

Association of Physical Activity with Co-morbid Conditions in Geriatric Population

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ABSTRACT

To find out association of physical activity with co-morbid conditions in geriatric population, a cross-sectional study was conducted in different cities of Pakistan in 2015. A total of 114 participants were inducted by non-probability convenience sampling technique. Data was collected after informed verbal consent by a validated questionnaire that is Rapid Assessment of Physical Activity (RAPA). Participants were categorized into two groups i.e. physically active and physically inactive. Data was entered and analyzed in SPSS version 20. There were 66 (57.9%) males and 48 (42.1%) females with mean age of 57.04 ± 7.348 years. Among hypertensive individuals ($n=43$, 37.7%) there were 39 (90.7%) physically inactive, among individuals having angina ($n=17$, 14.9%) there were 15 (88.2%) physically inactive. Out of 37 (32.5%) diabetics, 35 (94.6%) were physically inactive. Among individuals suffering from arthritis ($n=40$, 35.1%), there were 38 (95%) physically inactive. A significant association was found between physical activity and diabetes and arthritis with p-value of 0.048 and 0.029 respectively. Physical activity is significantly associated with diabetes and arthritis in geriatric population. Adequate physical activity should be performed to reduce the risk of co-morbid conditions and improve the quality of life in geriatric population.

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1. INTRODUCTION

Morbidity is defined as a diseased state, disability, or poor health due to any cause, any degree and any severity of disease. Co-morbidity refers to the presence of one or more additional disorders or diseases, whether physical, mental or social co-occurring with a primary disease or disorder. Hypertension, Diabetes and Arthritis are few of the many co-morbid conditions that are most prevalent [1]. Physical activity is defined as any bodily movement produced by skeletal muscles that result in energy expenditure beyond the basal metabolic rate [2]. Exercise is a subset of physical activity that is planned, structured, repetitive, and purposeful in the sense that improvement or maintenance of physical fitness is the objective. Physical exercise is a determinant of health [3]. Hence, lack of physical activity is the primary cause of most of the morbidities [4]. Deem mentioning are obesity, ischemic heart disease, metabolic syndrome, type 2 diabetes, fatty liver disease, hypertension, stroke, peripheral artery disease, osteoporosis, osteoarthritis, rheumatoid arthritis, depression and anxiety [5].

Morbidities are considered to be the pre-death disorders in virtually all the mortalities. Therefore, reducing the risk of morbidities can result in better health span of the population which is the primary objective of modern medicine. Moreover, quality of life can be improved and annual death rates can be cut

down if causes of such morbidities are properly identified and eliminated. According to WHO, the leading cause of mortality for the year 2012 stood out to be ischemic heart disease (13.2%) followed by stroke (11.9%), various respiratory and GI disorders, diabetes (2.7%) and hypertensive vascular disease (2%). According to the figures, it can be deduced that lack of physical activity has a strong association with more than 30% of annual deaths [6].

Multiple researches have been conducted to evaluate the affiliation between lack of physical activity and incidence/prevalence of morbidities [7]. In an International Cross-Sectional Study, the odds ratio of CHD in sedentary women was found to be 2.1% (95% CI 1.0-4.3, P=0.046) [8]. In another Cross-Sectional Study, prevalence of sedentary lifestyle in hypertensive patients was 60% [9]. A National paper reports that inadequate physical activity (e.g. watching TV for 2 hrs daily) increases the risk of diabetes mellitus type 2 by 14% and contributes towards increasing the risk of other co-morbidities as well [10]. Whereas, brisk walking 1hr/day decreases risk for diabetes by 34% [11-12].

This research encompasses the significance of physical activity in geriatrics and its association with co-morbid conditions prevalent in Pakistani community. Adequate physical activity can reduce the risk of co-morbid conditions and improve the quality of life in geriatrics. This research upholds that a community based effort can be generated to encourage people towards appropriate physical activity that will reduce the morbidity rates which would certainly help in increasing the health span of the community, the major goal of modern medicine.

