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## The predictors of metabolic syndrome based on Walker Health-Promoting lifestyle in Iran 2016

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### Abstract

**Background:** Understanding the metabolic syndrome has been the center of attention in recent years as a major risk factor of many diseases. Given the rising incidence of this disease and as the patient can compete against this disease with choosing healthy lifestyle, in the present study, we investigated the predictors of metabolic syndrome, based on Walker's health-promoting lifestyle in two large cities in Iran, in 2016.

**Methods:** This cross-sectional study used two-stage cluster sampling to select 1128 patients, among patients who referred to health centers in Isfahan and Yazd. Data were gathered by Walker lifestyle questionnaire that evaluates health-promoting behavior (nutrition, physical activity, health responsibility, spiritual growth, interpersonal relations, and stress management) by self-report that were completed by interviews for illiterate and semi-literate individuals. Data analysis was performed by SPSS statistical software.

**Results:** In this study, 576 women and 454 men participated with mean age of  $56.19 \pm 12.11$  years and mean weight of  $73.90 \pm 14.45$  kg. Results showed that the highest mean score for different health-promoting behaviors was related to social responsibility ( $25.53 \pm 5.65$ ) and the lowest was related to nutritional status ( $15.18 \pm 5.79$ ). Regarding the strongest predictor of lifestyle, the results of regression analysis showed that the most direct impact was related to stress management ( $R^2=0.343$ ) and the least direct impact was related to social responsibility ( $R^2=0.243$ ). Among the structures, physical activity with overall effect of  $R^2=0.621$  was the strongest predictor of lifestyle based on Walker's pattern.

**Conclusion:** Considering the results of this study, the greater emphasis in planning and interventions to reduce the risk of metabolic syndrome should be spotted on physical activity and stress management in patients with the metabolic syndrome.

**Keywords:** Health-promoting lifestyle, metabolic syndrome, Walker pattern

## Introduction

Disease prevention and health promotion of the community have always been considered by health care system, as the global healthy people program in 2020 aimed at encouraging healthy behaviors, and creating healthy social and physical environment for improving health of people and the community.<sup>1-3</sup>

Based on world health organization (WHO), until 2020, chronic non-communicable diseases include three-fourth of mortality in developing countries. Changes in food pattern, decreased physical activity, and increased smoking (called new world's syndrome or lifestyle) is the fundamental cause of non-communicable diseases in recent and future years.<sup>4</sup>

Also, this organization said that 60% of the quality of life and health status of an individual depend on his behaviors and life styles.<sup>5</sup> Lifestyle modification is an important and considerable strategy for prevention of non-communicable diseases in the 20<sup>th</sup> and 21<sup>st</sup> century.<sup>6</sup>

In general, health-promoting behaviors and life styles have important role in determining the level of people's health.<sup>7</sup> Health behavior includes behaviors that affect people's health and behaviors such as searching information related to the issue of health, general examinations, physical activity, appropriate nutrition, proper sleep pattern, establishing healthy relations and considering patients' situation, not using alcohol, and self-immunity.<sup>8-9</sup>

Health-promoting lifestyles are defined by Walker as following: A multidimensional model of perceptions and actions, starting with self-motivation that help the person to continue and strengthen his/her health level and self-actualization.<sup>10</sup>

Based on the definition (NCEP ATPIII), metabolic syndrome includes increased serum triglyceride levels, decreased serum levels of HDL, hypertension, increased waist circumference, and insulin resistance that is associated with atherosclerosis and cardiovascular diseases.<sup>11-14</sup> Metabolic syndrome (MS), also known as X syndrome, is the fastest growing disease in developed countries, as in the United States, 25% of adults,<sup>15</sup> in Europe 2% and 1.4%, aged 15 and 10 years, respectively, suffer from this disease.<sup>16</sup> In studies conducted in South Korea, the prevalence of MS has been reported 14.2% in men and 17.7% in women.<sup>17-18</sup> Studies in Iran showed a prevalence of 32.1% in Yazd and 35.8% in Isfahan.<sup>19-20</sup>

In reviewing the studies, the study in Vietnam showed that metabolic syndrome includes high triglycerides, low HDL, hypertension, high blood sugar, and abdominal obesity.<sup>21</sup>

Other researchers examined the effects of physical activity and Mediterranean diet over a one-year period on the prevalence of metabolic syndrome in middle-aged Greek population and showed that the prevalence of metabolic syndrome reduced in people with physical activity and Mediterranean food that was associated with levels of inflammatory marker (CRP), coagulation markers, like fibronectin and homocysteine, and lipid profiles.<sup>22</sup>

