Association between lifestyle and pathologic fractures in patients admitted to surgery departments of selected hospitals affiliated to Alborz University of Medical Sciences in 2014–2015

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Abstract

Background and Purpose: Health professions that previously focused on treatment of patients are now focusing on prevention and health provision by improving lifestyle and eliminating factors that somehow have a negative impact on human health. Some people have strong skeleton genetically, but others do not. So far, medical science has not been able to change the genetic characteristics of individuals; however, lifestyles can be changed to reach the maximum bone mass. The aim of this study was to investigate the association between lifestyle and pathologic fractures in patients admitted to surgery departments of selected Hospitals in 2014–2015. **Materials and Methods:** In this descriptive (correlational) study, using the Cochran sampling formula, 350 patients with fractures were selected by stratified sampling in surgery departments of selected hospitals affiliated to Alborz University of Medical Sciences. Data were collected using the standard lifestyle questionnaire, which was validated through the test–retest method. The qualitative data of this project were analyzed using SPSS 20 software at a significance level of 0.05. **Results:** Most of the subjects were in the age group of 72–85 years which included 103 (26.8%) people. In all, 187 (48.6%) subjects were male and 198 (51.4%) subjects were female. A total of 83 (21.6%) participants were in the healthy group, 123 (32.0%) subjects were in the osteoporosis group, 113 (29.3%) subjects were in the bone infection group, and 66 (17.1%) individuals were in the general bone disease group. **Conclusion:** All studied components including smoking, physical activity, and nutrition directly affect pathologic fractures.

Keywords: Hospital, lifestyle, pathological fracture

Introduction

Improving health and providing community health are among the key factors of community development. New healthcare has gradually shifted its focus from studying mortality as a health outcome to wider areas such as health promotion, lifestyle, and quality.[1] Lifestyle is a way that a person chooses during his life and is one of the most important factors in the health of

human body and soul that is influenced by culture, race, religion, geographic, economic, and social factors and beliefs.[2]

Lifestyle is the daily routine that people accept in their lives and these activities affect the health of individuals.[3]

Correcting and improving lifestyles is essential to maintain and improve health.[4] Now that the healthcare system has been redirected to health promotion and disease prevention, community health nurses have a greater responsibility for health behaviors because the goal of this profession is to help people reach the desired level of health. Nurses are health teachers at

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the community level.[5] In the realm of choosing a lifestyle, the community health nurse plays a major role.

Pathologic fracture refers to a kind of fracture that is the result of an impact to the bone that is weakened by any cause. Sometimes the bone becomes weakened so that it fractures without any impact and only due to forces incurred by everyday life. This kind of fracture is called pathologic fracture.

In addition, in recent years, pathologic fractures in the world are not only increasing among the elderly people due to osteoporosis, changes in the nutritional pattern, and environmental pollution but also becoming evident at lower ages, due to drug abuse, high-risk behaviors, and reduced physical activity.[6]

According to the review of the conducted studies, so far, no comprehensive research has been conducted to cover all aspects of lifestyle and its association with pathologic fractures. The performed studies are limited to some angles of lifestyle and its relationship with some diseases associated with pathologic fractures, such as osteoporosis in some classes of society, such as the elderly. Therefore, the need to conduct a comprehensive study of the aspects of lifestyle and their relationship with pathologic fracture is felt in Iran.

In this study, the researcher considering his human and professional responsibilities and due to the lack of a specific and indigenous model for promoting lifestyle of clients in Iran in terms of their value and cultural systems (as the World Health Organization has emphasized) will seek to design a model for promoting the specific lifestyle of this group of clients based on accurate scientific principles while answering the question "Is lifestyle associated with pathologic fracture?" so that it would be used by other researchers, clinical experts, healthcare managers, and other users.

Materials and Methods

This study examines the relationship between different dimensions of lifestyle which include nutrition, physical activity, and smoking as variables and pathologic fracture. The study population included patients with pathologic fractures admitted to selected hospitals affiliated to the Alborz University of Medical Sciences.

In this descriptive (correlational) study, using the Cochran sampling formula, 350 patients with fractures were selected by stratified sampling in surgery departments. Data were collected using the standard lifestyle questionnaire (in terms of nutrition, physical activity, and smoking), which was validated through the test–retest method.