2. RESEARCH METHOD

2.1. Study Design and Population

A descriptive cross sectional study was conducted in residential colonies of 04 cities of Pakistan including Rawalpindi, Islamabad, Peshawar and Lahore. Study was 7 months duration from August, 2014 to February, 2015.

2.2. Sampling Technique and Sample Size

Non-probability convenience sampling was used. Using WHO sample size calculator, the sample size was calculated to be approximately 114 with Confidence Level (CL) of 95%, Anticipated population proportion (P) of 0.6 and Absolute Precision (d) of 0.15. Individuals 50 years and above were selected. Those who were bedridden, physically disabled or mentally disoriented (in time, place and person) and/or unwilling were excluded from study. Verbal informed consent from participants and permission from the Ethical Committee was taken.

2.3. Data Collection Tool and Procedure

Data Collection tool is a validated questionnaire titled Rapid Assessment of Physical Activity (RAPA). RAPA is a nine-item questionnaire with the response options of yes or no to questions covering the range of levels of physical activity from sedentary to regular vigorous physical activity as well as strength training and flexibility. The instructions for completing the questionnaire provide a brief description of three levels of physical activity (light, moderate, and vigorous) with graphic and text depictions of the types of activities that fall into each category. It has two sections, RAPA 1 and RAPA 2. In RAPA 1, the total score of the first seven items is from 1 to 7 points, with the respondent's score categorized into one of five levels of physical activity: 1=sedentary, 2=underactive, 3=regular underactive (light activities), 4=regular underactive, and 5=regular active. In RAPA 2, responses to the strength training and flexibility items are scored separately, with categorization as: strength training=1, flexibility=2, both=3 or none=0. Individuals were further categorized as physically inactive if they were at first 4 levels (sedentary, underactive, regular underactive or regular underactive) and as physically active if they were at level 5.

2.4. Data Analysis

Data was entered and analyzed in SPSS version 20. Descriptive statistics are presented as frequencies and percentages. For quantitative data that is age, mean and standard deviation were calculated. Chi-square test of significance with 95% confidence level was used to find association between physical activity and comorbid conditions. A p-value of <0.05 was taken as statistically significant.

3. RESULTS AND ANALYSIS

Among 114 participants, there were 66 (57.9%) males and 48 (42.1%) females. Mean age of participants was 57.04±7.348 years. Gender was not significantly associated with physical activity (p=0.933). Demographic variables details are shown in Table 1.

Table 1. Association of Demographic Variables with Physical Activity. (n=114)

| Demographic Variables | Number of persons/events | Percentages | p-value |
|------------------------|--------------------------|------------------------|---------|
| Age (mean \pm SD) | | 57.04 \pm 7.35 years | |
| Gender | | | |
| 1. Male | 66 | 57.89 | 0.933 |
| 2. Female | 48 | 42.1 | |
| Occupation | | | |
| 1. Medical field | 17 | 14.9 | |
| 2. Government | 19 | 16.7 | |
| 3. Business | 7 | 6.1 | 0.869 |
| 4. Army/security | 9 | 7.9 | |
| 5. House wife | 17 | 14.9 | |
| 6. Retired | 20 | 17.5 | |
| 7. Others | 25 | 21.9 | |
| Co-morbid conditions | | | |
| 1. Hypertension | 43 | 37.7 | 0.191 |
| 2. Diabetes mellitus | 37 | 32.5 | 0.048* |
| 3. Angina | 17 | 14.9 | 0.693 |
| 4. Arthritis | 40 | 35.1 | 0.029* |
| RAPA** 1 | | | |
| 1. Sedentary | 21 | 18.4 | |
| 2. Underactive | 22 | 19.3 | |
| 3. Underactive regular | 32 | 28.1 | - |
| light | 22 | 19.3 | |
| 4. Underactive light | 17 | 14.9 | |
| 5. Active | | | |
| RAPA** 2 | | | |
| 1. Strength | 8 | 7 | |
| 2. Flexibility | 40 | 35.1 | - |
| 3. Both | 1 | 0.9 | |
| 4. None | 65 | 57 | |
| Physical Activity | | | |
| 1. Physically active | 17 | 14.9 | - |
| 2. Physically inactive | 97 | 85.1 | |

*Statistically Significant

**Rapid Assessment of Physical Activity

Multiple responses were recorded while evaluating co-morbid conditions. Out of one hundred and fourteen individuals, 43 (37.7%) were suffering from hypertension, 17 (14.9%) had angina, 40 (35.1%) were suffering from arthritis while 36(31.6 %) had diabetes.

