RESEARCH ARTICLE

Relationship between physical activity level and BMI among Pakistani labourers in Saudi Arabia: A cross-sectional study

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Abstract

Objectives: To study the level of physical activity of Pakistani labourers in Saudi Arabia, and to find its relationship with body mass index.

Method: The observational study was conducted inside the Pakistan Embassy in Riyadh, Saudi Arabia, from October 2017 to March 2018, and comprised Pakistani males aged 22-60 years doing unskilled and semi-skilled jobs. Body mass index was calculated, and the level of physical activity was assessed using the short form of International Physical Activity Questionnaire. Data was analysed using SPSS 20.

Results: There were 130 subjects with mean age of 33.53±7.9 years. There were 109(83.8%) subjects aged <40 years, and 21(16.2%) were aged >40 years. Mean body mass index of the sample was 26.13±5.29kg/m^2. Overall, 71(54.6%) participants were insufficiently active having energy expenditure <600 metabolic equivalent of task in minutes per week. No statistically significant result was found when total energy expenditure was considered ($p>0.05$), but significant result was found for energy expenditure due to 'walk alone' ($p<0.05$). Significant correlation was found between profession and overall energy expenditure and job-related energy expenditure. Significant but weak positive correlation was found between body mass index and walk-related energy expenditure ($r=0.279$), ($p<0.001$).

Conclusion: Mean body mass index of the sample was high compared to South Asian cut-off values, and the level of physical activity was very low, but the findings failed to show an inverse relationship between physical activity level and body mass index.

Keywords: Relationship, Physical activity level, BMI, Pakistani labourers, Saudi Arabia, Cross-sectional.

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Introduction

In Arab countries, sedentary lifestyle is one of the most important modifiable risk factors for type 2 diabetes mellitus (T2DM) and cardiovascular diseases.[1] More than 70% population of Saudi Arabia has been reported to be physically inactive in relation to work, leisure-time activities, and transport.[2] The most important factors labelled as causes of this physical inactivity are changes in lifestyle, increased use of electronic screens, lack of walk, excessive availability of transport, and intensely hot weather.[1] Urban planning is mostly not in favour of physical activity (PA). Exercise facilities are either not available, or, if available, are too expensive[3] Interest of Gulf Cooperation Council (GCC) governments, including the Kingdom of Saudi Arabia (KSA), Kuwait, Bahrain, Oman, Qatar and the United Arab Emirates (UAE), in spreading awareness about PA benefits has also not been sufficient.[3,4] Only recently the Arab region has started taking interest in surveillance of non-communicable diseases (NCDs). GCC countries have reported high prevalence of physical inactivity, along with rising trends of overweight and obesity.[4]

Expatriates were also found to be less physically active in Middle Eastern countries. Similarly, expatriates living in KSA were not found to be significantly physically active.[5] Affordable transport in Gulf states was found to be an important factor that resulted in low PA.[6] Many factors might be involved in attaining a high body mass index (BMI) by South Asian (SA) expatriates living in Gulf states. Scanty research has been done on expatriates in Gulf states.[7] The factors include access to highly refined food, dietary acculturation,[8] low PA level,[9] and South Asian genetics.[10] The factors affecting PA levels in GCC countries seem to be long work hours,[11] hot climate[1] and affordable transport.[6]

Exclusive studies on PA levels of Pakistani community have not been done in Middle-Eastern countries, but some studies have been done on SA ethnicity, which included Pakistanis as a subgroup.[12]

The current study was planned to evaluate the PA level of Pakistani labourers in KSA, and to find its relationship with BMI.

Subjects and Methods

This observational study was conducted from October

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2017 to March 2018 inside the Pakistan Embassy in Riyadh, KSA, where all migrant Pakistani workers come from across KSA for renewal of national identity cards and passports, as well as for other legal issues. Permission for the study was taken from the ERC of Allama Iqbal Open University Islamabad. Purposive sampling technique was used. For sample size, following formula was used considering literature.[13]

Significance level of the study was kept at 5%, and confidence level was set at 95%.

Sample size = $n = z^2 \times p \times (p-1) / d^2 = (1.96)^2 \times 0.52 \times (1 - 0.52) / (0.1)^2 = 95.8$

z = z-score= 1.96 (corresponds to confidence level, and 95% confidence level),

p = 52% or 0.52, i.e. prevalence rate of over-weight in a study done on Pakistanis living in UAE 1

d = Margin of error= 10% or 0.1

Those included in the study were Pakistani males aged 22-60 years who were unskilled or semi-skilled workers. An informed consent was signed by all participants.

