

Relationship between physical activity and medicine use among the older people in Amirkola, Babol, Iran (2011-2012)

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Abstract

Background: The increase in life expectancy has led to an increase in the prevalence of chronic diseases and multiple drug use in elderly population. Given the role of regular physical activity in reducing the risk of a number of diseases, this study aimed to determine the amount of physical activity and its relationship to medicine use among the older people in Amirkola, Babol, Iran.

Methods: This study is the part of the Amirkola Health and Ageing Project (AHAP). Information on physical activity was collected using the Physical Activity Scale for the Elderly (PASE) and through interviews with older people. The score of this questionnaire was rated from 0 to 400 points. Data about the number and kind of drugs were obtained through interviews and observation of their medications and prescriptions. Then data was analyzed.

Results: Among 1616 elderly people, 883 cases were male (54.6%) and 733 were female (45.4%). The average amount of physical activity in the elderly in Amirkola was 99.01 ± 52.53 , which was 100.5 ± 66.3 in men and 111.5 ± 55.1 in women ($p < 0.001$). Average number of drugs used by elderly population was 1.9 ± 2.4 in men and 3.3 ± 2.7 in women ($p < 0.001$). There was an inverse and significant correlation between total physical activity and drug use ($p = 0.003$, $r = -0.075$), and the most correlation was with household physical activity ($p < 0.001$, $r = -0.098$).

Conclusion: These results indicate lower level of physical activity in older people in Amirkola and also showed that an increase in physical activity can reduce the number of medicines in the elderly.

Keywords: Older people, Physical activity, Medicine use.

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Aging as a process of deterioration in biological and physiological structure of a person is defined as "gradual decrease in a person's ability to adapt to the environment, which may lead to loss of functional ability (1). According to the World Health Organization, elderly has known as older than 60 years in developing countries, and older than 65 years in developed countries (2).

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In particular, individuals aged 65 to 74 years are known as "young old", and aged 75 to 84 as "old elderly", and those over 85 years are referred to as "old old" (3). The elderly population is the fastest growing population of patients worldwide. Currently, one out of every 6 people is over 65 years, which is expected to reach 1 to 4 by 2050 (4). Also, the elderly population is increasing, and it is expected to reach to 11.3% by 2025 and 31% by 2050 (5). The incidence of chronic diseases increases with age. Increasing life expectancy has led to an increasing number of elderly and subsequently increased prevalence of chronic diseases among the population (6).

Physical activity includes any body movement produced by skeletal muscles that create and lead to increased energy consumption, which covers a wide range of activities from competitive sports activities to simple activities such as walking, cycling or activities of daily living (7-9). Regular physical activity is associated with reduced mortality and reduces the incidence or progression of chronic diseases such as heart disease, diabetes mellitus, hypertension, osteoporosis, degenerative arthritis, colon cancer, cognitive deficits, depression and anxiety (10-12), and increases self-esteem and self-confidence of the people (13). Also, it reduces the risk factors of the metabolic syndrome and strengthens muscles and reduces the risk of falls and fractures, and subsequently reduces long-term hospitalization (14-18). Polypharmacy is a condition in which 5 or more drugs are simultaneously consumed (regardless of dose and duration of use) (19). The prevalence of polypharmacy increases with age and chronic illnesses (20).

Multiple drug risks include secondary mortality through taking unnecessary or inappropriate drugs and drug incompatibilities. Similarly, it will have so many risks if a patient has no good perception of the purpose of taking drugs and how to use it (21). Regular physical activity can be a good alternative to drug therapy in the elderly and reduces the need for medication in some conditions, such as hypertension and diabetes (22). According to World Health Organization criteria, the recommended amount of physical activity, includes 2.5 hours of moderate exercise or an hour of vigorous exercise every week. The prevalence of physical activity is decreasing with increasing age. Currently, 41% of the elderly population have less than the minimum recommended amount of physical activity (7). Studies on the relationship between physical activity and medicine use in the elderly indicate an inverse relationship between physical

activity and use of drugs (23-24). Due to the absence or lack of adequate data on physical activity in the elderly in the country and also in the North of Iran, this study aimed to determine the amount of physical activity and its relationship with the amount of medicine use in the elderly in Amirkola, Babol, Iran.

