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Original Article

The influence of healthcare workers' occupation on Health Promoting Lifestyle Profile

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Abstract: To compare the adoption of healthy lifestyle behaviors, including: spiritual growth, nutrition, physical activity, interpersonal relations, health responsibility, and stress management, of healthcare workers with workers of other professions. Cross-sectional observational study among a convenience sample of 285 healthcare workers and 137 of other professions. The Health-Promoting Lifestyle Profile-II (HPLP-II), a 52-item measure regarding the six components of healthy lifestyle. Demographic characteristics, education, income, work duration and self-rated health were also collected. Multivariable linear models were specified for each of the components of healthy lifestyle. Both groups were comparable in their age, family status, income and self-rated health. Results of multivariable linear models revealed that healthcare workers adopt better nutrition (β=0.228, p<0.001), more physical activity (β=0.133, p=0.049), and greater health responsibility (β=0.131, p=0.016), compared to other professions. Such differences were not found with regard to spiritual growth (β=0.097, p=0.121), interpersonal relations (β=0.039, p=0.444), or stress management (β=0.053, p=0.299). Healthcare workers adopt better healthy lifestyle only in components that may be perceived to have direct influence on health outcomes, namely nutrition, physical activity, and health responsibility. Further research that will explore the reasons for the observed differences may enable designing health-improving interventions.

Key words: Health promoting behaviors, Health Promoting Lifestyle Profile-II, Healthcare workers, Nutrition, Physical activity, Health responsibility

Introduction

Health-promoting lifestyle is a multidimensional pattern of self-initiated perceptions and actions, aimed to maintain and improve the individual's wellness[1, 2]. According to Walker *et al.*, healthy lifestyle consists of six basic components: spiritual growth, nutrition, physical activity, interpersonal relations, health responsibility, and stress management[1, 2]. The relation between adoption of healthy lifestyle and disease prevention and health maintenance is well recognized[3, 4].

Professional occupation affects health outcomes[5, 6]. This might be derived from a direct influence, such as physical working conditions (e.g., exposure to heat or noise, work injuries), or through indirect influence, as a result of work characteristics (e.g., high workload and lack of flexibility in working hours), work environment policies (e.g., smoking prohibition), and through the effect of income on health outcomes. Although one might expect that healthcare workers' education and experience will promote their adherence to health-promoting behaviors, current evidence is inconclusive. Studies among specific groups of health workers

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(e.g., medical doctors, nurses, etc.) conclude that those were more inclined to adopt a healthy lifestyle including physical activity, lower alcohol consumption, periodic screening tests and healthier nutrition[7–11]. On the contrary, other studies have shown that health workers do not adopt healthy lifestyle behaviors for various reasons, such as a false feeling of "protection" due to their medical knowledge, the tendency to prioritize their patients' health over their own (a dominant factor within the nursing profession), lack of time, fatigue, lack of motivation and insufficient exposure to healthy lifestyle promoting academic contents during their academic qualification[12–15]. Moreover, in a healthy-lifestyle-promotion project among health care workers, those reporting relatively unfavorable lifestyles were not more motivated to participate[16]. To the best of our knowledge, there is no study that analyzed patterns of healthy lifestyle among a diverse group of healthcare workers including physicians, nurses, pharmacists, dietitians and administrators in comparison to workers in other professions.

Healthcare workers are expected to be more knowledgeable than others about health care behaviors and their long-term consequences. Some are exposed on a daily basis to chronically ill patients whose illness is closely related to health-risk behaviors (e.g., diabetes). In addition, they are expected to act as role models[17, 18]; physicians' health behaviors were found to affect patients' attitudes and motivation to make lifestyle changes[19]. Therefore, understanding the lifestyle patterns of healthcare workers, as well as the motivation for these patterns, may have possible implications on public health.

This study's first objective was to examine whether healthcare workers adopt healthier lifestyles than workers in other professions. In addition, assuming such differences exist, the second objective was to explore whether being defined as a "caregiver" within the healthcare system (thus directly involved in patients' medical treatment) is related to adoption of healthier lifestyle patterns.

