ORIGINAL ARTICLE

The Role of Occupational Factors in Physical Activity of Nurses Based on PRECEDE-PROCEED Model

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Abstract

Background: Nurses have insufficient physical activity due to occupational conditions. This study investigated occupational factors affecting their physical activity based on PRECEDE-PROCEED Model.

Methods: This is a cross-sectional study conducted among 161 nurses working at Shiraz University of Medical Sciences. The data were collected by simple randomization. Researcher-made tools included demographic, attitude, and PRECEDE-PROCEED constructs questionnaires. Self-Efficacy for Exercise (SEE) Scale, General Health Questionnaire(GHQ), and Beck Physical Activity questionnaire were standard tools used in the present investigation. Data were analyzed by Linear Regression and descriptive analysis.

Results: The findings showed that attitude score of 96.4% of the studied nurses and self-efficacy scores of 50.9% of these nurses were higher than the overall mean scores. But they achieved scores lower than the overall mean scores in Enabling (44.1%), Reinforcing (44.7%) and Management-Organizational (29.2%) factors. Less than half of the nurses could attain scores higher than the overall mean scores of physical activity (49.1%) and general health (48.4%). There were no any significant correlations between attitude (0.922), self-efficacy (0.134), Enabling factors (0.224), Reinforcing factors (0.950), and Management-Organizational factor (0.627) with their physical activity level. But direct correlations were found among Enabling, Reinforcing, and Management-organizational factors.

Conclusion: Although nurses owned enough Predisposing factors, insufficient Enabling, Reinforcing and Management-Organizational factors led them to do insufficient physical activity. Consequently, occupational factors should be provided in the workplace for nurses.

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Introduction

Nowadays, how people behave is one of the most important determinants of their lifestyles. Non-communicable diseases affecting peoples' lifestyles are the main causes of deaths among more than 36 million people around the world annually.[1] One of the basic factors causing these diseases is the low level of physical activity in addition to smoking, hypertension, hyperlipidemia, and malnutrition.[2,3] Low physical activity was the main agent

of 56 million deaths in 2008 as the fourth cause of mortality in the world.[4] In addition, low physical activity which may lead to death has negative economic consequences such as reduction of productivity, contributing up to 13.7 billion dollars financial loss.[5] Meanwhile, the findings have shown that physical activity affects people's physical, psychological, and social health positively; so that, it is known as an effective alternative for improving people's quality of life.[6]

Physical activity is influenced by different factors including an individual's occupation.[7] Health-related staff are also affected by poor life quality including low physical activity. Nurses are the dominant human forces in the health system in every country. In comparison with other health-related jobs, they experience inappropriate conditions or even dangerous situations which may affect their lifestyle and also their health.[8-13] Moreover, nursing is known as one of the most stressful jobs which engage the nurses with anxity.[14-17] The previous studies proved that stress and anxiety can lead them to have less physical activity in their workplace.[18-20] The investigations have demonstrated that nurses and doctors who have more physical activity are more prone to recommend their patients and clients to follow healthy behavior, physical activityand other healthy lifestyle's determinants.[21-25]

Since physical activity is a complex and multi-factorial behavior,[26] it is influenced in the workplace by different kinds of factors such as staff attitudes,[27] accessibility to efficient supplies in the workplace,[28] organizational policies and a supportive environment,[29] organizational and cultural conditions,[30] the characteristics of the job, salary or wage,[27] and self efficacy.[7, 27] Although physical activity is a multi-factorial behavior, most studies focus on intrapersonal and interpersonal theories and ignore environmental factors.

So, It is necessary to determine the main factors based on a model through which the principal factors would be recognized and approached by officials efficiently. Precede-Proceed Model may be the most frequently used health promotion model[31] that was designed by Green & Kruterin 1980.[27, 32]

The model has two inter-related components consisting of 'PRECEDE' and 'PROCEED'. The PRECEDE presenting Predisposing, Reinforcing, and Enabling Constructs in Educational Diagnosis and Evaluation, forms the diagnostic and assessment components of the model. Predisposing factors are individuals and reflect the internal motivation to take any behavior.[31-33] The level of knowledge -, attitude, and self-efficacy are some important determinants of these factors studied in the present investigation. Enabling factors refer to every kind of skill, new resources, or even removing any obstacle in the environment to facilitate the commitment to a behavior. Providing the appropriate place and exercise devices in hospitals,[34] their accessibility and availability, and time management in using[35, 36] are some instances of enabling factors applied in the present study. Reinforcing factors are any sort of external rewards or incentives that make the individuals motivated to take behavior. External rewards which were investigated in the present study include supportive relationships in the social environment, persuasive communication, and financial, occupational, and instrumental rewards.

