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Frequency of Physical Activity in Acute or Chronic Smoker among General Population of Karachi - A Cross-Sectional Study

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Abstract

Background: This research aims to evaluate the frequency of physical activity among acute or chronic smokers in Karachi's general population, recognizing the reciprocal influence between smoking and physical activity on overall health. Assessing exercise frequency among smokers is crucial, considering the commonly observed association between smoking and declining bodily functions, making it pivotal for comprehensive health assessment.

Methods: In this study, a cross-sectional survey involved 316 healthy adults aged 15-69 years, utilizing convenience sampling is used for diverse demographic representation. Data on demographic details, smoking status, and physical activity levels were collected through the International Physical Activity Questionnaire (IPAQ). The subsequent analysis, conducted using SPSS version 0.22, aimed to scrutinize the impact of smoking on participants' physical activity.

Results: Among the participants, a majority (76.9%) held jobs with varying physical activity levels. For transportation, nearly all employed modes showed varying physical activity intensities, with 59.8% reporting low, 25.3% moderate, and 14.9% vigorous activity levels. Engagement in household chores and family care displayed diverse physical activity levels: 66.5% reported low, 24.1% moderate, and 9.1% vigorous activities. Similar trends were observed for house maintenance and family care, with 69.0% reporting low, 14.6% moderate, and 16.5% vigorous activities.

Conclusion: The study indicates that smokers participate in physical activity less frequently, underscoring the need for heightened attention to their exercise habits. These findings underscore the importance of tailoring health strategies for smokers and examining lifestyle factors influencing their physical well-being.

Keywords

Physical Activity, METs, Smoking, Well-being.

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Introduction

Smoking poses a number of health problems, which contribute significantly to preventable morbidity and premature mortality worldwide[1]. Smoking cigarettes can injure almost every organ in the body since they are full of toxic substances like nicotine, tar, carbon monoxide, and radioactive materials[2]. In comparison to non-smokers, smokers typically live eight years less than non-smokers[3]. Populations exposed to cigarette smoking at any point in their life experience worsening respiratory issues and slower growth[4]. Smokers face an increased risk of experiencing acute myocardial infarction (heart attack) and sudden death. In addition, smoking is associated with the development of three lung diseases (ILD): bronchiolitis-related ILD (RB-ILD), desquamative interstitial pneumonia (DIP), and pulmonary Langerhans cell histiocytosis (PLCH)[5,6]. The acute and reversible effects of smoking can be attributed to substances like carbon monoxide and other compounds present in smoke, which impede oxygen delivery and disrupt mitochondrial function. In the long term, chronic smokers are at a higher risk of developing life-threatening diseases later in life[7].

It is not necessary to engage in physically demanding activities in order to maintain good health; instead, it is crucial to concentrate on the overall quantity of physical activity that is available to people, giving them a choice of possibilities to include into their everyday life. Regular exercise has been demonstrated to lower mortality and morbidity rates and can help counteract the detrimental physiological effects of a largely sedentary lifestyle[8]. The detrimental effects of various forms of smoke, such as cigarette smoke, environmental smoke resulting from factors like heavy vehicles, industries, and burning, have an adverse impact on the human body. Numerous Randomized Controlled Trials (RCTs) offer compelling evidence that individuals who engage in regular physical activity experience reduced cravings for nicotine. Furthermore, non-smokers who are physically active tend to experience fewer disabilities as they age[9,10]. The frequency of physical activity is a behavioral factor that sheds light on the relationship between smoking addiction and the general population's adaptation. Several studies indicate a negative correlation between physical activity and cigarette smoking, indicating that individuals who engage in any form of physical activity are less likely to smoke or smoke fewer cigarettes[11]. A study conducted by Salin et al. in 2019 among 3355 Finnish adults over a 31-year period, identified distinct trajectories for smoking and Physical Activity (PA) among males and females. For both genders, five smoking trajectories and four to five PA trajectories were delineated. Notably, individuals in the persistently active PA group exhibited lower likelihoods of engaging in regular smoking trajectories, while the inactive and low active PA groups were less likely to follow

non-smoking trajectories. Particularly in females, the inactive and low active groups showed reduced probability of belonging to the non-smokers category[12]. This cross-sectional study in Karachi addresses the public health concerns of high smoking rates and sedentary lifestyles. Focusing on the frequency of physical activity among acute and chronic smokers, the research aims to fill a critical gap in understanding local health behaviors. By examining this interplay within Karachi's diverse population, the research contributes context-specific insights essential for developing effective and culturally sensitive public health strategies.