Methods

This study came from the Amirkola Health and Ageing Project (AHAP), which was conducted from 2011 on all persons aged 60 years and over in Amirkola, Babol, Iran (25). All older people were invited to participate in the study by sending letters and phone calls and home visits, besides providing information about the project. Among the total number of 2234 older people in Amirkola, 1616 people participated in this comprehensive project. Demographic information were collected using a questionnaire, including age, gender, education, occupation and marital status.

Information on physical activity were collected using the Physical Activity Scale for the Elderly (PASE) questionnaire and through interview with elderly people (26-27). Validity and reliability (Cronbach's alpha 0.97) of the questionnaire were evaluated in one study (28). The questionnaire consisted of three sections. The first part on the leisure time physical activity includes six questions. The second part has three questions on household activity and the third part which is related to the work-related activity with one question. Based on the questionnaire and scoring method, the weight of each activity has multiplied by its frequency to obtain the total score of physical activity. This will be a number between 0 and 400; more points mean more physical activity. The data on the number of drugs were collected through interviews and observations about the medications and patients' self-reported prescriptions.

The data were statistically analyzed using SPSS18 software, chi-square tests, T-tests and linear regression. $P \leq 0.05$ was considered as significant.

Results

In this study, 1616 older people were studied, of which 883 were male (54.6%) and 733 were female (45.4%). Most of the participants (35.5%) were in the age group 60-64 years, 1377 of them were married (85.3%), 64.6% illiterate and 21.7% were retired with a career record (Table 1).

Table 1. Distribution and percentage of demographic variables of the elderly in Amirkola (2011-2012) (N=1616)

| Variables | Number | Percent |
|------------------------------|--------|---------|
| Gender | | |
| Male | 883 | 54.6 |
| Female | 733 | 45.4 |
| Marital status | | |
| Married | 1377 | 85.3 |
| Single | 238 | 14.7 |
| Age group | | |
| 60-64 | 573 | 35.5 |
| 65-69 | 336 | 20.7 |
| 70-74 | 283 | 17.5 |
| 75-79 | 254 | 15.8 |
| 80<= | 170 | 10.5 |
| Education | | |
| Illiterate | 1045 | 64.7 |
| Primary and secondary school | 465 | 28.8 |
| College | 106 | 6.5 |

The mean age of male participants was 69.9 ± 7.6 and for females was 68.6 ± 7 ($p=0.001$). The average physical activity was 99.01 ± 52.53 that the rate was significantly higher among women than men ($p=0.001$).

Among the types of physical activity in both genders, the highest level of physical activity belonged to leisure time physical activity which was significantly higher in women than men ($p=0.001$).

The lowest level of physical activity in both genders belonged to work-related physical activities which was higher in men than women ($p=0.001$). The mean number of drugs was significantly higher in women than men ($p=0.001$) (Table 2).

As can be seen in Figure 1, the total physical activity level in both men and women decreases with increasing age. The maximum physical activity was in 60-64 year old women and the minimum was in 85-99 year old men.

