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Correlation of intensity of physical activity and subjective health status of adults working in selected institutions, Bangaluru, India

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ABSTRACT

INTRODUCTION: Physical activity is known to play an important role in overall health and wellness. The study's main aim was to determine the correlation between the intensity of physical activity and the subjective health status of adults.

METHOD: In a correlational study design, 150 adults working at different academic institutions in Bangaluru and meeting the eligibility criteria were randomly selected and invited to complete the International Physical Activity Questionnaire (IPAQ), 36 Item Short Form Health Survey (SF 36) short form quality of life scoring system, and Subjective Health Complaints Questionnaire.

RESULTS: The mean age of the participants was 34±7 years old, and the highest percentage of participants were married (76.6%), post-graduates (64.7%), and working as teaching staff (86.0%). A descriptive analysis of physical activity revealed that 22.0% of the participants were inactive and 28% were moderately active. The mean score of health-related quality of the participants was 54.9 ± 13.5. Participants had the highest mean score in social functioning, followed by emotional well-being, and most subjects (92.7%) reported having mild health complaints. Health-related quality of life was positively correlated with the intensity of physical activity (r=0.617, p=0.001). Gender (p=0.026) and job title (p=0.029) were also associated with the intensity of physical activity among adults.

CONCLUSION: Physical activity plays an important role in maintaining the physiological and psychological well-being of adults, and institutions should be proactive in encouraging healthy habits in the workforce.

Keywords: Intensity of Physical Activity, Subjective Health, Health Facilities, Exercise, Bangaluru

INTRODUCTION

"Health is wealth" is a famous saying that refers to the importance of health to human beings. Various factors can affect an individual's health, such as diet, environmental factors, socioeconomic status, genetics, gender, access to health services, and exercise. Optimal physical activity has proved to have many health benefits, such as reducing the risk factors of non-communicable diseases (NCD) like coronary artery disease, stroke, etc., lowering serum cholesterol levels, and boosting immune and nervous system function [1]. The relationship between unhealthy lifestyles such as physical inactivity, alcohol consumption, and non-communicable diseases has been examined by

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many cross-sectional and interventional studies in various populations or different age groups [2]. Maintaining optimal health and wellness is primarily dependent on physical activity status, and many research studies have been carried out to identify the positive effects of exercise on improving physical health.

According to the World Health Organization (WHO), physical inactivity contributes to 6% of global deaths and is the 4th greatest risk factor for global mortality arising from NCD [3]. It has also been cited as the 11th greatest risk factor contributing to the percentage of disability-adjusted life years. Physical inactivity is estimated to cause approximately 3.2 million deaths and 32.1 million disability-adjusted life years annually worldwide. Physical inactivity is recognized as a major contributing factor for developing various heart diseases, and the proportion of myocardial infarctions caused by physical inactivity was 12% [4]. Physical inactivity is competing with tobacco consumption in causing deaths, and the mortality associated with physical inactivity is estimated at 5.3 million deaths annually [5]. Since a significant percentage (31%) of the world's population does not follow the WHO directions for a physically active life, physical inactivity has become a common phenomenon, with a prevalence of 17% globally [6]. As digitalization becomes more common in the workplace, many jobs could become replaced by computerized robots and contribute to decreased physical activity among the general population [7].

A survey conducted in rural areas of Kerala noted decreased physical activity among the population aged 16-65 years and recommended immediate intervention to enhance the intensity of exercise. Improving physical stamina is vital to reducing the prevalence of non-communicable diseases, enhancing quality of life, and reducing lifestyle-related disease risk factors [8]. While some studies have been conducted to identify the correlation between physical health status and the intensity of physical activity, the relationship between physical activity and subjective health status is not well understood. Many clinical trials have reported the effectiveness of increased physical activity in enhancing mood and decreasing the symptoms of stress, anger, and burnout. It is also suggested that enhanced physical activity can be compared to behavior therapy in reducing depression [9].