Subjects and Methods

Study population

A cross-sectional observational study was conducted among a convenience sample of health care workers (n=285) and workers in occupations (n=137). Healthcare workers were recruited from Leumit Health Services and Meuhedet, two health plans (HMOs) in Israel and constituted of medical doctors (n=43), nurses (n=105), pharmacists (n=75), administrators (n=27), nutritionists (n=10) and other health workers (n=25).

A secondary classification of health workers defined caregivers as medical doctors, pharmacists, nurses and nutritionists (n=233), and non-caregivers as other healthcare workers (n=48).

Workers in other professions were recruited mainly from Modiin-Maccabim-Reut municipality (n=95), and others were recruited using a snowball sampling technique (n=42).

Measures

The Health Promoting Lifestyle Profile in its second version (HPLP-II) is a validated questionnaire that has been widely used for the measurement of health behaviors of workers in various occupations[20–25]. It is a 52-item measure that refers to the six components of healthy lifestyle[1], namely, spiritual growth, nutrition, physical activity, interpersonal relations, health responsibility and stress management. Respondents were asked to report how frequently they adopt the behavior presented in each item on a 4-point scale ranging from 1 (never) to 4 (routinely). The internal consistency range of the subscales' values was 0.673–0.847.

The second part of the questionnaire collected demographic characteristics (gender, age, family status, religion, religiosity), education, income, work duration and self-rated health.

Study procedure

The HPLP-II questionnaire was translated to Hebrew following accepted standards, and aspects regarding the questionnaire's clarity were assessed through a pilot study prior to distributing the final version. The questionnaires were distributed via e-mails and workers were informed that their responses would be kept anonymous. In order to increase response rate, reminders were sent periodically by the contact person in each of the cooperating institutions. The overall response rate was 19.1% (26.1% at Leumit Health Services, 9.5% at Meuhedet, 29.6% at Modiin-Maccabim-Reut municipality and 23.7% in the snowball sampling method). The study was approved by all cooperating institutions and by the Human Subjects Research Committee of the Gilford Glazer Faculty of Business and Management, Ben-Gurion University of the Negev (#TS09072013).

Statistical analysis

A non-normally distributed continuous variable (age) is presented as median (minimum-maximum). Dichotomous variables (e.g., gender and education) are presented as proportions. Comparison between groups' medians and

Table 1. Comparison of characteristics between healthcare workers and workers of other occupations

Characteristic	Healthcare workers	Non-healthcare workers	*p*-value
N	285	137	
Age (Median (min-max))	43 (23–68)	43 (27–73)	0.785[a]
Gender (% Male)	20.4	30.6	0.024[b]
Religion (% Jews)	90.4	99.3	0.001[b]
Religiosity among Jews (%)			
Secular	34.7	56.9	<0.001[b]
Traditional	14.4	24.1	
Religious	30.5	14.6	
Orthodox	9.1	2.2	
Family status (% married)	87.9	85.2	0.433[b]
Employment years (%)			
0–5	9.9	18.7	<0.001[b]
5–10	20.1	17.2	
10–15	20.4	22.4	
15–20	9.5	23.9	
20–25	13.7	6.0	
Above 25	26.4	11.9	
Education (% higher education)	85.8	72.8	0.001[b]
Mean monthly income per person (%)			
Low/very low compared to average	38.2	45.5	0.314[b]
Average	24.0	23.5	
High/very high compared to average	37.8	31.1	
Self-rated health (%)			
Not very good/not good at all	4.2	2.9	0.513[b]
Good	40.4	33.6	
Very good	49.1	56.9	

[a] Mann-Whitney U test.
[b] Chi-square test

proportions was done using Mann-Whitney U test and Chi-square test, respectively. We used multivariable linear regression analysis to examine predictors of adoption of each of the six components of the healthy lifestyle profile (dependent variables). In order to examine whether healthcare occupation increases the odds to engage in healthy lifestyle, we specified multivariable logistic regression models. For this purpose, respondents were defined as those who never or sometimes engage in healthy lifestyle, score ≤ 2.5, and those who often or routinely engage in healthy lifestyle, score > 2.5. For the analysis of the odds to adopt physical activity (and since the variable distribution enabled it), respondents were defined as those who never engage in physical activity, score < 1.5, and those who sometimes, often, or routinely engage in physical activity, score ≥ 1.5. The area under the receiver operating characteristic (ROC) curve was presented for the models' predictive power. All models included occupation type (healthcare vs. others; caregivers vs. other healthcare workers), age, gender and education (higher education (i.e., bachelors', master's, or doctoral degree) vs. secondary education), as independent variables. Additional independent variables including religion, marital status and health sta-

