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Predictors of lower work ability among emergency medicine employees: the Croatian experience

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ABSTRACT

Background Worldwide research has indicated that emergency medicine employees and particularly ambulance personnel have symptoms related to traumatic events, and experience more chronic stressors in their work than workers in other health service settings. Unlike other countries which conducted similar studies, no specialty branch in emergency medicine exists in Croatia.

Study objectives To identify possible predictors of low work ability, including occupational stress and quality of life, among emergency medicine employees.

Methods A cross-sectional study was conducted from May 2010 till July 2010 in the Institute of Emergency Medicine in the City of Zagreb. Questionnaires were distributed to all employees with gathered total sample of 125 subjects (39 physicians, 38 medical nurses /technicians and 48 drivers). Data were collected using the socio-demographic questions, occupational stress assessment, work ability index (WAI) and WHO quality of life (WHOQOL-BREF) questionnaires.

Results Emergency physicians were significantly more exposed to public criticism ($p=0.008$) but drivers had more exposure to hazards at workplace ($p=0.001$) regarding other employee groups. Binary logistic regression model showed two significant predictors of lower work ability (WAI score <37): lower physical WHO-BREF domain (OR=0.78; 95% CI 0.68 to 0.89; $p<0.001$) and the professional and intellectual demands (OR=1.09; 95% CI 1.01 to 1.19; $p=0.043$).

Conclusion Strenuous physical activity should be reduced in order to increase the overall work ability of the emergency medicine employees and better structural organisation and introduction of a residency in emergency medicine should significantly improve total work ability among emergency physicians.

INTRODUCTION

The worldwide popularity of TV dramas taking place in emergency rooms, and our own real life experiences and conclusions have meant that working in emergency medicine (EM) is widely perceived as being as stressful as it gets when it comes to medical practice, and extensive research has been conducted based on these assumptions.[1] Worldwide research has indicated that ambulance personnel have symptoms related to traumatic events and engage in more activities that lead to chronic stress in their work than workers in other health service settings.[2] These include having to take rapid action and providing medical care under life-and-death circumstances in unfamiliar and inconvenient conditions, while being scrutinised by bystanders and relatives.[3] As a consequence of this, ambulance personnel are said to have an increased standardised mortality rate[4] and an increased occupational death rate,[5] and a higher proportion take early retirement.[6 7]

There are claims that ambulance work may not be inherently stressful, and that it is sources other than ambulance work, such as managerial roles, relationships with others at work and the work-life balance which create pressure for ambulance personnel.[1 8] However, research concerning both administrative-organisational and ambulance-specific stressors is sparse.[9]

Ambulance workers may also face different challenges in urban and rural areas, such as differences in the closeness of interaction with the client population, distance to the nearest hospital, number and types of incidents and overall activity level. It is of utmost significance to increase understanding of the type of stressors that may decrease work ability in ambulance employees in both urban and rural areas.

According to the Croatian Labour Law, until 1999, health workers employed in EM had a prolonged insurance period.[10 11] This could be dated back to legislation in former Yugoslavia, where the prolonged insurance period had a preventive role and enabled EM workers to retire prior to onset of disability. Croatia is a post-communist, transitional country and as such is experiencing intense changes in its laws and law making processes. Labour laws have been among the most commonly changed laws since Croatia's independence, mainly due to European Union (EU) accession negotiations.

Additionally, as of 2009, a residency period in EM officially exists but at the time of writing the manuscript, not a single person was working as an EM resident in Croatia.[12] As a consequence, physicians employed in EM centres in Croatia essentially have no formal specialist education. EM in Croatia today is basically a step on the ladder for young physicians. After a maximum of two years, young physicians leave after being accepted for their desired residency outside EM. This is due to the lack of the above mentioned residency and also the fact that many young physicians try to choose a specialty that is considered 'lifestyle controllable'.[13] Other reasons for not staying in EM include shift-work and, emotional stress, family considerations and physical stress.[14] The devoted few stick around and comprise the vast majority of the older medical staff working in institutions providing EM services. Implementation of a new residency system would also mean that the older

emergency physicians (EP) need to fulfil a series of conditions in order to be acknowledged as EM specialists according to the new law.[15] All of these factors have until now been contributing to the long-term general low appeal of careers in EM for young physicians in Croatia. On the other hand, field medical technicians and nurses now have options for further education to a BSc after high school.[16]

Our study is the first conducted in Croatia to investigate this field of medicine. The aim of our study was to identify possible predictors of work ability, including occupational stress and quality of life, among EM employees.

