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HEALTH HAZARDS AND RESULTS OF PERIODICAL MEDICAL CHECK-UP OF HEALTH-CARE WORKERS

Abstract: *Health care workers (HCWs) are exposed to various health hazards present at work-sites (e.g., viruses of hepatitis, HIV, SARS, TBC, aldechides, chemotherapeutics, latex, noise, ionizing irradiation, shift-work, stress etc.). In accordance to the law of R. Serbia, all laborers, including health care workers, have to undergo pre-employment and periodical medical check-ups, if are exposed to certain health hazard at work-site - „work-place with increased risk". Aim of the paper is to reveal health risks present at the work-place of HCWs and to analyze actual health condition in studied group of HCWs. All of HCWs underwent periodical medical check-up (PMCU) during year 2011 and their medical records were analyzed. Total number of examinees was 210. Basic methods of descriptive statistics were used. There were 35 males (17,5%), and 175 females (82,5%). Various professional risk factors were noted – biological, physical, chemical, and shift-work. Also, other health risk factors were found, such are: increased body mass, tobacco smoking, and alcohol consumption. Increased body mass was found in 73 (34,8%), obesity in 34 (16,2%), and malnutrition in 5 (2,4%) examinees; 98 examinees (46,7%) was found to have body mass within normal range. There were 97 smokers (46,2%), 10 ex-smokers (4,8%), and 103 non-smokers (49,0%). Of all 210 examinees, only 19 (9%) had no medical diagnosis following completion of PMCU. Heart and blood vessels diseases (25,9%), eye diseases (13,8%), endocrine system (12,4%), and lungs diseases (12,1%), had the highest prevalence. Hyperglycemia was noted in 39 examined subjects, while diabetes was found in three female examinees. Regarding work ability assessment (WAA), „limited working ability" is noted in 8 subjects (3,8%), while 202 examinees (96,2%) were assessed as „capable for further work at the same work-place". HCWs are exposed to various health hazards while performing very demanding job tasks. Since it is very hard to eliminate different health hazards and to diminish stress in HCWs, it is necessary to perform all preventive measures; one of them is medical measure - periodical medical check-up.*

Key words: healt care workers, work ability assessment, occupational diseases, work-setting with increased health risk.

INTRODUCTION

The task of occupational medicine is to preserve and promote the health of working population, on the one hand, and to make work-place "healthier" for those who work at, on the other. That practically means that occupational medicine is oriented towards elimination/diminishing all of harms that can be found at work-place. Special category or work-places are work-places with "increased risk". According to the law of R. Serbia, all of employees coming from those work-places need to pass pre-employment and periodical medical check-ups, which are done in occupational health departments. These check-ups are performed in regular time frames. The main purpose of these check-ups are detection of possible, discreet changes in health condition or changes in traced biochemical parameters; once that changes are detected, employee needs to be taken out from the work-site and change job position; by this action, one will be protected from further exposure to health hazards which may cause significant deterioration of health condition and diminishing of work-ability.

Based on literature data, health care sector worldwide employ around 59 million of people nowadays. Health care workers are exposed to various health hazards, such are: 1. biological factors (e.g., TBC, hepatitis viruses, HIV, SARS, and so on), 2. chemical hazards (such are: aldechides for endoscope cleaning, etylenoxide, chemotherapeutics in oncology, latex,

sulfurdioxide, glutaraldechide, and acids), 3. physical hazards (e.g., noise, ionizing irradiation etc.), 4. inappropriate ergonomics solutions, 5. psycho-social hazards (shift-work, stress etc.). Health-care workers need to be protected from all of these harms in the same way as workers present in other industrial fields. Health-care workers, who take care about sick and injured people, are usually not concerned about their own health because they are thought to be „immune“ to injures and diseases. Patients and their health are always at the first place.

According to WHO „Global Action Plan“ for health, all members of WHO are invited to create and promote national strategies for health and safety at work; this is also related to health-care workers. This plan also includes immunization proposal for all heath-care workers having an occupational risk for hepatitis B. According to WHO statistics, among all health-care workers having hepatitis B infection, 37% of them are infected at work-place by contact with infected blood; this usually was caused by sharp device injury (lancet or so). On the other side, it is very important to mention that this infection can be prevented in 95% by immunization. However, it should be highlighted that preventive measures – immunization of health-care workers are very rare and, according to WHO data, only 20% of all health-care workers worldwide have received full immunization (three vaccine doses). Also, infection by HIV virus is also present among health-care workers and can be defined as occupational risk factor. Statistical data showed that, among all HIV positive health-care workers, less than 10% of them developed HIV infection as a result of injury by sharp device (lancet, needle etc.).

