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ORIGINAL ARTICLE

The effect of physical activity on the quality of life of emergency room nurses working in public hospitals

Ioannis Leridis *General Hospital of Kavala. Greece*
Department of Physical Education & Sport Science. Democritus University of Thrace. Komotini, Greece.
Ourania Matsouka. *Department of Physical Education & Sport Science. Democritus University of Thrace. Komotini, Greece.*
Evangelos Bebetsos. *Department of Physical Education & Sport Science. Democritus University of Thrace. Komotini, Greece.*
Georgios Kosta. *Department of Physical Education & Sport Science. Democritus University of Thrace. Komotini, Greece.*

ABSTRACT

The aim of this study is to investigate the effect of physical activity on the quality of life of emergency room nurses working in public hospitals. The sample for the preliminary research consisted of 476 nurses, working in emergency rooms in the 3rd, 4th and 5th Health Regions of Greece. The participants' ages ranged from 22 to 60 years (age 42.49 ± 9.5 years). The latter completed questionnaires where the quality of life and physical activity were assessed. The questionnaire SF12 was used – a questionnaire developed as a shorter alternative solution to the questionnaire SF36 (Ware & Sherbourne 1992). Furthermore, for the assessment of physical activity, the International Physical Activity Questionnaire (short version) was used (Craig, et. al., 2003). The results of statistical analysis showed that nurses' quality of life level was low, and the majority of nurses displayed a low level of physical activity. Also, according to the post-hoc Scheffe test, physical activity is directly correlated to the quality of life, because it positively affects physical and mental health indicators - $F(2,473)$, $p < .05$. We conclude that physical activity helps to improve the quality of life parameters, improving physical and mental health indicators.

Keywords: Physical activity psychology, Sport Medicine, Physical health, Mental health, Sports health.

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Corresponding author. *Department of Physical Education & Sport Science. Democritus University of Thrace. Komotini, Greece.*
E-mail: johnleridis@gmail.com
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INTRODUCTION

As defined by the World Health Organisation (WHO), physical activity is any bodily movement produced by skeletal muscles that requires energy expenditure higher than that of resting energy expenditure, i.e., any bodily movement caused by muscle contraction that requires energy expenditure (WHO 2004). Consequently, physical activity apart from exercising and sports, may also be doing housework. Sports is defined as a strictly structured physical activity, under rigorous rules, high levels of competition and specialisation, whose basic aim is to maximise athletic performance. On the other hand, exercising is defined as each systematic bodily movement or participation in physical activities, that is time-limited, less competitive and where, mostly, the body's major muscle groups are involved (Berger et al.,2007).

WHO guidelines recommend the following for individuals in the age range 18-64: a) at least 150–300 minutes of moderate-intensity aerobic physical activity per week or 75 minutes of vigorous-intensity aerobic physical activity weekly or an equivalent in time combination of moderate and vigorous-intensity activity (e.g., 75 minutes of moderate + 30 minutes of high-intensity activity). b) muscle-strengthening exercises with an emphasis on major muscle groups, that must be undertaken at least twice a week. (WHO,2004).

For additional health benefits, individuals should increase moderate-intensity aerobic physical activity from 150 to 300 minutes weekly or commit themselves to more than 150 minutes of vigorous-intensity aerobic physical activity or an equivalent in time combination of moderate to high-intensity activity. Each aerobic physical activity session should be at least 10 minutes long. (WHO,2004).

Exercising systematically over a long period of time, strengthens body muscles, diminishes excess fat, defines muscles and results in a graceful and attractive physique. Strengthening the muscles has a very practical result: it enables individuals to effortlessly carry out daily bodily activities whist dealing with any additional problems with ease. Individuals become productive without getting overly tired. Their self-esteem is boosted as is their satisfaction, feelings that are so important for our mental health (Hornquist, 1982).

The quality of life was originally associated with the concept of the standard of living as it included concepts related to the consumer society, as owning electrical appliances, cars and a residence, i.e., purely material goods. (Fallowfield, 1990). Later, the term "*quality of life*" was expanded to include the rate of satisfaction of needs, as regards the physical, mental, social, material and structural areas of life.(Hornquist, 1982).

