ORIGINAL ARTICLE

Annals of Agricultural and Environmental Medicine
www.aaem.pl

Effect of selected factors related to emotions and general health on the health behaviours of paramedics

Agnieszka Gonczaryk[1,A-D], Jarosław Piotr Chmielewski[2,A,C-E], Agnieszka Strzelecka[3,C-D], Jarosław Fiks[4,B,D], Grażyna Nowak-Starz[5,C,E-F], Magdalena Florek-Łuszczki[6,A,E-F]

[1] *Department of Health and Social Policy, Marshal's Office, Warsaw, Poland*
[2] *Faculty of Rehabilitation of the Józef Piłsudski University of Physical Education in Warsaw, Poland*
[3] *Department of Public Health, Collegium Medicum, Jan Kochanowski University, Kielce, Poland*
[4] *Office of the Patient Ombudsman, Warsaw, Poland*
[5] *Collegium Medicum, Jan Kochanowski University, Kielce, Poland*
[6] *Institute of Rural Health, Lublin, Poland*
A – Research concept and design, B – Collection and/or assembly of data, C – Data analysis and interpretation, D – Writing the article, E – Critical revision of the article, F – Final approval of the article

Gonczaryk A, Chmielewski JP, Strzelecka A, Fiks J, Nowak-Starz G, Florek-Łuszczki M. Effect of selected factors related to emotions and general health on the health behaviours of paramedics. Ann Agric Environ Med. doi:10.26444/aaem/151531

Abstract

Introduction and Objective. Lifestyle and its related health behaviour are significant factors affecting health. The aim of this study was to define a selection of factors influencing the health behaviour of paramedics from the Masovian Province, the biggest in Poland.

Materials and method. The study group consisted of paramedics employed in Emergency Response Teams (ERT) on the territory of Masovian Province. The study involved 238 participants: 223 men and 15 women. The mean age of the participants was 39.03±9.27 years for males, and 31.93±7.76 years for females. The research was carried out between May 2019 – September 2019 using the diagnostic survey method, including Jurczyński's Health Behaviour Inventory (HBI), Courtauld's Emotional Control Scale (CECS) and the General Health Questionnaire (GHQ-28).

Results. The health behaviours of the participants were defined as average. The probability of exhibiting proper health behaviours increases with age (OR=2.178, 95% CI: 1.030–4.604; p 0,042), the ability to control emotions, especially on the depressive mood scale, (OR=0.901, 95% CI: 0.827–0.981; p 0.017) and the general health condition, i.e., the less anxiety or insomnia the participating paramedics experience, the higher the chance of them exhibiting proper health behaviours (OR =0.809, 95% CI: 0.725–0.903; p 0.000) or not experiencing social dysfunction (OR=0.760, 95% CI: 0.628–0.920; p 0.005).

Conclusions. As an occupational group, paramedics require help from their employers and other specialists in the fostering of proper health behaviour in order to experience a good quality of life in the workplace and beyond. Educative measures have to be undertaken in the paramedic population, especially with regard to ameliorating eating habits, handling stress, burnout prophylaxis, and counteracting musculo-skeletal disorders.

Key words

paramedic, prophylaxis, health behaviour

INTRODUCTION

The health and well-being of paramedics is of key significance in the quality of medical intervention *in situ*, operating the ambulance and its equipment, as well as providing the patient with high-quality clinical care.

On the most general level, health behaviours can be defined as actions targeted at increasing the human health potential and eliminating behaviours that worsen the health condition. They are commonly developed as a result of lifestyle rules determined in accordance with the present system and level of knowledge. Currently, they encompass six elements: responsibility for one's health, physical activity, eating habits, dealing with stress, self-fulfilment and interpersonal relationships [1, 2, 3, 4].

One's lifestyle and the health behaviours related to it are classified as one of the most important factors influencing health. These behaviours are factors responsible for the maintenance and strengthening of one's health, as well as that of the entire population throughout life. Knowledge about health or illness is defined as the facts and skills honed throughout life through experience or education. In order to maintain a good health condition and mental well-being, people have to be motivated to: regularly attend health check-ups, quit using addictive substances (alcohol, smoking tobacco), follow a diet, and be physically active [4, 5, 6].

The work of a paramedic is difficult and taxing (both physically and emotionally), which undoubtedly has a negative influence on their body, and consequently their health. Moreover, they are often overloaded with responsibilities and do not have the time to dedicate to satisfactory care for their own health condition. Stress, which is inseparably tied to their work environment and the nature of their work with patients, also has a negative impact on their health condition. Paramedics regularly confront traumatic events, including

Address for correspondence: Magdalena Florek-Łuszczki, Institute of Rural Health, Lublin, Poland, Jaczewskiego 2, 20-090 Lublin, Poland
E-mail: magdalena.florek@wp.pl

Received: 31.05.2022; accepted: 22.06.2022; first published: 05.07.2022

life-threatening situations, as well as serious injuries and death. The daily experiencing of trauma and accumulation of stressogenic events play a significant role in the development of mental disorders or injuries, including Post Traumatic Stress Disorder (PTSD) [7, 8, 9, 10].

The aforementioned factors cause paramedics to have limited means to enforce the rules of healthy behaviour in practice, regardless of the fact that they may have a higher knowledge of healthy behaviours than the average person, and are aware of the negative consequences of addiction, stress, or ignoring symptoms of illness.

The subject of the research are the health behaviours of paramedics. On the one hand, this choice was dictated by the aim to confront public opinions about a healthy lifestyle exhibited by paramedics as healthcare professionals with reality; on the other hand, it was motivated by the will to study the lifestyle of paramedics who, as part of their work, come into daily contact with people who do not adhere to the recognized rules of health behaviours in their daily lives.

The personal attitude and approach of paramedics in their daily work may have a significant effect on the patients in the context of the health education they provide [11], as well as the formation of individual opinions regarding health behaviours.

Constant analysis of the influence of the working environment factors on the health of employees is not only one of the fundamental obligations of the employer in terms of creating the safe and hygienic working conditions, but should also be a permanent element of accident and disease prevention and health promotion in the workplace. The above-mentioned tasks result mainly from the fact of changes taking place in the work environment, which often result in the emergence of new occupational hazards and unprecedented risk factors resulting, for example, from the way the work is organized or the place where it is performed and the risk factors present there [12, 13, 14, 15, 16].

With regard to the professional group of paramedics, the issues related to the mental burden occurring at work are important not only for their individual health, but also for the proper functioning of emergency response teams (ERT) [17]. The exact identification of risk factors for mental strain will allow the employer not only to take preventive measures to reduce individual health effects, but also to avoid possible errors in ERT operation. Numerous studies show that issues related to adaptation disorders, workplace violence, burnout, post-traumatic stress disorder (PTSD) and depression are factors that significantly affect not only individual health, but also the manner and quality of performing professional tasks by medical personnel [13, 14, 18, 19, 20]. The appearance of the COVID-19 pandemic significantly influenced a change in the safety behaviour of both health care system employees and patients. To a greater extent than before, activities related to health promotion have been undertaken in the area of understanding the influence of biological factors on individual health status. In the area of occupational health and safety, it turned out to be necessary to undertake a wider range of organizational and technical activities during professional activities performed by medical personnel (e.g. providing personal protective equipment, disinfectants, providing locks, gates and disinfecting mats, introducing decontamination ambulances, providing psychological care, training) aimed at reducing the negative impact on physical and mental health [21, 22, 23, 24, 25, 26, 27].