Risk of getting infection (such are HBV, HCV, HIV, and so on) for health-care workers is great since they work with contaminated blood and devices (such are needles, lancets, broken glass etc.). According to WHO statistics, among health care workers, there were 3 million of per cutaneous exposures to pathogenic microorganisms which can be found in blood and human body secrets during the year of 2000. This number of exposures is statistically equal to the number of 0,1 to 4,7 injuries with sharp device per one health care worker annually. WHO report shows that around 40% of all HBC and HCV infections present among health care workers happened following injury with contaminated sharp device at work-place. These data show enormous geographical variation. Also, one of WHO conclusions is that around 4,4% of all HIV infections among health care workers are the results of injury by sharp device; this number also shows huge variation when various regions are in question worldwide. Thus, this number can vary from 1% up to 12% in some regions of the World (1).

When occupational diseases caused by biological hazards in health-care workers are in question, in majority of cases, they are the results of needle injury (2). During the year 2003, according to WHO data, these injuries caused approximately 1.000 HIV infections, 66.000 HBV infections, and 16.000 HCV infections in health-care workers (3). Health-care sector is very important part of economy of every country. As an example, USA can be noted. Namely, health-care sector in USA is the second fastest growing sector in the country with around 12 million of employees. Of this number, 88% are women. In USA, similarly to the situation in other countries, the number of injuries at work-place, work-related diseases, and occupational diseases, showed the trend of rise during past several decades. On the other side, there is paradoxical situation – two main industries with highest rate of occupational traumatism - agriculture and civil construction, became safer during recent years in comparison to previous decades (4-6).

Traumatism at work also presents very important problem in all other countries worldwide. Thus, according to International Labor Organization data, there are around 2,2 million of deaths caused by occupational diseases and injuries at work. Injuries at work-places caused approximately 350.000 death cases (7). The most common occupational risks which significantly influences overall morbidity at global level, are: low-back pain - 37%, hearing loss – 16%, chronic obstructive pulmonary disease – 13%, bronchial asthma – 11%, malignant diseases of trachea and bronchus – 9%, injuries – 8%, and leukemia – 2% (8). Health-care workers who prepare and administer chemotherapeutics (for malignant diseases therapy), antiviral drugs, hormonal-based drugs, as well as, bio-engineering drugs, may be exposed to these drugs at work-site, and may face health problems due to the exposure.

Statistical analysis has shown that around 5,5 million health-care workers in USA are exposed to above mentioned health hazards. The highest level of exposure is revealed among medical doctors, pharmacists, lab-workers, workers who work at drug admission and so on. Scientists from Center for Diseases Control, Atlanta, USA point that health-care workers who take care about population health, perform labor at work-places where they are exposed to different health hazards which can cause harm to their health. Also, numerous studies have shown that health hazards present at work-site of health care workers, may cause both acute and chronic diseases. The most prevalent diseases are diseases of skin, reproductive organs diseases (infertility, spontaneous abortion, congenital malformation and so on); it is very important to note that leukemia presents very significant health problem, as well as, other malignant diseases. Health risk depends on what kind of toxic substances (drugs) health care workers are exposed to and the duration of exposure. On the other side, having this in mind, health care workers wear personal protective equipment while work and, also, are subjected to other collective protective measures, preventive periodical medical check-ups in occupational medicine department and so on (9). Thus, in one study performed in USA focused at health-care

workers and health hazards present at their work sites, there were 3.650 health workers enrolled. Of this number, there were 862 medical doctors, 941 nurses, 968 occupational therapists, and 879 other therapists. The most prevalent disease among these health care workers was occupational bronchial asthma. This disease was caused by the use of detergents and other solutions for cleaning and maintaining of medical instruments and apparatus, the use of latex made gloves, and by administration of drugs via aerosol. There was also an interesting finding regarding allergic reaction on latex – this allergy has not been noticed since 2000. As for bronchial hyperactivity - it was noticed that the main cause were detergents for maintenance of windows and rooms, as well as, drug administration by aerosol and plasters, and exposure to aggressive chemical solutions vapors (10).

