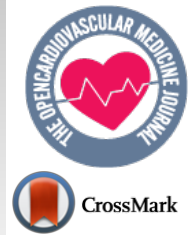




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RESEARCH ARTICLE

Relationship between Physiological Health Status, Lifestyle Behaviors, and Cardiovascular Disease Among Adults in Two Arab Countries

Nada A. AbuAlUla¹, Rami A. Elshatarat², Mohammed I. Yacoub³, Khadega Ahmed Elhefnawy^{2,4}, Mohammed S. Aljohani², Ziad T. Saleh³ and Ahmad H. Abu Raddaha^{5,*}

¹Department of Psychiatric Nursing, College of Nursing, Taibah University, Madinah, Kingdom of Saudi Arabia

²Department of Medical-Surgical Nursing, College of Nursing, Taibah University, Madinah, Saudi Arabia

³Department of Clinical Nursing, School of Nursing, The University of Jordan, Amman, Jordan

⁴Department of Medical-Surgical Nursing, Menoufia University, Al-Minufiyah, Egypt

⁵Department of Nursing, College of Applied Medical Sciences, Prince Sattam Bin Abdulaziz University, Al-Kharj, Kingdom of Saudi Arabia

Abstract:

Purpose:

Identify the relationships among participants' lifestyle and their perceptions toward physiological health status.

Methods:

This is a cross-sectional research study. A convenience sampling was used to recruit 480 adult clients from Jordan and Saudi Arabia.

Results:

The majority of the participants (48.8%) rated their physiological health status as sub-optimal health. Significant positive associations were found between participants' perceptions about physiological health status as 'healthy' and their positive lifestyle and low-risk behaviors for Cardiovascular Disease (CVD). Specifically, the associations were between *not being smoker* ($\chi^2 = 4.17, p = 0.04$), *practicing physical activity* ($\chi^2 = 60.9, p < 0.001$), *eating ≥ 5 cups of fruits and vegetables daily* ($\chi^2 = 8.33, p = 0.004$), and *being normal/under-weight* ($\chi^2 = 65.5, p < 0.001$).

Conclusion:

Perception about poor/sub-optimal physical health status is associated with many CVD risk factors. Using a brief screening tool to assess physical health status is recommended at each clinic visit. In addition, periodic physical assessment, full check-up, and follow-up with healthcare providers are highly suggested for those who perceived their physical health status as "poor" to prevent further CVD. Health education is pressingly recommended to improve the awareness of these Arab communities toward the prevention of CVD risk factors and enhancement of positive lifestyle behaviors.

Keywords: Arab population, Cardiovascular disease, Lifestyle behaviors, Physical health, Sub-optimal health status.

Article History

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1. INTRODUCTION

Sub-optimal Health Status (SHS) has subjective complaints about early manifestations or discomforts that are not confirmed by laboratory or radiological examinations due to negative or unclear results of clinical investigations [1 - 3]. Further, SHS is not only associated with various CVD risk factors, but it contributes to its development as well. CVD risk factors

include tobacco smoking, family history of cardiovascular diseases such as hypertension, obesity measured by body mass index, no or limited practicing of exercises, unhealthy diet choices such as consuming high daily caffeine, and limited intake of fruits and vegetables [1, 3].

Literature showed an association between SHS and poor lifestyle habits such as consuming tobacco, physical inactivity, and poor dietary habits [3]. These poor lifestyle habits are believed to be major contributors to clinical manifestations in patients with SHS [1 - 3]. Since these clinical manifestations in the participants with SHS are less noticeable than among those

* Address correspondence to this author at the Department of Nursing, College of Applied Medical Sciences, Prince Sattam Bin Abdulaziz University, Al-Kharj, Saudi Arabia; E-mail: a.aburaddaha@psau.edu.sa

with diseases, such manifestations are often ignored. Failure to identify these warning signs amplifies the risk for developing chronic diseases [4].

Many Arab countries, particularly Jordan and Saudi Arabia, have a high prevalence of non-communicable diseases (NCDs) such as CVD, diabetes mellitus, and cancer [5]. NCDs are a global burden health problem. CVD is one of the leading causes of death. Nonetheless, the prevalence of behavioral risk factors for CVD and NCDs is very high in Jordan and Saudi Arabia [5 - 8]. Despite the increasing numbers of NCDs in Arab countries, there are still weaknesses in implementing assertive preventive interventions and policies to control NCDs in the Arab world [5, 8].