There were 19 (16.7%) government officers, 7 (6.1%) business man, 17 (14.9%) related to health care, 17 (14.9%) house wives, 9 (7.9%) army personnel, 20 (17.5%) were retired and 25 (21.9%) were related to other professions i.e. mechanic, banker, shopkeeper, waiter, driver and architect. Occupation was also not statistically significantly associated with physical activity (p=0.869).

3.1. RAPA 1

The rapid assesment of physical activity 1 (RAPA-1) showed 21 (18.4%) individuals being sedentary, 22 (19.3%) being underactive, 32 (28.1%) being underactive regular light, 22 (19.3%) being underactive light and only 17 (14.9%) being active.

The RAPA-1 scoring of sedentary, underactive, underactive regular light and underactive regular were further catogorised to as physically inactive which were about 97 (85.1%) while the active being catogorised as physically active were only 17 (14.9%).

Among 43 hypertensive individuals, 39 (90.7%) were physically inactive while only 4 (9.3%) physically active. Among 17 individuals having Angina, 15 (88.2%) were physically inactive while 2 (11.8%) were physically active. Among 37 Diabetics, 35 (94.6%) were physically inactive while 2 (5.4%) were physically active. Among 40 individuals suffering from Arthritis, 38 (95%) were physically inactive and only 2 (5%) physically active. A statitically significant association was found between physical activity and diabetes and arthritis with p values of 0.048 and 0.029 respectively. However, no association was found between physical activity and angina and hypertension with p values of 0.693 and 0.191 respectively. Refer to Figure 1 for details.

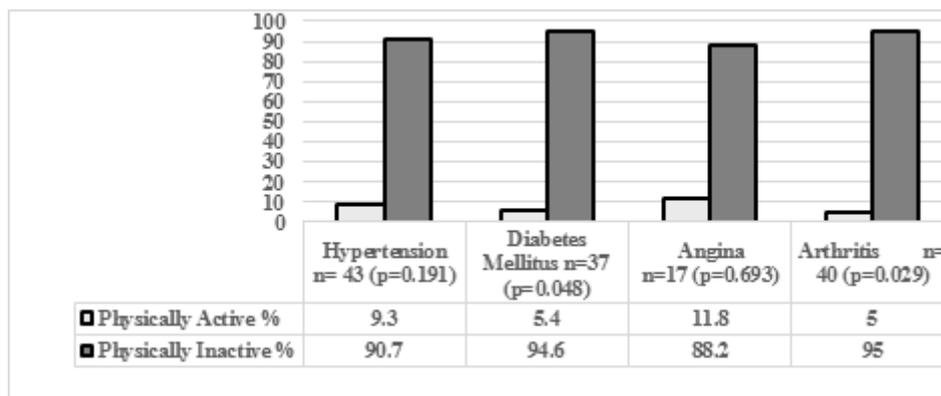


Figure 1. Association of physical activity with co-morbid conditions (n=114)

3.2. RAPA 2

According to RAPA-2, there were 8 (7%) individuals performing activities to increase muscle strength, 40 (35.1%) to increase muscle flexibility, 1 (0.9%) doing both exercises and 65 (57%) doing none of the exercises.

3.3. Discussions

This cross-sectional study shows the association of exercise and sedentary lifestyle patterns with various co-morbid conditions including hypertension, diabetes, angina and arthritis in a sample population of four cities of Pakistan including Islamabad, Rawalpindi, Lahore and Peshawar. According to our findings, increasing levels of physical activity was associated with decreased risk of all the co-morbidities mentioned above whereas lack of physical activity was associated with an increased risk. This study also confirms the data obtained from previous researches verifying an increased prevalence of these co-morbidities in physically inactive population.