The measure of health behaviours threatening to health may help in the programming of prophylactic measures, determining the direction of behaviour modification, and the monitoring of changes in health practices of this occupational group.

OBJECTIVE

The aim of the study was the determination (detection) of various factors influencing the health behaviours of paramedics in the Masovian Province of Poland.

MATERIALS AND METHOD

According to the 2019 data from Statistics Poland regarding the National Medical Emergency Service System, in Poland there were 1,577 (100%) mobile emergency response teams (ERT), 369 (100%) of which were specialized and 1,208 (100%) which were basic, the latter involving 200 ERTs (12.7%) located in the Mazovian Province(46 specialized (12.5%) and 154 basic (12.7%)), while the number of medical personnel constituting the medical emergency system totalled 12.7 thousand people [28].

This study was a part of a research project on the occupational safety and health of paramedics employed at ERT in Mazovian Province, planned for implementation in the period 2019 – 2020 by the Health Department of the Provincial Office in Warsaw and the Department of Health and Social Policy of the Marshal's Office in Warsaw. The study was intended to be cross-sectional study, but due to the COVID-19 pandemic in 2020, the project was suspended.

The study was carried out in the period between May 2019 – September 2019 among occupationally-active paramedics in ERTs from five operational regions in the Mazovian Province: Warsaw, Płock, Ostrołęka, Siedlce, and Radom. The sample selection was deliberate, as the Mazovian Province has the highest number of emergency response teams (ERTs) on a national scale. Participation in the study was voluntary and anonymous, and carried out in accordance with the Helsinki Declaration [29]. Information about the study subject and purpose was provided to the participants. Informed consent to participate in the study was obtained without pressure, voluntary participation in the project was ensured, and the respondents were guaranteed anonymity and confidentiality.

Psychometric tools were purchased from the Psychological Test Laboratory in Warsaw.

The final analysis included 238 participants – 223 males and 15 females. Participants had to meet the following inclusion criteria: perform full-time / on-call work (regardless of the nature of the contract), work directly as an ERT member, agree to participate voluntarily in this study.

The mean age of the participants was 39.03±9.27 years for males, and 31.93±7.76 years for females (Tab. 1).

Table 1. Participant age in years between genders

Participant Gender	n	M	SD	Min	Max	p-value
Male	223	39.03	9.27	23.00	65.00	0.003*
Female	15	31.93	7.76	23.00	50.00	

** Mann-Whitney, U Test p<α; α=0.05*

The mean years of work experience showed significant gender differences (p = 0.000); the mean for males – 12.62±9.41 years, and for females – 5.36±7.04 years. In both participant groups, the shortest work experience was approximately half a year (Tab. 2). The participants had further secondary education, as well as professional and masters higher education (Tab. 3).

Table 2. Years of participant work experience between genders

Participant Gender	n	M	SD	Min	Max	p-value
Male	223	12.62	9.41	0.50	41.00	0.000*
Female	15	5.36	7.04	0.50	28.00	

**Mann-Whitney U Test p<α; α=0,05*

Table 3. Level of education between genders

Level of Education	n(%)	Secondary/ Further Secondary Education	Professional Higher Education	Masters Higher Education	p-value
Male	223 (100,00)	48 (21.52)	132 (59.19)	43 (19.28)	0.109*
Female	15 (100,00)	1 (6.67)	8 (53.33)	6 (40.00)	

** χ^2 Test; p>α; α=0,05*

In order to examine the health behaviours of the participant group, the standardised Health Behaviour Inventory (HBI) questionnaire was used. This tool includes four subscales: positive mental attitude, prophylactic behaviours, healthy eating habits, and health practices. For each subscale, six questions were defined, where participants could identify their behaviour on a five-point (1–5) Likert scale. Furthermore, stens (1–10) were also defined to score the total results obtained separately for men and women. The reliability of the tool was examined through calculating Cronbach's alpha, which was equal to 0.90 for the overall questionnaire, 0.82 for the positive mental attitude subscale, 0.68 for the prophylactic behaviour subscale, 0.82 for the heathy eating subscale and 0.65 for the health practices subscale (Tab. 4).

Table 4. Reliability analysis for the psychometric tools

Cronbach's alpha	Own results	Standardized results
Health Behaviour Inventory (HBI)		
Overall	0.90	0.85
Positive mental attitude	0.82	0.65
Prophylactic behaviours	0.65	0.61
Healthy eating habits	0.82	0.60
Workplace practices	0.65	0.64
Courtauld Emotional Control Scale (CECS)		
Overall	0.86	0.87
Anger subscale	0.74	0.80
Depressed mood subscale	0.75	0.77
Anxiety subscale	0.71	0.78
General Health Questionnaire (GHQ-28)		
Overall	0.93	0.93
Somatic symptoms	0.81	0.86
Anxiety/Insomnia	0.88	0.89
Social dysfunction	0.81	0.77
Severe depression	0.89	0.83

Clinical research shows that the suppression of emotions may cause them to exacerbate, which consequently may lead to long-term nervous tension. Courtauld's Emotional Control Scale (CECS) is the standardized tool consisting of three subscales, each comprised of seven statements, where participants could indicate their proper forms of suppressing emotions on a four-point (1–4) Likert scale. The scale is used to measure the subjective control of anger, anxiety, and depressed moods in difficult situations. The results for each of the subscales range from 7–28 points, while the overall indicator of emotional control ranges between 21–84 points. The higher the score of the participant, the more they suppress negative emotions. The reliability of the tool was examined through calculating Cronbach's alpha, which was equal to 0.86 for the overall scale, 0.74 for anger control subscale, 0.75 for depressive mood control subscale, and 0.71 for anxiety control subscale (Tab. 4).

The mental health of the paramedics was evaluated using the General Health Questionnaire (GHQ-28). The tool captures four subscales, each one comprised of seven questions scored between 0 – 21 points. Stens (1–10) were also indicated for the score resulting from the sum of the obtained results, separately for men and women. The reliability of the tool was examined through calculating Cronbach's alpha, which was equal to 0.93 for the overall questionnaire, 0.81 for the somatic symptoms subscale, 0.88 for the anxiety and insomnia subscale, 0.81 for the social dysfunction subscale, and 0.89 for the severe depression subscale (Table 4).