The samples were selected randomly from different surgery departments, and the ratio of male-to-female fracture was 77.5%–22.5%.

Due to the direct or indirect relationship with lifestyle, the main inclusion condition to test was pathologic fracture due to osteoporosis, bone infection, and general bone disease (such as osteoporosis, rashitism, osteomalacia, and Cushing's syndrome). Other causes of other pathological fractures, such as bony cysts, benign and malignant tumors, Paget's disease, and osteogenesis, are not acceptable.

The age criterion is 18–18 years to assess lifestyle and prevent other influential factors. The scales used to measure the extent of pathologic fractures and lifestyle of patients are multi-item scales, and these items are based on the 6-point spectrum (totally agree, agree, slightly agree, slightly disagree, disagree, and totally disagree).

Data analysis

The quantitative findings of this design were analyzed using SPSS 20 software at significance level of 0.05. Moreover, to determine a significant relationship between the variables, the required statistical methods such as correlation calculation, Chi-square and Pearson's coefficient were used.

Results

In this study, 385 individuals participated, most of whom were in the age group of 72–85 years which included 103 (26.8%) people. In all, 187 (48.6%) subjects were male and 198 (51.4%) subjects were female. A total of 83 (21.6%) participants were in the healthy group, 123 (32.0%) subjects were in the osteoporosis group, 113 (29.3%) subjects were in the bone infection group, and 66 (17.1%) individuals were in the general bone disease group.

One-way analysis of variance (ANOVA) was used for comparing health and physical activity among the four groups whose results are presented in Table 1.

Based on the analysis, there was a significant difference between the groups ($P < 0.001$). To see the difference between the groups, Scheffe's *post hoc* test was used, the results of which are presented in Table 2.

As seen in Table 2, the healthy group has gained higher scores in comparison to the other three groups and these differences are statistically significant. Besides, no significant difference was observed between the three groups in the health and physical activity variables.

One-way ANOVA was used to compare nutrition among the four groups, the results of which are presented in Table 3.

According to the results of Table 3, there was a significant difference between the four groups in terms of nutritional status ($P = 0.007$). Scheffe's *post hoc* test was used to determine the difference between the four groups [Table 4].

As shown in Table 3, the healthy group had a higher score in the nutrition variable than the other three groups. However, only

Table 1: One-way ANOVA of health and physical activity among the four groups

Variable	Level	Mean	SD	F	P
Health and physical activity	Healthy	01.38	37.12	23.7	<0.001
	Osteoporosis	64.33	35.9		
	Bone infection	15.33	82.9		
	General bone disease	59.30	19.8		

ANOVA: analysis of variance; SD: standard deviation

Table 2: Scheffe' *post hoc* test to determine the difference in mean in four groups for health and physical activity variables

Variable	Level	Level	Difference in means	P
Health and physical activity	Healthy	Osteoporosis	35.4	0.026
		Bone infection	84.4	0.012
		General bone disease	40.7	<0.001
	Osteoporosis	Bone infection	48.0	0.987
		General bone disease	05.3	0.267
	Bone infection	General bone disease	56.2	1.55

Table 3: One-way ANOVA test to compare nutrition among groups

Variable	Level	Mean	SD	F	P
Nutrition	Healthy	37.32	56.9	05.4	0.007
	Osteoporosis	52.31	34.9		
	Bone infection	30.17	7.65		
	General bone disease	27.78	7.45		

ANOVA: analysis of variance; SD: standard deviation

Table 4: Scheffe's *post hoc* test to determine the difference in mean in four groups for nutritional variables

Variable	Level	Level	Difference in means	P
Nutrition	Healthy	Osteoporosis	0.853	0.922
		Bone infection	2.19	0.377
		General bone disease	4.58	0.016
	Osteoporosis	Bone infection	1.34	1.12
		General bone disease	3.73	1.31
	Bone infection	General bone disease	2.38	1.33

ANOVA: analysis of variance; SD: standard deviation

the difference between the healthy group and the general bone disease group was significant ($P = 0.016$), and the difference between the healthy group and osteoporosis ($P = 0.922$) and bone infection ($P = 0.377$) was not significant.