In another study, the association between lifestyle factors, including smoking, physical activity, alcohol absorption, body weight, fat and carbohydrate consumption, and physical activity during 3 years were recorded and assessed with the risk of metabolic syndrome. The researchers concluded that lifestyle modification primarily prevents metabolic syndrome, even in later life periods.<sup>23</sup>

Given that the above-mentioned results showed that metabolic syndrome is associated with lifestyle, and since today providing people's health is a major challenge for the country, and based on health promotion approach, people should be enabled to accept their own health responsibility and take healthy life style. For maintenance and promotion of health, correction and improvement of lifestyle, it is necessary that the person knowledgeable takes healthy choices.<sup>24-25</sup> Recognition of the structure and mental views of people towards a specific lifestyle, gives the health staff the

opportunity to evaluate life style exactly and design preventive proportional approaches, based on its main essence, improve abilities, and finally correct life style.<sup>26-27</sup>

Given the rising prevalence of metabolic syndrome and the importance of healthy lifestyle, in the present study, the predictors of metabolic syndrome were investigated based on Walker health-promoting lifestyle in Iran.

### **Materials and method**

This cross-sectional study used two-stage cluster sampling to select 1128 patients, among patients who referred to health centers in Isfahan and Yazd. After obtaining license and introduction letter from the University of Medical sciences, patients, who referred to health centers were selected by simple random sampling, based on the number of people in the centers. Given that Isfahan has two health centers, one center was randomly selected and then, samples were selected from medical records of patients who referred to the covered centers from different parts (north, south and center) of the city. In Yazd city, according to 10 health centers in Yazd, number of samples were randomly selected in proportion to population of centers in different parts (north, south, and center) of the city. The questionnaires were completed by telephone or in-person interviews and semi-literate or illiterate individuals were interviewed, as well.

Inclusion criteria for the study included men and women >30 years of age with metabolic syndrome who had at least three disorders of metabolic syndrome, according to the physician's check-up and NCEP measures<sup>28-29</sup> and had medical records in the health center of Isfahan and Yazd, and lived for more than two years in the cities of Isfahan and Yazd. In order to comply with ethical considerations, patients' consent were obtained for the study and they were assured that their information will remain confidential.

Data were completed by a questionnaire that included two sections: the first section contained demographic data such as sex, age, educational level, place of living, and smoking. The second section contained Walker health-promoting lifestyle questionnaire (HPLP) that assessed health-promoting behavior with confirmed validity and reliability by Zaidi and colleagues.<sup>30</sup> The questionnaire assesses health-promoting lifestyle through six dimensions (nutrition, physical activity, health responsibility, spiritual growth, interpersonal relations, and stress management) that are scored by a 4 point Likert scale (1 = never, 2 = sometimes, 3 = often, 4 = usually). The range of scores of health-promoting behaviors was between 52 and 208 and a separate score was calculated for each behavioral dimension. The score of each subscale was calculated from answers given to questions of each sub-scale. The total score of health-promoting lifestyle is a score obtained from answers out of 52. The score range of each question was 1-4. High scores indicated better health-promoting lifestyle.

Health-promoting lifestyle reliability was confirmed by Walker and colleagues with a Cronbach's alpha of 0.86 for spiritual growth, 0.86 for responsibility, 0.85 for physical activity, 0.87 for interpersonal relations, 0.79 for stress management, and 0.80 for nutrition. So, a range of 0.79 to 0.86 was proven for the six dimensions and 0.94 for entire questionnaire. Validity and reliability of the Persian version of the questionnaire was confirmed by Zaid et al., who reported a Cronbach's alpha of 0.64 for spiritual growth, 0.86 for responsibility, 0.79 for physical activity, 0.75 for interpersonal relations, 0.91 for stress management, 0.81 for nutrition and 0.81 for the whole questionnaire.

## Results

In this study, 576 women and 454 men participated with mean age of  $56.19 \pm 12.11$  years and mean weight of  $73.90 \pm 14.45$  kg. Regarding the occupational status, most participants (48%) were housekeepers and most (79%) were non-smokers.

