligence (AI) in occupational medicine has exponentially increased in the last few years. The aim of the article is to explore the areas of the most common use of AI in this field of medicine. In order to determine the trend of the use of AI in occupational medicine, we analyzed the relevant corpus of articles with the help of synthetic knowledge synthesis (SKS) – a triangulation of bibliometrics and content analysis and identified the trends and areas where AI is most present. The corpus contained 688 publications. The first publication dates back to 1986, after that the production was sparse, but in 2017 almost exponential increase in research productivity began, reaching its peak in 2023 with 130 publications. The most prolific countries were United States of America (n=133), China (n=88), India (n=55) and the United Kingdom (n=47), whereas The Hong Kong Polytechnic University (n=12), Yıldız Teknik Üniversitesi (n=12), Ministry of Education of the People's Republic of China (n=8) and University of Alberta (N=8) are the most prolific institutions. The most publications were published in *International Journal Of Environmental Research And Public Health* (n=31), *Occupational Therapy International* (n=29), *Advances In Intelligent Systems And Computing* (n=14) and *Safety Science* (n=14). The SKS analysis also resulted in four thematic clusters: (T1) AI, data science, machine learning and Internet of Things in occupational therapy; (T2) Deep learning and artificial neural networks in occupational medicine; (T3) Decision support/expert systems and natural language processing in occupational safety; (T4) Random forest in occupational health. The analysis shows that occupational medicine and occupational therapy use new generic AI technologies and new remote sensing technologies. Additionally, it is clear that occupational health and safety does not yet use emerging technologies, but relies on traditional AI technologies.

KEY WORDS: database analysis; bibliometrics; occupational health; publications

Umjetna inteligencija u medicini rada

Korištenje umjetne inteligencije (AI) u medicini rada višestruko je poraslo u posljednjih nekoliko godina. Cilj članka je istražiti područja najčešće primjene umjetne inteligencije u ovom području medicine. Kako bismo utvrdili trend korištenja AI u medicini rada, analizirali smo relevantni korpus članaka uz pomoć sintetičke sinteze znanja (SKS) – triangulacije bibliometrije i analize sadržaja te identificirali trendove i područja u kojima je AI najzastupljeniji. Korpus je sadržavao 688 publikacija. Prva objava datira iz 1986., nakon toga produkcija je bila rijetka, no 2017. počinje gotovo eksponencijalni rast istraživačke produktivnosti, dosegnuvši vrhunac 2023. sa 130 objava. Najplodnije zemlje bile su Sjedinjene Američke Države (n=133), Kina (n=88), Indija (n=55) i Ujedinjeno Kraljevstvo (n=47), dok su Politehničko sveučilište Hong Kong (n=12), Yıldız Teknik Üniversitesi (n=12), Ministarstvo obrazovanja Narodne Republike Kine (n=8) i Sveučilište Alberte (N=8) najplodnije ustanove. Najviše publikacija objavljeno je u *International Journal of Environmental Research and Public Health* (n=31), *Occupancy Therapy International* (n=29), *Advances in Intelligent Systems and Computing* (n=14) i *Safety Science* (n=14). SKS analiza također je rezultirala sa četiri tematska klastera: (T1) AI, podatkovna znanost, strojno učenje i Internet stvari u radnoj terapiji; (T2) Duboko učenje i umjetne neuronske mreže u medicini rada; (T3) Potpora odlučivanju/expertni sustavi i obrada prirodnog jezika u zaštiti na radu; (T4) Slučajna šuma u zdravstvu na radu. Analiza pokazuje da medicina rada i radna terapija koriste nove generičke tehnologije AI i nove tehnologije daljinskog očitavanja. Osim toga, jasno je da zdravlje i sigurnost na radu još ne koriste nove tehnologije, već se oslanjaju na tradicionalne tehnologije umjetne inteligencije.

KLJUČNE RIJEČI: analiza baza podataka; bibliometrija; znanstvena publicistika