SUBJECTS AND METHODS

Location and participants

This study was conducted from May 2010 to July 2010 in the Institute of Emergency Medicine of the City of Zagreb. During the study period, there were 425 employees working in the Institute, among whom 252 (59.3%) employees were medical staff (91 EP's, 158 nurses/medical technicians and 3 laboratory engineers/technicians) and 173 (40.7%) non-medical staff: 122 drivers, 14 vehicle technicians, 2 tailors and 23 administrators. All employees were offered the opportunity to participate in the study. One hundred and twenty five people (39 emergency physicians, 38 nurses/medical technicians and 48 drivers) returned completed questionnaires, giving a response rate of around 30%.

Ethical considerations

The relevant institutional ethics committee approved the current research. Furthermore, the institutional research board at each hospital gave additional permission to carry out and publish the results of the study. Each questionnaire was prefaced with a letter explaining the objectives of the study and assuring respondents as to the anonymity and confidentiality of their responses. Questionnaires were distributed in unmarked envelopes in each hospital department. All questionnaires were returned anonymously in sealed unmarked envelopes to protect the participants' privacy. Participation in the study was voluntary.

Instruments

The self-administered questionnaire comprised three parts, with additional questions addressing the participants' socio-demographic characteristics (sex, age, marital status, number of children, educational level, workplace, total duration of employment, duration of employment at the current workplace, work hours, teamwork and regular employment). The first part assessed their work ability and the second part assessed their quality of life. Work ability was measured using the work ability index (WAI) developed by the Finnish Institute of Occupational Health.[17] Quality of life was measured using the Quality of Life questionnaire developed by the WHO (WHOQOL-BREF).[18 19]

The WAI is a self-administered questionnaire that derives the sum of scores for seven variables: (1) subjective estimation of present work ability compared with lifetime best (0–10 points), (2) subjective work ability in relation to both physical and mental demands of the work (2–10 points), (3) diseases diagnosed by the physician (1–7 points), (4) subjective estimation of work impairment due to diseases (1–6 points), (5) sickness absenteeism over the past year (1–5 points), (6) own prognosis of work ability after 2 years (1, 4 and 7 points) and (7) psychological resources including how much the participant enjoys daily tasks, activity and life spirit, and how optimistic they are about the future (0–4 points).

The score derived from the WAI ranges from 7 to 49, and participants' overall scores can be put into one of the four categories: poor (7–27 points), moderate (28–36 points), good (37–43 points) and excellent (44–49 points). The reliability and validity of WAI has been very well reported with Cronbach's α=0.83.[20] The test-retest reliability of WAI shows an acceptable level of reliability for the classification of a subject's work ability over a 4-week period.[21] Moreover, significant correlations have been found between the WAI scores and objective measurements, with r=0.32 for muscular strength, and r=0.37 for endurance.[22]

The WHOQOL-BREF psychometric properties of the Croatian version of the questionnaire were comparable with the international studies.[18 23 24] Socio-demographic data included questions concerning age, gender, working experience, primary workplace (non-surgical or surgical department), education level, marital status, amount of shift work (work other than work on work days, 8 h a day, starting between 6:00 and 8:00 and ending between 14:00 and 16:00, respectively), satisfaction with present work tasks, satisfaction with professional life, positive experiences in professional life, career advancement and satisfaction with general health status. Questions in the WHOQOL-BREF questionnaire were grouped into four domains: physical health (daily living activities, dependence on medicinal substances and medical aids, energy and fatigue, mobility, pain and discomfort, sleep and rest and work capacity), psychology (bodily image and appearance, negative feelings, positive feelings, self-esteem, spirituality / religion / personal beliefs, thinking, learning, memory and concentration), social relationships (personal relationships, social support, sexual activity) and environment (financial resources, freedom, physical safety and security, health and social care: accessibility and quality, home environment, opportunities for acquiring new information and skills, participation in and opportunities for recreation / leisure activities, physical environment (pollution/noise/traffic/climate), transport).

Occupational stress was measured with the Occupational Stress Assessment Questionnaire (OSAQ). The OSAQ is shorter than available questionnaires that estimate occupational stress and is thus more convenient for healthcare workers. In addition, it assesses stressors specifically associated with hospital healthcare workers in post-communist transitional countries who work in similar systems.[25] The second part comprised 37 questions that related to stressors in the workplace. Participants were asked to grade the stressors using a Likert Scale from one (not stressful at all) to five (extremely stressful).[16]

Study variables

Satisfactory work ability was defined as a WAI score equal to 37 or more. The WHOQOL-BREF data was collated according to the WHOQOL-BREF scoring instructions prior to statistical analysis.[13] Variables were transformed to a linear scale (0–100), with 100 indicating the highest and 0 the lowest possible quality of life. The scale scores were not calculated if more than 50% of items in the scale were missing. The stressors from OSAQ were grouped into six groups as follows: organisation of work and financial issues, public criticism, hazards in the workplace, interpersonal conflicts at the workplace, shift work and professional and intellectual demands.[26 27]