Increased physical activity can augment the quality of life, thus reducing the risk factors of lifestyle-related diseases, and many sources argue that a healthy and fulfilling life needs an active lifestyle and time spent outdoors [10]. There is a need to understand how physical activity may influence the concept of subjective health status, which covers complex physical, emotional, mental, and social aspects of health. Identification of the intensity of physical activity and the subjective health status of adults can help the institutions plan awareness programs and render facilities to enhance physical activity among the employees. The establishment of routine physical activity or exercise in their daily schedule can create a healthy workforce. Hence, the current study correlated the intensity of physical activity and subjective health status among adults.

METHODS

Study design and population

This was a cross-sectional study conducted on randomly selected 150 adults working in different institutions in Bangaluru, India, excluding adults with a known history of chronic health conditions.

Data collection tools

Data were collected using three instruments: the International Physical Activity Questionnaire (IPAQ), a 36-item Short Form Survey (SF 36) short form quality of life scoring system, and a symptom checklist.

IPAQ measures the physical activity taken up throughout a wide range of domains, including leisure time, work, domestic activities, and transport-related activity. Based on the activity performed, the physical activity is categorized into high, moderate, and low levels. Individual activity was calculated by adding the Metabolic Equivalent of Tasks (METS) from moderate/vigorous physical activity and walking. Adults who obtained a MET of at least 3000 MET minutes were classified as performing high-intensity physical activity, while those who achieved 600-3000 METs per minute per week were categorized as having moderate intensity of physical activity. Adults who completed less than 600 MET minutes per week were classified as performing low levels of physical activity [11].

The subjective health status of the subjects was measured by the SF 36 short form quality of life scoring system and subjective health complaints.

SF 36 is a 36-item, self-reported survey consisting of 8 multi-item sub-scales, namely bodily pain, role-physical general health, role-emotional, vitality, social functioning, physical functioning, and mental health. These scales are summed up into physical and mental health. The average score of role-physical, bodily pain, general health, physical functioning, and vitality was taken as average physical health, while the average scores of vitalities, social functioning, general health, role-emotional, and mental health were taken as average mental health. Each domain score ranged from 0 to 100, with higher scores defining an enhanced health state [12]. The subjective health complaints questionnaire was used to identify the health complaints of adults and consisted of 24 items with a score ranging from 0-3 depending on the severity of the complaints.

Statistical analysis

Results were analyzed using SPSS (IBM, Inc., version 20). Descriptive statistics was performed and data were presented as mean and standard deviations, frequency and percentages. Karl Pearson's correlation coefficient was used to correlate adults' subjective health status and intensity of physical activity. Statistical significance was defined as $p < 0.05$.

Ethical clearance was obtained from the Institutional Ethical Committee of Krupanidhi College of Nursing with ethical clearance number-KCNIEC /2019/05. The subjects were briefed about the purpose of the study and informed written consent was procured.

RESULTS

Description of the demographic characteristics of the subjects.

Participants had a mean age of 34±7 years old. Many participants were married (76.6%), postgraduate (64.7%), and employed as teaching staff (86%). Most were from the nuclear family (married couple and their children) (78.7%), residing in urban areas (72.7%), and non-smokers (92.7%).

Intensity of physical activity among adults.

As recommended per IPAQ (full form) scoring system, the minutes which were more than 3 hours spent in vigorous, moderate physical activities and walking were truncated to create a normalized distribution of activity levels [11]. Truncation was performed for categorizing the amount of physical activity and for correlational analysis. To categorize the intensity of physical activity performed, the weekly physical activities of the participants were converted into metabolic equivalents (MET – minutes). METS were calculated based on the criteria: walking METS = 3.3 × total minutes in walking × number of days; moderate activity = 4 × total minutes of moderate activity × number of days performing the moderate activity and vigorous activity = 8 × total minutes of vigorous activity × vigorous activity days. A descriptive analysis of physical activity revealed that 22% of the participants were inactive, 28% of them were moderately active, and 49% were highly active (Table 1).