The concept of health-related quality of life has been at the forefront of scientific research in recent years. It expresses the subjective feeling of fulfilment and safety as well as the feelings of satisfaction and pleasure that an individual experiences by participating in all activities of everyday life (Ventegodt, 1995).

As regards the first factor, i.e. Physical health, it has been established that the contribution of physical activity to the quality of life, is that it reduces the risks for obesity, coronary artery disease, type II diabetes and breast and colon cancer(Williamson et al., 2004). As to the second factor, i.e. mental health, exercise brings about pleasure associated with well-being and life satisfaction. The release of "*endogenous*" opioid substances created inside the body during physical activity, as β-endorphin and β-lipotropin, prompt euphoria either during or after exercising(Clarke and Haworth, 1994).

A substantial proportion of emergency room nurses display burnout symptoms as a result of low quality of life levels. Also, many researchers maintain that the percentage of burnout in emergency room nurses is

higher than that of nurses working in other hospital departments, such as intensive care units, surgery departments etc.(Adriaenssens et al., 2015; Robin and Leslie, 2006).

The aim of the study

The aim of this study is to investigate the effect of physical activity on the quality of life of emergency room nurses working in public hospitals.

Through the findings of this research, this research hopes to provide public and private sector health care units with guidelines for developing and materialising motor activation models which will potentially contribute to increasing the active life span of emergency room nurses in Greek hospitals. It will also try to shed light on some of the recent main research interest topics in the field of Physical Activity and especially in the field of exercise and mental well-being.

Specifically, the research has two sub-objectives. The first is to record and evaluate the levels of physical activity and quality of life of workers, and the second is to track the relation between physical activity as a health behaviour and the quality of life of emergency room nurses.

MATERIAL AND METHODOLOGY

Participants

The research sample consisted of 476 nurses, both male and female, working in public hospital emergency rooms in the 3rd, 4th and 5th Health Regions of Greece. In total 476questionnaires were filled out and used for statistical analysis. The sample consisted of 355women and 121 men, with an average age of about 43 years (mean = 42.49, SD = 9.5). To facilitate date analysis, the participants were grouped in four categories based on data distribution. The first category consisted of nurses in the 22-32 age group, the second in the 33-43 age group, the third in the 44-54 age group and the fourth in the age group 55 and over. A prerequisite to participating in the research, is that the nurses have been employed for at least one year in the specific department and that they are permanent civil servants serving in the 3rd, 4th and 5th Health Regions.

Furthermore, 50.5% were married, followed by singles at 36.3%. Divorcees were at 13.2% whilst 58% of the total sample indicated that they were parents. As regards the educational level of the employees, most, 51%, were higher technological school graduates (N = 245), 39% (N = 185) were secondary school graduates, whilst the percentage of university graduates was the lowest at 10% (N = 46). The percentage of participants holding postgraduate degrees (both university graduates and higher technological school graduates) was only 15.5% (N = 74).

Measures

For the assessment of physical activity, the International Physical Activity Questionnaire (IPAQ, short version) (recall period one week) was used (Craig, et. al., 2003). Specifically, the said questionnaire consists of 7 questions collecting information on the time consumed daily in vigorous, moderate and walking activities as well as the time consumed sitting at rest over a seven-day period. The daily physical activity was assessed in MET (MET is a unit that represents the energy spent sitting at rest. 1 MET = 3.5 nil 02 /kg body weight/minute, which is the oxygen consumed sitting at rest), as per the official protocol of IPAQ Being. Three classification categories of physical activity were built based on the values: a)low physical activity, b)moderate physical activity, c) high physical activity.

For the assessment of the quality of life, the questionnaire SF12 was used, a questionnaire developed as a shorter alternative version of the questionnaire SF36 used for large-scale studies, and science the results that interest us, are those of physical and mental health, theSF12 was more appropriate for our needs, as opposed to the characteristic SF36 that consists of eight scaled scores (Ware & Sherbourne 1992).

The aim of the questionnaire is to measure the eight sections of the quality of life that are associated with health. These eight sections are as follows: Physical functioning (PF), physical role functioning (RP), bodily pain (BP), general health perceptions (GH), vitality (VT), social role functioning (SF), emotional role functioning (RE) and emotional well-being or mental health (MH) (Ware 1992).