Data was collected using the telephonic version of the short form of International Physical Activity Questionnaire (IPAQ), which is a validated questionnaire.[14] IPAQ explored frequency and duration of moderate and vigorous PA during a week. In order to achieve significant results, PA should be done for a duration of at least 10 minutes in one go. IPAQ also assesses the frequency and duration of walk over one week. All types of walk are included in IPAQ, i.e. walk to work, walk for leisure, or walk to the market.

The questionnaire was translated into Urdu language and the questions were rearranged to make them easy for the labourers to understand.

A metabolic equivalent of tasks (MET) is a ratio of one's working metabolic rate relative to the resting metabolic rate. MET values of all activities were noted down by the help of a compendium of physical activities developed by Arizona State University.[15] Time utilised in all types of activities was noted and changed to minutes. Work hours per day and work days per week were also recorded. MET values related to household chores were also recorded. Most of the labourers living in KSA were without their families, and they did their own house chores. Time spent in every type of walk was also noted. Other than overall energy expenditure (EE) per week, categories of walk-related EE, job-related EE, and leisure-time-related EE were also made.

A cut-off score of 600 MET minutes per week was fixed for all types of EE because a minimum of 150 minutes per week of moderate PA is recommended by the United States Department of Agriculture (USDA) guidelines for adults[16. Labourers who scored less than 600 MET-minutes per week were labelled as insufficiently active, and those who scored equal to or more than 600 MET-minutes per week were labelled as sufficiently active.[17]

Body weight and height of all participants was measured by using digital weighing scale, and a stadiometer, respectively. BMI was calculated by dividing weight in kilogram by height in meters squared. According to the World Health Organisation (WHO), BMI 23-27.5kg/m^2 represents overweight, and 27.5kg/m^2 or higher represents obesity in all Asian populations, including SA population.[18] Therefore, subjects were categorized as normal (<23.0kg/m^2), and overweight ($\geq$23.0 kg/m^2) by using the SA cut-off points.

Data was analysed using SPSS 20. Continuous variables were expressed as means ± standard deviation (SD), and categorical variables were expressed as frequencies and percentages. For categorical variables, chi-square test was used, while for continuous variables Pearson's correlation was used. $P<0.05$ was considered significant.

Results

A total of 130 participants completed the study. The mean age was 33.53±7.9 years (SD ± 7.9), ranging from 22 to 60 years. There were 109 (83.8%) subjects aged <40 years, and 21(16.2%) were aged >40 years. Mean BMI of the sample was 26.13±5.29kg/m^2. Further, 66 (50.8%) participants were involved in some kind of PA, while 27(20.8%) reported that they actually 'walked' during a week. The BMI of 62(47.7%) participants was <23kg/m^2, while that of 68(52.3%) was $\geq$23 kg/m^2 (Table-1).

Overall, 71(54.6%) participants were insufficiently active having EE <600 MET-minutes per week.

No statistically significant association of BMI was found with total EE ($p>0.05$), but significant result was found for EE due to 'walk alone' ($p<0.05$). Significant relationship of profession was found with total EE, with drivers being the most insufficiently active, and unskilled labourers being the most physically active groups ($p<0.05$). Significant correlation was found between profession and overall EE and job-related EE. Significant but weak positive correlation was found between BMI and walk-related EE ($r=0.279$, $p\leq0.001$) (Table-2).

Table-1: Distribution of physical activity and body mass index (BMI) categories.

Physical activity distribution:	Frequency (n=130):	Percent:
Physically active	66	50.8
Physically inactive	64	49.2
Walk distribution:	**Frequency:**	**Percent:**
No walk	103	79.2
Do walk	27	20.8
Leisure-time Physical activity:	**Frequency:**	**Percent**
Does leisure-time PA	50	38.5
Does no do leisure-time PA	80	61.5
Causes of leisure-time inactivity:	**Frequency (n=80)**	**Percent**
Do not like doing exercise	20	25
Do not have time for exercise	52	65
Tiredness	8	10
Occupational physical activity:	**Frequency (n=130)**	**Percent**
Yes	26	20.0
No	104	80.0
BMI categories distribution:	**Frequency (n=130)**	**Percent**
Less than 23	62	47.7
Equal to or more than 23	68	52.3

Table-2: Energy expenditure (EE) per week.