Table 1: Frequency and percentage distribution of adults based on the level of physical activity

Levels	Frequency	Percentage
High	74	49.3
Moderate	42	28.0
Low	34	22.7
Total	150	100.0

Description of the health-related quality of life of adults

Health related quality of life data among the participants was collected using SF 36 survey with the scores ranging from 0-100 with the high score indicating enhanced wellness. Analysis revealed that the mean health-related quality of the participants was 54.92 ± 13.59. The mean average physical and mental health score was 53.53±14.81 and 53.36 ±14.87, respectively. The participants had the highest mean score in the domain of social functioning, followed by emotional well-being (Figure 1).

Description of subjective health complaints of adults.

Subjective health complaints were identified using a questionnaire consisting of 24 items with scores ranging from 0-3 depending on the severity of the complaints. The maximum obtainable score was 72 and the health complaints were categorized as mild (scores ranging from 1 to 24); moderate (scores ranging from 25-48) and severe (scores ranging from 49 to 72).

Table 2: Frequency and percentage distribution of subjects based on health complaints

Levels	Frequency	Percentage
Mild	139	92.6
Moderate	10	6.7
Severe	1	0.7
Total	150	100.0

The scores ranged from 0-59 and were categorized into mild, moderate, and severe health complaints. The highest percentage (92.7%) of subjects reported to have mild health complaints, and the mean score of subjective health complaints was 13.28 ± 9.2 (Table 2).

Correlation between the intensity of physical activity and subjective health status among adults

Karl Pearson Correlation coefficient was computed, and a significant positive correlation (r=0.617, p=0.001) was observed between health-related quality of life and intensity of physical activity. Average physical and mental health were found to have a positive correlation with the intensity of physical activity (r = 0.689, p <0.001, r = 0.770, p <0.001, respectively).

Association with selected demographic variables and intensity of adults' physical activity

Chi-square test was computed, and a significant association was found between gender (P=0.026), job title (P=0.029), and the intensity of physical activity among adults (Table 3).

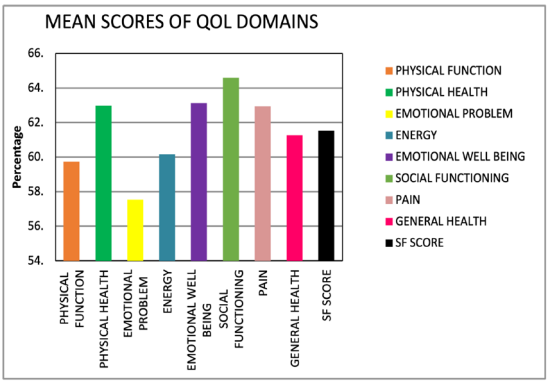

Figure 1: The domain-wise mean score of quality of life

Table 3: Association of intensity of physical activity with selected demographic variables of adults

Variables	High	Mild	Low	p-value
Gender				
Male	16	12	16	0.026*
Female	58	30	18	
Job title				
Teaching	69	32	28	0.029*
Non-teaching	5	10	6	
Educational status				
Graduate	10	10	9	
Post graduate	64	32	24	0.177
Types of family				
Joint	54	30	22	0.92
Nuclear	20	12	12	
Residential area				
	50	32	28	0.817
	24	10	6	

DISCUSSION

The study focused on identifying the correlation between subjective health status and the intensity of physical activity of adults working in teaching institutions. Optimal physical activity is associated with increased life expectancy, reduced risk of mortality, enhanced cardiovascular fitness and improved cognitive performance and well-being. The WHO recommends that adults perform at least 150 minutes of physical activity of moderate intensity or a minimum of 75 minutes of physical activity of vigorous intensity per week, which equals a minimum of 600 METs per week [13]. In the current study, most subjects (49.3%) had high physical activity levels, while 22% of subjects had low physical activity. Similar findings are reported by a past study, in which the majority of the participants exceeded recommendation given by the American College of Sports Medicine and the United States Department of Health and Human Services [14].