Results showed that the mean scores for different dimensions of health-promoting behaviors was  $125.01 \pm 29.2$  and the highest mean score was related to social responsibility ( $25.53 \pm 5.65$ ) and the lowest mean score was related to nutritional status ( $15.18 \pm 5.79$ ) (Table 1). Regarding determining the strongest predictor of lifestyle, variables of the present study in the first stage were significantly correlated with lifestyle, based on Pearson correlation (Table 3). According to the regression analysis, to predict stages, behavioral change was evaluated and based on the results of regression analysis, all structures had direct impact on lifestyle (Figure 1) and the direct and indirect impact of structures showed the most direct impact on stress management (0.343) and the least direct impact on social responsibility (0.243) and among the structures, physical activity with overall effect of 0.621 was the strongest predictor of lifestyle, based on Walker's pattern.

## Discussion and conclusion

Health-promoting lifestyle scores in this study indicated moderate situation that is somewhat acceptable. However, there is need for more detailed planning to improve the present situation. The highest score was in sub-scale of spiritual growth and the lowest score was for stress management, physical activity, and nutrition. In a research, conducted by Tol and colleagues in Isfahan, the same results were obtained.<sup>31</sup> In the study by Motlagh et al, the lowest score was in the subgroup of physical activity and the highest score in spiritual growth that confirms the findings of this study.<sup>32</sup>

In this study, there was a significant relationship between physical activity and dietary habits, so that by increasing physical activity, the food habits improved. Salis et al, after several reviews on this topic, expressed that food intake and physical activity are associated with each other.<sup>33</sup> Evans and colleagues concluded in their study that sport activities can affect the nutritional needs of individuals.<sup>34</sup> Significance of this relationship is consistent with the results of studies by Motlagh and colleagues<sup>35</sup> and Blair and colleagues.<sup>36</sup>

Sport and appropriate nutrition, in addition to mental health have positive impacts, also good life style, such as daily breakfast eating or regular physical training are in direct relationship with mental health and ultimately improve lifestyle.<sup>37</sup>

Healthy behaviors and health-promoting behaviors can be appropriate coping strategies and effective treatment for prevention of chronic diseases, such as metabolic syndrome. It seems that individual's health responsibility makes the individual sensitive and responsible to maintain and improve their health. People with high health responsibility, usually visit physicians regularly and are aware of their health. So, in this way, they improve their health and report less anxiety. physical activity create psychological joy and adherence to an appropriate nutritional program help the individual find meaning in the hardship of life, interpersonal relationships and stress management, like coping strategies that can be positively related to improved quality of life. According to regression analysis, physical activity, and stress management had the greatest positive impact on the quality of their lifestyle.

## Conclusion:

The results of this study showed physical activity as the strongest predictor of health-promoting behaviors, improving the lifestyle of patients with metabolic syndrome. So, a greater emphasis on physical activity can be implemented in planning and interventions to reduce the risk of metabolic syndrome.

Also, two limitations can be considered for this study: first that a cross-sectional study cannot show causality and behavioral changes related to lifestyle over time and second that the questionnaires were completed by the participants.

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**Table 1: Mean and standard deviation of various dimensions of Walker's health-promoting life style**

Variable	Groups possible	Mean	Standard deviation
<b>Spiritual growth</b>	9-36	25.48	4.20
<b>Social Responsibility</b>	9-36	24.53	5.05
<b>Community Relations</b>	9-36	19.47	4.98
<b>Stress management</b>	8-32	18.34	5.32
<b>Physical activity</b>	8-32	15.81	5.79
<b>Nutrition</b>	9-36	21.38	4.65
<b>Total mean</b>	52-208	125.01	29.9

**Table 2: Correlation matrix of Walker pattern components**

	Life style	Stress Management	Physical activity	Nutrition	Spiritual growth	Social Responsibility	Community Relations
<b>Life style</b>	1						
<b>Stress Management</b>	**0.790	1					
<b>Physical Activity</b>	**0.738	*0.519	1				
<b>Nutrition</b>	**0.701	**0.446	*0.461	1			
<b>Spiritual Growth</b>	**0.648	*0.642	**0.354	**0.314	1		
<b>Social responsibility</b>	**0.655	**0.310	**0.391	**0.349	**0.356	1	
<b>Social relations</b>	0.711	0.452	0.372	*0.500	*0.330	*0.478	1

\*\* : Significance at 0.01, \* : Significance at 0.05

**Table 3: The direct, indirect, and overall effects of Walker's pattern structures on life style in patients with metabolic syndrome**