The scaled scores range from 0-100. When the result obtained is <50, what it indicates is that the health of the patient is below the mean (Ware & Sherbourne 1992). Each assessment scale corresponds to a specific number of close ended questions with a distinct set of pre-defined responses. The range of options in responses ranges from 2–5 gradations (e.g. there are questions where the response either has two options, "*Yes*" or "*No*", or three options: (a) "*Yes, it limits me a lot*", (b)"*Yes it limits me a little*", (c)"*Not it does not limit me at all*", or five options: (a)"*Not at all*", (b)"*Slightly*", (c)"*Moderately*", (d)"*A good bit of the time*", (e) "*Very much*"(Ware and Sherbourne 1992).

The scoring of each section can be converted into a percent, where the value 0 represents the lowest possible score and the value 100 (perfect health) the highest possible score. The scores between these two extreme values depict the ratio of the final total score of the scale measured. The higher thus the participant's score, the better the quality of his/her life (Ware et al., 1998). The eight sections are summarised into two total results, the first relating to the overall physical health and the second to the overall mental health, and as measurable indicators, and for the sake of brevity, they are namedPCS-36 and MCS- 36 (Ware and Stewart,1996; Ware et al.,1998).

Procedure

The participants were informed that all questionnaire answers would be confidential. The questionnaires were completed from January 2022 to April 2022. Each nurse completed three questionnaires, one on physical activity, one on burnout and one on their demographics, during their work, in the presence of the researcher. Firstly, permission was requested from the Board and Scientific Council of each hospital for conducting the research, as well as from the Ethics Committee of the Democritus University of Thrace. Permission from the latter was granted on 16/12/2021 under permission no. 25075/168.Thereafter, the head and director of the department was informed about the goals and the content of the research. After the briefing, participants were advised that a)their participation was voluntary, b)the questionnaires were anonymous, c)absolute confidentiality would be maintained and d)the results would be used solely for scientific purposes.

Analysis

Data analysis was run using the statistical package SPSS 17.0 for Windows. The internal consistency of tests and measures was assessed by using Cronbach's alpha reliability coefficient. Mean and standard deviation and/or medians were used for describing the quantitative variables. Absolute values (N) and relative frequencies (%) were used to describe the qualitative variables. Also, in order to examine whether there were differences in factors between quality of life (dependent variable) and the level of physical activity (independent variable) a two-way MANOVA was performed (multivariate analysis of variance), and to test differences between the groups, Scheffe's post hoc test was carried out. The significance level was set to $p < .05$.

RESULTS

Cronbach's alpha reliability coefficient

The internal consistency of the questionnaire's factors of quality of life, was measured using Cronbach's alpha coefficient**.** The results showed that most variables had a high degree of internal consistency, and especially so as regards the variable "*physical role functioning*" (RP = 0.83) (Table 1).

Table 1. Results of reliability testing, survey instrument SF-12.

Factor	Cronbach coefficient α
Physical functioning (PF)	0.78
Physical role functioning (RP)	0.83
Bodily pain (BP)	0.81
General health (GH)	0.81
Vitality (VT)	0.81
Social role functioning (SF)	0.81
Emotional role functioning (RE)	0.66
Emotional well-being or mental health (MH)	0.72

Level of physical activity

The level of physical activity of the research participants was measured using the International Physical Activity Questionnaire (IPAQ, short version). Table 2 depicts the level of the participants' physical activity, which was divided into three categories (1 = low activity, 2 = moderate activity and 3 = high activity). Analysing the levels of physical activity, it was shown that 44.5% of nurses displayed a low level of physical activity, 33.4% displayed a moderate level of physical activity and 22.1% displayed a high one.

Table 2. Participants' level of physical activity.

Physical activity level	N	%
Low activity	212	44.5%
Moderate activity	159	33.4%
High activity	105	22.1%
Total	476	100%

Level of quality of life

The participants' quality of life (QOL) was measured using the scale SF12 and the values found by category are described in the table below (Table 3). The results of the individual dimensions showed low mean values that ranged between 42.55 and up to 59.30. The lowest mean value was found to be that of "*physical role functioning*" (Mean = 42.55, Standard deviation = 45.783) whilst the highest was that of "*physical functioning*" (Mean = 59.30, Standard deviation = 32.791). The common feature of these results is the high standard deviation which corresponds to at least to one third of the mean. The average coefficient of variation was equal to 0.595, indicating that on average, the standard deviation was equal to 60% of the mean value.