Table 2. The mean and standard deviation of the variables in terms of gender in the elderly population of Amirkola, 2011-2012 (N=1616)

| Physical activity | Male | | Female | | P-Value |
|-------------------------------------|--------|------------|--------|------------|---------|
| | Number | Mean±SD | Number | Mean±SD | |
| Leisure time physical activity | 861 | 45.8 ±30.1 | 708 | 60.6±34.3 | <0.001 |
| Household physical activity | 883 | 44±33.6 | 731 | 51.5±32.8 | <0.001 |
| Work related physical activity | 868 | 12.7±41.8 | 726 | 0.9±9.9 | <0.001 |
| Total physical activity without Job | 861 | 89.1±49.4 | 707 | 111±53.7 | <0.001 |
| Total physical activity | 846 | 100.5±66.3 | 703 | 111.5±55.1 | <0.001 |
| The number of drugs | 883 | 1.9±2.4 | 733 | 3.3±2.7 | <0.001 |
| Age | 883 | 69.9±7.6 | 732 | 68.6±7 | <0.001 |

In this study, there was an inverse correlation between the types of physical activity and the number of drugs among the elderly in Amirkola; and the highest correlation was related to household physical activity, so that with increasing the levels of physical activity, the number of medicine use declined (Table 3).

The linear regression model was used to determine the role of variables on medicine use among the elderly of Amirkola, Babol, Iran.

As can be seen in Table 4, the average number of chronic diseases has a positive impact and physical activity has a significant and reverse impact on medicine use in older people.

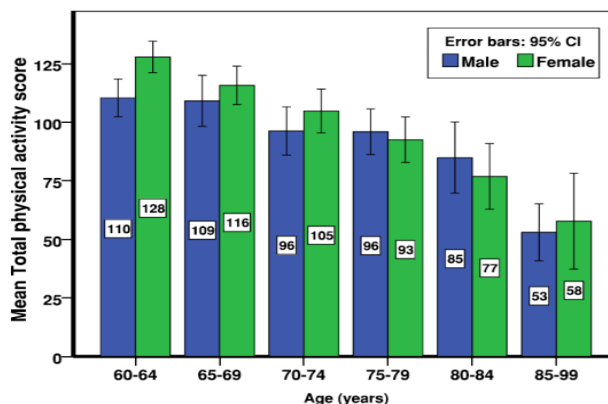
**Figure 1. Level of physical activity based on age and gender groups in Amirkola, 2011-2012 (N = 1616)**

Table 3. Correlation between physical activity and the number of medications subgroups among the elderly population of Amirkola, 2011-2012 (N=1616)

| Physical activity | Number of drugs | P-value |
|--------------------------------|-----------------|---------|
| Leisure time physical activity | -0.003* | 0.917 |
| Household physical activity | -0.098 | <0.001 |
| Work related physical activity | -0.045 | 0.070 |
| Total physical activity | -0.075 | 0.003 |

* Correlation Coefficient

Table 4. Linear regression analysis to examine the relationship between different variables and medicine use among the elderly of Amirkola, 2011-2012 (N=1616)

| | β coefficient | C.I. 95% β | | P-value |
|--------------------------------|------------------------|------------------|--------|---------|
| | | Upper | Lower | |
| Age | 0.003 | 0.017 | -0.014 | 0.898 |
| Gender | 0.101 | 0.793 | 0.298 | <0.001 |
| Leisure time physical activity | -0.010 | 0.003 | -0.004 | 0.649 |
| Household physical activity | -0.073 | -0.002 | -0.010 | 0.001 |
| Work related physical activity | -0.024 | 0.006 | -0.002 | 0.276 |
| Number of chronic diseases | 0.513 | 0.761 | 0.641 | <0.001 |

Discussion

The results of this study showed that average physical activity level in the elderly was low in Amirkola, Babol, Iran and physical activity in older adults is reduced with increasing age. In this study, the total level of physical activity was higher in elderly women than men, and the maximum score was for leisure time physical activity in both genders in which women had more points. The lowest level of physical activity belonged to the work-related physical activity in which men had more points than women.

A study conducted by Bauman et al. on the prevalence of physical activity in the 20 countries has indicated that the prevalence of high physical activity was 21-63% and the prevalence of low physical activity was 9-43%. In this study, men had more physical activity than women and physical activity decreased with age. The observed differences in the prevalence of physical activity in different countries could be due to the differences in survey questions and methods (15).