A survey conducted in rural Kerala on residents aged 16-65 years old reported a high prevalence of physical inactivity among (65.8%), while only 17.9% of the adults had high levels of physical activity [4]. The present study finding revealed that the majority of the participants exceeded the WHO recommendation, which could be due to the population sample characteristics as the highest percentage of participants were post graduates (64.7%) and were working as teaching staff. An observational study conducted in Finland to investigate the relationship between educational attainment and physical activity in adulthood reported that years of education is positively related to physical activity; one additional year of education leads to a 0.62 unit higher overall physical activity ($p < .01$),0.26 more hours of weekly intensive activity ($p<.05$), 560 more steps per day($p<.10$) and 390 more aerobic steps per day [15].

The current study observed that health-related quality of life was positively correlated with the intensity of physical activity ($p=0.001$. The study also identified a significant positive correlation between average physical health ($p=0.001$) and average mental health ($p=0.001$) with the intensity of physical activity. The present study finding is corroborated by the finding of a past study, which revealed a positive correlation between psychological well-being and physical activity of moderate and light intensity, a negative correlation between depression and physical activity of light intensity, and a negative correlation between pain severity and moderate-intensity physical activity [14].

A systemic review on the association between health-related quality of life (HRQOL) and physical activity among healthy adults reported that all five studies reviewed showed a moderate to strong association between HRQOL and physical activity. Higher scores in physical functioning and vitality had a significant association with an increased amount of physical activity [16]. A cohort study conducted to analyze the relationship between physical activity during leisure time and health-related quality of life reported that the participants who followed the community health norms for physical activity had a better quality of life [6]. Similar findings are reported by a randomized controlled study conducted to identify the effect of workplace health promotion programs on quality of life in which a significant improvement in quality of life and physical fitness was observed after the intervention [17]. A nationwide survey in England reported a consistently positive relationship with different measures, including subjective and objective measurements of physical activity and subjective well-being [18]. Participating in physical activity was linked to health benefits, including reduction in risk factors, enhanced fitness, and improved psychological health [18]. Similar findings were observed in the current study, in which subjects had higher mean scores in social functioning and emotional well-being.

A longitudinal study conducted to identify the impact of increased leisure physical activity for three years on health-related quality of life reported improved physical functioning, mental health, and vitality for both genders, as well as improved social functioning in women [19]. In the current study, gender and job title of adults demonstrated a significant association with the intensity of physical activity.

There are several limitations to this study. Since the study was cross-sectional in nature, it was not possible to establish a causal link between subjective health status levels of physical activity. Another limitation of this study is that activity was self-reported, and thus there was no objective measure of physical activity. The present study findings highlight the vital role of physical activity

in enhancing the wellbeing of adults and future research can focus on prospective studies need to establish the cause-and-effect link between subjective health status and physical activity.

CONCLUSION

In the present study, physical activity was positively correlated with subjective health status, which corroborates the findings of earlier similar studies. Since being active or participating in physical activity is associated with an enhanced quality of life, it is important for workplaces to encourage an active and healthy lifestyle amongst employees. Institutions should invest time and resources in organizing programs to encourage health-promotive lifestyles in the workforce.