Policy, Regulatory and Organizational Constructs in Educational and Environmental Development represent the first part of Proceed. Its second part includes the intervention and evaluation phases. So the model has eight phases, with the Precede component comprising three separate phases (1–3) and the PROCEED component representing Phases 4–8,[37] (Green & Kreuter 2005) (Figure 1).

Management and organizational assessments as the important factors of PROCEED section are, in fact, the optimal adjustment of planned programs with organizational and regulatory disciplines to lead the individuals towards the targetted behavior.[38] Organizational climate is an important factor investigated in the present study and is supposed to be affected by management and organizational factors

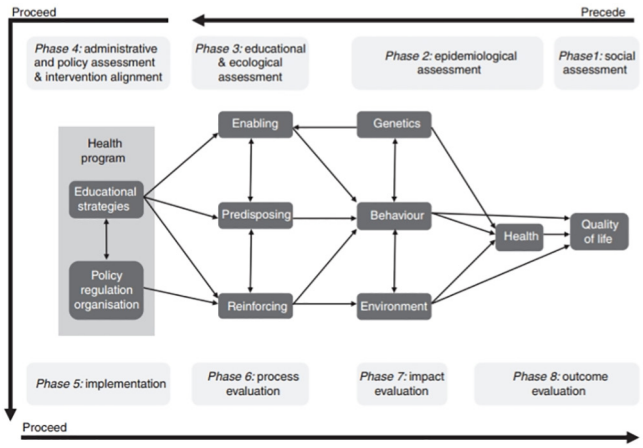

Figure 1: Overview of the Precede–Proceed Model. Adopted from Green & Kreuter 2005.

in addition to regulatory disciplines.

Finally, according to this model, the related factors of every assessment are monitored in the first part and matched with other parts. Then, sufficient interventions are provided to control and prevent these factors. Meanwhile, the process of this course, short-term impacts and long-term outcomes are evaluated in the second part of the model.[31, 32] Since it is a planning model, the present study was designed to determine the main factors affecting nurses' physical activity, by using the constructs of the mentioned model in Precede section and a part of PROCEED one to make it possible for decision-makers in the nursing field and hospital management promote healthy behaviors such as physical activity among nurses and other health-related staff. Therefore, the present study was conducted in 13 hospitals managed by Shiraz University of Medical Sciencesin Shiraz city in south of Iran to find the occupational factors impacting the physical activity of nurses working in these centers based on the constructs of Precede-Proceed Model.

Methods

This is a descriptive-analytical and cross-sectional study conducted among 161 nurses working in 13 hospitals managed by Shiraz University of Medical Sciences in 2017. The study aimed to determine the main factors related to nurses physical activity based on the constructs of Precede-Proceed Model. The inclusion criteria included working at least two years as a nurse in the mentioned centers, having at least two years of academic study in nursing, not having any important disability to do physical activities, having the tendency to participate in the study, and filling consent form. Two faculty members majoring in nursing and one faculty member majoring in physical education confirmed the inclusion criteria. The exclusion criteria included unwillingness to take part in the study and incomplete filling of the questionnaire. The sample size was determined using G Power software adopted from Tofigi's study.[13] Accordingly, sample should include 134 participants with 95% confidence level and 80% test power. 161 nurses were determined as the final number of samples considering this point that some participants may withdraw from the study in different phases of research. It should be noted that the total population of the target community of nurses working in hospitals managed by Shiraz University of Medical Sciences was not reported to the researchers of the present study due to professional considerations.

