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Physical activity in health care professionals as a means of primary prevention of cardiovascular disease

A STROBE compliant cross-sectional study

Elena Marques-Sule, PhD[a,b,c], Silvia Miró-Ferrer, PT[d], Elena Muñoz-Gómez, PhD[a], Antonio Bermejo-Fernández, PhD[a,*], Raúl Juárez-Vela, PhD[e,f], Vicente Gea-Caballero, PhD[g], María del Carmen Martínez-Muñoz, N[d], Gemma Victoria Espí-López, PhD[a]

Abstract

The aim of this study was to assess the physical activity level of health care professionals, as well as the differences by sex, age, academic background, and among different health care professions.

This is an cross-sectional study.

Health care settings in the Valencian Community, Spain.

A total of 647 health care professionals.

Physical activity was assessed with the European Health Interview Survey-Physical Activity Questionnaire (EHIS-PAQ) that includes the assessment of work-related physical activity, transport-related physical activity, health-enhancing physical activity, muscle-strengthening physical activity, and total physical activity.

93.51% of all health care professionals were physically active at work. Transport-related physical activity and health-enhancing physical activity were significantly lower in women (21.62% vs 41.86%, $P < .001$; and 50.19% vs 68.99%, $P < .001$, respectively). In addition, compliance with health-enhancing and muscle-strengthening physical activity guidelines were lower in older professionals (42.7% vs 61.84%, $P < .001$; and 47.57% vs 61.84%, $P < .001$, respectively). Those with higher education were more compliant with health-enhancing and muscle-strengthening physical activity guidelines (58.55% vs 45.69%, $P = .002$; and 60.24% vs 48.28%, $P = .003$, respectively). Moreover, 67.98% of physiotherapists performed health-enhancing physical activity and 67.54% muscle-strengthening physical activity regularly, and significant differences in all outcomes were observed compared to the rest of health care professionals ($P < .05$). Technicians showed lower work-related and total physical activity than nurses and nursing assistants (74.55% vs 90.37%, $P = .002$; and 83.64% vs 95.72%, $P < .001$, respectively). Additionally, nursing assistants showed higher work-related physical activity compared to nurses (97.18% vs 90.37%, $P = .008$).

Most health care professionals showed an appropriate level of physical activity. Men performed more transport-related and health-enhancing physical activity than women. Younger professionals and those with higher education were more compliant with health-enhancing and muscle-strengthening physical activity guidelines. Physiotherapists were more physically active when compared to the rest of health care professionals.

Abbreviations: CVD = cardiovascular disease, EHIS-PAQ = European Health Interview Survey-Physical Activity Questionnaire, HEPA = compliance with the health-enhancing physical activity, MSPA = compliance with the muscle-strengthening physical activity, PA = physical activity, TPA = total physical activity, TRPA = transport-related physical activity, WRPA = work-related physical activity.

Keywords: cardiovascular disease, health, physical activity, physiotherapy, primary prevention

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The authors have no conflicts of interest to disclose.

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

[a] Department of Physiotherapy, [b] Physiotherapy in Motion, Multispeciality Research Group (PTinMOTION), Department of Physiotherapy, University of Valencia, [c] Heart Institute of Valencia, Spanish Heart Foundation, Valencia, [d] Cardiac Rehabilitation Unit, Department of Rehabilitation, University General Hospital of Castellón, Castellón de la Plana, [e] Department of Nursing, University of La Rioja, Logroño, [f] Hospital La Paz Institute for Health Research (IdiPAZ), Madrid, [g] Nursing School La Fe, Adscript Center of Universidad de Valencia, Research Group GREIACC, Health Research Institute La Fe, Valencia, Spain.