Statistical analysis

Descriptive statistics including frequencies, means, medians, SDs, 25th and 75th percentiles (IQR) were calculated. Data distribution was analysed using a Kolmogorov-Smirnov test and,

Table 1 Socio-demographic data of investigated population

Variables	Emergency physicians N=39	Nurses/medical technicians N=38	Drivers N=48	p Value
Male gender: N (%)*	9 (23.1%)	36 (94.7%)	47 (97.9%)	<0.001
Living with partner: N (%)*	33 (84.6%)	36 (94.7%)	48 (100.0%)	0.013
Age (years): mean±SD†	39.7±12.2	34.9±10.6	38.4±7.9	0.100
Total working experience (years): median (IQR)‡	14.0 (2.0–25.0)	11.5 (6.8–18.3)	16.0 (10.3–21.0)	0.174
Working experience on emergency unit (years): median (IQR)‡	5.0 (0.5–17.0)	8.0 (5.0–15.0)	8.5 (6.0–15.0)	0.589
WAI: mean±SD†	39.8±8.3	41.6±5.9	42.7±5.7	0.141
Physical domain: mean±SD†	80.7±17.9	79.8±17.9	80.3±14.7	0.972
Psychological domain: mean±SD†	73.6±14.5	75.7±18.1	76.9±13.9	0.617
Social relationship: mean±SD†	75.8±18.6	75.5±22.3	79.3±16.3	0.583
Environmental domain: mean±SD†	70.7±16.0	66.2±19.9	67.9±17.5	0.542
Organisation of work and financial issues: mean±SD†	48.3±24.9	41.8±26.2	44.1±23.4	0.499
Public criticism: mean±SD†	53.0±28.3	33.7±29.4	38.6±26.4	0.008
Hazards at workplace: mean±SD†	26.9±20.5	27.9±25.5	44.8±25.8	0.001
Interpersonal conflicts at workplace: mean±SD†	28.5±23.2	23.0±22.0	26.4±23.9	0.464
Shift work: mean±SD†	47.4±27.8	38.9±32.0	35.3±27.6	0.150
Professional and intellectual demands: mean±SD†	40.4±23.8	31.5±24.3	30.1±21.1	0.093

*χ^2 test.
†One way ANOVA.
‡Kruskal–Wallis test.
WAI, Work Ability Index.

according to the type of distribution, appropriate parametric or equivalent non-parametric tests were used. Quantitative variables that did not have a normal distribution were described using the median and corresponding IQR. Since the WAI score followed a normal distribution, the mean and SD were used. Binary logistic regression was performed to assess how predictions for each of the WHOQOL-BREF domains: predictor variables included socio-demographic characteristics and work ability groups (WAI score <37 and ≥37). Dependent binary variables concerning quality of life domains were individually coded, giving a '0' if score was ≤60 and '1' if score was > 60.[28] Subjects who scored over 60 were included in the group with satisfactory quality of life for that domain. MedCalc (MedCalc Software V.11.3) statistical software was used to perform all statistical analyses; p<0.05 was considered statistically significant.

RESULTS

Table 1 shows the socio-demographic data of the surveyed population. We note that there were significant differences in gender distribution; in comparison with physicians, medical technicians and drivers were more likely to be men (p<0.001). EPs also were more likely to be living on their own, while more medical technicians and drivers lived with partners (p=0.013). Physicians showed higher exposure to public criticism than other two groups (p=0.008), while drivers had a higher exposure to hazards in the workplace compared with the other two groups (p=0.001).

Binary logistic regression was performed to assess the impact of various factors on the likelihood that participants had a poor WAI score (WAI<37). The model included 16 independent variables (occupation, gender, WHOQOL-BREF domains, occupational stress factors, work experience and marriage). The full model containing all predictors was statistically significant (N=125, χ^2=81.3 p<0.001) indicating that the model was able to identify participants who had a poor work ability. The model as a whole explained between 47.8% (Cox and Snell R^2) and 73.8% (Nagelkerke R^2) of the variance in work ability status and correctly classified 92.0% of cases.