Table 2. Multivariable linear analyses of determinants of adoption of healthy lifestyle-healthcare workers compared to others

Healthy lifestyle components	β	*p*-value
Nutrition[a,b] (n=365, R^2=0.11)	0.228	<0.001
Physical activity[a,c] (n=366, R^2=0.12)	0.133	0.049
Health responsibility[a,d] (n=391, R^2=0.13)	0.131	0.016
Spiritual growth[a,e] (n=341, R^2=0.07)	0.097	0.121
Interpersonal relationships[a,b] (n=365, R^2=0.05)	0.039	0.444
Stress management[a,f] (n=366, R^2=0.05)	0.053	0.299

[a] Independent variables included in the model: age, gender, education.
[b] Additional significant predictors: marital status, health status.
[c] Additional significant predictors: health status.
[d] Additional significant predictors: religion.
[e] Additional significant predictors: health status, religiosity.
[f] Additional significant predictors: religion, health status.

Table 3. Multivariable logistic models of determinants of adoption of healthy lifestyle[a]-healthcare workers compared to others

Healthy lifestyle components	OR	95% CI	*p*-value	Area under the ROC curve
Nutrition[b,c] (n=365)	1.68	1.04–2.73	0.036	0.686
Physical activity[b,d,e] (n=366)	1.96	1.11–3.48	0.021	0.697
Health responsibility[b,f] (n=391)	1.30	0.76–2.21	0.337	0.690
Spiritual growth[b,g] (n=341)	1.34	0.72–2.50	0.350	0.708
Interpersonal relationships[b,c] (n=365)	1.30	0.69–2.46	0.414	0.716
Stress management[b,h] (n=366)	1.08	0.58–2.01	0.802	0.646

[a] Respondents who reported they adopted a healthy lifestyle often or routinely vs. those reported never or sometimes.
[b] Independent variables included in the model: age, gender, education.
[c] Additional significant predictors: marital status, health status.
[d] Additional significant predictors: health status.
[e] Respondents who reported they exercise sometimes, often or routinely vs. those reported they never exercise
[f] Additional significant predictors: religion.
[g] Additional significant predictors: health status, religiosity.
[h] Additional significant predictors: religion, health status.

tus, were included following evidence of bivariate significant association. Data were analyzed using SPSS software (ver. 20.0, IBM corp., Armonk, NY, USA). p values <0.05 determined statistical significance in all analyses.

Results

Four hundred twenty-two participants were included in our analysis (median age of 43 (23–73) and 23.8% males). Table 1 summarizes the differences in personal characteristics between healthcare workers (n=285) and workers in other occupations (n=137). No significant differences were found between groups with regard to age, family status, income per person and self-rated health. However, compared to others, lower proportions of healthcare workers were male and Jewish (20.4% versus 30.6%, $p=0.024$; 90.4% versus 99.3%, $p=0.001$; respectively). In addition, a higher proportion of healthcare workers were employed 20–25 years and more than 25 years (13.7% versus 6.0%, 26.4% versus 11.9%, $p<0.001$). Finally, a higher proportion of health care workers had higher education compared to workers of other professions (85.8% versus 72.8%, $p=0.001$).

Results of the linear multivariable models are presented in Table 2. The analyses reveal that healthcare workers adopt better nutrition ($\beta=0.228$, $p<0.001$), more physical activity ($\beta=0.133$, $p=0.049$) and higher health responsibility ($\beta=0.131$, $p=0.016$). However, such differences were not found between healthcare workers and others with regard to spiritual growth ($\beta=0.097$, $p=0.121$), interpersonal relations ($\beta=0.039$, $p=0.444$) and stress management ($\beta=0.053$, $p=0.299$). Multivariable logistic models yielded similar results (Table 3). First, healthcare occupation increased the odds of workers to adopt better nutrition (OR; 95% confidence interval (CI): 1.68; 1.04–2.73) and physical activity (OR; 95% CI: 1.96; 1.11–3.48); however, we could not confirm the results with regard to health responsibility. Namely, healthcare occupation did not increase the odds of healthcare workers to adopt higher health responsibility (OR; 95% CI: 1.30; 0.76–2.21). Similar to the findings of the linear models, healthcare occupation did not increase the odds of healthcare workers to engage in spiritual growth (OR; 95% CI: 1.34; 0.72–2.50), better interpersonal relationships (OR; 95% CI: 1.30; 0.69–2.46), and better stress management (OR; 95% CI: 1.08; 0.58–2.01).

