Research article

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Physical activity and its associated factors among nurses at Ho Chi Minh City Hospital for Rehabilitation – Professional Diseases

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Abstract

Introduction: Physical activity (PA) increasingly became a critical public health concern, as the number of individuals meeting the World Health Organization (WHO) recommendations for PA continued to decline. Nurses, due to the nature of their demanding and continuous work, played a crucial role in promoting PA among patients. Therefore, attention should have been given to their own PA levels.

Objectives: This study identified the proportion of nurses who met the WHO-recommended PA levels. And this study identified the association between sociodemographic characteristics, lifestyle habits and barrier factors with the level of PA that meets the WHO recommendations.

Methods: A cross-sectional study was conducted among 118 nurses using an online survey via Google Forms. The Global Physical Activity Questionnaire (GPAQ) was employed to assess PA levels. The WHO recommendation of $\geq$ 600 MET-minutes per week was used as the threshold for adequate PA. Chi-square and Fisher's exact tests were applied for statistical analysis.

Results: The proportion of nurses meeting the WHO-recommended PA levels was 36.4%. Factors significantly associated with adequate PA included gender, leisure-time activities, barriers to engaging in PA, and frequent consumption of alcoholic beverages, with a statistical significance level of $p < 0.001$.

Conclusions: The proportion of nurses who met the WHO-recommended PA levels remained low and was significantly associated with gender, leisure-time activities, barriers to engaging in PA, and frequent consumption of alcoholic beverages. This issue warranted attention to enhance nurses' health, improve patient care efficiency, and strengthen health education and promotion efforts.

Keywords: Physical, activity, nurses, associated factors.

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1. INTRODUCTION

According to WHO, PA is defined as any bodily movement produced by the skeletal muscles that requires energy expenditure [1]. Adequate and regular PA has been proven to reduce the risk of chronic diseases such as cardiovascular diseases, diabetes, and obesity, as well as enhance work performance [2]. Despite these benefits, only about one-quarter of the global adult population, including nurses, meets the recommended PA levels, and physical inactivity is one of the leading risk factors for mortality worldwide [2]. Nurses represent a critical component of the healthcare workforce,

accounting for approximately 48% of healthcare providers. Maintaining adequate PA levels is essential for preserving their health and overall well-being [2], [3]. However, most nurses fail to meet WHO-recommended PA levels, which not only compromises their own health but also reduces their likelihood of promoting PA among patients, potentially impacting the quality of care [2], [4].

Numerous studies have examined PA levels among nurses in various healthcare settings. WHO-recommended PA levels were reported to be low in studies by Song MinKyoung et al. in the United States [5] and Mohamad A. Al-Tannir (2017) [2]. In Vietnam, the 2015 National Survey on Non-Communicable Disease Risk Factors revealed that nearly one-third of the population, including healthcare professionals such as nurses, did not meet WHO PA recommendations [6].

The directive on "*Enhancing Physical Activity in the Healthcare Sector*" has introduced several initiatives to improve PA among nurses. The primary goals include achieving at least 10,000 steps per day and engaging in a minimum of 30 minutes of other physical activities daily. Despite these efforts, there remains a lack of research on PA among hospital-based nurses in Vietnam. Understanding the PA levels of nurses is crucial, as adequate PA not only benefits their health but also enhances their ability to promote PA among patients.

Therefore, this study aims to identify the proportion of nurses at Ho Chi Minh City Hospital for Rehabilitation – Professional Diseases who meet the WHO-recommended PA levels in 2023. Additionally, it seeks to identify the associations between PA levels and related factors, including sociodemographic characteristics, lifestyle habits and barrier factors, to provide insights for future interventions aimed at improving PA among nurses.

2. MATERIALS & METHODS

2.1. Study population

The study population comprises nurses working at Ho Chi Minh City Hospital for Rehabilitation – Professional Diseases.

Inclusion Criteria: Nurses who are actively practicing at Ho Chi Minh City Hospital for Rehabilitation – Professional Diseases during the study period. Nurses consent to participate in the study.