Sampling Method

The researchers referred to the target hospital after receiving official documents and permission from the Research Chancellor of Shiraz University of Medical Sciences and notifying the university's Central Nursing Office about the goals of the present study. The cases were selected randomly considering variable work shifts of nurses in target hospitals. The researchers asked the nurses to fill the questionnaires as soon as possible in the presence of the researcher. However, since they were mostly so busy with their duties, the researcher asked at least one of the ward staff especially the head nurse to take the responsibility to gather the questionnaires after being completed and hand them in later.

Data Collection Tools

The researchers used 7 individual questionnaires. The first one consisted of 10 demographic questions related to the factors which may affect nurses' physical activity (place of work, position in the hospital, years of working, gender ,employment branch, age, education level, the name of ward, marital status, and the type of shift).[13, 14] The cut-off point age was set to 40 years old since the domestic policy of the professional engineering department at Shiraz University of Medical Sciences make it neccessary for all nurses working in this university to do paraclinical tests annualy to check out their health condition and lifestyle-related risk factors. This cutting point was suggested by two faculty members majoring in health education and promotion working in this university (Table 1).

The attitude questionnaire was researcher-made and consisted of 12 questions based on a 5-point Likert scale. (from 1 agree completely to 5 disagree completely). Its face validity was tested by three health education and promotion scholars and its reliability was measured by Alpha Cronbach (0.7) by asking 30 nurses to complete the questionaire two times in a two-week interval.

Questionnaires 3 to 5 respectively consist of Enabling (17 questions), Reinforcing (13 questions), and organizational and Management Factors (6 questions) related to the constructs of the PRECEDE-PROCEED model. They have a five point scale (Never, Seldom, Sometimes, Usually, and Always) and a three point scale (Yes, No, and To some extent) Never" gets score 1 while "Always" get score 5. Two questions were scored reversely. The scores zero, one, and two were given to "No, To some extent and Yes" options respectively. One example of questions related to Enabling factors states, "CDs, books, and exercise software concerning physical activity are available in the ward where I work". An example of Reinforcing questions is, "Hospital's officials give me a gift if I do exercise regularly." An example of Management and Organizational question is, "Hospital's officials specify enough budget to nurses' sporting affairs whenever needed." The face validity of the questionnaire was tested by three health education and promotion scholars and the reliability was measured by Cronbach's Alpha. It showed an acceptable

Table 1: Demographic Characteristics of the Studied Nurses

Variable		Percent (%)
Sex	Woman	73.9
	Man	26.1
Marital status	Single	30
	Married	70
Age	Under 40 Years old	82
	Above 40 Years Old	18
Job Experience	Under 10 Years	65
	Between 10 to 20 years	32
	More than 20 Years	3
Employment status	Permanently employed	39.1
	Contracted employed	31
	Temporal	10.5
	be-in-service	19.4
Educational status	B.S.	96.3
	M.S.	3.7
Shift working type	Rotational	77
	Fixed	23

internal consistency (0.7, 0.9, 0.7for Enabling (0.7) and Organizational and Management factors (0.7) while the internal consistency for Reinforcing (0.9) was excellent.

The sixth questionnaire was "The Self-Efficacy for Exercise (SEE) Scale" with 9 questions. Its grades range from 1 to 10. The questonnaire asks the nurses if they have faced situations described in the items. The reliability and validity of the self-Efficacy for Exercise Scale were measured by Resnick, B., & Jenkins, L. S. (2000). An excellent Internal consistency (0.92) was achieved.[39]

The seventh questionnaire was General Health Questionnaire (GHQ)that is an international and reputable psychiatric toolincluding 28 questions in physical, anxiety signs, social function, and depression dimensions. It achieved a good internal consistency (0.84) in Tofighi's study.[13]

The eighth one was Beck Physical Activity Questionnaire that is an international and standard questionnaire including 16 questions divided into the physical activity in the workplace (8 questions), exercise index (one two-part question), and leisure time index (7 questions). It achieved an acceptable Internal consistency (0.74) in Tofighi's study.[13] Beck Physical Activity Questionnaire has three-point Likert scale (Yes, no, to some extent).

Linear Regression (ANOVA), Pearson Product Moment Correlation tests and descriptive analysis and also SPSS (version 22) were used to analyze the achieved data.