[*] Correspondence: Antonio Bermejo-Fernández, Department of Physiotherapy, Faculty of Physiotherapy, University of Valencia, Gascó Oliag St, 5, 46010 Valencia, Spain (e-mail: antoniobermejofisio@hotmail.com)

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1. Introduction

Cardiovascular disease (CVD) is one of the most common causes of death worldwide,[1] and sedentary lifestyle is one of the most important cardiovascular risk factors.[2] Primary prevention of CVD has been proven to be effective, since the reduction of health risk behaviors would prevent a high percentage of CVD.[3] Thus, the promotion of physical activity (PA) is one of the fundamental pillars in primary prevention of heart disease.[4,5] In fact, people who do not perform PA have a higher risk of heart disease than those who exercise on a regular basis, since PA improves functional capacity and decreases the incidence of CVD and mortality.[6] Health professionals play an important role in promoting a physically active lifestyle by prescribing regular PA to patients, to improve their health and intervene in the prevention and management of chronic diseases.[7] The World Health Organization (WHO)[8] and the European Society of Cardiology (ESC)[9] established PA recommendations to prevent diseases, such as CVDs, through regular PA. In this regard, physiotherapy personnel possess privileged knowledge that puts them in a key position to advise a wide variety of clinical groups on PA.[10] In addition, it has been shown that health care providers' own lifestyle habits can influence the attitudes and counseling of others.[11] This study aimed at evaluating the PA performed by healthcare professionals according to the PA recommendations of WHO and ESC and specifically work-related PA, transport-related PA, health-enhancing PA, muscle-strengthening PA, and total PA. We further aimed to analyze sex-based differences in PA performed by health professionals, and differences between physiotherapy personnel and other health professions.

2. Material and methods

2.1. Participants

Health professionals from public and private settings in the Valencian Community (Spain) were recruited between September 2018 and September 2019. The inclusion criteria were: age ≥18 years, health professional presently working.

2.2. Study design

An observational, descriptive, cross-sectional, and multicenter study was conducted. We distributed the questionnaires to various health departments in major public and private hospitals and healthcare centers via hard copies. Questionnaires were also distributed during seminars for continuous health care education. A response rate of 65.1% was reached. Before starting the study, all subjects signed an informed consent document. The privacy of all participants was preserved by anonymizing all subjects, in accordance with European data protection regulations. The authors declare the absence of conflicts of interest. The study was approved by the Ethical Committee for Human Research of the authors' institution (UV-INV_ETICA-1213185) and complied with the fundamental principles set out in the Declaration of Helsinki.

2.3. Assessment instruments

PA was assessed by the *European Health Interview Survey-Physical Activity Questionnaire* (EHIS-PAQ).[12] To avoid bias in testing methods, a standardize interviewer's interaction with patient was performed and a researcher supplied all subjects with the questionnaire.

Only activities lasting >10 minutes were considered, in accordance with PA recommendations.[8] The items evaluated were: Work-related physical activity (WRPA), Transport-related physical activity (TRPA), Compliance with the health-enhancing physical activity (HEPA) guidelines, Compliance with the muscle-strengthening physical activity (MSPA) guidelines, and total PA. WRPA is defined as the proportion of subjects performing most of their tasks exerting a moderate physical effort while working. TRPA is defined as quintiles of PA related to travel in METs/minutes per week. The TRPA value is generated by the sum of the METs and minutes spent walking and cycling. MET is the metabolic equivalent (1 MET corresponds to the energy expenditure in a resting state). MET values are 3.3 for walking and 6 for cycling.[13] Finally, participants are grouped according to whether they are in the upper quintile limit of the transport-related activity index. Compliance with the HEPA guidelines defined as the proportion of subjects performing moderate PA at least 150 minutes/week, according to the international and national HEPA guidelines.[8] The minutes/week used in cycling and aerobic activities or sports are added for the calculation . Compliance with the MSPA guidelines is defined as the proportion of subjects who perform muscle strengthening at least 2 days a week, according to international and national guidelines.[8] Total PA is defined as the proportion of subjects who are sufficiently active overall, including those who meet the HEPA guidelines, or those who are physically active at work.