AIM

Aim of the paper is to point out health hazards present at various work places of health-care workers, as well as, to highlight health condition of health care workers following one periodical medical check ups.

Based on results, aim is also to propose further measures dedicated to prevent diseases onset and to improve health condition among health care workers.

METHODOLOGY

Medical records obtained from periodical medical check-ups were analyzed. Medical check-ups were performed in occupational health department. Total number of examined health-care workers was 210. All of them were employed in one health care center in Serbia. All of them underwent periodical medical check up (PMCU) during 2011. All of diseases established, were coded according to International Classification of Diseases ver. 10 (ICD-10). Basic methods of descriptive statistics were applied.

RESULTS AND DISCUSSION

Of 210 examined subjects, there were 35 (17,5%) males (M) and 175 (82,5%) females (F). In relation to educational level, there were: a) with secondary school education = 186 (88,6%), b) with high school education = 6 (2,9%), and c) with faculty education 18 (8,6%) examinees.

By table 1., work places of examined subjects are presented.

Table 1. *Work places where health-care workers work*

Work place, department	Number of examinees	%
Nursing care of hospitalized patients	83	39,5
Laboratory	28	13,3
Home treatment and patronage	8	3,8
Medical transport	11	5,2
Emergency room and ambulance	32	15,2
Gynecology and Maternity ward	17	8,1
Operating departments	16	7,6
Neonatology	8	3,8
Health care center departments	7	3,3
	210	100,0

The vast majority of examinees work in health care of hospitalized patients (39,5%) followed by emergency admission and ambulance ward (15.2%).
Age distribution of the examinees is shown in table 2.

Table 2. *Age distribution of the examinees*

Years of age	Number	%
21-30	41	19,5
31-40	78	37,1
41-50	57	27,1
51-60	33	15,7
61-65	1	0,5
Total:	210	100,0

The vast majority of examined subjects were between 31 and 40 years of age; that means that the group of examined subjects was relatively young, in general. The oldest examined subject was 63 year old, while the youngest one, was 21 year old.

Tables 3. and 4. present distribution of examinees relative to total working duration (TWD) and exposure working duration (EWD).

Table 3. *Examinees distribution relative to TWD*

TWD (in years)	Number of examinees	%
1 up to 5	31	14,8
6 up to 10	28	13,3
11 up to 15	36	17,1
16 up to 20	43	20,5
21 up to 25	18	8,6
26 up to 30	33	15,7
31 up to 35	17	8,1
36 up to 40	4	1,9
Total	210	100

Table 4. *Examinees distribution relative to EWD*

EWD (in years)	Number of examinees	%
1 up to 5	67	31.9
6 up to 10	28	13.3
11 up to 15	29	13.8
16 up to 20	27	12.9
21 up to 25	16	7.6
26 up to 30	28	13.3
31 up to 35	11	5.2
36 up to 40	4	1.9
Total	210	100.0

From tables above, it can be seen that the vast majority of examinees belong to the group from 16 years to 20 years, when TWD is in question; on the other side, when EWD is in question, the vast majority belong to the group from 1 year up to 5 years of exposure.

In analyzed group of health-care workers, various health hazards were noted. Some of them belong to the group of occupational health hazards and the most important among them are: 1) biological health-hazards - presented by possible exposure to viruses in human body fluids (e.g. hepatitis viruses, HIV, SARS or so), bacteria (e.g., TBC and others), and other pathogenic organisms, 2) the most common chemical hazard was latex, 3) as for physical hazards, it is worth to mention exposure to ionizing irradiation, and certainly, 4) main factors of psycho-social hazards are shift-work, which was found in 171 persons and different stress levels; 5) also, inappropriate ergonomics solutions were found in examined group of health-care workers.

Table 5. *The most prevalent diagnoses following PMCU of health-care workers*

ICD-10	Number of diagnoses	%
Diseases of the circulatory system (I00 do I99)	144	25,9
Diseases of the eye and adnexa (H00 - H59)	77	13,8
Endocrine, nutritional and metabolic diseases (E00 - E90)	69	12,4
Diseases of the respiratory system (J00 - J99)	67	12,1
Diseases of the musculoskeletal system and connective tissue (M00 - M99)	54	9,7
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism (D50 - D89)	40	7,2
Diseases of the genitourinary system (N00 - N99)	30	5,4
Diseases of the digestive system (K00 - K99)	21	3,8
Benign neoplasm (D00 – D99)	16	2,9
Diseases of the nervous system (G00 - G99)	15	2,7
Diseases of the ear and mastoid process (H60 - H95)	13	2,3
Mental and behavioral disorders (F00 - F99)	5	0,9
Diseases of the skin and subcutaneous tissue (L00 - L99)	3	0,5
Certain infectious and parasitic diseases (A00 - A89); st. post	1	0,2
Malign neoplasm (C00 - D48): C50 (st. post op.)	1	0,2
	556	100