The effect of physical activity on the quality of life

To analyse the variance of the quality-of-life factors with the factor of physical activity the Multivariate Analysis of Variance (MANOVA) technique was performed. The purpose of this research was to examine the research hypothesis regarding the parallel effect of the level of physical activity on quality of life dimensions.

This particular analysis is used to study the effect of two or more categorical variables, which in this case will be referred to as factors, on a multitude of quantitative variables. Categorical variables are to be understood

as independent variables and quantitative variables are to be understood as dependent ones. The categorical-independent variable in this specific study is physical activity in three levels (1 = low physical activity, 2 = moderate physical activity and 3 = high physical activity), whilst the dependent variables are the scales (variables) of the questionnaires on quality of life.

Table 3. Measures of location and dispersion of the dimensions quality of life.

Factor	Mean ± SD	CV
Physical functioning (PF)	59.30 ± 32.79	0.55
Physical role functioning (RP)	42.55 ± 45.78	1.07
Bodily pain (BP)	55.81 ± 27.50	0.49
General health	53.20 ± 24.79	0.46
Vitality (VT)	51.18 ± 24.68	0.48
Social role functioning (SF)	57.65 ± 27.67	0.48
Emotional role functioning (RE)	42.55 ± 45.78	1.07
Emotional health or mental well-being (MH)	56.79 ± 20.16	0.35
Physical component summary (PCS)	52.72 ± 26.92	0.51
Mental health component summary (MCS)	52.04 ± 23.67	0.45

Table 4. Effect of physical activity on quality of life.

Factor	Activity	N	Mean ± SD	F (2,473)	*p*
Physical functioning	Low	212	44.46 ± 31.85	55.89	.000
	Moderate	159	65.41 ± 29.06		
	High	105	80.00 ± 25.09		
Physical role functioning	Low	212	80.00 ± 25.09	51.49	.000
	Moderate	159	45.91 ± 45.69		
	High	105	74.29 ± 40.49		
Bodily pain	Low	212	44.67 ± 25.53	41.58	.000
	Moderate	159	60.79 ± 23.83		
	High	105	70.76 ± 27.42		
General Health	Low	212	45.52 ± 24.53	25.64	.000
	Moderate	159	55.50 ± 22.79		
	High	105	65.24 ± 22.86		
Vitality	Low	212	40.75 ± 24.30	57.94	.000
	Moderate	159	53.33 ± 20.21		
	High	105	68.95 ± 20.37		
Social role functioning	Low	212	47.17 ± 25.41	40.52	.000
	Moderate	159	60.75 ± 26.13		
	High	105	74.10 ± 25.25		
Emotional role functioning	Low	212	24.32 ± 38.77	51.49	.000
	Moderate	159	45.91 ± 45.69		
	High	105	74.29 ± 40.49		
Emotional health or mental well-being	Low	212	48.92 ± 19.42	43.53	.000
	Moderate	159	59.12 ± 18.77		
	High	105	59.12 ± 18.77		
Physical component summary (PCS)	Low	212	39.74 ± 24.19	71.42	.000
	Moderate	159	56.90 ± 23.71		
	High	105	72.57 ± 22.39		

Mental health component summary MCS)	Low	212	40.29 ± 20.34	85.54	.000
	Moderate	159	54.78 ± 20.71		
	High	105	71.62 ± 19.70		

The results of this testing are presented in Table 4, and it was shown, that in all cases, when testing the variables independently, physical activity was a statistically significant factor as regards differences in means. In fact, the significance in all cases was quite high ($p < .001$). Also, according to the post-hoc Scheffe test, physical activity is directly correlated to the quality of life, because it positively affects physical and mental health indicators - $F(2,473)$, $p < .05$. It was also found that in all quality of life variables, there was a positive effect on the level of physical activity and an increase of the quality of life in a stable linear pattern.