Methodology

This is a cross-sectional population-based study conducted among a population of smokers in Karachi, covering the period from June 2020 to November 2020. The frequency of physical activity was determined and the sample size (n=316)[15] was calculated using prevalence data from OpenEpi. The study employed a non-probability convenience sampling method.

Inclusion criteria for participants were as follows: only males were included, participants' age ranged from 15 to 69 years, and the study included 124 individuals from both acute and chronic smoker populations. Participants were asked to engage in a variety of physical activities, including work-related physical activity (paid work and voluntary work), transportation-related physical activity, home-based physical activity, and leisure-time physical activity. Informed consent was obtained from all participants. Exclusion criteria included those identified as having systemic diseases such as chronic obstructive pulmonary disease, asthma, asthma, pneumonia, cystic fibrosis, or SLE. Individuals who are physically inactive and who take medications such as antidepressants, muscle relaxants, and nonsteroidal anti-inflammatory drugs are also excluded. Individuals who refused to participate were excluded from the study.

The analysis employed descriptive statistics, incorporating measures such as frequency and mean, to document the demographic attributes of the participants. Furthermore, these statistical methods were utilized to quantify the frequency of physical activity across various activities, providing a comprehensive overview of the participants' engagement in different forms of physical exercise. Statistical analysis is done through SPSS statistics 22.0.

Outcome measures were assessed using the International Physical Activity Questionnaire (IPAQ) [15 -16]. The IPAQ has demonstrated acceptable accuracy and consistency in larger populations. This questionnaire, originally designed for young and middle-aged adults, covers four domains of physical activity: work-related activity (including paid work and volunteer work), transportation activity, housework, and leisure. The questionnaire asks about the frequency of physical activity, with responses given in the past week. Evaluation of physical activity based on three categories:

- **Low:** This category represents the lowest level of physical activity. People who do not meet the criteria for category 2 or 3 are considered low or inactive.

- **Medium:** This category includes three dimensions:*igorous activity for at least 20 minutes a day for 3 or more days.*
- *Moderately vigorous activity or walking for at least 30 minutes a day for 5 or more days.*
- *Any combination of walking, moderate-intensity, or vigorous-intensity activity that adds up to at least 600 MET-minutes per week for 5 or more weeks.*

- **High:** This category includes two dimensions:
  - *High Intensity at least 3 days with at least 1500 MET minutes per week.*
  - *Any combination of walking, moderate-intensity, or vigorous-intensity activity that adds up to at least 3,000 MET-minutes on 7 or more days per week.*

The formula for calculating MET values and MET-minutes is used to estimate energy expenditure:

- **MET-minutes / walking week = 3.3 * walking minutes * walking days**

- **Average MET-minutes / week = 4.0 * average minutes of vigorous activity * average day**

- **Vigorous MET-minutes/week = 8.0 * Vigorous Intensity Activity Minutes * Vigorous Intensity Day**

Sitting variables are used as estimates of energy expenditure per minute:

- **Total Sitting Minutes/Week = Sitting Minutes Sunday * 5 Weeks + Sitting Minutes Sunday * 2 Weeks**

- **Average total sedentary minutes/day = (weekday sedentary minutes * 5 weekends days + weekend sedentary minutes * 2 weekend sedentary minutes) / 7**

Sitting behavior is evaluated by categorizing the number of sitting hours per day on weekdays and weekend days. If the sitting hours per day on weekdays are 5 or more, it indicates a sedentary lifestyle during weekdays. Similarly, if the sitting hours per day on weekend days are 7 or more, it indicates a sedentary lifestyle during weekends.

The final score is calculated using the MET rate, which is the MET rate multiplied by the number of minutes of activity and events per week, resulting in MET-minutes per week.