Statistical methods. Logistic regression was used to indicate the predictors, related to expressing emotions, general health condition, of the chosen health behaviours of paramedics, as well as indicating the determinants between age and scores on the HBI, CECS and GHQ-28 scales. The goodness of fit of the model was verified using the Homer-Lemeshow test (HL); the cut-off point for the area under the curve was AUC = 0.7. While verifying and building the logistic model, the Wald test was used. To compare the distributions of the different subscales of emotional control and general health, and the defined grouping variable based on the standardization of the Health Behaviour Inventory tool results (stens), the Mann-Whitney U test was used. The same test was also applied to compare the distributions of all the dimensions of the analysed questionnaires on account of age, which was presented as two age brackets. While searching for the relationship between health behaviours, expressing emotions, and the general health condition, the non-parametric Spearman's rank correlation coefficient test (Spearman's Rho) was used.

For all the statistical tests, the level of significance was established at α=0.05. The statistical analysis was carried out using STATISTICA ver 13.1 software.

RESULTS

The frequency of individual statements specified by the participants serves as an indicator of the general intensity of health fostering behaviours. According to the HBI assumptions, healthy eating habits include the type of products consumed, prophylactic behaviours include adhering to health recommendations, obtaining knowledge with regard to health and illness alike. Workplace practices

involve everyday sleeping habits, recreation, and physical activity. A positive mental attitude involves a range of health behaviours, such as psychological factors – avoiding excessive emotions, stress or tensions. While indicating the predictors of the aforementioned behaviours of paramedics indicated in the HBI questionnaire, a dichotomous variable was created (0–1), which originated from standardized units and determined the sten scale (1–10) in accordance with the interpretation of the standardized tool's results. Results ranging from 1–6 sten were defined as low or average and coded as '0', while results between 7–10 were defined as high and coded as '1'. This preparation allowed for the creation of the first logistic model, where CECS and GHQ-28 factors were explanatory variables. Determinants that had an influence on the appropriate health behaviours of the participants were defined (Tab. 5).

Table 5. Final predictors constituting the logistic regression model (first model)

Variable	Estimated logistic regression parameter	OR (95% CI)	p-value
Intercept parameter	3.450	31.485 (4.502–62.204)	0.001
Age	0.778	2.178 (1.030–4.604)	0.042
Depression mood subscale	-0.104	0.901 (0.827–0.981)	0.017
Anxiety/Insomnia	-0.212	0.809 (0.725–0.903)	0.000
Social dysfunction	-0.274	0.760 (0.628–0.920)	0.005

On the basis of the estimated logistic regression, it can be stated that the probability of appropriate health behaviour prevalence in participants increases with age (OR = 2.178, 95% Cl: 1.030–4.604; p 0.042). It was noted that the factors constituting the Health Behaviour Inventory which defined participant behaviours were: positive mental attitude, prophylactic behaviours, healthy eating habits and workplace practices. Another determinant which had an effect on the high degree of health behaviours was the ability to deal with emotions, in particular the depression mood degree (OR = 0.901, 95% Cl: 0.827–0.981; p 0.017) and general health condition – the less participants experience anxiety and insomnia, the higher the chance of observing appropriate health behaviours (OR = 0.809, 95% Cl: 0.725–0.903; p 0.000) and a lack of social dysfunctions (OR = 0.760, 95% Cl: 0.628–0.920; p 0.005) (Tab. 5).

The goodness of fit amounting to HS = 12.834, with p = 0.118 is a marker of a significantly fit logistic regression model. On the basis of the area under the ROC curve it can also be determined that the model is well suited for the data (area under the curve at AUC= 0.797) (Fig. 1), and is characterized by a high predictive ability resulting from the obtained sensitivity and specificity graphs for different probability levels.

Analysing the distribution of the individual indications, including factors and normalized scores of the CECS and GHQ-28 questionnaires related to HBI as a grouping variable, it can be observed that there are statistically significant differences between individual dimensions.

Emotional control and the general health condition was differentiated depending on the degree of health behaviour. In accordance with the accepted sten range of the normalized sum of all HBI subscales, it was concluded that the distribution of the indicators including all the elements of the GHQ-28

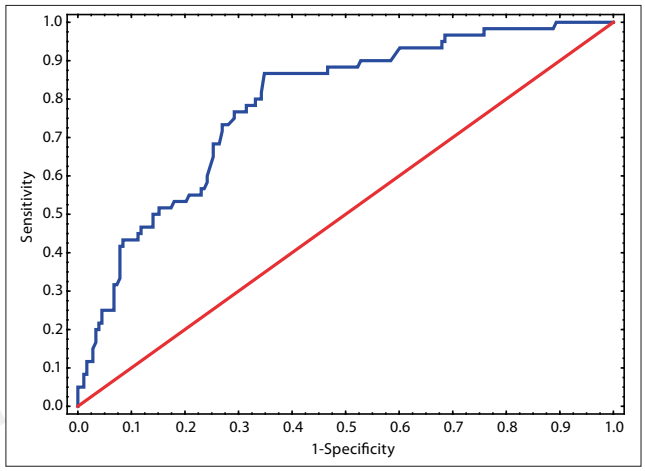

Figure 1. ROC curve graph for the first model

tool is indeed statistically lower in the paramedic group for the 7–10 sten range (1) – i.e. for the appropriate health behaviours according to the Health Behaviour Inventory questionnaire (Tab. 6).

Table 6. Emotion and general health condition control and health behaviours of paramedics

Factors	Unsatisfactory Health Behaviours (as per IZZ) (0) n=178		Satisfactory Health Behaviours (1) n=60		p-value*
	Me (Q1-Q3)	*min-max*	*Me (Q1-Q3)*	*min-max*	
Age	36 (31–43)	23–59	40 (35–51)	24–65	0.011*
Work experience	10 (4.5–16)	0.5–40	13(5.5–20.5)	0.5–41	0.018*
Anger subscale	17 (15–20)	7–28	17 (15–19)	10–25	0.790
Depression mood subscale	17 (15–20)	7–28	15 (14–18)	7–25	0.005*
Anxiety subscale	18 (17–20)	7–28	18 (16–20)	9–28	0.617
Total	52 (48–57)	24–84	50 (48–55.5)	29–78	0.149
Somatic symptoms	6 (4–9)	0–20	3 (3–6)	0–12	0.000*
Anxiety/Insomnia	7 (5–9)	0–21	4 (2–6)	0–18	0.000*
Social dysfunction	7 (7–8)	0–21	7 (5.5–7)	0–9	0.000*
Severe depression	1 (0–4)	0–21	0 (0–1)	0–11	0.005*
GHQ-28 Stens (1–10)	6 (5–7)	1–10	4 (3–5)	1–9	0.000*

* Mann-Whitney U Test; α=0.05; p<α statistical significance reached

A statistically significant relationship was observed between the increase in satisfactory health behaviours and age (r = 0.223; p = 0,001) and work experience (r = 0.167; p = 0.010) of the participating paramedics. No significant relationship was found between health behaviours and emotional control for the entirety of the tool; however, it was indicated in certain subcomponents that positive mental attitude (r = 0.129; p = 0.047), workplace practices (r = 0.134; p = 0.038) or healthy eating habits (r = 0.129; p = 0.023) statistically significantly increased the ability to control the degree of anger among participants. Meanwhile, there is a relationship between appropriate health habits and the general health condition (r = -0.453; p = 0.000). This relationship was determined at all the levels of the GHQ-28 questionnaire (Tab. 7).