Exclusion Criteria: Nurses who are pregnant or on maternity leave during the study period. Nurses on unpaid leave, temporary suspension, or disciplinary action, and those not actively engaged in clinical work at the time of data collection.

2.2. Research Methods

Study design: A cross – sectional study

Sample size The sample size was determined using Krejcie and Morgan's (1970) formula for estimating a proportion in a finite population:

$$n \geqslant \frac{NZ^2_{1-\alpha/2}p(1-p)}{d^2(N-1)+Z^2_{1-\alpha/2}p(1-p)}$$

Where:

n: Required sample size

$\propto = 0.05$

p = 0.5 (Assumed population proportion)

N = 200 (Total population)

d: Margin of error (d = 0.06).

The minimum required sample size for this study was 115 nurses.

Sampling method: A systematic random sampling method was applied:

Step 1: A complete list of eligible nurses at the hospital was compiled.

Step 2: Each nurse was assigned a sequential number from top to bottom. The sampling interval k was calculated as $k = N/n = 200/115 \approx 2$

Step 3: The first participant was randomly selected. Subsequent participants were selected systematically by choosing every second nurse on the list.

Step 4: If the list was exhausted before reaching the required sample size, selection continued from the beginning of the list until the sample size was met.

Steps of the Study Process

Data Collection Process

Step 1: Obtain approval from the Scientific Council of the Ho Chi Minh City Hospital for Rehabilitation – Professional Diseases.

Step 2: Create a Google Form system, which includes two parts: Part 1: Informed consent form for participation in the study. Part 2: The questionnaire.

Step 3: Contact the Hospital Management Board, Personnel Department, and Nursing Department to request permission to conduct the research with nurses.

Step 4: Contact the head nurses of each department, compile a list, and screen for nurses who meet the inclusion criteria for the study.

Step 5: Based on the list of selected participants who meet the study criteria, the researchers will assign a sequential number to each nurse from top to bottom. The researchers will then randomly draw a number, and subsequently select every second number according to the sampling interval k = 2 until the minimum sample size is reached. The researchers will create a second list consisting of the nurses selected from those who meet the study criteria.

Step 6: The researcher will clearly explain the study's objectives, procedures, and data confidentiality measures, then provide a QR code to the head nurses. The head nurses will only provide the QR code to the selected nurses on the second list, who are the nurses chosen based on the study criteria.

Step 7: After the morning briefing (07:30 AM), the head nurses will reiterate the study information and distribute the QR code to the selected nurses listed in the second list provided by the researchers. The QR code will only be given to nurses present in the briefing room if they are working the morning or night shifts. For nurses assigned to the afternoon shift (01:30 PM), data collection will take place at the beginning of their shift.

Step 8: Nurses will fill in the link to the "Informed Consent for Participants" on the Google Form system. After selecting "Agree" to participate, the system will redirect them to the questionnaire. If the nurse selects "Disagree," the study link will be terminated.

Study Variables

Dependent Variable: The dependent variable is PA, categorized according to the WHO classification, and collected using the GPAQ (Global Physical Activity Questionnaire).

The GPAQ has been widely used in Vietnam and has been evaluated for its reliability and validity. A study by Oanh T. H. Trinh et al., after translating the tool into Vietnamese, reported a reliability coefficient of r = 0.69 when retested after 14 days and r = 0.55 when retested after two months [7].

Energy expenditure is estimated based on the duration, intensity, and frequency

of the PA performed on average over a week. The unit of measurement for energy expenditure is MET (Metabolic Equivalent Task), calculated by dividing the energy expenditure of a specific activity by the energy expenditure while sitting/resting. One MET is equivalent to the energy expenditure while sitting/resting (1 kcal/kg/hour), with oxygen consumption calculated in ml/kg/min, where 1 MET corresponds to an oxygen consumption of approximately 3.5 ml/kg/min [8].

The amount of PA is measured in MET-minutes, calculated by multiplying the "intensity of the activity" (MET) by the time spent on the activity (minutes). The total PA per week for each activity is calculated using the formula:

Total PA per week for each activity = Intensity of activity (MET) × Duration of activity per day (minutes) × Number of days per week [8].