EHIS-PAQ has demonstrated good reliability and validity for the measurement of work-related, transport-related and health-improving PA levels, with an intraclass correlation ratio of 0.55 (range 0.43–0.73).[14]

2.4. Data analysis

The Statistical Package for Social Sciences (SPSS 24, SPSS Inc, Chicago, IL) software was used for the statistical analysis. Data for continuous quantitative variables are expressed by mean and standard deviation, and data for qualitative variables by frequencies and percentages. Differences by sex (ie, women and men), by age (ie, <45-year-old and ≥45-year-old),[15] by academic background (ie, higher education and secondary education), and among health professionals (ie, physiotherapists, nurses, nursing assistants and technicians) were analyzed using the Student t test and the χ^2 test as appropriate. Type I error was set at <5% ($P < .05$). When missing responses were found, they were accommodated by mean substitution.[16]

3. Results

The study included 647 health professionals (Fig. 1) (80.10% women, mean age 42.50 ± 10.4 years, from 21 to 64 years). The professions analyzed were physiotherapists (35.24%), nurses (28.90%), nursing assistants (27.36%), and technicians (ie, radiology technicians, laboratory technicians and pharmacy technicians) (8.50%) (Table 1). A total of 93.51% of health professionals were physically active at work.

25.66% of participants were within the upper quintile limit of MET minutes/week when walking or cycling, whilst 53.94% met the HEPA requirements of moderate PA (at least 150 minutes/week or cycling), and 55.95% met the requirements for muscle strengthening (at least twice/week). 96.14% of health personnel showed an adequate total PA.

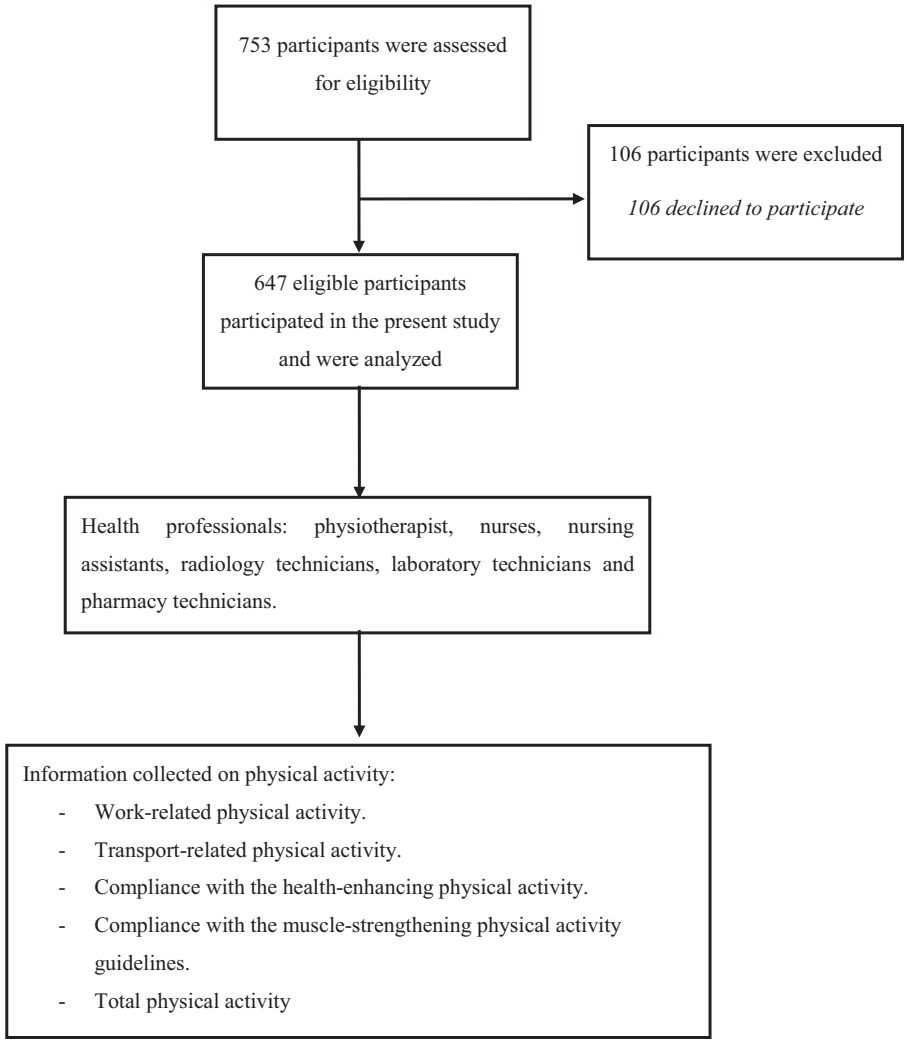

Figure 1. Flow chart of study population selection.