A number of studies have reported that higher levels of physical activity are associated with significant reduction in risk of hypertension, diabetes, angina and arthritis. Williams showed that physically active men had lower odds of becoming diabetic and hypertensive (86% and 62% respectively) [13-14]. Similarly, in our study, 94.6% of diabetics and 89% of hypertensive individuals were found to be inactive while a lower incidence of these co-morbidities was seen in physically active individuals.

A review by Katzmarzyk and Lear demonstrated that physical activity had an effect on chronic disease risk factors with a reduction in diastolic and systolic blood pressure as well as fasting glucose levels [15]. A similar pattern was seen in our study where physically active individuals were found to have a lower risk of developing chronic co-morbid conditions as compared to the inactive individuals. A study showed that lack of physical activity accounts for 9% of premature mortality particularly due to cardiovascular disease [16]. Another study depicted that physical activity leads to increased sensitivity to insulin and decreased lipid levels thus decreasing the chances for developing NIDDM [17-18].

Arthritis acts as a double edged sword i.e. lack of physical activity is found to be one of the causative factors of arthritis whereas arthritis itself leads to impaired physical functioning of the body. This pattern was observed in our study as well as a study conducted by American college of Rheumatology [19-20]. In one study, pain intensity, frequency duration and number of sites were associated with demographic characteristics in 504 participants aged 60 years and over. It concluded that interventions for increasing physical activity should be emphasized also more in those individuals who have more pain intensity, are more depressed and who are above 75 years or older. Our study mostly concentrated on 50 years and above and on comorbid of the individuals. Depression and pain elements are not addressed in the article but can be included in further studies [21]. A met analysis was conducted for assessing physical activity interventions in adults specifically on their systolic blood pressure. It was found that a decrease in blood pressure was observed in the intervention group while in our study the hypertensive showed non-significant association with physical activity [22].

Daniela Di and colleagues conducted study on females with rheumatoid arthritis to see its association with physical activity. The study was conducted on a large cohort of women (30112 participants) and concluded a significant association of physical activity has protective effect for arthritis. In our study although sample size was not large but significant association was established between physical activity and gender [23]. In another study, hypertension, diabetes and also obesity was evaluated in terms of physical activity. Conclusion was that all these three comorbid are significantly associated with physical inactivity but

not always significant in female's gender which contrast our study results as gender was significantly associated with physical activity. Reason might be our small sample size. Further studies need to assess this aspect further [24].

The aforementioned association between physical activity, sedentary lifestyle patterns and co-morbid conditions shows a significantly decreased risk in physically active individuals. The results also indicate a different disease pattern for the two genders but that is out of the scope of this study. Probably some biological differences or methodological considerations were responsible for the variation between both the sexes.

The primary strength of this study was the quantification of physical activity carried out by the sample population and the frequencies of hypertension, diabetes, angina and arthritis in the population. Despite meager resources, population from different socioeconomic classes from four cities of Pakistan was included in the study. Also the major co-morbid conditions prevalent in our region were taken into consideration. People from all walks of life were included in research which helped in having a broader idea about the level of physical activity of the overall population.

A major limitation to this study was that the research was carried out on a sample population involving few cities of Pakistan hence it cannot be generalized to entire population owing to the use of non-probability convenience sampling. Also, inclusion of only English language in the questionnaire possibly resulted in bias because some proportion of the population was poor at understanding the questionnaire. Another limitation is whether the physical inactivity was preceded by comorbid conditions or not? This aspect need to be evaluated by detail cohort studies.

4. CONCLUSION

The lack of physical activity is significantly associated with diabetes mellitus and arthritis in geriatric population. Awareness and counselling at physician level regarding adequate physical activity should be performed to increase patient's activity level and thus improve the quality of life in geriatric population.

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