Results

A total of 316 male participants from the smoking population aged 15 to 69 years were enrolled in this cross-sectional study. In the current study, the researcher analyzed the frequency of physical activity from the data provided by the IPAQ, which divides the IPAQ into four domains, the first is work-related physical activity, the second is transportation-related physical activity, and the third is housework, home maintenance and care; physical activity related to family and recent recreation, sports and physical activity in free time.

After dividing the IPAQ into four domains then analyze the physical activity of each domain by three categories, first is low physical activity, second is moderate physical activity and last is high physical activity.

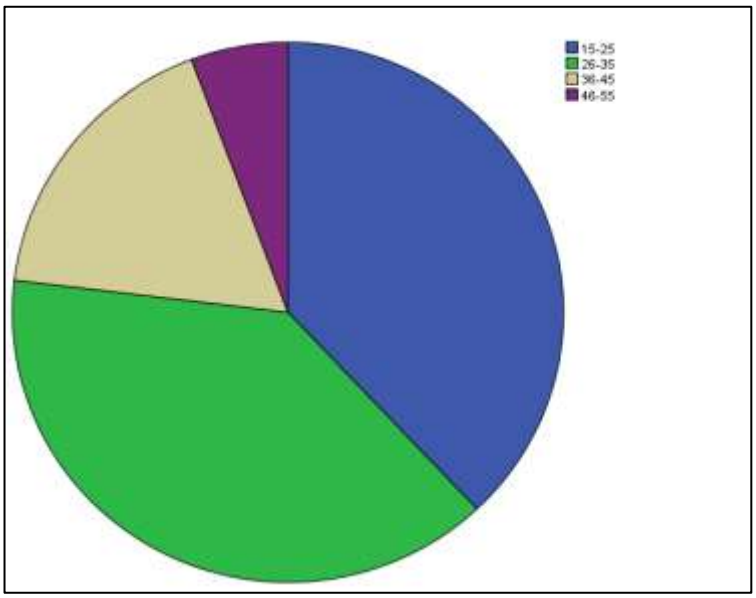

Figure-1 Age of participants included in study

Work-related Physical Activity

Of the 316 respondents, 73 (23.1%) were unemployed, and 243 (76.9%) were employed or working outside without pay. Frequency of physical activity among individual having job or do unpaid work outside home. Out of 316 participants, 243 participants having job with frequency of low physical activity is 114(36.1%), moderate physical activity is 24(7.6%) and vigorous physical activity is 105(33.2%).

Transported-related Physical Activity

It shows frequency of physical activity among individual having job or do unpaid work outside home. Out of 316 participants, every participants is using transport with frequency of low physical activity is 189(59.8%), moderate physical activity is 80(25.3%) and vigorous physical activity is 47(14.9%).

Taking Care of the Household, Housekeeping, and Physical Activities Related to the Family

It includes participants' physical activity related to housework, home maintenance, and family-related physical activity, further divided into three levels and provides the frequency of physical activity among them. It shows the frequency of physical activity among those involved in housework, housework, and family-related physical activity. Each participant 316 involved in taking care of housework, housework, and physical activity related to the family with low physical activity frequency in 210 (66.5%), moderate physical activity in 76 (24.1%) and vigorous physical activity in 30. (9.1%).Figure 4.5: Participant involve in taking care of the household, housekeeping, and physical activities related to the family.