Table 4. Multivariable linear analyses of determinants of adoption of healthy lifestyle-caregivers compared to administrative personnel within the healthcare system

Healthy lifestyle components	β	*p*-value
Nutrition[a,b] (n=240, $R^2=0.05$)	0.077	0.416
Physical activity[a,c] (n=240, $R^2=0.11$)	−0.026	0.809
Health responsibility[a,d] (n=257, $R^2=0.15$)	−0.145	0.092

[a] Independent variables included in the model: age, gender, education.
[b] Additional significant predictors: marital status, health status.
[c] Additional significant predictors: health status.
[d] Additional significant predictors: religion.

Two hundred and eighty-five healthcare workers were included in our analysis, of whom 233 were caregivers and

Table 5. Multivariable logistic models of determinants of adoption of healthy lifestyle[a]-caregivers compared to administrative personnel within the healthcare system

Healthy lifestyle components	OR	95% CI	*p*-value	Area under the ROC curve
Nutrition[b,c] (n=240)	2.70	1.19–6.13	0.018	0.737
Physical activity[b,d,e] (n=240)	1.45	.52–4.02	0.474	0.730
Health responsibility[b,f] (n=257)	0.67	.31–1.43	0.302	0.733

[a] Respondents who reported they adopted a healthy lifestyle often or routinely vs. those reported never or sometimes.
[b] Independent variables included in the model: age, gender, education.
[c] Additional significant predictors: marital status, health status.
[d] Additional significant predictors: health status.
[e] Respondents who reported they exercise sometimes, often or routinely vs. those reported they never exercise
[f] Additional significant predictors: religion.

48 were administrative workers (median age 43 (23–68), and 20.4% males). No significant differences were found between groups with regard to age, family status and self-rated health. However, compared to others, higher proportions of caregivers were males (22.9% versus 8.3%, $p=0.023$) and lower proportions of caregivers were Jewish (88.2% versus 100%, $p=0.012$). In addition, higher proportions of caregivers were employed 20–25 years and more than 25 years (14.7% versus 10.4%, 30.6% versus 8.3%, respectively; $p=0.003$) and had a higher education (91.7% versus 56.3%, $p<0.001$). Finally, higher proportions of caregivers had higher than average monthly income (43.3% versus 10.6%, $p<0.001$).

The multivariable linear analyses presented in Table 4 examine whether the healthier lifestyle adopted by healthcare workers with regard to nutrition, physical activity and health responsibility is related to being caregivers. Among healthcare workers, compared to non-caregivers, being a caregiver was not associated with better nutrition ($\beta=0.077$, $p=0.416$), more physical activity ($\beta=-0.026$, $p=0.809$), or greater health responsibility ($\beta=-0.145$, $p=0.092$). Multivariable logistic models yielded similar results with one exception (Table 5). Compared to the administrative personnel, health caregivers did not have higher odds to adopt physical activity (OR; 95% CI: 1.45; 0.52–4.02) or higher health responsibility (OR; 95% CI: 0.67; 0.31–1.43). However, this analysis revealed that compared to the administrative personnel, health caregivers had higher odds to adopt better nutrition (OR; 95% CI: 2.70; 1.19–6.13).

Discussion

According to our findings, healthcare workers adopt healthier nutrition, more physical activity and greater health responsibility compared to workers in other occupations. However, this trend was not observed with regard to spiritual growth, interpersonal relations, and stress management. Finally, compared to healthcare workers who are not caregivers, being a caregiver was not associated with better nutrition and greater health responsibility. The following discussion considers these results in light of the currently available literature.