Based on the above, we observe that the level of physical activity effects the factors of quality of life. Nurses with a low level of physical activity had higher scores on the variables of quality of life, in comparison to their co-workers who had a moderate to high level of physical activity.

DISCUSSION

What we tried to record in this research, was the degree of quality of life that emergency room nurses, both male and female, experience, and the benefits that a motor activation model provides.

As shown by data analysis, physical activity levels of emergency room nurses are not satisfactory – 44.5% of the sample displayed low physical activity and only 22.1% displayed a high one. Generally, the percentage of the Greeks participating in a physical activity is lower than that of the Europeans as a whole, even though an increase has been noted in recent years (Tzormpatzakis and Sleap, 2007). It is characteristic, however, that the Greeks report that they participate in a vigorous physical activity more days than other Europeans (Rütten et al., 2004).

However, according to a study conducted in 22 public Brazilian hospitals, Burdick et al. (2014) concluded that nurses living in other countries also lead an unhealthy lifestyle. This was determined while trying to explore the overall knowledge that nurses possessed on physical activity issues and health recommendations. The results showed that the majority of nurses required additional information on starting to engage in exercise programmes. Furthermore, traditional obstacles mentioned in international bibliography that hinder engagement in exercising were also presented in the study in question. The main factors that act as deterrents to engaging in physical exercise are lack of time, of education and training as well as lack of institutional support (Burdick et al., 2014).

A current research conducted in the United Kingdom by Blake et al. (2019) reached the same conclusions. 1.452 hospital workers including many nurses working at the National Health System (NHS) participated in the research. 45% of nurses did not meet the guidelines of the recent WHO protocols that recommended 30 minutes of moderate daily physical activity. Reasons mentioned for not taking part in physical activity programmes, were fatigue, non-existent free time as well as incentives. Also other factors causing them to refrain from exercising were lack of time, a feeling of tiredness, lack of incentive, working shifts and animosity at the workplace.

Withal, the aim of this study is to determine the level of the quality of life of nurses. The results showed that all factors of the questionnaire displayed low means, the values ranging from 42,55 and up to 59,30. We thereby observe that nurses' overall quality of life is low.

According to Brooks and Anderson (2005), the quality of life of nurses is defined as being "*the extent to which nurses are able to satisfy important personal needs through their experiences in their work organisation while achieving the organisation's goals.*" Consequently, the concept of work satisfaction does not just imply securing a job and a salary, but also securing a working environment where the individual feels accepted and appreciated.

The results of the said research coincide by the those of the research carried out by Schutz and Shattell (2020), who, during the pandemic, evaluated the quality of life of emergency room nurses as well as that of nurses working in departments that cared for SARS-COV-2 patients. The results showed that workers had a low quality of life due to social isolation that they imposed on themselves, in fear of transmitting an infectious disease to their acquaintances and loved ones.

In addition, a number of earlier researches undertaken, blame a variety of factors for the negative effects on nurses' physical and mental health. Some of these factors include round-the-clock shifts, a rapid working pace, the intensity of the work plus the uncontrollable flow of patients especially in emergency rooms. All of the above impact nurses' physical health since it has been proven that they have a 77% higher chance of carcinogenesis. Moreover, their mental health is also affected since problems and conflicts in both their family and social life were also reported.

In regard to the research hypothesis as to the degree to which the indicators of the quality of life differ when correlated to the level of physical activity, analysing the results, it was found that nurses with a high and moderate physical activity level displayed higher scores on the indicator of the quality of life compared to that of nurses with low activity levels. The hypothesis that emergency room nurses' quality of life differs depending on their level of physical activity, is thus confirmed.

The engagement in interests and activities as brisk walking, dancing, jogging and cycling or other sport activities, help to reduce emotional tension and work pressure improving nurses' quality of life indicators (Bährer,2018). Matsugaki's (2017), research conducted in Japan yielded similar results. What was assessed was the effectiveness of supervised exercise among nurses working round-the-clock shifts with the aim of enhancing their quality of life. The average scores of the questionnaire on the quality of life increased significantly, meaning that a physical activity programme can amount to a useful tool for the work performance of emergency room nurses. A healthy diet and exercising accompanied by the necessary rest, can strengthen the body and prevent the occurrence and the development of the phenomenon of work fatigue which undoubtably affects the quality of life. These measures can, each individually, and each in its own way, significantly reduce the levels of stress development, and thus obviate the risk of leading nurses to chronic stress and burnout (Peterson et al., 2008; Bährer,2018).