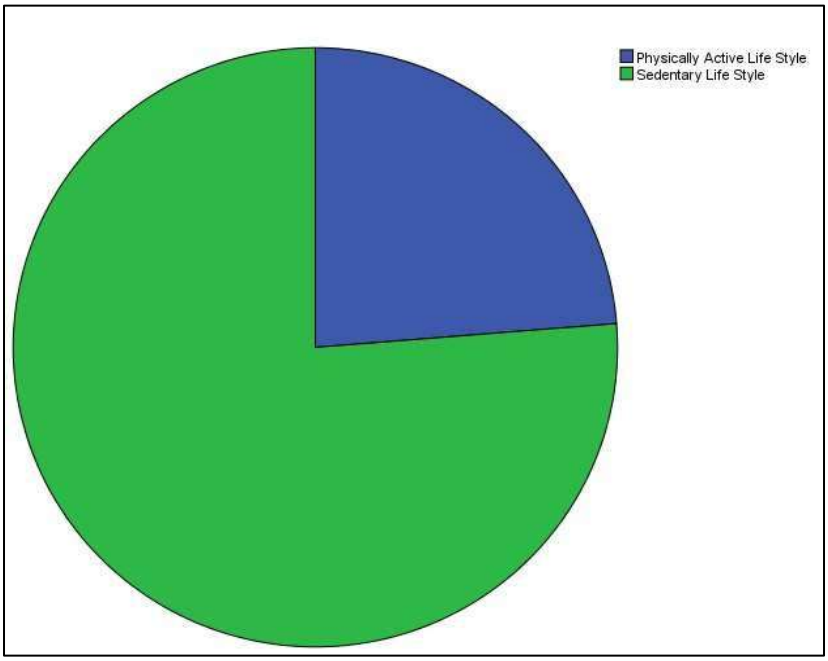

Figure-2 Life style of participants according to their sitting hours per day in weekdays

Recreation, Sport, and Leisure-Time Physical Activity

Recreation, sports and leisure time physical activity included the participants' physical activity, which was further divided into three levels and provided the frequency of physical activity among them. It show the frequency of physical activity among those involved in housework, housework, and family-related physical activity. Each participant 316 participates in housework, housework, and physical activities related to the family with frequency; low physical activity 218 (69.0%), moderate physical activity 46 (14.6%) and vigorous physical activity 52 (52 16.5%).

Table-1 Time spent by participants in sitting

Minutes 5 days/week	Hours 5 days/week	Minutes/ Day	Hours/ Day	No of Participants
25	0.42	5	0.08	1
300	5	60	1	4
600	10	120	2	26
900	15	180	3	26
1200	20	240	4	18
1500	25	300	5	43
1800	30	360	6	51
1950	32.5	390	6.5	2
2100	35	420	7	28
2250	37.5	450	7.5	2
2400	40	480	8	48
2700	45	540	9	19
3000	50	600	10	28
3250	54.2	650	10.8	2
3300	55	660	11	4
3600	60	720	12	14
Total	316			

Discussion

In this cross-sectional study involving 316 male participants aged 15 to 69 from the smoking population of Karachi, the researcher investigated the frequency of physical activity across various domains using the IPAQ. The study aimed to analyze work-related, transportation-related, household and family-related, and recreation, sports, and leisure-time physical activities, categorizing them into three levels: low, moderate, and high. The findings revealed notable patterns in each domain. For work-related activities, 36.1% of employed participants exhibited low physical activity. In transportation-related activities, 59.8% demonstrated low physical activity. Household and family-related tasks showed 66.5% engaged in low physical activity. In recreation, sports, and leisure-time activities, 69.0% displayed low physical activity. These results underscore the prevalence of low physical activity across diverse life domains among the studied smoking population, emphasizing the need for targeted programs to promote healthier lifestyles and well-being.

This study shows the cumulative effect of smoking and physical activity on a person's health status. In addition, a study found that a significant proportion (14%) of male smokers did not engage in moderate intensity physical activity[17]. Interestingly, most of the participants in this study reported engaging in physical activity, even at a low frequency. Most smokers start the habit before the age of 18, with tobacco trials and smoking periods continuing from adolescence to the age of 18.[18] As part of this study, it was found that young adults are more likely to smoke. Among men, the highest prevalence of smoking occurs in the age group of 45 to 64 years (63.0%), and the lowest prevalence in the age group of 15 to 24 years (33.6%).[19] In addition, smoking is responsible for 12.9% of deaths among men.[20]

The report says that smoking kills more than 500,000 people in the United States every year. The prevalence of smoking among men was found to be 65.4% [21]. Men in this study reported an average age of 22.8 (7.4) when they started smoking. In addition, the average (standard deviation) of cigarettes smoked per day by men was 16.5 (11.5). The use of valid and reliable measures is essential to accurately assess and understand physical activity patterns in specific populations. These measures help document the frequency, duration, and distribution of physical activity, estimate the prevalence of people who meet health recommendations, and study the effects of different levels of physical activity on specific health parameters. Therefore, the International Physical Activity Questionnaire was used in this research.