REFERENCES

[1] Wicker, P.; Frick, B. Intensity of physical activity and subjective well-being: an empirical analysis of the WHO recommendations. Journal of Public Health. 2017, 39(2), e19-26.
[2] Reiner, M.; Niermann, C.; Jekauc, D.; Woll, A. Long-term health benefits of physical activity–a systematic review of longitudinal studies. BMC Public Health. 2013, 13(1), 813.
[3] Wicker, P.; Coates, D.; Breuer, C. The effect of a four-week fitness program on satisfaction with health and life. International Journal of Public Health. 2015, 60, 41-7.
[4] Koolhaas, C.M.; Dhana, K.; Schoufour, J.D.; Ikram, M.A.; Kavousi, M.; Franco, O.H. Impact of physical activity on the association of overweight and obesity with cardiovascular disease: The Rotterdam Study. European Journal of Preventive Cardiology. 2017, 24(9), 934-41.
[5] Warburton, D.E.; Bredin, S.S. Reflections on physical activity and health: what should we recommend?. Canadian Journal of Cardiology. 2016, 32(4), 495-504.
[6] Paffenbarger, J.R.; Blair, S.N.; Lee, I.M.; Hyde, R.T. Measurement of physical activity to assess health effects in free-living populations. Medicine and Science in Sports and Exercise. 1993, 25(1), 60-70.
[7] Katulanda, P.; Jayawardana, R.; Ranasinghe, P.; Sheriff, M.R.; Matthews, D.R. Physical activity patterns and correlates among adults from a developing country: the Sri Lanka Diabetes and Cardiovascular Study. Public Health Nutrition. 2013, 16(9), 1684-92.
[8] Aslesh, O.P.; Mayamol, P.; Suma, R.K.; Usha, K.; Sheeba, G.; Jayasree, A.K. Level of physical activity in population aged 16 to 65 years in rural Kerala, India. Asia Pacific Journal of Public Health. 2016, 28(1_suppl):53S-61S.
[9] Taylor, C.B.; Sallis, J.F.; Needle, R. The relation of physical activity and exercise to mental health. Public Health Reports. 1985, 100(2), 195.
[10] Babyak, M.; Blumenthal, J.A.; Herman, S.; Khatri, P.; Doraiswamy, M.; Moore, K.; Craighead, W.E.; Baldewicz, T.T.; Krishnan, K.R. Exercise treatment for major depression: maintenance of therapeutic benefit at 10 months. Psychosomatic Medicine. 2000, 62(5), 633-8.
[11] IPAQ Research Committee. Guidelines for data processing and analysis of the International Physical Activity Questionnaire (IPAQ)-short and long forms. http://www.ipaq.ki.se/scoring.pdf. 2005.
[12] Kalantar-Zadeh, K.; Kopple, J.D.; Block, G.; Humphreys, M.H. Association among SF36 quality of life measures and nutrition, hospitalization, and mortality in hemodialysis. Journal of the American Society of Nephrology. 2001, 12(12), 2797-806.
[13] https://www.who.int/news-room/fact-sheets/detail/physical-activity. [Accessed Sept.10, 2020]
[14] Panza, G.A.; Taylor, B.A.; Thompson, P.D.; White, C.M.; Pescatello, L.S. Physical activity intensity and subjective well-being in healthy adults. Journal of Health Psychology. 2019, 24(9), 1257-67.
[15] Kari, J.T.; Viinikainen, J.; Böckerman, P.; Tammelin, T.H.; Pitkänen, N.; Lehtimäki, T.; Pahkala, K.; Hirvensalo, M.; Raitakari, O.T.; Pehkonen, J. Education leads to a more physically active lifestyle: Evidence based on Mendelian randomization. Scandinavian Journal of Medicine & Science in Sports. 2020, 30(7), 1194-204.
[16] Bize, R.; Johnson, J.A.; Plotnikoff, R.C. Physical activity level and health-related quality of life in the general adult population: a systematic review. Preventive Medicine. 2007, 45(6), 401-15.
[17] Brand, R.; Schlicht, W.; Grossmann, K.; Duhnsen, R. Effects of a physical exercise intervention on employees' perceptions of quality of life: a randomized controlled trial. Sozial-Und Präventivmedizin. 2006, 51(1), 14-23.
[18] Anokye, N.K.; Trueman, P.; Green, C.; Pavey, T.G.; Taylor, R.S. Physical activity and health related quality of life. BMC Public Health. 2012, 12(1), 624.
[19] Tessier, S.; Vuillemin, A.; Bertrais, S.; Boini, S.;

Le Bihan, E.; Oppert, J.M.; Hercberg, S.; Guillemin, F.; Briançon, S. Association between leisure-time physical activity and health-related quality of life changes over time. Preventive Medicine. 2007, 44(3), 202-8.