On the other side, non-occupational health hazards were also found among examined subjects. The most important were increased body mass, smoking and alcohol consumption habits. Regarding body mass, it was found that 73 of examined subjects (34,8%) had an increased body mass index; obesity was found in 34 persons; I grade obesity was found in 24 examined subjects, II grade obesity in 4, while 6 examined subjects had III grade obesity; prevalence of subjects with obesity were 16,2%. Malnutrition was detected in 5 subjects (2,4%), while 98 of examinees (46,7%) had their body mass index within normal range. When smoking habits, as health risk factors among health-care workers are in question, it was found that there were 97 smokers (46,2% of all examinees), former smokers – 10 (4,8%), and non-smokers - 103 (49,0%). Female examinees denied alcohol consumption. On the other side, 35 male examined subjects, answered that: a) rarely consume alcohol - 6 (17,1%), b) occasionally consume alcohol - 4 (11,4%), and c) deny alcohol consumption - 25 (71,4%).

Of all 210 examinees, only 19 (9%) of them did not have any diagnoses following PMCU. The vast majority of examinees, 39 (18,6%) and 38 (18,1%) had

two or three diagnoses, respectively. One of the examined subjects had 15 diagnoses.

Table 5. represents all of medical diagnoses according to ICD-10 established following PMCU of health care workers.

From the table above, it can be easily seen that circulatory diseases have the highest prevalence - 25,9%, followed by diseases of eye, endocrine organs disorders, respiratory problems etc. Except eye diseases, all categories of chronic non-communicable diseases found, also dominate in pathology of general population in R. Serbia (11).

Very interesting finding was also that out of 210 of examinees, there were 39 of them with increased blood glucose level diagnosed (hyperglycemia; R73). Unfortunately, during this PMCU, diabetes mellitus 2 was diagnosed for first time in three female examinees who were not aware about the disease they had.

Following PMCU, occupational health specialist is required to give a work ability assessment (WAA) of examined subjects. WAA takes into account work-place demands and health risks on one side, and health condition of certain person, on the other. Following this PMCU, there were 8 examined subjects (3,8%) having WAA with certain permanent limitation. Limitations were related to: a) no shift work – in 5 examinees, b) no heavy work-load – in 1 examined subject, c) no exposure to ionizing irradiation – 1 subject, and d) not to be engaged at workplace requiring good hearing – 1 examined subject. Two examinees have temporary limitation of WAA and their medical check-up was required for 6 and 12 months. Interestingly, all of the restrictions in WAA, were noted in female population of examinees.

Based on all data of the health condition analysis related to health-care workers presented here, it can be noted that health-care workers are also vulnerable part of the population. They also suffer from the same chronic non-communicable diseases like general population. Therefore, it can be suggested that we all need to follow the guidelines that we recommend to our patients. Among them, I would like to underline the importance of healthy habits, such are: 1) do not smoke/quit smoking, 2) enjoy alcoholic drinks at moderate level and consume not-strong spirits (glass of red wine daily is desirable), 3) to perform physical activity every day, if possible (e.g., fast walking – 6km per hour), 4) to consume healthy food with no or, as less as possible, of preservatives and additives, 5) to rehydrate the body with a plenty of fresh water avoiding soft drinks and other beverages with sugar, sweeteners, and artificial flavor added. Aside of these measures which are related to prevention of chronic non-communicable diseases in general, health-care workers need to be encouraged to protect themselves from occupational diseases by using all measures possible. One of those is vaccination which is very important protective measure, when biological hazards are considered. It is suggested to complete whole vaccination, not partially. Also, health-care workers are recommended to wear all personal protective equipment possible. For this purpose, they are encouraged to wear gloves, glasses, lab-coats; those exposed to ionizing irradiation, are suggested to wear lead-glasses, lead-coats, protection for thyroid gland etc. On the other side, other measures dedicated to safety at work-place must be implemented regarding ventilation, barriers, storage of waste possible contaminated etc. At last, the importance of periodical medical check-ups, as medical measure, should be highlighted; health-care workers need to undergo them on regular time basis in order to reveal discrete changes in traced parameters, if any. By using all measures possible, health-care workers may protect themselves against health hazards which may induce chronic non-communicable diseases, on one side, and to protect them against hazards present at their work-sites which would be the way to avoid development of occupational diseases and long lasting working ability.