Results

The demographic data showed that 73.9 and 25.5 percent of the studied nurses were females and males respectively. 39.1, 31.1, 10.5, 18.6 percent of the nurses worked as full time employees, contracted employees, temporary and in-service-committmentemployees respectively. 6.8, 89.4 and 3.7 percent of them, in turn, had diploma, B.S. and M.S. 82 and 18 percent were younger and older than 40 years respectively. 65, 32 and 3 percent of them had, respectively, a work experience of 10 year, between 10-20 years, and more than 20 years. 70 and 30 percent of the nurses were, in turn, married and single. 77 and 23 percent of these cases worked in fixed and rotational shifts respectively (Table 1). The results indicated no correlation between demographic characteristics and the other variables of the study.

Results showed that the attitude and self-efficacy scores of 99.4 and 50.9 percent of the studied nurses were higher than the overall mean scores of these two variables. In addition, the total physical activity level score of 49.1% of nurses and General Health score of 48.4% of them were higher than the overall mean scores of the variables. However, their mean score in General Health was 94.8 which was so high in comparison with the highest supposed (score112) (Table 2).

Also, 44.1, 44.7, 29.2 and 47.8 percent of the studied nurses achieved the scores higher than the overall mean scores of Enabling factors, Reinforcing factors, Management and Organizational factors, and Organizational Climate factors respectively (Table 2).

Since the main constructs of PROCEED part of PRECEDE-PROCEED Model include Predisposing, Enabling, Reinforcing, Management and Organizational dimensions, the attitude, and self-efficacy, they were assessed as Predisposing factors. The achieved data indicated that there were no significant correlations between attitude (0.922), self-efficacy (0.134), Enabling factors (0.224), Reinforcing factors (0.950), Management and Organizational factor (0.627), and Organizational Climate (0.812)

Table 2: The Mean Scores and Standard Deviations of the Studied Variables

Variables	Mean	Median	Mode	Std. Deviation	Variance
Enabling Factors	22.18	21.00	21.00	5.60	31.43
Reinforcing Factors	22.65	22.00	17.00	7.71	59.57
Management-Organizational Factors	4.04	3.00	1.00	3.05	9.34
Self-efficacy	39.40	40.00	45.00	18.25	333.280
General Health	94.86	94.00	84.00	14.34	205.84
Attitude	41.75	42.00	41.00	4.92	24.288

Table 3: The correlation between Physical Activity and the Constructs of Precede-Proceed Model

The constructs of Precede-Proceed Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
Attitude	7.738	0.899	-0.008	8.609	0.000	5.963	9.513
	-0.002	0.021		-0.097	0.922	-0.044	0.040
Sell-efficacy	7.311	0.249	0.118	29.391	0.000	6.820	7.802
	0.009	0.006		1.505	0.134	-0.003	0.020
Enabling Factors	7.144	0.428	0.096	16.697	0.000	6.299	7.989
	0.023	0.019		1.221	0.224	-0.014	.060
Reinforcing Factors	7.631	0.327	0.005	23.362	0.000	6.986	8.276
	0.001	0.014		0.063	0.950	-0.026	0.028
Management-organizational Factors	7.583	0.175	0.039	43.443	0.000	7.238	7.928
	0.017	0.034		0.486	0.627	-0.051	0.085

Table 4: The Correlation between General Health and Physical Activity

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
General Health	7.560	0.705		10.730	0.000	6.168	8.951
	0.001	0.007	0.010	0.131	0.896	-0.014	0.015

Table 5: The Correlation among Enabling, Reinforcing and Management Factors

	Enabling Factors	Reinforcing Factors	Management Factors
Enabling Factors	1	0.528**	0.435**
		0.000	0.000
	161	161	161
Reinforcing Factors	0.528**	1	0.688**
	0.000		0.000
	161	161	161
Management-Organizational Factors	0.435**	0.688**	1
	0.000	0.000	
	161	161	161

with physical activity level (Table 3). Also, there was no significant correlation between General Health score (0.896) and physical activity. Linear Regression test was used to find the possible correlations that were significant at the 0.01 level (2-tailed) (Table 4).