Finally, one-way ANOVA was used to compare smoking avoidance among the four groups, the results of which are presented in Table 5.

According to the results obtained from the smoking avoidance variable, in the healthy group the means of healthy, osteoporosis, bone infection, and general bone disease groups were 17.22, 15.56, 13.82, and 13.62, respectively, and the difference between the groups was statistically significant ($P < 0.001$). Scheffe's *post*

hoc test was used to determine the difference between the four groups [Table 6].

As seen in Table 6, the healthy group score was significantly higher than the bone infection ($P < 0.001$) and the general bone disease ($P = 0.001$) groups.

Discussion

According to the results, healthy people were physically more active than those with pathologic bone fractures, and there were usually sports activities in their daily schedule. These results are consistent with Christos et al.,[7] Egbunikei et al.,[8] Langsetmo et al.[9] and Winklmayr et al.[10]

Correct physical activity can be a guarantor of bone health and increased muscle strength, balance, and coordination of the body that has a direct impact on the overall health of the body. Moreover, some studies have proposed resistance and stretching exercises to prevent osteoporosis and fractures because of their positive effects in the studied samples. For example, Kelley et al.[11] reported the effect of walking along with resistance training with the aim of increasing the strength of the lower body and improving balance, and it can be said that walking and other physical activities could be part of a comprehensive program for improving muscle strength and balance.

According to the results, there is a significant relationship between the type of nutrition and pathologic fractures. In the comparison of this study between healthy subjects and those with pathologic fractures, the results showed that healthy people had a proper diet for growth and consistency of their bones, while the nutrition of patients with pathologic fractures lacked the required value for bone formation and strength.

This research finding is directly and indirectly similar and consistent with Peterlik et al.[12] Lee et al.[13] and Zuo et al.[14]

The researchers showed that osteoporosis has a high correlation with calcium and vitamin D intake. They also argued that diets that contain zinc usually provide stronger bone formation, and even after a fracture, the duration of treatment is lower. Nutrition plays a major role in creating the highest bone density during growth. Getting sufficient calcium at an early age and reaching the maximum bone mass, as well as in adulthood and aging, is necessary to combat bone loss.[15,16] The balance between calcium intake and loss plays a major role in maintaining bone mass. Therefore, the group of healthy participants in the study may have used a diet that contains the highest levels of calcium zinc and vitamin D that are useful in bone formation and strength.

The results of this study also show that smoking in patients with pathologic fractures is higher than healthy ones, and hence smoking can be considered as another important factor in pathologic fractures. This research finding is consistent with Silvennoinen et al.[16] and Hegarty et al.[17]

Table 5: One-way ANOVA to compare smoking avoidance among the groups

Variable	Level	Mean	SD	F	P
Smoking avoidance	Healthy	17.22	4.72	8.46	<0.001
	Osteoporosis	15.56	4.95		
	Bone infection	13.82	6.02		
	General bone disease	13.62	5.64		

Table 6: Scheffe's *post hoc* test to determine the difference in mean in four groups for smoking avoidance

Variable	Level	Level	Difference in means	P
Smoking avoidance	Healthy	Osteoporosis	1.66	0.190
		Bone infection	3.40	<0.001
		General bone disease	3.60	0.001
	Osteoporosis	Bone infection	1.73	0.105
		General bone disease	1.93	0.134
	Bone infection	General bone disease	0.201	0.831

Ren *et al*.[18] found that cigarette smoking reduces the amount of vitamin D intake and its amount in the body. Vitamin D is one of the most important elements in the process of bone formation and its strength in the body. This can be one of the reasons for osteoporosis and other problems. Hegarty *et al*.[17] also stated that smokers negatively affect their dietary cycle, because many smokers are likely to smoke before having food, which causes low appetite and ultimately malnutrition in the individual.

Conclusion

The analysis of the results showed that all three studied components, that is, smoking, physical activity, and nutrition directly affected participants' pathologic fractures, and finally, by modifying the current procedures and improving their health, it is possible to delay or remove osteoporosis process and other bone losses.

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Conflicts of interest

There are no conflicts of interest.

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