CONCLUSION

Improving the quality of life of emergency room nurses, will bring about a number of benefits to both employees and health care providers themselves. The quality of life of nurses which is greatly influenced by the quality of their work life, should not take a back seat as it often has an impact on the quality of services provided.

Hospital administrations should promote motor activation programmes for personnel which can take place on site after working hours, under the guidance of a gym teacher. However, engaging solely in physical activities is not a panacea for the improvement of nurses' quality of life - medical equipment, working hours,

psychological support, training and adequate staffing of hospitals in nursing staff are some strategies to enhance and protect the overall health of workers (WHO, 2021).

Limitations

The participants of this survey were practising emergency room nurses working in the 3rd, 4th and 5th Health Regions of Greece. The sample size was adequate for generalisation of the results as regards the population under study. However, generalising the results of the nurses as a whole, regardless of their level of education (University graduates, Higher technological school graduates, secondary school graduates) should be avoided. Moreover, even though the questionnaires were anonymous, it is impossible to verify the honesty of the answers of research participants as it is impossible to verify the degree to which the questions of the research sample were understood. Therefore, future studies with a larger sample size are needed to confirm the results of this study. The Community Nurse in collaboration with the physical education teacher, can play a catalytic role in promoting physical activity in the community, and hence promote the health and well-being of people.

AUTHOR CONTRIBUTIONS

Conceptualization: I. Leridis, O. Matsouka, E. Bebetsos and G. Kosta. Data curation: I. Leridis. Formal analysis: I. Leridis and O. Matsouka. Investigation: I. Leridis. Methodology: I. Leridis and O. Matsouka. Project administration: O. Matsouka, E. Bebetsos and G. Kosta. Resources: I. Leridis. Supervision: O. Matsouka, E. Bebetsos and G. Kosta. Validation: I. Leridis. Visualization: I. Leridis. Writing –original draft: I. Leridis. Writing–review & editing: I. Leridis and O. Matsouka.

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No potential conflict of interest was reported by the authors.

REFERENCES

Adriaenssens, J., De Gucht, V., &Maes, S. (2015). Causes and consequences of occupational stress in emergency nurses, a longitudinal study. Journal of Nursing Management, 23(3), 346-358. https://doi.org/10.1111/jonm.12138

Akersterdt, T., Knutsson, A., Narusyte, J., Svedberg, P., Kecklund, G., Alexanderson, K. (2015). Night work and breast cancer in women: a Swedish cohort study. BMJ Open, 50(8),2-7.

Bährer, K. S. (2018). Burnout for Experts: Prevention in the Context of Living and Working. USA: Springer.

Berger, B., Pargman, D., & Weinberg, R. (2007).Foundations of exercise psychology (2nd edition). Morgantown, WV: Fitness Information Technology.

Blake, H., Mo, P.K., Lee, S., & Batt, M. E. (2012). Health in the NHS: Lifestyle behaviours of hospital employees. Perspectives in Public Health, 132(5), 213-215. https://doi.org/10.1177/1757913912457309

Brooks, B. A., Anderson, M. A. (2005). Defining Quality of Nursing Work Life.Nursing Economics,23, (6), 319-326.

Burdick, K. E., Russo, M., Frangou, S., Mahon, K., Braga, R. J., Shanahan, M. & Malhotra, A. K. (2014). Empirical evidence for discrete neurocognitive subgroups in bipolar disorder: clinical implications. Psychological Medicine, 44, 3083-96. https://doi.org/10.1017/S0033291714000439

Clarke, S. G., & Haworth, J. T. (1994). "Flow" experience in the daily lives of sixth-form college students. British Journal of Psychology, 85(4), 511-523. https://doi.org/10.1111/j.2044-8295.1994.tb02538.x

Craig, C.L., Marshall, A.L., Sjöström, M., Bauman, A.E., Booth, M.L., Ainsworth, B.E., Pratt, M., Ekelund, U.L.F., Yngve, A., Sallis, J.F. and Oja, P. (2003) International Physical Activity Questionnaire (IPAQ): 12-Country Reliability and Validity. Medicine & Science in Sports & Exercise, 35, 1381-1395. https://doi.org/10.1249/01.MSS.0000078924.61453.FB

Fallowfield, L. (1990). Quality of life: the missing measurement in health care. London: Human horizon: Series souvenir Press.