For the GPAQ, the PA intensity in MET is defined as follows [8]:

Moderate occupational activity: MET = 4; vigorous occupational activity: MET = 8; cycling or walking: MET = 4; moderate recreational activity: MET = 4; vigorous recreational activity: MET = 8.

The total PA per week for an individual is the sum of the MET-minutes from the following five activity types:

(Vigorous occupational activity) + (Moderate occupational activity) + (Cycling or walking) + (Vigorous recreational activity) + (Moderate recreational activity).

Using the WHO's recommendation, PA ≥ 600 MET-minutes/week is considered sufficient PA [8].

Independent Variables: Sociodemographic characteristics (Age, gender, house situation, seniority and BMI), lifestyle habits (Leisure activities, frequent consumption of alcoholic beverages and smoking cigarettes) and barrier factors (Barriers to engaging in PA, environmental barriers to engaging in PA).

2.3. Data processing

The data were collected via Google Forms, cleaned using Microsoft Excel, and analyzed with SPSS 22.0. Descriptive statistics were used to summarize the data, with categorical variables presented as frequencies and percentages. Continuous variables with a normal distribution were expressed as means and standard deviations, whereas those without a normal distribution were described using medians and interquartile ranges. For analytical statistics, the Chi - square test or Fisher's exact test was applied to compare proportions between two groups. Additionally, appropriate statistical tests were used to compare mean values, depending on the distribution characteristics of the data.

2.4. Ethical Considerations

This study was conducted after obtaining approval from the Scientific Council of the Ho Chi Minh City Hospital for Rehabilitation – Professional Diseases, under Decision No. 372/QĐ-BVPHCN, dated June 23, 2023. All participants were informed about the study objectives, data collection procedures, and their voluntary participation. Confidentiality was ensured, and all collected data were used solely for research purposes.

3. RESULTS

Among the 118 nurses who participated in the study, the sociodemographic characteristics are as follows: The mean age of the study sample was 31 years (± 8.137), with the youngest being 22 years

old and the oldest 56 years old. The majority of nurses had a BMI classified as normal (86 nurses, 72.9%), followed by overweight (16 nurses, 13.5%), underweight (10 nurses, 8.5%), and the least represented category was obesity (6 nurses, 5.1%).

Table 1. Sociodemographic characteristics and lifestyle habits (n=118)

Characteristics		Frequency (n)	Ratio (%)
Sociodemographic characteristics			
Gender	Male	32	27.1
	Female	86	72.9
Housing situation	Living with family	91	77.1
	Renting	27	22.9
Seniority	< 5 years	58	49.2
	5 – 9 years	31	26.3
	10 – 19 years	18	15.3
	≥ 20 years	11	9.3
Lifestyle habits			
Leisure activities	Spending time with family and friends	55	46.6
	Exercising	15	12.7
	Using the internet	42	35.6
	Sleeping	6	5.1
Frequent consumption of alcoholic beverages	Yes	19	16.1
	No	99	83.9
Smoking cigarettes	Yes	4	3.4
	No	114	96.6
Barrier factors			
Barriers to engaging in PA	Lack of time	68	57.6
	Bad weather	18	15.3
	Illness	3	2.5
	Lack of motivation to exercise	29	24.6
Environmental barriers to engaging in PA	Fear of crime and violence in the living area	9	7.6
	High traffic density	36	30.5
	Poor air quality and pollution	10	8.5
	Lack of parks, sidewalks and exercise areas	63	53.4

Table 1 shows that the majority of the study participants were female, accounting for 86 (72.9%), and most lived with their families, 91 (77.1%). The majority of nurses had less than 5 years of work experience, 58 (49.2%). During their leisure time, nurses

mainly spent time with family and friends, 55 (46.6%), and used the internet, 42 (35.6%). The primary barriers to engaging in PA were lack of time, 68 (57.6%), and lack of motivation to exercise, 29 (24.6%). Environmental factors such as lack of parks, sidewalks, and exercise areas, 63 (53.4%), and high traffic density, 36 (30.5%), were the main barriers to leisure activities. Most nurses did not frequently consume alcoholic beverages, 99 (83.9%), and did not smoke cigarettes, 114 (96.6%).