The literature revealed a lack of published research studies that examined the association between lifestyle factors and physical SHS or poor health status among Jordanians and Saudis.

1.1. Research Objective

The objectives of this study were to identify the following: (1) the participants' self-rated physiological health conditions, (2) the significant differences between Jordanians and Saudis in rating their overall physiological health status, and (3) the relationship between participants' demographics, lifestyle and cardiovascular risk factors and their perceptions toward physiological health status.

2. METHODS

2.1. Research Design

A cross-sectional research design was used to investigate the perceptions of adult Jordanians and Saudis toward their physiological health status.

2.2. Settings and Sample

Data were collected from five Primary Health Care (PHC) centers in Amman (Jordan) and three PHC centers in Madinah (Saudi Arabia). The study investigators randomly selected the PHC centers.

A convenience sampling was used to recruit 480 adult clients, with 240 participants recruited from each country (Jordan and Saudi Arabia). Participants were eligible to take part in the study if they visited the selected PHC centers, were medically free from chronic diseases, and were Arabic language speakers. The potential participants who were diagnosed with psychiatric disorders or pregnant women at the time of data collection were excluded from participation in this study.

2.3. Research Tools

Demographic data and lifestyle sub-scales were adopted from previous studies [2, 9]. Sub-Health Measurement Scale (SHMS), particularly the sub-scale of physiological health dimension [2], was used to investigate the participants' SHS. The reliability and validity of the original SHMS were documented in the previous literature [2]. Two experts had translated the SHMS tool to Arabic language. The participants were asked to rate their overall physiological health status and uncomfortable physiological symptoms which they experienced during the previous month. For example, the

following question was asked to identify gastrointestinal discomfort: 'How often do you suffer from gastrointestinal discomfort last month?' The participants' responses on such type of questions ranged between (1 = *never*) and (5 = *always*). The CVD risk factors were confirmed when reviewing the health records of the participants in the PHC centers and during the person-to-person interviews.

2.4. Data Collection Procedure

The study protocol was reviewed and approved by the Ethical Committee for Medical Research at "Al-Ghad International Colleges for Applied Medical Sciences," Saudi Arabia. Further, official ethical approvals were obtained from the Ethical Committee of Health Research at the Ministry of Health in Saudi Arabia and Jordan. All the participants in this study signed written consent.

To collect the data from the participants in this study, a direct person-to-person interview was held in a private room inside selected PHC centers. The participants were informed that their participation was voluntary and their personal data would be confidential. The participants spent between 10 and 15 minutes finishing the interview. The data were collected between February 7, 2017, and November 13, 2017.

2.5. Statistical Analysis

IBM Statistics for Windows, version 27 (IBM Corp., Armonk, N.Y., USA) was used for data analysis and management. The *t*-test analyses were run to determine significant differences between physiological health status scores reported by Jordanian and Saudi participants. Chi-square analyses were carried out to identify significant relationships between the participants' demographic, CVD risk factors, lifestyle, and their perceptions toward physiological health status. The *p*-value was considered statistically significant at the 0.05 cut-point.

3. RESULTS

Table 1 shows significant differences between means of Jordanian and Saudi participants in rating their physical health conditions, including satisfied appetite ($t = 6.47, p = 0.03$), satisfied sleeping pattern ($t = 3.78, p = 0.02$), and hair growth ($t = 6.57, p < 0.001$). Although the Saudis had better appetite and sleeping pattern than Jordanians, they had significant worsened organ dysfunction than Jordanians, including thoracic health problems ($t = 10.75, p < 0.001$), gastrointestinal discomfort ($t = 4.19, p = 0.04$), abnormal urine ($t = 7.55, p < 0.001$), and head discomfort ($t = 4.03, p < 0.001$). However, Jordanian participants had significant worsened impairment in body movement function than Saudi participants, including difficulty with knees bending ($t = 5.03, p < 0.001$), difficulty in climbing 3-5 floors ($t = 6.24, p < 0.001$), and difficulty in walking 1500 meters ($t = 5.15, p < 0.001$). Furthermore, there was a significant difference in scores' means of Saudi sample (3.78 ± 1.28) and Jordanian sample (3.19 ± 1.09) in responding to alleviating of fatigue by rest ($t = 0.084, p = 0.022$).