<b>Independent variables</b>	<b>Direct effect</b>	<b>Indirect effect</b>	<b>The overall effect</b>	<b>The dependent variable</b>
<b>Stress Management</b>	0.343	$(0.301 \times 0.245) + (0.266 \times 0.145 \times 0.256)$	0.426	<b>Life style</b>
<b>Physical Activity</b>	0.320	$(0.366 \times 0.256 \times 0.308) + (0.301 \times 0.222) + (0.308 \times 0.260) + (0.343 \times 0.366)$	0.621	
<b>Nutrition</b>	0.308		0.308	
<b>Spiritual Growth</b>	0.266	$(0.145 \times 0.308)$	0.310	
<b>Social responsibility</b>	0.243	$(0.357 \times 0.205 \times 0.266) + (0.141 \times 0.145 \times 0.308) + (0.357 \times 0.301) + (0.266 \times 0.141)$	0.413	
<b>Social Relations</b>	0.301	$(0.266 \times 0.205)$	0.355	

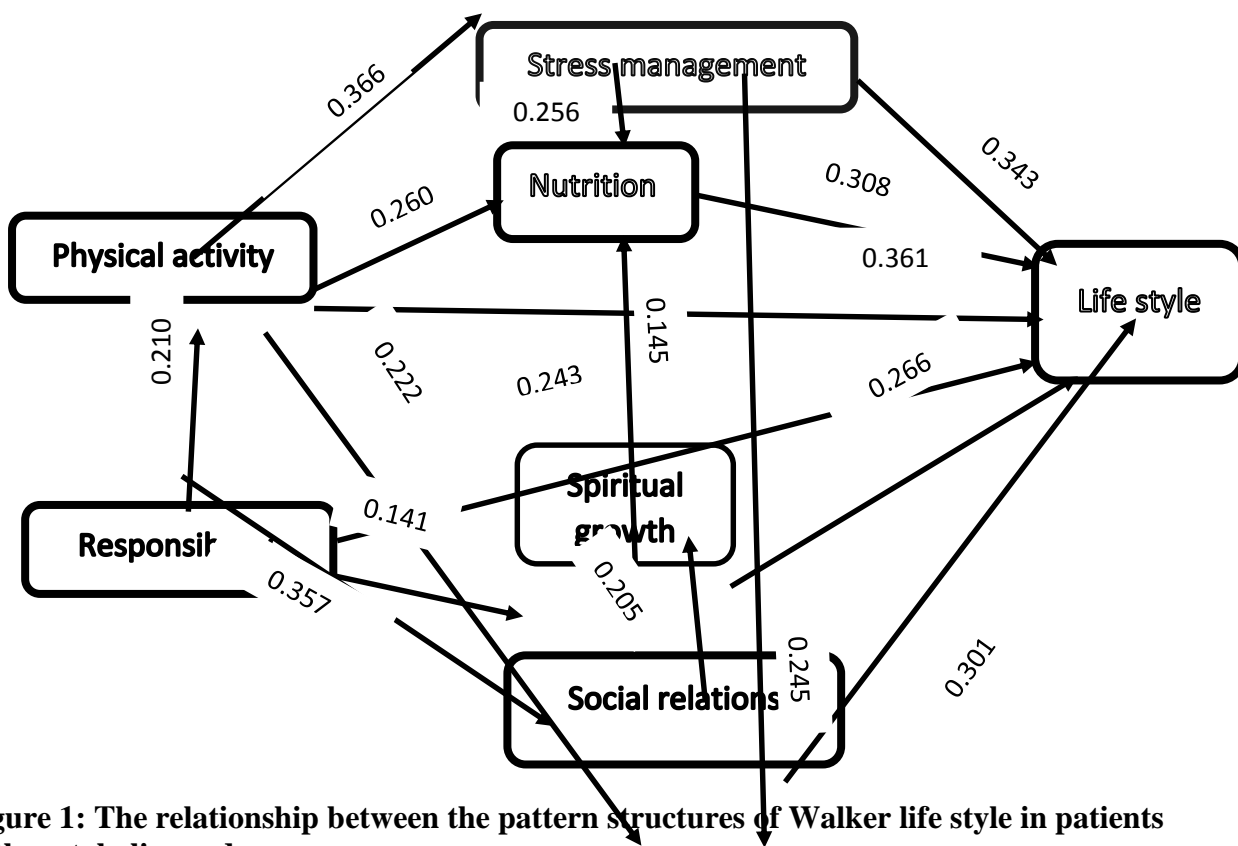


Figure 1: The relationship between the pattern structures of Walker life style in patients with metabolic syndrome