Our finding that healthcare workers adopt better nutrition is congruent with those of two other studies among physicians[7, 9]. As noted by the authors in one of these studies, the reason for this is that physicians typically believe they were perceived as being more professional if they lived balanced lives. However, a review of health behaviors (including nutrition) of Israeli doctors found that physicians disregard maintaining a healthy diet, perhaps due to feeling protected by their own knowledge[12]. These different results might stem from differences in research setting. Our study investigated health-promoting behaviors among healthcare workers mainly in community clinics, whereas the review addressed both community and hospital workers. The working environment in hospitals is different from that in community clinics. Work in hospitals is characterized by long and often stressful working hours that may not enable workers to adjust mealtime to hunger, thus they may eat larger amounts eventually. In addition, hospital workers have greater accessibility to buffets, which typically serve fatty, salty and non-balanced meals, as well as food machines with snacks, sweets or sweetened beverages; thus compared to community clinic workers, they may be more inclined to consume unhealthy food. Intervention targeted at improving healthcare workers' attitudes toward better lifestyle resulted in a decrease

in waist circumference due to actual adherence to a better diet[26]. Thus, qualitative research may be required in order to reveal healthcare workers' perceptions and preferences and discover reasons for their behavior.

We demonstrate that healthcare workers practice physical activity more often than workers in other occupations. These findings are similar to the findings of other studies among physicians, cardiac nurses and medical students[8, 10, 11, 27–29]. However, a study of physical activity patterns among hospital workers reached opposite conclusions[14]. Again, the reason for this contradiction might be related to the study setting. Compared to healthcare workers in the community setting, workers in hospitals face heavier workloads and rotating longer shifts, and thus may feel more tired and do not have the time to practice physical activities. In addition, our results are different from studies that were focused on physical activity patterns only among nurses[13, 15, 30]. Physical activity patterns among nurses were, according to the investigators, very poor, and led the investigators to strongly recommend an intervention[15]. However, our study population consisted of a mixed group of healthcare workers, i.e., 285 workers of which only 37% were nurses. Future research should analyze each sector separately and explore the reasons if and why specific groups are more likely to adopt physical activity than others.

The current study revealed that workers in the healthcare system had greater health responsibility. Another study that investigated lifestyle patterns among physicians provided similar conclusions[7]. Yet, other studies that examined rates of performing preventive screenings (such as cholesterol levels, blood pressure, mammograms, colonoscopy, etc.) among healthcare workers compared to the general population, either displayed no differences, or even showed that healthcare workers performed less preventive screening[17, 31]. The reason for this apparent contradiction may be derived from the fact, that the HPLP-II part that refers to health responsibility does not address the actual performance of preventive checkups, but rather general statements in this regard, for example, reporting unusual signs or symptoms, seeking health education and consulting professionals.

Our results may be derived from two sources. First, it is assumed that healthcare workers believe that they are expected to act as role models and that adopting a healthier lifestyle is important in order to be perceived as a professional by their patients. Several studies support this assumption. A study aiming to examine the relationship between adoption of healthy lifestyle and self-perception of professionalism among nurses, has found that nurses who adopted healthier lifestyle patterns had a significantly better self-perception of their own professionalism and self-rated health[30]. Another study among physicians has shown that 75% of the respondents believe that they are expected to act as role models by following a healthy lifestyle[32]. Nonetheless, our hypothesis that healthcare workers adopt healthier lifestyle behaviors due to being caregivers who are expected to act as role models was not confirmed. No significant differences in the adoption of health promoting behaviors were found between caregivers and other healthcare workers. However, due to the small sample of non-caregiver workers (n=48) and the low predictive power of the models, this issue should be further examined both qualitatively and quantitatively among a representative samples in order to reach a definite conclusion.

Secondly, we suggest that healthcare workers adopt healthier nutrition, physical activity and health responsibility patterns, because they possess much greater knowledge regarding health promoting behaviors and their long-term effects on health outcomes, and are exposed on a daily basis to chronically ill patients, whose illness is closely related to health-risk habits. These unique characteristics of healthcare workers may facilitate the changing horizon in occupational health, namely the progress from work-related hazards prevention towards healthy lifestyle-related disease prevention[33]. However, little is known about the relationship between routine exposure to chronically ill patients and the healthy lifestyle of healthcare workers that are involved in their therapy. Considering the fact that no differences in healthy lifestyle behaviors were found between caregivers and other healthcare workers in our study, this assumption was not confirmed. Future in-depth studies may be warranted to address this issue.