Chi-square analyses showed a significant difference in proportions between Jordanian and Saudi participants in rating their overall physiological health status ($\chi^2 = 12.57, p = 0.03$). About half of the Jordanians (55.8%) and Saudis (41.1%) rated

their physiological health status as sub-optimal (*i.e.*, SHS). Only 37.1% of the Saudi sample and 20.4% of Jordanian participants rated their overall physiological health status as healthy (Table 2).

Table 3 shows significant differences in proportions between the participants who have ‘high school grade or less’ vs. ‘diploma, bachelor, and higher’ level of education ($\chi^2 = 14.7, p < 0.001$), were male vs. female ($\chi^2 = 9.30, p = 0.03$), married vs. not married ($\chi^2=29.3, p = 0.01$), employed vs. retired or not

employed ($\chi^2 = 12.6, p < 0.001$), ≥ 45 years old vs. < 45 years old ($\chi^2 = 14.2, p < 0.001$), current tobacco user vs. not tobacco user ($\chi^2 = 4.17, p = 0.04$), practicing regular exercise vs. not practicing regular exercise ($\chi^2 = 60.9, p < 0.001$), eating five cups or more of fruits and vegetables daily vs. who do not ($\chi^2 = 8.33, p = 0.004$), and overweight/obese vs. normal/underweight [per BMI values] ($\chi^2 = 65.5, p < 0.001$) in rating their health status as either sub-optimal or disease “poor” vs. healthy.

Table 1. Comparison between the perception of Jordanian and Saudi samples in rating their physiological health status.

Variables	Jordanian Sample Mean±SD	Saudi Sample Mean±SD	T-test Value	p-value***
Physical Condition*	-	-	-	-
Satisfied appetite	2.54±0.41	3.45±0.91	6.47	0.03
Satisfied sleeping pattern	2.92±0.40	3.66±1.04	3.78	0.02
Satisfied with hair growth	3.63±1.34	2.12±0.36	6.57	<0.001
Organ dysfunction**	-	-	-	-
Thoracic problems (<i>e.g.</i> palpitation, chest tightness, and shortness of breath)	1.20±0.61	2.57±0.96	10.75	<0.001
Gastrointestinal discomfort (<i>e.g.</i> nausea, diarrhea, constipation, and abdominal pain)	2.12±0.71	3.46±1.20	4.19	0.04
Abnormal urine (<i>e.g.</i> oliguria, dysuria, and nocturia)	1.67±0.37	3.56±0.88	7.55	<0.001
Head discomfort (<i>e.g.</i> dizziness, and headache)	1.86±1.42	2.38±1.09	4.03	<0.001
Eye discomfort (<i>e.g.</i> soreness, dryness, and more tears)	1.56±0.86	1.35±0.67	6.95	0.72
Hearing abnormalities (<i>e.g.</i> , tinnitus, and earache)	1.30±0.83	1.44±0.82	1.63	0.054
Body movement dysfunction**	-	-	-	-
Difficulty with knees or with bending over	2.92±0.57	1.92±1.15	5.03	< 0.001
Difficulty in climbing 3-5 floors	3.28±0.62	2.25±1.32	6.24	< 0.001
Difficulty in walking 1500 meters	3.44±0.78	2.14±1.17	5.15	< 0.001
Vigor**	-	-	-	-
Fatigue can be alleviated by rest	3.19±1.09	3.78±1.28	0.084	0.022
Have enough energy to cope with everyday life	3.15±1.24	3.60±1.21	3.76	0.278

* Participants’ responses on this 5 points-likert sub-scale is ranged between (1= very poor) and (5= very good).

** Participants’ responses on this 5 points-likert sub-scale is ranged between (1= never) and (5= always).

*** Significant p value (<0.05) is bolded.

Table 2. Comparison between Jordanian and Saudi samples in rating their overall physiological health status.