	Overall EE:		Walk-related EE:		Job-related EE:		Leisure-time EE:	
BMI:	<600 MET-min/ week	=>600 MET-min/ week	<600 MET-min/ week	=>600 MET-min/ week	<600 MET-min/ week	=>600 MET-min/ week	<600 MET-min/ week	=>600 MET-min/ week
<23 kg/m	34 (26.2%)	28 (21.5%)	59 (45.4%)	3 (2.3%)	47 (36.2%)	15 (11.5%)	48 (36.9%)	14 (10.8%)
≥23 kg/m	37 (28.5%)	31 (23.8%)	54 (41.5%)	14 (10.8%)	57 (43.8%)	11 (8.5%)	60 (46.2%)	8 (6.2%)
p-value:	1		0.009*		0.279		0.109	

BMI: Body mass index, MET-min/week: Metabolic equivalent of task in minutes per week. *Significant value

Discussion

The study found no statistically significant relationship between BMI and job-related EE, but a trend of low PA level was found in both BMI categories, especially among the overweight.

Only about 40% participants were involved in some kind of leisure-time PA. Most of them who were physically active during leisure-time played cricket or football in their free time. Very few reported ´walk: as a leisure-time PA, as there was no appropriate place to walk. Majority remained inactive during leisure-time. Most of the physically inactive participants (60%) were not interested in doing any PA due to long work hours. Also, 25% of the physically inactive participants said that they did not like to exercise even while living in Pakistan. Rest of them reported being inactive due to tiredness. Although no statistically significant relationship was found between BMI and leisure-time-related EE, there was a trend of low PA level in both BMI categories, especially among the overweight. Only 21% participants reported they actually 'walked' during a week. This ´walk: included walk during leisure-time, walk during work, or walk to go to friends, mosque or market. Almost none of these workers walked 'to' work. They were either living in the vicinity of areas where they worked, like oil refineries, construction companies etc, or they were provided with transport by their employers. Provision of transport is not expected to be expensive for employers in an oil-producing country.[1,19] Another reason for lack of ´walk: is unavailability of walking tracks and footpaths in most parts of the cities.[1,19] It is easy to afford vehicles and petrol prices in the country, and there is no trend of public transport in KSA. Hence, relatively better skilled labour actually uses personal vehicles. Most of the workers not having their own transport, mostly stay indoors in free time. Walk is not a part of the Gulf lifestyle. Hot weather is another important factor which refrains people from participating in walk and other outdoor activities.[1] Significant correlation was found between walk-related EE and BMI categories. Lower level of PA was found to be related with both BMI categories, especially among the overweight. Pearson's correlation also showed very weak positive correlation of BMI with walk-related EE. These and other findings in the current study were contrary to expected results, as low EE was supposed to be related to high BMI and vice versa.[20]

Promotion of walkability is required, and a physically active lifestyle needs to be encouraged so that people can walk or do cycling.[21] Most semi-skilled and unskilled migrants live in labour camps in the Gulf states. These camps are frequently present in the peripheral industrial areas of cities, which do not allow the migrants for grocery shopping, socialisation, and for moving about in the city during their free time.[21] Hot climate is another big concern because the mean temperature in the Gulf states, in most parts of the region, is >30 degrees Celsius for at least six months of the year.[1] People spend most of their time in air-conditioned areas. Long job hours also pose a risk for high BMI.[11] Long work hours can result in obesity due to unhealthy eating habits, decreased exercise, sedentary lifestyle,[22] and decreased sleep.[23] Long work hours act as a barrier to regular exercise through

constraining the time duration for PA.[11] Gulf countries are unpopular for their unjust attitude towards expatriates in the form of long work hours.[24] Lastly, South Asians themselves usually do not like to do leisure-time PA.[25] South Asian adults are more prone to stay inactive during leisure time.[9] SA males actually need to do higher level of PA compared to European males to stay away from cardiovascular illnesses, for a given age and BMI.[26] Migrant South Asians in Western countries commonly do not undertake leisure-time PA due to tiredness after work, lack of facilities for leisure time activities, and high expense for the available facilities.[26] Studies done in KSA also showed prevalence of physical inactivity among SA expatriates.[5]

The limitations of the current study included its small sample size and self-reporting done by a less educated population. The response rate was poor (47%) which was due to the drastic reduction in number of migrant workers in KSA in recent times. Also, there were apprehensions in the less educated sample about revealing facts about one's health and financial status due to legal issues in Saudi Arabia.

Conclusion

Mean BMI of the sample was quite high in relation to SA BMI cut-off values, and PA level of unskilled and semi-skilled Pakistani workers living in KSA was found to be very low. However, there was no significantly inverse relationship between EE and BMI.

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