CONCLUSIONS

Health care workers are exposed to various health hazards while performing very demanding job tasks. These hazards may harm human health and may further cause occupational diseases, if lasts long enough. Since it is very hard to eliminate different health hazards and to diminish stress in health care workers, it is necessary to perform all preventive measures; one of them is medical measure - periodical medical check-up that should be performed in regular time-frames with the aim to find-out discrete variations of health condition/biochemical parameters from normal values and act accordingly.

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BIOGRAPHY

Dušan Vešović graduated from Medical School, University of Belgrade, Serbia where he received doctoral degree in the field of Occupational Health. His works is mainly oriented towards work ability assessment, as well as, identifying of health hazards present at the work place and giving the solutions for elimination and/or diminishing effects of the exposure to them. He presently works as a professor at VISAN, while practical work he performs at Center for chrono-nutrition dr Gifing, both situated in Belgrade, Serbia. Aside of professional interest expressed above, dr Vešović is also oriented towards integrative approach of diagnosis and treating diseases.

ZDRAVSTVENI RIZICI I REZULTATI PERIODIČNOG LEKARSKOG PREGLEDA ZDRAVSTVENIH RADNIKA

Dušan Vešović, Stoja Rikić

Rezime: *Zdravstveni radnici su izloženi različitim zdravstvenim rizicima na radnom mestu (npr., virusima hepatitisa, HIV-a, SARS-a, bacilima TBC-a, aldehidima, hemoterapeuticima, lateksu, buci, jonizujućem zračenju, smenskom radu, stresu itd.). U skladu sa zakonom R. Srbije, svi radnici, uključujući i zdravstvene radnike, moraju da pre zapošljavanja na radnim mestima s povećanim rizikom, obave prethodni pregled kod lekara. Cilj ovog rada je da analizira zdravstvene rizike prisutne na radnom mestu zdravstvenih radnika, kao i aktuelno zdravstveno stanje nakon periodičnog lekarskog pregleda (PLP). Korišćeni su lekarski izveštaji s PLP-a zaposlenih, koji je obavljen tokom 2011. godine. Ukupan broj ispitanika je bio 210. Osnovne metode deskriptivne statistike su primenjene. Bilo je 35 ispitanika (17,5%) i 175 ispitanica (82,5%). Uočeni su različiti profesinalni rizici – biološki, fizički, hemijski, smenski rad. Takođe, notirani su i drugi rizici po zdravlje – povišena telesna masa, pušenje cigareta, konzumiranje alkohola. Povišena telesna masa je uočena kod 73 (34,8%) ispitanika, gojaznost kod 34 ispitanika (16,2%), pothranjenost kod 5 (2,4%) ispitanika; 98 ispitanika (46,7%) je bilo normalne uhranjenosti. Bilo je 97 pušača (46,2%), 10 bivših pušača (4,8%) i 103 nepušača (49,0%). Samo19 ispitanika (9%) nije imalo ni jednu dijagnozu nakon PLP-a. Najveću prevalenciju imaju oboljenja srca i krvnih sudova (25,9%), oboljenja oka (13,8%), oboljenja endokrinog sistema (12,4%) i bolesti pluća (12,1%). Hiperglikemija je nađena kod 39 ispitanika, dok je dijagnoza dijabetes mellitus-a prvi put postavljena kod tri ispitanice. U odnosu na ocenu radne sposobnosti, umanjena radna sposobnost je nađena kod 8 ispitanika (3,8%), dok je 202 ispitanika (96,2%) ocenjeno sposobnim za rad na svom radnom mestu. Zdravstveni radnici su izloženi različitim zdravstvenim rizicima obavljajući jedno veoma zahtevno zanimanje. Obzirom da je veoma teško eliminisati ove raznolike zdravstvene rizike, kao i stres, neophodno je sprovoditi sve neophodne preventivne mere - jedna od njih jesu i PLP pregledi.*

Ključne reči: zdravstveni radnici, ocena radne sposobnosti, profesionalna oboljenja, radna mesta s povećanim rizikom.