Participants’ Self-rate for their Psychological Health State	Total (N=480) n (%)	Jordanian Sample N=240 n (%)	Saudi Sample N=240 n (%)	Chi-square (χ^2)	p-value
Healthy	138 (28.8%)	49 (20.4%)	89 (37.1%)	12.57	0.03
Sub-healthy	234 (48.8%)	134 (55.8%)	100 (41.1%)		
Disease (poor) status	108 (22.5%)	57 (23.8%)	51 (21.3%)		

Table 3. Relationship between participants’ demographic, lifestyle, and CVD risk factors, and their perceptions toward physiological health status.

Variables	Total (N=480) n (%)	Rated their Health Condition as SHS or Disease “Poor” Status (N= 342) n (%)	Rated their Health Condition as Healthy (N=138) n (%)	Chi-square (χ^2)	P value†
Gender	-	-	-	-	-
Male	198 (41.3%)	120 (36.6%)	78 (51.3%)	9.30	0.03

(Table 3) contd.....

Variables	Total (N=480) n (%)	Rated their Health Condition as SHS or Disease "Poor" Status (N= 342) n (%)	Rated their Health Condition as Healthy (N=138) n (%)	Chi-square (χ^2)	P value [†]
Female	282 (58.8%)	208 (60.8%)	74 (48.7%)	-	-
Marital status	-	-	-	-	-
Married	315 (65.6%)	237 (69.3%)	78 (50.5%)	29.3	0.01
Single, divorced or widowed	165 (34.4%)	105 (30.7%)	60 (43.5%)	-	-
Education	-	-	-	-	-
≤ high school	236 (49.2%)	195 (57.0%)	41 (29.7%)	14.7	< 0.001
> high school	244 (50.8%)	147 (43.0%)	97 (70.3%)	-	-
Employment	-	-	-	-	-
Current worker	309 (64.4%)	237 (69.3%)	72 (52.2%)	12.6	< 0.001
Retired or not employed	171 (35.6%)	105 (30.7%)	66 (47.8%)	-	-
Age	-	-	-	-	-
< 45 years	234 (48.7%)	148 (43.3%)	86 (62.3%)	14.2	< 0.001
≥ 45years	246 (51.3%)	194 (56.7%)	52 (37.7%)	-	-
Family history of cardiovascular disease	-	-	-	-	-
Yes	234 (49.1%)	166 (48.5%)	68 (50.5%)	0.13	0.76
No	243 (50.9%)	176 (51.5%)	67 (49.5%)	-	-
Tobacco use	-	-	-	-	-
Current tobacco user	66 (13.8%)	54 (15.8%)	12 (8.7%)	4.17	0.04
No current tobacco user	414 (86.3%)	288 (84.2%)	126 (91.3%)	-	-
Physical activity or exercise	-	-	-	-	-
No regular exercise	266 (55.4%)	228 (66.7%)	38 (27.5%)	60.9	<0.001
Practiced regular exercise	214 (44.6%)	71 (33.3%)	72 (72.5%)	-	-
Nutrition	-	-	-	-	-
Eat ≥ 5 cups of fruits and vegetables daily (a cup is equal to one small apple)	-	-	-	-	-
Yes	195 (40.6%)	153 (44.7%)	42 (30.4%)	8.33	0.004
No	243 (59.4%)	189 (55.3%)	96 (69.6%)	-	-
Drink more than 3 caffeinated beverages daily (e.g., tea, coffee, and cola)	-	-	-	-	-
Yes	239 (49.8%)	174 (50.9%)	65 (47.1%)	0.56	0.48
No	241 (50.2%)	168 (49.1%)	73 (52.9%)	-	-
Body mass index (BMI) kg/cm²	-	-	-	-	-
Overweight/obese (BMI ≥ 25)	277 (57.7%)	237 (69.2%)	40 (29.0%)	65.5	<0.001
Normal/under-weight (BMI < 25)	203 (42.3%)	105 (30.8%)	98 (71.0%)	-	-

4. DISCUSSION

Although not all the participants of this study had a chronic disorder, the results showed only one-quarter of the participants perceived their health status as healthy. In addition, there was a significant positive relationship between the participants' demographic (including those who were female, married, employed, and had low educational level) and negative lifestyle and high cardiovascular risks (including using tobacco, > 45 years old, physical inactivity, and unhealthy diet), and rating their health status as sub-optimal or poor. These results are consistent with the results in previous studies among several societies [2, 10 - 13]. For example, in a previous Saudi study, about 75% of Saudi adults rated their health status as "excellent/very good." Female gender, older age and restricted practicing vigorous exercises were significantly associated with rating their health condition as "poor/fair". However, there was no significant relationship

between tobacco use, obesity/overweight, and engaging in regular exercises and participants' perception of better health status [12].