Table 1

Sociodemographic characteristics of the sample.

Variables	Total (n = 647)	Men (n = 129)	Women (n = 518)
Occupation			
Physiotherapist	228 (35.24)	82 (63.57)	146 (28.19)
Nurse	187 (28.90)	21 (16.28)	166 (32.04)
Nursing assistant	177 (27.36)	17 (13.18)	160 (30.89)
Radiology technician	22 (3.40)	7 (5.43)	15 (2.90)
Laboratory technician	20 (3.09)	2 (1.55)	18 (3.47)
Pharmacy technician	13 (2.01)	0 (0)	13 (2.51)
Work sector			
Public	483 (74.65)	73 (56.59)	410 (79.15)
Private	164 (25.35)	56 (43.41)	108 (20.85)
Work center			
Hospital	413 (63.83)	41 (31.78)	372 (71.81)
Private clinic	143 (22.10)	51 (39.53)	92 (17.76)
Primary care	50 (7.73)	28 (21.71)	22 (4.25)
Elderly residence	36 (5.56)	9 (6.98)	27 (5.21)
Health benefit society	5 (0.77)	0 (0)	5 (0.97)

Categorical data are expressed as absolute frequencies (percentages).

Regarding PA by sex, TRPA and compliance with the HEPA guidelines were significantly lower in women ($P < .001$ and $P < .0001$, respectively). There were no significant differences in WRPA, compliance with the MSPA guidelines or total PA between men and women (Table 2).

With regard to PA by age, compliance with the HEPA and MSPA guidelines was significantly lower in the ≥45-year-old group ($P < .001$ and $P < .001$, respectively) compared to the <45-year-old group. However, there were not significant differences in TRPA, WRPA, and total PA (Table 3).

In relation to academic background, the higher education group showed significantly more compliance with HEPA guidelines than the secondary education group (58.55% vs 45.69%, $P = .002$), as well as with MSPA guidelines (60.24% vs 48.28%, $P = .003$). There were not significant differences in TRPA, WRPA, and total PA.

When comparing the different health care professions, physiotherapists showed a significantly larger proportion of WRPA participants ($P < .001$), TRPA ($P < .001$), compliance with HEPA guidelines ($P < .001$), compliance with MSPA

Table 2

Physical activity evaluated with EHIS-PAQ and differences between men and women.

Variables	Total (n = 647)	Men (n = 129)	Women (n = 518)	*P*
WRPA (physically active at work)	605 (93.51)	124 (96.12)	481 (92.86)	.178
TRPA (upper quintile limit of MET min/wk when walking or cycling)	166 (25.66)	54 (41.86)	112 (21.62)	<.001*
Compliance with guidelines (moderate PA at least 150 min/wk)	349 (53.94)	89 (68.99)	260 (50.19)	<.001*
Compliance with MSPA guidelines (at least twice a week)	362 (55.95)	82 (63.57)	280 (54.05)	.052
Total PA: TPA (compliance with HEPA guidelines or mostly active at work)	622 (96.14)	126 (97.67)	496 (95.75)	.311

Data are expressed as absolute frequencies (percentages). HEPA = health-enhancing PA, MET = metabolic equivalent, min/wk = minutes/week, MSPA = muscle-strengthening PA, PA = physical activity, TPA = total PA, TRPA = transport-related PA, WRPA = work-related PA.

* $P < .05$.

guidelines ($P < .001$), and total PA ($P < .05$), compared to the rest of professionals (Table 4). However, technicians showed a significantly lower proportion of WRPA and total PA participants in comparison to nurses and nursing assistants (74.55% vs 90.37% and 97.18%, $P = .002$; and (83.64% vs 95.72% and 97.74%, $P < .001$, respectively). Additionally, nursing assistants showed a significantly larger proportion of WRPA participants when compared to nurses (97.18% vs 90.37%, $P = .008$).

4. Discussion

According to our results, the PA level among health care professionals was high, since 96% were physically active, mostly at work or in their spare time. Men performed more TRPA and moderate PA (at least 150 minutes/week) than women. Physiotherapists performed more PA than the rest of health care professionals.