Several studies have reported that teenagers who are involved in regular physical activity and sports are consistently more likely to smoke cigarettes than their sedentary counterparts.[22] In line with previous research, this study also uncovers a negative relationship between smoking and physical activity[16]. A widely use questionnaire with moderate reliability 0.59[23]. The study questionnaire divided participants' physical activity into four domains, with the first domain focusing on job-related physical activity. Interestingly, the results demonstrate a positive outcome in this domain among the diverse population of Karachi. Among the general population of Karachi, a significant proportion of individuals (76.9%) reported having a job. Among those individuals who have a job and engage in physical activity, the breakdown is as follows: 36.1% reported low physical activity, 7.6% reported moderate physical activity, and 33.2% reported vigorous physical activity.

The second domain of the study questionnaire focuses on transport-related physical activity, revealing a low level of physical activity among participants in this specific domain. Among the participants who reported engaging in physical activity related to transportation, the distribution of frequency is as

follows: 59.8% reported low transport-related physical activity, 25.3% reported moderate transport-related physical activity, and 14.9% reported vigorous transport-related physical activity.

The third domain of the survey questionnaire, focused on physical activity related to housework, home maintenance and family care, revealed a low level of this type of physical activity among participants. The frequency distribution of physical activity among those involved in housework, housework, and family care is as follows: 66.5% reported low physical activity in this domain, 24.1% reported moderate physical activity, and 9.5% reported vigorous physical activity in this domain. The fourth domain of the questionnaire focuses on recreation, sports and leisure-time physical activity, indicating the low participation of participants in these activities. The distribution of the frequency of physical activity among participants who are involved in recreation, sports, and physical activity in free time is as follows: 69.0% reported low physical activity in this domain, 14.6% reported moderate physical activity, and 16.5% reported vigorous physical activity in. this domain.

In the final part of the study, the researchers assessed sitting time on weekends and on weekends. Previous research has shown that people who spend 5 or more continuous hours, including during transportation, on the weekend are associated with a sedentary lifestyle. Likewise, people who sit for 7 hours or more on weekends, including during transit, tend to be sedentary. In this study, the researchers found that only 23.73% of the population of smokers maintained a physically active lifestyle on weekdays, while the remaining 76.26% had a sedentary lifestyle during weekdays. However, on weekend days, 50.31% of the participants were found to engage in an active lifestyle, while 49.69% continued to maintain a sedentary lifestyle.

Strength and Limitations

This study's strengths lie in its comprehensive use of the International Physical Activity Questionnaire, ensuring a thorough examination of physical activity patterns. Additionally, its focus on Karachi's diverse population provides insights specific to the local sociocultural context. However, limitations include potential biases from reliance on self-reported data, hindering the establishment of causal relationships due to the study's design. Findings may be limited in applicability beyond the specific demographic of Karachi. The International Physical Activity Questionnaire used in the study did not differentiate between chronic and acute smokers, limiting the specificity of results in this regard. This inherent limitation in the measurement tool restricted the exploration of distinct physical activity patterns within these subcategories. Future research with more nuanced tools may address this aspect comprehensively.

Future Recommendations

Moving forward, it is recommended to conduct longitudinal studies for a deeper understanding of temporal relationships between smoking, physical activity, and health outcomes. Integration of objective measures, like accelerometers, is advised for more reliable data on physical activity, along with biochemical validation for smoking. Furthermore, exploring the effectiveness of targeted interventions to enhance physical activity among smokers is an area worthy of investigation.

Conclusion

Under consideration of limitations of this study, the following conclusions may be drawn on the basis of domains given in referenced questionnaire; Firstly, the frequency of individual having job is higher among general population of Karachi. There is a low involvement in physical activity among participants with jobs. The frequency of physical activity among participant using transport is low but the rate of participant using transport is high. Another conclusion from this study is made about the frequency of physical activity among participant involved in housework, house maintenance, and caring for family is low but participant count is very high, who were involved in low level of physical activity of this domain. At last, the frequency of physical activity during recreation, sport, and leisure-time activities is evaluated which divulge low level of physical activity.

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Conflict of Interest
None.

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AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

Conception or Design: Shahzad S

Acquisition, Analysis or Interpretation of Data: Iqbal S, Shahzad S, Ahmed H

Manuscript Writing & Approval: Ahmed H

All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.