Table 2 Predictors of poor work ability (WAI <37): binary logistic regression

	B	SE	Wald	df	OR (95% CI)	p Value
Female gender	0.30	1.36	0.05	1	1.34 (0.09 to 19.22)	0.828
Total work experience (years)	0.04	0.04	0.95	1	1.04 (0.96 to 1.12)	0.329
Physical domain*	−0.25	0.07	13.60	1	0.78 (0.68 to 0.89)	<0.001
Psychological domain	0.07	0.06	1.53	1	1.07 (0.96 to 1.21)	0.216
Social relationship	−0.02	0.04	0.26	1	0.98 (0.91 to 1.06)	0.607
Environmental domain	0.10	0.05	3.45	1	1.10 (0.99 to 1.22)	0.063
Organization of work and financial issues	−0.08	0.05	2.03	1	0.93 (0.83 to 1.03)	0.154
Public criticism	0.02	0.03	0.52	1	1.02 (0.97 to 1.07)	0.471
Hazards at workplace	0.03	0.03	0.99	1	1.03 (0.97 to 1.10)	0.321
Interpersonal conflicts at workplace	−0.05	0.04	2.08	1	0.95 (0.88 to 1.02)	0.150
Shift work	0.03	0.02	1.79	1	1.03 (0.99 to 1.08)	0.181
Professional and intellectual demands*	0.09	0.04	4.10	1	1.09 (1.01 to 1.19)	0.043
Emergency physicians			3.13	2		0.209
Medical technicians	−2.00	1.50	1.77	1	0.14 (0.01 to 2.58)	0.183
Drivers	−3.53	2.01	3.10	1	0.03 (0.00 to 1.49)	0.078
Living with partner	0.98	1.95	0.25	1	2.65 (0.06 to 120.85)	0.617
Constant	5.55	3.40	2.67	1	257.99	0.102

B, Unstandardized Regression Coefficient.
*Statistically the two most significant criteria for prediciting low work ability.

As shown in table 2, only two of the independent variables (Physical WHOQOL-BREF domain and professional and intellectual demands) made a unique statistically significant contribution to the model. This indicated that participants who had a lower score in the physical domain were 1.64 (1/0.78) times more likely to have a poor WAI score and participants who had more professional and intellectual demands were 1.09 times more likely to have a poor WAI score, when all other factors were controlled for in the model.

DISCUSSION

Even though our study had a relatively low overall response rate, the logistic regression model explained a high percentage of the variance (between 47% and 73%) and correctly classified 92% of cases. Results in table 1 indicate a skewed gender distribution among the surveyed participants. The higher proportion of women as EPs correlates with the increasing percentage of female physicians newly graduating from medical schools each year.[29] Growing public criticism of EPs goes hand in hand with the higher intellectual demands and could contribute to more stress along with other factors such as having to carry more responsibility. Hence, more EP's live on their own than the other two groups surveyed. Drivers reported a higher number of hazards in the workplace, which indicates the higher perceived likelihood of injury, especially minor injuries in car crashes.

Two very specific and statistically significant criteria for predicting low work ability were physical health and, professional and intellectual demands (table 2). As expected, the more physically challenging the daily routine, the lower the WAI score. Similar studies have drawn the same conclusions[1 2 16 26 30] Lowering the physical stress experienced by employees in the institute would significantly improve overall productivity through improving the work ability index. Increasing the amount of healthy physical activity done outside or inside the workplace through exercise (possibly through subsidised memberships in health clubs), adjusting or slightly reducing daily working hours and increasing the number of vacation days could perhaps help towards this.[31]

The professional and intellectual demands measured in the questionnaire assessed the level of intellectual engagement necessary for the daily routine. Our study found that higher intellectual demands while working impacted negatively on the WAI score. This means that high intellectual demands at work in fact act as a negative stimulus and result in a poorer WAI score. Similar studies have found the opposite effect,[16 26 30] with high intellectual demands stimulating the employee to perform better. Our findings may correlate with the current lack of organisation in further specialist EM education in Croatia. Physicians working in EM are not professionally stimulated due to the aforementioned lack of an EM residency programme. The main solution to the problem would primarily be the implementation of a specialised EM branch with appropriate education set in place, according to the new five-year residency law.

Further multi-centric study should be conducted in urban and rural areas with a higher number of participants and should assess in detail the physical demands in specific areas of work and work assignments.

Limitations

The main limitation of this preliminary study was a relatively low combined response rate; however, when each survey group is considered separately, the response rates were: 39 out of 91 (42.8%) for EPs, 38 out of 158 (24.0%) for medical technicians/nurses and 12 out of 48 (39%) for drivers. The majority of employees were medical technicians/nurses. Such a low response rate could be a result of burnout in the institute, especially among the medical technicians and it will be a tough challenge to find out how to reach this group. Additional effort shall be applied when conducting a second, expanded study in the institute in the near future.

CONCLUSION

Physical health and professional and intellectual demands were the main factors influencing work ability among EM employees. Physical health was negatively correlated with work ability and physical demands should be reduced in order to increase overall work ability among EM employees. Professional and intellectual demands also have a negative impact on work ability. Better structural organisation and swifter implementation of the new EM residency programme to increase competitiveness of EPs should significantly improve their total work ability.

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Competing interests None.

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