To our best knowledge, this is the first study that uses EHIS-PAQ in health care professionals, and specifically includes physiotherapists, since most studies that evaluate PA levels and healthy habits of health care workers mainly collect information related to nursing and medical staff[17–20] or unspecified health staff.[21–23] In addition, in line with previous studies, the majority of subjects in our study were women (80.1%).[17–19,21–23] In this regard, it should be taken into account that worldwide, most health care providers are women.[24,25] Moreover, women comprise 7 of 10 health care workers.[24–26]

53.94% of the participants performed at least 150 minutes/week of PA, with men showing a higher level of compliance adherences. However, it was not possible to differentiate between moderate and vigorous activities. In addition, 56% of the sample complied with the MSPA recommendations. Compared to the general population evaluated by the Spanish National Health Survey,[27] the health care workers evaluated in the present study exhibited a higher PA level, whereas among the general population, 38% is mainly sedentary and 35% fail to reach the healthy PA level recommended by the WHO.

Presently, a number of studies analyze free-time PA; however, performing PA at work or while travelling also seems to offer benefits.[28,29] 93.51% of our sample performed moderate WRPA, whereas only 25.66% was at the upper limit of the quintile of the TRPA index, by walking or cycling.

Compared to previous studies in health care professionals, such studies appear to have reported similar values as those of the present study, although measurement instruments other than EHIS-PAQ were used. Márquez-Moreno et al[22] reported that most of the hospital health personnel presented healthy lifestyle habits, namely 76.70% of the subjects performed PA based on a habits and lifestyle questionnaire. Diaz-Sampedro et al[18] noted that health care personnel's body mass index presented normal values ($23.17 \pm 3.40\,kg/m^2$) and that 72.90% performed some type of PA. Both studies concluded that the level of PA was adequate among the evaluated staff and that shift schedules did not adversely affect PA, body mass index, or eating habits. However, a study conducted in Brazil[19] reported a 40.30% proportion of physical inactivity in nurses, this being 52.10% in all health professionals. The difference between these studies may be due to several causes, such as health habits and PA programs in each country.

It is encouraging that all health personnel exhibited a high level of PA given the strong association between the habits of health professionals and of patients,[30,31] as well as the importance of an interdisciplinary team in improving lifestyle and quality of life.[32] Physiotherapists not only have an important role in the primary prevention and management of diseases associated with low PA levels,[10] but in the present study this group further complied to a greater extent to HEPA (67.98% vs 46.30%) and MSPA guidelines (67.54% vs 49.64%), as compared to other health professionals. This difference may be due to the knowledge base of physiotherapy staff, which may lead to their increased

Table 3

Physical activity evaluated with EHIS-PAQ and differences by age.

Variables	Total (n = 647)	<45 y (n = 380)	≥45 y (n = 267)	*P*
WRPA (physically active at work)	605 (93.51)	354 (93.16)	251 (94.01)	.666
TRPA (upper quintile limit of MET min/wk when walking or cycling)	166 (25.66)	96 (25.26)	70 (26.21)	.470
Compliance with HEPA guidelines (moderate PA at least 150 min/wk)	349 (53.94)	235 (61.84)	114 (42.7)	<.001*
Compliance with MSPA guidelines (at least twice a week)	362 (55.95)	235 (61.84)	127 (47.57)	<.001*
Total PA: TPA (compliance with HEPA guidelines or mostly active at work)	622 (96.14)	368 (96.84)	254 (95.13)	.266

Data expressed as absolute frequencies (percentages). HEPA = health-enhancing PA, MET = metabolic equivalent, min/wk = minutes/week, MSPA = muscle-strengthening PA, PA = physical activity, TPA = total PA, TRPA = transport-related PA, WRPA = work-related PA.

* $P < .05$.

Table 4

Physical activity evaluated with EHIS-PAQ and differences between physiotherapists and other health professionals.