However, the correlations among the constructs of the mentioned model showed that although no significant correlations were found among these constructs, direct correlations were found between Enabling factors and Management and Organizational factors (0.435), Enabling factors and Reinforcing (0.528), and also Reinforcing factors and Management and Organizational factors (0.688). Pearson Product Moment correlation test with 0.01 significant level (2-tailed) was used in this part (Table 5).

Discussion

This study was designed mainly to recognize the major occupational determinants impacting nurses' physical activity in their workplace. The findings of present study showed that only less than half of the nurses did physical activity higher than the overall mean. This insufficient amount of physical activity is consistent with the findings

of many studies done before.[10-13, 17-20] Principally, nurses are hypoactive in comparison to other para-medical professions.[30, 40] It might be due to long-lasting working shifts and the insufficient facilities and opportunities in workforce,[41, 42] high level of anxiety,[18-20] poor meal habits, insufficient sleeping time, and the disturbance of sleep process.[7, 43] On the other hand, some studies have proved the impact of physical activity on fulfilling occupational duties, especially educational roles in patients' treatment.[21-23]

This study also demonstrated that although all of the studied nurses had acceptable level of general health, general helth of more than half of the nurses was lower that the overall mean obtained in the current study. It is consistent with the research indicating the nurses' inappropriate health promotion behaviors in comparison with other para-medical staff.[8, 9] As nursing is a stress-making profession, the health of nurses is usually threatened by occupational factors. So, it is very important to minimize these factors and direct this group of people toward more healthy behaviors. Meanwhile, no significant correlation was found between general health and physical level of the studied nurses in this investigation. Since the percentages of both variables are less than 50%, this insignificant correlation would be justifiable. Several studies have also shown that the nurses' level of physical activity was less regarded by nurses in comparison with other health promotion modifiers such as healthy nutrition.[10-13] However, most of the cases were known healthy according to GQH's scales.

The findings indicated that the nurses had sufficient self-efficacy and a high level of attitude regarding the importance of doing physical activity. But, no association was found between these two predisposing factors with the level of physical activity. This is inconsistent with Sébastien Mas et al. study. They came to the conclusion that the attitude of the studied cases was related to their intentions to promote their physical activity so there was a link between attitude and frequency and duration of physical activity.[44] Similarly, Huey-Hong Hsieh et al. showed that a positive exercise attitude had a positive relationship with exercise habits.[45] The results of this study in inconsistent with some of the previous research about self-efficacy. Casy et al. found that Self-efficacy was positively associated with physical activity.[46] Leonie Klompstra et al. indicated that motivation predicted physical activity, but after controlling the effect of self-efficacy, the relationship between motivation and physical activity was no longer significant.[47] However, all these investigations were not conducted in the workplace. Consequently, they might not have been affected by occupational factors which are supposed to be more important than individual ones. It seems that individual factors such as knowledge, attitude, and self-efficacy do not necessarily lead to behavior modification. Basically, doing physical activity is a multi-faceted process which is not encouraged and fulfilled just by obtaining personal determinants.[26]

The results of current study, based on the constructs of PRECEDE-PROCEED Model, demonstrated that nurses had limited acess to the factors considered effective in predicting physical activity. Several studies are in line with this result that claim having access to facilities in workplace,[28] sort of working shift,[27] organizational and environmental support,[40] and also the organizational climate in favor of doing physical activity[48] are effective in the nurses' physical activity.

According to the findings of the current study, there were direct associations between constructs of the model and nurses' physical activity level although the relation was not significant. These direct associations can be justified because most of the mentioned factors are interwoven to each other in hospitals and the workplaces of nurses.

Conclusion

This study showed that in spite of having high levels of Predisposing factors including attitude and self-efficacy, physical activity level was not reported as much as expected among nurses. This may be due to the fact that the enabling, reinforcing, and management factors were not supplied enough and this limited supply of the constructs affects as the physical activity negatively.

The limitations of present study include restricted sample size, nurses' insufficient cooperation in completing the questionnaires due to being overbusy in their workplace, and several questionnaires' to complete. It is suggested to conduct this study qualitatively and investigate the determinants out of the workplace and in the community. Even it is recommended to study the role of nurses' families which may affect their physical activity and other health determinants.

Conflicts of interest: None declared.

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