Table 7. Relationship between HBI (sten values) and CESC and GHQ-28

HBI and different CESC and GHQ components	Spearman rho	t(N-2)	p-value
HBI Sten & Age	0.222712	3.50951	0.001*
HBI Sten & Work Experience	0.166459	2.59338	0.011*
HBI Sten & Total CECS	-0.003560	-0.05469	0.956
HBI Sten & Anger subscale	0.112777	1.74364	0.082
HBI Sten & Depression mood subscale	-0.129283	-2.00290	0.046*
HBI Sten & Anxiety Subscale	0.022716	0.34905	0.727
HBI Sten & GHQ-28 Sten	-0.452767	-7.80093	0.000*
HBI Sten & Somatic Symptoms	-0.421664	-7.14387	0.000*
HBI Sten & Anxiety/Insomnia	-0.453912	-7.82577	0.000*
HBI Sten & Social Dysfunction	-0.373723	-6.18975	0.000*
HBI Sten & Severe Depression	-0.289729	-4.65037	0.000*

$p<\alpha$; $\alpha=0.05$

Subsequently, predictors affecting health behaviours, control of emotions, and overall health conditions were defined in relation to the age of the participating paramedics. In accordance with WHO recommendation and the formulation of the questionnaires used in the present study, participants were divided into two age brackets: Group 1 – people aged 45 or below, Group 2 – people above the age of 45. HBI and GHQ-28 factors and final scores presented as stens, as well as the score for individual components of the CECS tool were used as explanatory variables. Finally, determinants related to the age of the participating paramedics were defined (Tab. 8).

Table 8. Final predictors constituting the logistic regression model (second model)

Variable	Estimated logistic regression parameter	OR (95% Cl)	p-value
Intercept parameter	-3.045	0.048(0.008–0.361)	0.003
HBI Sten	0.380	1.462 (1.212–1.763)	0.000
Anger subscale	-0.160	0.852 (1.009–1.271)	0.005
Depression mood subscale	0.124	1.132 (1.009–1.271)	0.005
Anxiety subscale	0.151	1.163 (1.053–1.285)	0.003

On the basis of the estimated logistic regression, it could be determined that the probability of appropriate health behaviour prevalence according to HBI for participants above 45 years of age increases 1.5 times, in comparison with people aged 45 or younger (OR = 1.462, 95% Cl: 1.212–1.763; p 0.000). The degree of depression also grew with age (OR = 1.132, 95% Cl: 1.009–1.271; p 0.005) as did symptoms of depression (OR = 1.162, 95% Cl: 1.053–1.285; p 0.003). Meanwhile, the participating paramedics had learned with age how to control their anger (OR = 0.852, 95% Cl: 1.009–1.271; p 0.005) (Tab. 8).

The goodness of fit amounting to HS = 5.7339, with p = 0.678, is a marker of a significantly fit logistic regression model. On the basis of the area under the ROC curve, it can also be determined that the model is well suited for the data (area under curve at AUC = 0.718) (Fig. 2), and is characterized by a high predictive ability resulting from the obtained sensitivity and specificity graphs for different probability levels.

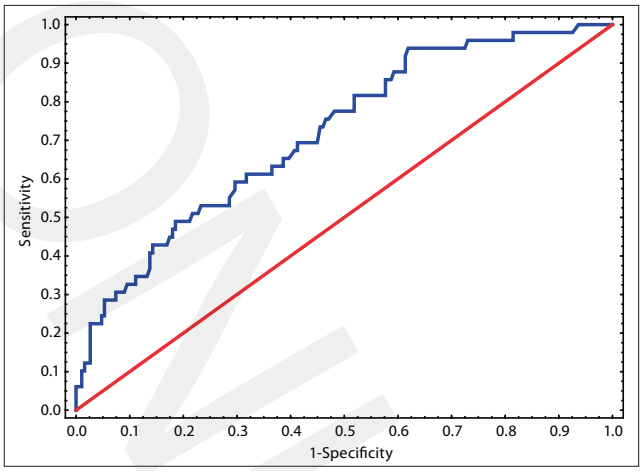

Figure 2. ROC curve graph for the second model

Analysing the distribution of the individual indicators including HBI, CECS and GHQ-28 factors and normalized values with regard to the age bracket of the participating paramedics, it can be observed that it indeed differs statistically for only some of the analysed dimensions.

Age was a differentiating factor only in areas included in the Health Behaviour Inventory, where higher indicators were observed in the group of paramedics above 45 years of age. Aside from that, the emotional control and general health condition of the participants did not differ between the established age ranges (Tab. 9).

Table 9. Health behaviours, emotion control and general health condition with regard to the age bracket of participating paramedics

Factors	Age 45 or below (n=189)		Age above 45 (n=49)		p-value*
	Me (Q1-Q3)	*min-max*	*Me (Q1-Q3)*	*min-max*	
HBI Sten (1–10)	5 (3–6)	1–10	6 (4–7)	1–10	0.005*
Positive mental attitude	3 (2.5–4)	1–5	4 (3–4)	1–5	0.034*
Prophylactic behaviours	3 (2.5–4)	1–5	4 (3–4)	1–5	0.002*
Healthy eating habits	3 (2.5–4)	1–5	3.5 (2.5–4)	1–5	0.188
Workplace practices	2.5 (2–3)	1–5	3 (2–4)	1–5	0.032*
Anger subscale	17 (15–20)	7–28	17 (14–19)	7–25	0.104
Depression mood subscale	17 (14–19)	7–28	18 (15–19)	7–25	0.668
Anxiety subscale	18 (17–20)	7–28	18 (15–20)	9–28	0.120
Overall	52 (48–57)	24–84	51 (48–56)	29–78	0.330
Somatic symptoms	6 (4–8)	0–18	4 (3–7)	0–20	0.241
Anxiety/Insomnia	7 (4–9)	0–18	6 (4–8)	0–21	0.265
Social dysfunction	7 (7–8)	0–16	7 (7–7)	1–21	0.523
Severe depression	0 (0–3)	0–14	1 (0–4)	0–21	0.244
GHQ-28 Stens (1–10)	5 (3–6)	1–10	5 (4–7)	2–10	0.737

*Mann-Whitney U Test; $\alpha=0.05$; $p<\alpha$ statistical significance reached

DISCUSSION

Paramedics are expected to exhibit a critical and conscious attitude towards the creation of health behaviours. This is the

effect of their amassed knowledge acquired during education and the awareness of the existence of life-threatening factors. Their approach to health, like that of other medical service professionals, should set an example for others [30].