Hornquist, J.O. (1982). The concept of quality of life.Scandinavian Journal of Social Medicine, 10, 57-61. https://doi.org/10.1177/140349488201000204

Matsugaki, R. 2017. Effectiveness of workplace exercise supervised by a physical therapist among nurses conducting shift work: A randomized controlled trial. Journal of Occupational Health, 59(4),327-335. https://doi.org/10.1539/joh.16-0125-OA

Mohammadi, A., Sarhanggi, F., Ebadi, A., Daneshmandi, M., Reiisifar, A., Amiri, F. &Hajamini, Zahra., (2011)."Relationship between psychological problems and quality of work life of Intensive Care Unit Nurses", Iranian Journal of Critical Care Nursing, 4(3), 135-40.

Peterson, U., Demerouti, E., Bergström, G., Samuelsson, M., Åsberg, M &Nygren, Å. (2008).Burnout and physical and mental health among Swedish healthcare workers.Journal of Advanced Nursing, 62(1), 84-95. https://doi.org/10.1111/j.1365-2648.2007.04580.x

Robin, M. & Leslie, R.M. (2006).Introduction to Health Psychology: Health reports. Athens: Greek Letters.

Rütten, A., Gelius, P & Abu-Omar, K. (2011).Policy development and implementation in health promotion - from theory to practice: the ADEPT model. Health PromotInt, 26:322-329. https://doi.org/10.1093/heapro/daq080

Silva, R. M., Beck, CL. C., Guido, L. A., Lautert, L., Tavares, J. P., Prestes, F. C., Rocha, L. (2009). Night shift pros and cons in nursing: qualitative study. Online Braz J of Nurs; 8 (2),1676-1685. https://doi.org/10.5935/1676-4285.20092346

Schutz, V., Shattell, M. (2020). Impact of COVID-19: What does it mean for nurses and health systems.Journal of Psychosocial nursing and Mental Health Services, 58(8):2-3. https://doi.org/10.3928/02793695-20200707-01

Török, S., Kökönyei, G., Károlyi, L., Ittzés, A. &Tomcsányi, T. (2006).Outcome Effectiveness of Therapeutic Recreation Camping Program for Adolescents Living with Cancer and Diabetes.Journal of Adolescent Health, 39(3), 445-447. https://doi.org/10.1016/j.jadohealth.2005.12.018

Tzormpatzakis, N. & Sleap, M.(2007). Participation in physical activity and exercise in Greece: a systematic literature review. International Journal of Public Health, 52(6):360-371. https://doi.org/10.1007/s00038-007-6118-6

Ventegodt, S. (1995).Quality of Life in Denmark.Results from a Population Survey.ForskningscentretsForlag, Copenhagen.

Ware, J. Kosinski, M., Keller, S. (1998). SF-12: How to Score the SF-12 Physical and Mental Health Summary Scales 2nd ed. Boston MA, The health institute.

Ware, J.E.& Stewart, A.L. (1996). Measures for a new era of health assessment.Measuring, functioning and well-being. Duke University Press, London.

Ware, J.E., &Sherbourne, C.D. (1992). The MOS 36-item short-form health survey (SF-36). Medical Care, 30(6), 473-483. https://doi.org/10.1097/00005650-199206000-00002

Williamson, D.F., Vinicor, F., & Bowman, B.A. (2004). Primary prevention of type 2 diabetes mellitus by lifestyle intervention: implications for health policy. Ann Intern Med, 140(11), 951-7. https://doi.org/10.7326/0003-4819-140-11-200406010-00036

WHO, (2021).SOWN Country Profiles NHWA Web Portal. Available at: https://apps.who.int/nhwaportal/Sown/Index[Lastaccess: April 2022].

WHO.(2019). Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19). Geneva: WHO; 2020.

World Health Organization (2004).Global strategy on diet, physical activity and health. Geneva, Switzerland: WHO.