Countries, which have infrastructures or cultural support for hiking in their community, can get high levels of physical activity. Generally, advertising on one aspect of physical activity leads to increased activity in other parts. Most of the vigorous physical activity belongs to Australia, Canada, New Zealand and the United States which have good facilities for recreational activities and a long history of promoting sports activities in the community (15). According to the study on the prevalence of physical activity in China among 35-74 year old subjects, participation in work-related activities, and leisure time activities was lower at older ages (29). Based on another study, 66.3% of China's population have an average of 30 minutes or more of moderate or vigorous physical activity (30). In a study conducted in Canada, 68% of men and 69% of women were inactive. In this study, the average daily inactivity time was 6.9 hours in men and 8.9 hours for women; besides, Canadian men and women had generally 4 hours of light physical activity (10).

In a study in Ankara, Turkey, to investigate the factors affecting the level of physical activity in the elderly, there was a direct relationship between physical inactivity and age older than 65 years (31). Most physical activity among participants was walking and there was no significant difference between the physical activity and gender (17).

In the present study, there was an inverse association between total physical activity and number of medicines. This means that increasing physical activity reduces the number of drugs. Among the types of physical activities, a significant relationship was observed only between household physical activities and taking fewer drugs; however, there was no significant relationship between the number of drugs, work-related physical activity and leisure time physical activity.

Lifestyle factors such as physical activity are associated with the development of chronic diseases (32). Concurrently and multiple chronic diseases may lead to use of multiple medications which is known as polypharmacy (4). Because of the multiple benefits for health, physical activity should be considered as a medicine and since it is used for many chronic diseases, its health benefits are more than conventional medications. One of the most notable benefits of physical activity is the lack of side effects in compared with the classic drugs. Unlike conventional medicine, physical activity may alter the physiological mechanisms of function, while conventional drugs can only hide symptoms or change the abnormal physiologic functions. For example,

beta-blockers which are used to treat hypertension and cardiovascular disease, may lead to a decrease in heart rate base which is not comparable with a decrease caused by participating in regular physical activity. Exercise also leads to increased oxygen supply to the myocardium, reduce myocardial oxygen demand, increase the electrical stability of the heart and generally improve heart function. These physiological changes are not limited to the cardiovascular system. In fact, physical activity improves the performance of all organ systems (32).

A study was conducted by Bertoldi et al. in Brazil on 3182 subjects on the relationship between physical activity and medicine use. In this study, International Physical Activity Questionnaire (IPAQ) was used to determine the level of physical activity. Based on the results of this questionnaire, participants rated in 4 groups: inactive, insufficiently active, sufficiently active and very active. Number of drugs were measured by showing drugs and prescriptions. In this study, it was observed that higher levels of physical activity were associated with lower usage of drugs ($p < 0.001$) (24).

Another study in Brazil was conducted on the relationship between leisure time physical activity and the need for long-term medicine use. In this cross-sectional population-based study, 890 patients included 385 subjects aged more than 60 years were participated. Leisure time physical activity information was collected based on responses to IPAQ and other medications' information were collected by another questionnaire. Those who had less than 150 min/w were inactive, and those who had more than this amount were considered as active. Finally, it was observed that those who did not reach to this threshold (150 min/w) compared with those who had reached this level of activity, 4.69 times more likely to need to use two or more drugs (33).

The limitations of this study include its cross-sectional nature, which made it impossible to examine the effects of physical activity on the medicine use over time, and also to compare the medicine use among elder groups with different levels of physical activity over time. Another problem was that the use of PASE questionnaire has limited this study to make an accurate comparison with other studies in which other questionnaires were used. Also, measuring the physical activity by questionnaire and self-report leads to further estimate of the actual amount of physical activity; but being a population-based study and also the high participation of the elderly population of Amirkola caused to get more

detailed information about their physical activity and medicine use.

The results of this study indicate the low levels of physical activity in older people of Amirkola, and also show that the number of drugs and medications can be reduced by increasing physical activity.

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