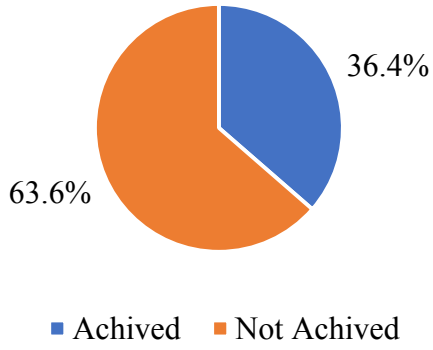

Figure 1. Physical Activity among Nurses (n=118)

Figure 1 shows that the proportion of nurses who engage in PA at the recommended level by WHO (≥ 600 MET-minutes/week) is 36.4%.

Table 2. Association between sociodemographic characteristics, lifestyle habits and PA

N = 118		**PA according to recommendations n (%)**		**p**
		Achieved	**Not Achieved**	**OR (CI 95%)**
Sociodemographic characteristics				
Gender	Male	23 (71.9)	9 (28.1)	**p < 0.001***
	Female	20 (23.3)	66 (76.7)	0.119 (0.047 – 0.297)
Housing situation	Living with family	31 (34.1)	60 (65.9)	0.325*
	Renting	12 (44.4)	15 (55.6)	0.646 (0.269 – 1.548)
Seniority	< 5 years	21 (36.2)	37 (63.8)	0.821**
	5 – 9 years	11 (35.5)	20 (64.5)	
	10 – 19 years	8 (44.4)	10 (55.6)	
	≥ 20 years	3 (27.3)	8 (72.7)	

Lifestyle habits				
Leisure activities	Spending time with family and friends	14 (25.5)	41 (74.5)	**p < 0.001***
	Exercising	14 (93.3)	1 (6.7)	
	Using the internet	11 (26.2)	31 (73.8)	
	Sleeping	4 (66.7)	2 (33.3)	
Frequent consumption of alcoholic beverages	Yes	12 (63.2)	7 (36.8)	**0.008***
	No	31 (31.3)	68 (68.7)	3.76 (1.35 – 10.474)
Smoking cigarettes	Yes	2 (50)	2 (50)	0.624**
	No	41 (36.3)	72 (63.7)	1.76 (0.24 – 12.94)
Barrier factors				
Barriers to engaging in PA	Lack of time	26 (38.2)	42 (61.8)	**p < 0.001****
	Bad weather	13 (72.2)	5 (27.8)	
	Illness	0 (0)	3 (100)	
	Lack of motivation to exercise	4 (13.8)	25 (86.2)	
Environmental barriers to engaging in PA	Fear of crime and violence in the living area	6 (66.7)	3 (33.3)	0.068**
	High traffic density	10 (27.8)	26 (72.2)	
	Poor air quality and pollution	6 (60)	4 (40)	
	Lack of parks, sidewalks and exercise areas	21 (33.3)	42 (66.7)	

** Chi - square test*

*** Fisher's exact test*

Table 2 shows that gender, leisure activities, barriers to engaging in PA and frequent consumption of alcoholic beverages are significantly associated with meeting the WHO's recommended level of PA (with $p < 0.001$, $p < 0.001$, $p < 0.001$, and 0.008, respectively). Furthermore, no significant association was found between meeting the recommended level of PA and factors such as seniority, housing situation, environmental barriers to engaging in PA and smoking cigarettes.

4. DISCUSSION

The proportion of nurses meeting the WHO's recommended level of PA in this study is 36.4%, which is lower than the result reported by Guillaume Fond (2023), who found that 61.9% of nurses met the recommended level. This difference may be attributed to the use of a different questionnaire in our study compared to the one used in the aforementioned research [4]. However, this proportion is quite similar when compared to the study by UU Nnadozie (2023), which used the same GPAQ questionnaire and found that 47.8% of participants met the recommended level of PA [9]. The reason for using the GPAQ questionnaire in this study is that it is shorter than the IPAQ and was specifically designed by the WHO for use in public health-related issues.

