

**A DESCRIPTIVE STUDY ON PHYSICAL ACTIVITY LEVEL AND ITS
CORRELATES IN YOUNG WOMEN (18-25 YEARS) OF AN URBAN SLUM
REGION IN MUMBAI CITY.**

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DECLARATION

I hereby declare that this dissertation titled **“A descriptive study on physical activity level and its correlates in young women (18-25 years) of an urban slum region in Mumbai city.”** is a bonafide record of my original field research. It has not been to any other university or institution for the award of any degree or diploma. Information derived from the published and unpublished work of others has been duly acknowledged in the text.



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CERTIFICATE

Certified that the dissertation entitled “ A descriptive study on physical activity level and its correlates in young women (18-25 years) of an urban slum region in Mumbai city.” is a record of the research work undertaken by DR SANSKRUTI M SHARMA in partial fulfilment of the requirements for the award of the degree “Master of Public Health” under my guidance and supervision.



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GLOSSARY OF ABBREVIATIONS

NCD:	Non-communicable disease
WHO :	World Health Organization
GPAQ :	Global Physical Activity Questionnaire
MET :	Metabolic Equivalents
BMI :	Body Mass Index
SD :	Standard Deviation
PI :	Principal Investigator
APL :	Above Poverty Line
COR :	Crude Odds Ratio
AOR :	Adjusted Odds Ratio
C.I. :	Confidence Interval
LMICs :	Low Middle Income Countries
WHO STEPS :	WHO STEPwise approach to surveillance
CDC :	Centers For Disease Control and Prevention
CHD :	Coronary Heart Disease
T2DM :	Type 2 Diabetes Mellitus
COPD :	Chronic Obstructive Pulmonary Disease
HES :	High income socioeconomic
LES :	Low income socioeconomic
SAGE :	WHO Study on Global AGEing and adult health
ICMR :	Indian Council Of Medical Research
NGO :	Non Governmental Organization
Ref. :	Reference category

ABSTRACT

A descriptive study on physical activity level and its correlates in young women (18-25 years) in the urban slum region of Mumbai city.

Introduction: Non communicable diseases are a leading cause of morbidity and mortality worldwide including in LMICs, major risk factors associated with it are improper diet, physical inactivity, smoking and alcohol consumption. This study assesses the level of daily physical activity among young women in urban slums and their correlates.

Methods: This community based cross sectional study was conducted in select urban slum colonies of M West ward in Mumbai city.

Global Physical Activity Questionnaire (GPAQ) which is a part of WHO STEPs survey , was used for assessing the level of daily physical activity along with an interview schedule, prepared on the bases of the Barriers to Being Active quiz of CDC for understanding the barriers and facilitators to being physically active. Anthropometric measures like height, weight, waist circumference and blood pressure were measured. Data analysis was done using the R software version 4.2.1.

Results: Out of the study population of 352 young women (18-25 years), 247 (70%) were physically active, as per the WHO GPAQ analysis guide. However the physical activity was mainly due to daily chores at home/work. Only 28.3% of the population was involved in recreational or fitness based physical activity.

Conclusions: A good portion of the study population is physically active. However, there are many barriers that these young women living in compromised settings have to face to undertake physical activity. The unexpected societal norms and family expectations that burden women with unpaid household labour are prominent barriers.

CHAPTER 1

INTRODUCTION

1.1 Background

Physical activity is defined by The World Health Organization (WHO) as “Any bodily movement produced by skeletal muscles that requires energy expenditure – including activities undertaken while working, playing, carrying out household chores, travelling, and engaging in recreational pursuits.”

According to WHO report on physical activity, those who are known to engage in regular physical activity are protected from non communicable disease ill effects and with a reduced risk of around 20 to 30%. Regular physical activity helps in preventing cardiovascular disease, depression and dementia by 7-8 % and type two diabetes cases by 5 %. It does not only help with physical health but also with mental health such as reducing the symptoms of depression, anxiety and preventing cognitive decline in elderly. It also helps in improving the grasping power and educational attainment of children in their growing years. Regular physical activity has also proven to be beneficial to pregnant women and those who are in the postpartum stage, individuals with chronic conditions or disabilities. The following are the various areas where regular physical activity helps in

- i. Helps in reducing the risk of coronary heart disease, manages it and also helps in reducing hypertension, type two diabetes.
- ii. Decreases the risk of development of certain cancers such as breast and colon cancer.
- iii. Helps in strengthening the muscles and bones of young, growing children and adults.
- iv. Helps in preventing falls in older adults.
- v. Helps in reducing adiposity and maintaining weight.