The results of this study are in line with previous research findings that show significant relationships between better individuals' satisfaction about health status and their positive lifestyle such as participating in regular exercise, eating a healthy diet, and not using tobacco [6, 7, 14]. However, Arab communities believed that eating habits and tobacco use were higher risk factors for CVD than physical inactivity. They believed that physical inactivity was not potentially life-threatening when compared with other CVD risk factors. Also, they reported that they might participate in regular physical activity if they consider physical inactivity as a direct lifestyle behavior for causing CVD [6, 15].

The study results showed that the perception about poor/sub-optimal physical health status was associated with

many CVD risk factors. Using a brief screening tool to assess physical health status is recommended at each clinical visit. In addition, periodic physical assessment, full check-up, and follow-up with healthcare providers were done for those who perceived poor physical health status in order to prevent further CVD. In the same light, it is very important to improve the awareness of Arab communities about the hazards of physical inactivity and its consequence in increasing individuals' weight and the risk of CVD [5, 14, 15]. Likewise, health education is pressingly recommended to improve the awareness of Arab communities regarding the prevention of CVD risk factors to enhance their positive lifestyle behaviors.

5. RESEARCH IMPLEMENTATIONS AND RECOMMENDATIONS

The literature shows the importance of early identification of clinical symptoms in helping in the prevention of NCDs risk factors and providing treatments. Visiting healthcare settings by clients to seek healthcare services is an important opportunity for health professionals to screen them and detect health disorders. Further, it is a venue to provide health education and counseling about positive lifestyle behaviors. Using a brief valid and reliable structured scales such as SHMS, self-rated health scale, and Framingham Risk Score (to estimate the risk of a heart attack in 10 years) are suggested to be used in health care settings, particularly in PHC centers to determine individuals' perception about their health condition and identify their risks of CVD [2, 4, 5, 15]. Moreover, periodically assessing clients' health status and doing physical assessments and laboratory checkups are recommended for early identification of the health problems and prevention of further complications [4, 5].

Conducting health education programs is recommended among Arab societies to promote their health well-being and to enhance their positive lifestyle. Also, using broadcast media (e.g., TV and radio) and online recourses are effective strategies in enhancing public awareness about NCDs risk factors and improving their positive lifestyle [5, 8].

6. RESEARCH LIMITATIONS

Using cross-sectional design is limited to assess the causality and effectiveness of the relationships. Using convenience sampling and recruiting the participants from two cities in Jordan and Saudi Arabia could limit the generalization of the results to all Saudi and Jordanian regions.

CONCLUSION

The majority of the participants rated their physiological health status as sub-optimal. Therefore, full health assessment and using brief assessment tools is very vital in order to comprehensively investigate the health status of individuals who visit the healthcare settings. Health education is very important to improve the awareness of Arab communities about the prevention of NCD and to enhance their positive lifestyle behaviors. Conducting health education programs and utilizing social media and broadcast media should be considered as supportive, effective strategies to enhance public lifestyle and improve community welfare.

LIST OF ABBREVIATIONS

BMI	=	Body Mass Index
CVD	=	Cardiovascular Disease
NCD	=	Non-Communicable Disease
PHC	=	Primary Health Care
SHMS	=	Sub-Health Measurement Scale
SHS	=	Sub-optimal Health Status

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study protocol was reviewed and approved by the Ethical Committee for Medical Research at "Al-Ghad International Colleges for Applied Medical Sciences," Saudi Arabia. Further, official ethical approvals were obtained from the Ethical Committee of Health Research at the Ministry of Health in Saudi Arabia and Jordan.

HUMAN AND ANIMAL RIGHTS

No Animals were used in this research. All human research procedures followed were in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2013.

CONSENT FOR PUBLICATION

All the participants in this study signed written consent.

AVAILABILITY OF DATA AND MATERIALS

Not applicable.

FUNDING

None.

CONFLICTS OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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