Health behaviours are influences by a multitude of factors, such as age, gender, family situation, or occupation. Health behaviours are actions that directly or indirectly affect a person's health and well-being. Behaviours which foster health, aside from physical activity, are rational eating habits, healthy diet, sleep and rest, as well as maintaining one's psychological balance. There is an undeniable cause and effect relationship between the prevalence of certain illnesses and one's lifestyle (improper diet, smoking tobacco, lack of physical exercise), which is classified as one of the risk-factors harmful to health. Research into the health behaviours of paramedics are justified because, theoretically, they possess higher knowledge and experience with regard to taking care of their own body. Moreover, they come into daily contact with the consequences of anti-health behaviours on the general health condition [31]. The authors of the present study conclude that, on the basis of the obtained results, the higher the age of the participant, the higher their consciousness of health behaviours. Moreover, they indicate a statistically significant relationship with the prevalence of depressive symptoms.

The work of a paramedic is widely considered to be one of the most stressful among the medical professions. Professional activities, volatile working environment, and everyday hardships cause paramedics to exhibit high levels of occupational burnout and has negative emotional and physiological consequences on their health [32, 33, 34, 35]. Post-traumatic stress indicators among paramedics range between 8 – 32%, and differ depending on the environment, nature of the crisis, available support, education and individual traits [36, 37, 38]. As the research indicates, paramedics are exposed to a higher risk of adverse mental health effects prevalence in their work [39, 40, 41].

The available data suggest that almost half of the studied paramedics complied with the screening criteria towards mental health disorders [42], while the mental health disorder symptoms they reported often coexisted with chronic pain [43], worsening of the general health condition [44], exposure to injury [45], disorders resulting from abuse of different kinds of alcoholic beverages [42] or suicide [46]. Present research in this field is consistent with the aforementioned results. Appropriate health behaviours are determinants of a lesser risk of mental health dysfunction, including the prevalence of depressive symptoms, and are correlated with the general health condition.

Statistical analysis of the results obtained in the present study simultaneously showed that factors such as a positive mental attitude, workplace practices, or healthy eating habits, do statistically significantly increase the ability to control the extent of anger among participants.

Research by other authors proves that the support of supervisors, clinical oversight, and changes in the workplace culture are significant for the health, personal development, occupational self-efficacy and self-satisfaction of the paramedics [47].

In their research, Pow et al. observed 87 paramedics in order to examine whether the negative effect of the daily occupational stress on the quality of the sleep was buffered by the perceived availability of social support. The study showed that paramedics who reported higher support accessibility also more frequently reported a better quality of sleep during the week. Moreover, the perceived availability of the support buffered the sleep after a day of work, on average, as well as particularly high stress conditions The perceived availability also buffered sleep after a cumulative stress load from the prior week of work. Paramedics with a low level of support exhibited low quality sleep after facing high stress levels at work, while paramedics with high levels of support did not exhibit any significant effect on their sleep of the stress faced at work [48].

While carrying out their correlational research from May – October 2016 on a sample of 252 paramedics working in east Iran, Froutan et al. observed a significant relationship between personality traits and the level of resilience against mental health disorders in this occupational group [49]. As part of their research into examining the intermediary role of stress management strategies in the relations between resilience and post-traumatic increase in a group of 80 paramedics, Ogińska-Bulik and Kobylarczyk concluded that resilience development may increase the effectiveness of dealing with traumatic experiences, as well as help emergency rescue personnel maintain psychological balance [50].

Research by Petrie et al. involved a systematic overview and metanalysis, the aim of which was to indicate the prevalence of mental health disorders (PTSD, depression, anxiety, general psychological distress) among ambulance personnel around the world. The study found that, as far as estimated prevalence was concerned, its rates were equal 11% for PTSD, 15% for depression, 15% for anxiety and 27% for general psychological distress. What is more, it has to be noted that the date on which data was collected had a significant impact on the heterogeneity observed in the study [51].

In a cross-sectoral study of 295 paramedics (78 women and 217 men), the aim of which was evaluating the prevalence of workplace stress, overweight, and smoking tobacco in paramedics, Hegg-Deloye et al. showed that over 88% of paramedics reported exhibiting one or more risk-factors for cardiovascular disease, and that men reported a higher number of risk factors than women. 91% of the male paramedics experienced stress in the workplace, 12% smoked tobacco, and 79% self-reported being overweight or obese. The incidence of workplace stress and tobacco smoking was comparable for female paramedics; however, the number of people self-reporting overweight or obesity was much lower than in males (37%). Moreover, the study included a self-evaluation which showed that nine out of ten paramedics are vulnerable to developing cardiovascular diseases [52].

Research shows that ambulance personnel are more likely to choose standardized early retirement compared to other health service professionals, with musculoskeletal disorders characterized by lower back pain often being the reason [53]. In their study involving 1560 emergency rescue service professionals from 38 hospitals across Shadong in China, Zhang et al. showed that lower back pain (LBP) across the period of one year lasted for 24 hours in 86.1% of the participants, seven days in 50.6% participants, and three months for 21.1% for 498 emergency service nurses. For 519 participating doctors, the numbers were 70.5%, 36.4% and 15.8%, respectively, while for 543 ambulance drivers, the prevalence totalled at 57.5%, 23.8% and 12.3%. Factors found to foster chronic LBP for nurses were frequent bending of the torso, improper lifting of heavy objects, working on shifts,

low work satisfaction, excessive tiredness, emotionally taxing demands of their work, low work control, low support from supervisors, age, gender (female) and obesity [54].

As studies indicate, 10% of the people working shifts do not experience any negative consequences of such work, while 20% need to resign from this system of work due to health reasons, while as much as 70% of the employees working shifts are not able to determine the exact degree of intolerance of this type of work [55, 56]. This group of workers includes paramedics. Due to the nature of this work, people who dedicate themselves to it are in the risk group for the development of obesity, hypertension, and type 2 diabetes [57, 58, 59].

A study including 136 Australian paramedics (45.8% men and 54.2% women; 85.4% rotational shift workers, 7% rural shift workers and 7.6% fixed work schedule) showed that the prevalence of obesity among participants was 23.1%, 34.2% for overweight, while 42.0% had a healthy BMI. The majority of the paramedics (85.4%) worked rotational shifts, 7.6% had a fixed working schedule and 7.0% worked rural shifts. Paramedics indicated a wide range of previously identified health problems, such PTSD (16.0%), anxiety (26.0%), depression (31.0%), stress (32.0%), obstructive sleep apnoea (OSA;8.0%) and insomnia (20.0%). No statistically significant correlation was found between age, mental health, and reported sleep (all $p > 0.05$). Furthermore, there were no statistically significant gender difference in the results regarding sleep and mental health (all $p > 0.05$). The study showed that Australian paramedics exhibited a high prevalence of mental health problems and sleep issues, most importantly insomnia, depression and anxiety. Depression and anxiety results were significantly correlated with sleeplessness. Moreover, paramedics accustomed to an evening chronotype who participated in the study exhibited worse sleep, mental health and general health condition [60].