As opposed to the above mentioned components of the healthy lifestyle profile, no differences were found between healthcare workers and others with regard to spiritual growth and interpersonal relations. The underlying reason might be that these components may not be perceived to have direct influence on health outcomes (in contrast to physical activity and diet). The aspects of spiritual growth and interpersonal relations are somewhat neglected in literature, and to the best of our knowledge, there is no study that explores the relationship between these unique components and healthcare occupation. Moreover, the low predictive power of the multivariable models of these components implies that there are other independent variables influencing these components that were not observed in our study, thus requiring further exploration.

Finally, no differences were found between healthcare workers and others with regard to stress management abilities. The high levels of occupational stress and burnout among healthcare workers have been widely explored[34–38]. Although there are no studies comparing stress management between health care workers and others, some non-comparative studies among nurses have shown they demonstrate poor stress management skills[15, 30]. Many reasons contribute to the nurses' inability to cope with work stressors, including lack of time, lack of tools to choose a specific method for coping with stress, the difficulty in prioritizing between many tasks simultaneously and the lack of social and occupational support networks[15]. Future studies are also needed in this regard, since the predictive power of our multivariable model for this component was relatively low.

This study has two main limitations. First, neither of the groups of workers examined is a representative one, due to study settings, low sample size and low response rates. In both groups of respondents, study setting might have led to selection bias. Healthcare workers were recruited in the community setting and thus do not represent hospital workers. Workers of other occupations were recruited mainly from Modiin-Maccabim-Reut municipality, and since the population of this city is characterized by higher than average socio-economic status[39], it cannot be regarded as representative of the general population. Due to the well-established connection between socio-economic level and healthy lifestyle and health outcomes[40], there might have been an overestimation of health promoting behaviors among this group. Yet, the fact that healthcare workers reported they adopt better nutrition, more physical activity and greater health responsibility, despite being compared to workers with relatively high socio-economic status, strengthens our findings. The distribution of questionnaires via e-mails, which resulted in relatively low response rates, led to the misrepresentation as well. Despite the obvious advantages of web-based surveys, there is evidence that gathering information through this method might lead to low response rates, which remain low even after sending periodic reminders[41]. Future studies should consider other measures of questionnaire and reminders distribution and design them in a way that would enhance response rate. The second limitation of this study is the low predictive power of the multivariable models of spiritual growth, interpersonal relations and stress management. This indicates the existence of other influential variables related to these unique components, which we are unaware of, and should be investigated in future research. Possible variables that may be considered in this exploration include self-efficacy, mental wellbeing (depression, in particular), self-esteem and time proximity to health shocks.

Notwithstanding these limitations, this preliminary study is, to our knowledge, the first to address the healthy lifestyle profile of a diverse group of healthcare workers in Israel. Moreover, besides examining the traditional aspects of healthy lifestyle (such as nutrition and physical activity), this study is unique by addressing spiritual growth, interpersonal relations and stress management, which are known as integral components of a healthy lifestyle, yet are usually ignored. Future research among representative samples of both healthcare workers and others is warranted to substantiate these results, with special attention to exploring the reasons of the observed differences and the obstacles that prevent adoption of a healthier lifestyle.

These analyses may ultimately enable design of workplace health promotion programs aimed to improve adoption of health promoting behaviors. This in turn will have the potential to improve health outcomes[3, 4].

Health care workers may be key actors in promoting healthy lifestyles of the public; it was found that improving adoption of healthy lifestyle of healthcare workers had a positive impact on the adoption of healthy lifestyle by their patients, thus their patients' health outcomes improve through a "halo effect"[42]. Hence, another potential promising benefit to such tailor-made worksite interventions may be improving public health. In this era of continuous lack of resources in the healthcare system and the growing expenditures on chronic illnesses, the possibility of improving adherence to health promoting behaviors and public health outcomes through improving the health lifestyle profile of their health caregivers is a promising strategy that should be further explored.

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