Variables	Physiotherapists (n = 228)	Other health professionals (n = 419)	P
WRPA (physically active at work)	223 (97.81)	382 (91.17)	.001*
TRPA (upper quintile limit of MET min/wk when walking or cycling)	75 (32.89)	91 (21.72)	<.001*
Compliance with HEPA guidelines (moderate PA at least 150 min/wk)	155 (67.98)	194 (46.30)	<.001*
Compliance with MSPA guidelines (at least twice a week)	154 (67.54)	208 (49.64)	<.001*
Total PA: TPA (mainly active at work or compliance with HEPA guidelines)	224 (98.25)	398 (94.99)	.040*

Data expressed as absolute frequencies (percentages). HEPA = Health-enhancing PA, MET = metabolic equivalent, min/wk = minutes/week, MSPA = muscle-strengthening PA, PA = physical activity, TPA = total PA, TRPA = transport-related PA, WRPA = work-related PA.
* $P < .05$.

awareness of the importance of PA. On the other hand, we would like to highlight the possible differences in PA between men and women due to neurologic mechanisms and the role of estrogens in women, that may produce differences by sex in general levels of PA.[33]

Actions intended to promote PA and to improve knowledge among health professionals could have a potential positive influence on preventive counseling and motivation for patients.[21] Therefore, the quality of health education needs to be improved with a focus on the prevention of heart disease for physicians, nurses and other health professionals,[34] as well as to improve their ability to encourage the patients to exercise.[20] A greater knowledge of primary CVD prevention resources,[35] while breaking down barriers related to attitudes and beliefs about PA counseling to promote primary prevention of heart disease[15] can influence the prescription and motivation towards PA.

Our findings suggest that greater compliance with PA recommendations by health care personnel is essential for healthy lifestyle promotion due to its influence on patient behavior. In addition, future studies should highlight physiotherapy as a fundamental pillar in PA management and as a tool in the primary prevention of CVD.

4.1. Limitations and strengths

This study is based in self-reports, which may mainly imply a data collection bias. However, EHIS-PAQ is a validated and reliable questionnaire for the measurement of PA levels. However, there were differences in sex due to the high number of female physiotherapists and nurses in these areas, so that could limit the generalizability of the study results. A relevant aspect of the present study is that our findings provide information from a wide group of healthcare personnel, and the results show that most comply with the PA recommendations established by the WHO and the ESC as primary prevention of CVD. In addition, this study provides information for health professionals who wish to achieve a healthy lifestyle and thereby be able to better advise and motivate their patients. Finally, our work includes physiotherapists, whereas previous studies focused on nurses, physicians and other health care professions in general.

5. Conclusions

Most of the health care professionals presented an adequate level of PA, were physically active at work, and complied with the WHO and the ESC recommendations for PA and muscle strengthening. Men carried out more transport-related PA and moderate PA (at least 150 minutes/week) compared to women, and there were no differences in the other variables. In addition, physiotherapists were physically more active than the rest of health care professionals.

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Author contributions

Conceptualization: Elena Marques-Sule, Silvia Miró-Ferrer, Gemma Victoria Espi-Lopez.
Investigation: Elena Marques-Sule, Elena Muñoz-Gómez, Maria Del Carmen Martinez-Muñoz, Gemma Victoria Espi-Lopez, Antonio Bermejo Fernández.
Methodology: Elena Marques-Sule, Elena Muñoz-Gómez, Gemma Victoria Espi-Lopez.
Project administration: Elena Marques-Sule.
Resources: Silvia Miró-Ferrer, Maria Del Carmen Martinez-Muñoz, Elena Muñoz-Gómez.
Supervision: Elena Marques-Sule, Raul Juárez-Vela, Vicente Gea-Caballero, Gemma Victoria Espi-Lopez.
Validation: Raul Juárez-Vela, Vicente Gea-Caballero, Antonio Bermejo Fernández.
Writing – original draft: Elena Marques-Sule, Elena Muñoz-Gómez, Gemma Victoria Espi-Lopez.
Writing – review & editing: Elena Marques-Sule, Elena Muñoz-Gómez, Antonio Bermejo Fernández, Gemma Victoria Espi-Lopez, Vicente Gea-Caballero, Raul Juárez-Vela, Silvia Miró-Ferrer, Maria Del Carmen Martinez-Muñoz.

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