The research carried out by Khan et al. involved 104 male paramedics from Saudi Arabia (mean age = 32.5 ± 6.1 years) and 83 paramedics from Australia (mean age = 44.1 ± 12.1 years). The study showed significantly higher depression, PTSD, insomnia and fatigue indicators. Compared to Australian paramedics, Saudi paramedics exhibited higher depression and PTSD indicators [61].

The aforementioned studies are consistent with the results of the present study. The participating paramedics were observed to suffer from anxiety, insomnia and depressive symptoms. Simultaneously, health behaviours of the participants are unsatisfactory, especially in areas such as: positive mental attitude, prophylactic behaviours and workplace practices.

The present study, as well as a literature review, shows that individual, as well as organized efforts have to be undertaken to educate and support paramedics in lessening their risk of developing cardiovascular illnesses, and preventing lower back pain [12, 52, 54].

The ability of paramedics to deal effectively with stress contributed to the reduction of risky behaviors and decrease of various negative health effects on health among paramedics. The introduction of specialized courses in this field is recommended. Paramedics should have the possibility and should be encouraged to use mental health services and support. As an occupational group, paramedics also need help from their employers and other specialists, including individual treatment, in order to experience a high quality of like in the workplace and beyond. Employing a higher number of paramedics in ERT and employing risk management strategies against fatigue may help in ameliorating mental health through decreasing the weight related to work in this occupational group [17, 18, 19, 20, 21, 49, 50, 51, 58, 59, 62].

The results indicate the need to prevent health disorders, including mental health and infectious diseases among ETR paramedics through the obligatory control of the health condition as a part of occupational medicine, and optional health promotion programmes at work focused on accident and health prevention. The COVID-19 pandemic has shown how necessary these measures are. The purposefulness of these actions is indicated in the literature [12, 18, 22, 62, 63, 64].

The main limitation of this study is that, due to the challenges related to the time and costs of conducting the study, the study population was limited to five operational regions / activities of the EMS in the Mazovian Province. For this reason, the survey results cannot be generalized to other parts of the country. The study was carried out before the COVID-19 pandemic, therefore, this factor could not be included in the health behaviour of paramedics.

CONCLUSIONS

1) Health behaviours of the participating paramedics are at an average level.
2) There is a need to develop targeted strategies of health promotion in the workplace in order to support paramedics in the prophylaxis of chronic illnesses. Such strategies would act as a supplement to the self-managed health care for paramedics.
3) The study proves that the health-related lifestyle choices of the paramedic population is worrying, and suggests a tendency for development of chronic illnesses related to an unhealthy lifestyle and nature of the occupation.
4) The identified predictors of problematic physical activity, eating habits, mental well-being, are environmental, social, or institutional barriers.
5) The ability to successfully deal with stress and control one's emotions correlates with appropriate health behaviours among paramedics; therefore, it is advised to implement specialised courses in this field. Paramedics should be able and be encouraged to access services and support with regard to mental health.

REFERENCES

1. Spring B, King AC, Pagoto SL, Van Horn L, Fisher JD. Fostering multiple healthy lifestyle behaviors for primary prevention of cancer. Am Psychol. 2015; 70(2): 75–90. https://doi.org/10.1037/a0038806
2. Alzahrani SH, Malik AA, Bashawri J, Shaheen SA, Shaheen MM, Alsaib AA, Mubarak MA, Adam YS, Abdulwassi HK. Health-promoting lifestyle profile and associated factors among medical students in a Saudi university. SAGE Open Medicine. 2019. https://doi.org/10.1177/2050312119838426
3. Latunji OO, Akinyemi OO. Factors influencing health-seeking behaviour among civil servants in Ibadan, Nigeria. Ann Ibd. Pg. Med. 2018; 16(1): 52–60. https://www.ajol.info/index.php/aipm/article/view/174662
4. Poortaghi S, Raiesifar A, Bozorgzad P, Golzari SEJ, Parvizy S, Rafii F. Evolutionary concept analysis of health seeking behavior in nursing: a systematic review. BMC Health Serv Res. 2015; 15(1): 523. https://doi.org/10.1186/s12913-015-1181-9