The male-to-female ratio among nurses at the Ho Chi Minh City Hospital for Rehabilitation – Professional Diseases is 1:2.68. Although the proportion of male nurses is lower than that of female nurses in this study, this is consistent with the characteristics of the nursing profession. Male nurses had a significantly higher proportion of meeting the recommended level of leisure activities compared to female nurses ($p < 0.001$). This may be due to the physical characteristics of men (Males generally possess greater muscle mass, higher physical strength, and enhanced load-bearing capacity. Additionally, the male hormone testosterone facilitates faster muscle recovery and greater resistance to fatigue compared to estrogen in females), thereby supporting PA. A study by Klajdi Xhebexhiu et al. demonstrated that male nurses exhibit a higher level of participation in physical activities compared to their female counterparts [10]. This finding is consistent with the results reported by Guillaume Fond et al. (2023) [4].

Our study found that among nurses with insufficient PA levels according to the recommendations, most of their leisure time was spent with family and friends. This result is consistent with the study by Gertrud Pfister, which found that nurses tend to allocate more of their leisure time to family rather than engaging in PA. The study also highlighted that an imbalance between work and personal life serves as a significant barrier to maintaining regular PA [11]. This can be explained by the work-life imbalance inherent in the nursing profession and the high workload due to staffing shortages in patient care. Our research results also found a statistically significant association between leisure activities and meeting the recommended level of leisure activity, with $p < 0.001$.

In this study, the main barrier to PA was lack of time, with 65 (55.1%) participants reporting this issue. This may be due to the heavy workload nurses face in patient care and the frequent involvement in on-call duties, which make it difficult to maintain PA. Moreover, occupational stress, work-life imbalance, and burnout can diminish nurses' motivation to engage in PA. These findings are consistent with those of Fabunmi AA (2021), who reported that the primary barrier to leisure activities was lack of energy after completing work (34.8%) [12] and Mohamad A. Al-Tannir (2017), who reported 82.6% [2]. Regarding objective barriers to PA, our study identified lack of parks, sidewalks, and exercise areas as the main environmental factors hindering leisure activities, with 63 (53.4%) participants mentioning this. This finding is similar to Fabunmi AA's (2021) study, which noted the lack of facilities or places for leisure activities (24.3%) [12]; the study by Ahmed H. Albelbeisi (2021) identified the lack of infrastructure as a significant barrier to sustaining PA [13]. This may be attributed to the fact that Vietnam,

Nigeria, and Palestine are developing countries, where the lack of facilities and designated spaces for PA remains prevalent. Additionally, societal emphasis on sustaining PA for health promotion is still limited. The barriers to PA related to meeting the WHO's recommended level of leisure activities were statistically significant ($p < 0.001$).

Throughout their education and work, nurses are equipped with solid knowledge about the severe health risks of smoking, along with strict regulations prohibiting smoking in healthcare facilities in Vietnam. As a result, the majority of nurses do not smoke. The proportion of nurses not smoking in this study was 113 (95.8%), which is similar to the findings of Mohamad A. Al-Tannir (2017), with 74.3% [2]. Furthermore, 99 (83.9%) nurses in this study reported not frequently consuming alcoholic beverages, which differs from Phi Ton (2015), where 88% of nurses reported consuming at least 1 to 4 alcoholic drinks per day [14]. This difference may be due to the differing climates between Western and Eastern countries, as well as Vietnamese laws that prohibit the consumption of alcohol during work duties. The study also found a significant association between frequent consumption of alcoholic beverages and meeting the WHO's recommended level of PA, with statistical significance at $p < 0.001$. This association was also identified in the study by Francesca Montali et al. (2016) [15].

Study Limitations: Small sample size.

5. CONCLUSIONS

The proportion of nurses meeting the WHO's recommended level of PA at the Ho Chi Minh City Hospital for Rehabilitation – Professional Diseases is 36.4%. Factors associated with meeting the WHO's recommended level of PA include gender, leisure activities, barriers to engaging in PA and frequent consumption of alcoholic beverages. It is essential to develop and implement programs that promote PA, including allocating appropriate break times, organizing suitable physical exercise sessions, and improving the work environment to minimize sedentary behavior during shifts.

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