5. De Lacy-Vawdon, C, Livingstone C. Defining the commercial determinants of health: a systematic review. BMC Public Health. 2020; 20(1). https://doi.org/10.1186/s12889-020-09126-1
6. Thacker K, Haas Stavarski D, Brancato V, Flay C, Greenawald D. CE: Original Research: An Investigation into the Health-Promoting Lifestyle Practices of RNs. Am J Nurs. 2016;116(4): 24–30. https://doi.org/10.1097/01.naj.0000482141.42919.b7
7. Granter E, Wankhade P, McCann L. Hassard J, Hyde P. Multiple Dimensions of Work Intensity: Ambulance Work as Edgework. Work Employ Soc. 2018. 095001701875920. https://doi.org/10.1177/0950017018759207
8. Cheng MKF, Joseph J, Ferguson D. A cognitive behavioral model of first responder posttraumatic stress disorder. J Cogn Psychother. 2018; 32(3): 184–191. https://doi.org/10.1891/0889-8391.32.3.184
9. Lewis-Schroeder NF, Kieran K, Murphy BL, Wolff JD, Robinson MA, Kaufman ML. Conceptualization, assessment, and treatment of traumatic stress in first responders: a review of critical issues. Harvard Rev Psychiat. 2018; 26(4): 216–227. https://doi.org/10.1097/HRP.0000000000000176
10. Brooks D, Brooks R. A systematic review: What factors predict post-traumatic stress symptoms in ambulance personnel? British Paramedic J. 2021; 5(4): 18–24. doi:https://doi.org/10.29045/14784726.2021.3.5.4.18
11. Chmielewski JP, Karkowski TA, Szpringer M, Florek-Łuszczki M, Rutkowski A. Health education in the professional work of paramedics. Med Og Nauk Zdr. 2019; 25(3): 131–134. https://doi.org/10.26444/monz/111254
12. Chmielewski J, Dziechciaż M, Czarny-Działak M, Uściński P, Rutkowski A, Florek-Łuszczki M, Żeber-Dzikowska I. Environmental health threats in the work process. Med Srod. 2017; 20(2): 52–61. https://doi.org/10.19243/2017207
13. Magnavita N, Chirico F. New and Emerging Risk Factors in Occupational Health. Applied Sciences. 2020; 10(24): 8906. https://doi.org /10.3390/app10248906
14. Chirico F. Adjustment Disorder as an Occupational Disease: Our Experience in Italy. Int J Occup Environ Med. 2016; 7(1): 52–57. https://doi.org /10.15171/ijoem.2016.716
15. Chmielewski J, Żeber-Dzikowska I, Kosecka J, Wójtowicz B, Działak M, Osuch M, Gworek B, Chmielowiec B, Czarny-Działak M. Exposure to chemicals as an etiological agent of occupational skin diseases and related health education. Przem Chem. 2020; 99(8): 1254–1260. https://doi.org /10.15199/62.2020.8.28
16. Chmielewski J, Pobereżny J, Florek-Łuszczki M, Żeber-Dzikowska I, Szpringer M. Sosnowsky's hogweed–current environmental problem. Environmental Protection and Natural Resources. 2017; 28(3): 40–44. https://doi.org/10.1515/oszn-2017-0020
17. Chirico F. The assessment of psychosocial risk: only "work-related stress" or something else? Med Lav. 2015; 106(1): 65–66. PMID: 25607288
18. Chirico F, Leiter M. Tackling stress, burnout, suicide, and preventing the "Great resignation" phenomenon among healthcare workers (during and after the COVID-19 pandemic) for maintaining the sustainability of healthcare systems and reaching the 2030 Sustainable Development Goals. J Health Soc Sci. 2022;7(1):9–13. https://doi.org /10.19204/2022/TCKL1
19. Leskovic L, Erjavec K, Leskovar R, Vukovič G. Burnout and job satisfaction of healthcare workers in Slovenian nursing homes in rural areas during the COVID-19 pandemic. Ann Agric Environ Med. 2020; 27(4): 664–671. https://doi.org/10.26444/aaem/128236
20. Makara-Studzińska M, Wontorczyk A, Izydorczyk B. Stress and occupational burnout in a population of Polish doctors – Organizational-professional and non-professional-social predictors. Ann Agric Environ Med. 2020; 27(3): 456–468. https://doi.org/10.26444/aaem/110846
21. Leszczyński P, Panczyk M, Podgórski M, et al. Determinants of occupational burnout among employees of the Emergency Medical Services in Poland. Ann Agric Environ Med. 2019;26(1):114–119. https://doi.org /10.26444/aaem/94294
22. Chirico F, Sacco A, Szarpak L, Nucera G. Training first aid rescuers at workplace during the COVID-19 pandemic in Italy: challenges and opportunities. Epidemiologia e Prevenzione. 2021; 45 (6): 434–435. https://doi.org /10.19191/ep21.6.110
23. Chmielewski JP, Raczek M, Puścion M, Chmielowiec B, Pawlas N, Łuszczki JJ. COVID-19 caused by the SARS-CoV-2 virus as an occupational disease of medical professionals. Med Og Nauk Zdr. 2021; 27(3): 235–243. https://doi:10.26444/monz/139319
24. Magnavita N, Sacco A, Nucera G, Chirico F. Nicola Magnavita, Angelo Sacco, Gabriella Nucera, Francesco Chirico, First aid during the COVID-19 pandemic. Occup Med. 2020; 70(7): 458–460. https://doi.org/10.1093/occmed/kqaa148
25. Chmielewski J, Galińska EM, Anusz K, Nagas T, Trela M, Zagórski J. Personal protection measures in veterinary practice. Życie Weterynaryjne. 2015; 90(05): 277–280.
26. Chmielewski J, Galińska EM, Nagas T, Trela M, Anusz K, Zagórski J. (2015). Environmental biological hazards in veterinary practic. Życie Weterynaryjne. 2015; 90(06): 353–357.
27. Gonczaryk A, Chmielewski J, Dziechciaż M, Wróblewska I, Łuszczki JJ. Occupational exposure to biological agents in Polish paramedics: a narrative review. Disaster Emerg Med J. 2021; 6(4): 194–203. https://doi.org/10.5603/DEMJ.a2021.0032
28. https://stat.gov.pl/files/gfx/portalinformacyjny/pl/defaultaktualnosci/5513/14/4/1/pomoc_dorazna_i_ratownictwo_medyczne_w_2019_r.pdf
29. World Medical Association Declaration of Helsinki. 2013. JAMA, 310(20): 2191. https://doi.org/10.1001/jama.2013.281053
30. Rasińska R, Nowakowska I. The perception of health for nurses in their fourties. Piel Pol. 2014; 2(52): 111–116.
31. Diener E, Pressman SD, Hunter J, Delgadillo-Chase D. If, Why, and When Subjective Well-Being Influences Health, and Future Needed Research. Applied Psychology: Health and Well-Being. 2017; 9(2): 133–167. https://doi.org/10.1111/aphw.12090
32. Witczak-Błoszyk K, Krysińska K, Andriessen K, Stańdo J, Czabański A. Work-Related Suicide Exposure, Occupational Burnout, and Coping in Emergency Medical Services Personnel in Poland. Int J Environ Res Public Health. 2022; 19, 1156. https://doi.org/10.3390/ijerph19031156
33. Beldon R, Garside J. Research normal Burnout in frontline ambulance staff. Journal of Paramedic Practice. 2021; 14(1): 6–14. https://doi.org/10.12968/jpar.2022.14.1.6
34. Nowakowska S, Wolniewicz Ł. Professional burnout among nurses and paramedics. Med Sci Pulse. 2017; 11: 22–25. https://doi.org/10.5604/01.3001.0010.1585
35. Moskola V, Sándor ÁD, Susánszky É, Székely A, Hornyák I, Ozsvárt B, Néninger T, Balogh Z. Examination of coping strategies among on-stite paramedics. Eur JMental Health. 2021; 16:2. 184–195. https://doi.org/10.5708/EJMH.16.2021.2.9
36. Sifaki-Pistolla D, Chatzea VE, Vlachaki SA, Melidoniotis E, Pistolla G. Who is going to rescue the rescuers? Post-traumatic stress disorder among rescue workers operating in Greece during the European refugee crisis. Soc Psych Psych Epid. 2017; 52: 45–54. https://doi.org/10.1007/s00127-016-1302-8
37. Kosydar-Bochenek J, Ozga D, Wozniak K, Migut M, Lewandowski B, Burdzy D. Traumatic stress in the work of paramedics. Przeglad Epidemiol. 2017; 71: 639–45.
38. Warren-James M, Hanson J, Flanagan B, Katsikitis M, Lord B. Paramedic students' experiences of stress whilst undertaking ambulance placements — An integrative review. Australasian Emergency Care. 2021; 24(4): 296–301. https://doi.org/10.1016/j.auec.2021.03.002
39. Berger W, Coutinho ES, Figueira I, Marques-Portella C, Luz MP, Neylan TC, Marmar ChR, Mendlowicz MV. Rescuers at risk: A systematic review and meta-regression analysis of the worldwide current prevalence and correlates of PTSD in rescue workers. Soc Psych Psych Epid. 2012; 47(6): 1001–1011. https://doi.org/10.1007/s00127-011-0408-2
40. Lawn S, Roberts L, Willis E, Couzner L, Mohammadi L, Goble E. The effects of emergency medical service work on the psychological, physical, and social well-being of ambulance personnel: A systematic review of qualitative research. BMC Psychiatry. 2020; 20(1): 348. https://doi.org/10.1186/s12888-020-02752-4
41. Brooks D, Brooks R. A systematic review: What factors predict post-traumatic stress symptoms in ambulance personnel? British Paramedic J. 2021; 5(4): 18–24. https://doi.org/10.29045/14784726.2021.3.5.4.18
42. Carleton RN, Afifi TO, Turner S, Taillieu T, Duranceau S, LeBouthillier DM, et al. Mental disorder symptoms among public safety personnel in Canada. Can J Psychiatry. 2018; 63(1): 54–64. https://doi.org/10.1177/0706743717723825
43. Carleton RN, Afifi TO, Turner S, Taillieu T, El-Gabalawy R, Sareen J, Asmundson GJG. Chronic pain among public safety personnel in Canada. Can J Pain. 2017; 1(1): 237–246. https://doi.org/10.1080/24740527.2017.1410431
44. Sommer JL, El-Gabalawy R, Taillieu T, Afifi TO, Carleton RN. Associations between trauma exposure and physical conditions among public safety personnel. Can J Psychiatry. 2020; 65(8): 548–558. https://doi.org/10.1177/0706743720919278
45. Carleton RN, Afifi T O, Taillieu T, Turner S, Krakauer R, Anderson GS, et al. Exposures to potentially traumatic events among public safety personnel in Canada. Can J Beh Sci. 2019; 51(1): 37–52. https://doi.org/10.1037/cbs0000115

46. Carleton RN, Afifi TO, Turner S, Taillieu T, LeBouthillier DM, Duranceau S, et al. Suicidal ideation, plans, and attempts among public safety personnel in Canada. Can Psychol. 2018; 59(3): 220–231. https://doi.org/10.1037/cap0000136
47. Harrison J. Organisational factors: impacting on health for ambulance personnel. Int J Emergency Serv. 2018. https://doi.org/10.1108/ijes-02-2018-0013
48. Pow J, King DB, Stephenso E, DeLongis A. Does social support buffer the effects of occupational stress on sleep quality among paramedics? A daily diary study. J Occup Health Psych. 2017; 22(1): 71–85. https://doi.org/10.1037/a0040107
49. Froutan R, Mazlom R, Malekzadeh J, Mirhaghi A. Relationship between resilience and personality traits in paramedics. Int J Emergency Serv. 2017. https://doi.org/10.1108/ijes-12-2016-0028
50. Ogińska-Bulik N, Kobylarczyk M. Relation between resiliency and post-traumatic growth in a group of paramedics: The mediating role of coping strategies. Int J Occup Med Env. 2015; 28(4): 707–719. https://doi.org/10.13075/ijomeh.1896.00323
51. Petrie K, Milligan-Saville J, Gayed A, Deady M, Phelps A, Dell L, et al. Prevalence of PTSD and common mental disorders amongst ambulance personnel: a systematic review and meta-analysis. Soc Psych Psych Epid. 2018. https://doi.org/10.1007/s00127-018-1539-5
52. Hegg-Deloye S, Brassard P, Prairie J, Larouche D, Jauvin N, Poirier P, et al. Prevalence of risk factors for cardiovascular disease in paramedics. Int Arch Occ Env Hea. 2015; 88(7): 973–980. https://doi.org/10.1007/s00420-015-1028-z
53. Maguire BJ, O'Meara P, O'Neill BJ, et al. Violence against emergency medical services personnel: a systematic review of the literature. Am J Ind Med. 2018; 61:167–180. https://doi.org/10.1002/ajim.22797
54. Zhang Q, Dong H, Zhu C, Liu G. Low back pain in emergency ambulance workers in tertiary hospitals in China and its risk factors among ambulance nurses: a cross-sectional study. BMJ Open. 2019; 9(9): e029264. https://doi.org/10.1136/bmjopen-2019-029264
55. Kuleta A. The impact of shift work on the occurrence of pathophysiological changes – a literature review. Forum Zaburz Metab. 2016; 7(2): 93–98. https://journals.viamedica.pl/forum_zaburzen_metabolicznych/article/view/47523/34867
56. Zużewicz K. Health Effects of Work in 'Nonphysiological Rythm'. Zesz Nauk SGSP. 2017; 62(1): 127–139. https://bibliotekanauki.pl/articles/137070
57. James SM, Honn KA, Gaddameedhi S., Van Dongen HPA. Shift Work: Disrupted Circadian Rhythms and Sleep—Implications for Health and Well-being. Curr Sleep Medicine Rep. 2017; 3: 104–112. https://doi.org/10.1007/s40675-017-0071-6
58. McNeil J, Heer E, Willemsen RF, Friedenreich CM, Brenner DR (2020). The effects of shift work and sleep duration on cancer incidence in Alberta`s Tomorrow Project cohort. Cancer Epidemiol. 2020; 67: 101729. https://doi.org/10.1016/j.canep.2020.101729
59. Heath G, Coates A, Sargent C, Dorrian J. Sleep Duration and Chronic Fatigue Are Differently Associated with the Dietary Profile of Shift Workers. Nutrients. 2016; 8(12): 771. https://doi.org/10.3390/nu8120771
60. Khan WAA, Conduit R, Kennedy GA, Jackson ML. The relationship between shift-work, sleep, and mental health among paramedics in Australia. Sleep Health. 2020. https://doi.org/10.1016/j.sleh.2019.12.002
61. Khan WAA, Conduit R, Kennedy GA, Abdullah Alslamah A, Ahmad Alsuwayeh M, Jackson, ML. Sleep and Mental Health among Paramedics from Australia and Saudi Arabia: A Comparison Study. Clocks and Sleep. 2020; 2(2): 246–257. https://doi.org/10.3390/clockssleep2020019
62. Patterson PD, Higgins JS, Van Dongen HPA, Buysse DJ, Thackery RW, Kupas DF, Becker DS, Dean BE, Lindbeck GH, Guyette FX, Penner JH, Violanti JM, Lang ES, Martin-Gill C. Evidence-Based Guidelines for Fatigue Risk Management in Emergency Medical Services. Prehosp Emerg Care. 2018: 15;22(sup1): 89–101. https://doi.org/10.1080/10903127.2017.1376137
63. Chirico F, Leiter M. Tackling stress, burnout, suicide, and preventing the "Great resignation" phenomenon among healthcare workers (during and after the COVID-19 pandemic) for maintaining the sustainability of healthcare systems and reaching the 2030 Sustainable Development Goals. J Health Soc Sci. 2022; 7(1):9–13. https://doi.org/10.19204/2022/TCKL1
64. Wróblewska I, Wróblewska Z, Grudzień R, Dziechciarz M, Czabak-Garbacz R, Choina P, Chmielewski J. Post-vaccination reactions occurring in patients vaccinated against SARS-COV-2. Med Og Nauk Zdr. 2021; 27(4): 421–427. https://doi.org/10.26444/monz/145063