Physical activity not only helps on an individual level but also on a community level and has its own environmental, economical benefits. This includes reduced vehicular congestion, reduced air and noise pollution if societies opt for healthy living alternatives like walking and cycling. Reports have suggested that physical inactivity can cost about \$33.8 billion expenditure to health care systems internationally with the major share held at 75% by the low and middle income countries (LMICs). (Bhawra et al., 2023)

Considering the importance of physical activity, WHO proposed the Global Action Plan on Physical Activity (GAPPA) 2018-2030 with a target to reduce the physical inactivity levels by 15%. It recommends a minimum of 60 minutes for children and adolescents in the age group of 5 to 17 years while adults in the age group of 18-64 years should be doing at least 150 to 300 minutes of moderate to vigorous physical activity daily. (WHO Global Action Plan on Physical Activity 2018-2030)

In terms of sedentary behaviour, there are no such global estimates present. However, increased urbanisation and modernization have led to more dependency on machinery, increased use of personal vehicles for transportation, presence of more sedentary occupations thus leading to a pattern of reduced physical activity and increased sedentary behaviour. The 2020 WHO guidelines on physical activity and sedentary behaviour are reported on the basis of the evidence and so are the global recommendations on physical activity and sedentary behaviour.

1.2 Review of literature

This chapter gives us an insight into physical activity, its various forms, the recommended physical activity levels for individuals, how physical activity can be measured, the problem of physical inactivity and sedentary lifestyle especially in urban regions, in slum areas and in women.

Undertaking regular physical activity has several benefits both physically and mentally.

Observational data has proved that those who do 45 to 60 minutes of exercise daily have less weight gain than others. 60 to 90 minutes of daily moderate physical activity should be performed to prevent weight gain after losing weight. Aim should be to carry out at least 60 minutes of continuous moderate intensity aerobic exercise daily. Physical activity has been proven to be beneficial in various health aspects. Moderate physical activity helps in maintaining weight loss, lowers the risk of cardiac diseases, helps in increasing high density lipoprotein cholesterol, lowers down blood pressure and is also highly advisable in diabetics. CHD and T2DM could be prevented with regular physical activity especially in those with a sedentary lifestyle. The American Heart Association, American college of Sports medicine and the US Department of Health and Human services were the first few organisations which published the guidelines for physical activity recommended. However for carrying out these it is necessary to have the appropriate infrastructure and policies available in institutions and societies.(Misra et al., 2012).

1.2.1 Definition of physical activity

Physical activity is defined by The World Health Organization (WHO) as “Any bodily movement produced by skeletal muscles that requires energy expenditure – including activities undertaken while working, playing, carrying out household chores, travelling, and engaging in recreational pursuits.”

The energy expenditure which occurs due to physical activity can be measured in calories.

Exercise is defined as a subset of physical activity which is planned, structured, and repetitive. Its final objective is to lead to improvement or maintenance of physical fitness.

While physical fitness is defined as a set of attributes which are either health or skill related.

Physical Activity is broadly divided into four domains namely:

A. Physical activity carried out at home including household chores, care taking and domestic activity involved.

B. Physical activity at occupation

C. Physical activity during transportation and travel

D. Physical activity during leisure time is also known as recreational purpose physical activity.

In general, human movements are rather complex and it is difficult to categorise them.

Human movement depending on the behaviour includes physical activity and sedentary movements. The three main deciding factors in these are duration, frequency and intensity.

Sedentary activity includes

A. During sitting

i. Sitting while riding

ii. Sitting while driving

B. During non occupation based activity

C. During occupation based activity

D. While using media like mobile phones, computers, laptops (Petee Gabriel et al., 2012)

Physical activity on the basis of duration is measured in terms of the time taken in which could be in minutes or hours. On the basis of frequency it is determined by the number of times a particular activity is undertaken in a defined time frame, usually a day during the

previous or the usual week. Intensity of physical activity is classified into vigorous intensity and moderate intensity based physical activity. According to the WHO, intensity and energy expenditure of physical activity is usually expressed in what is called as Metabolic Equivalents that is METs whereone MET is defined as “the caloric energy used/spent when sitting still or resting and is equivalent to the caloric consumption of one kilocalorie per kilogram per hour or equal to the oxygen cost of sitting quietly and is equivalent to 3.5 millilitre per kilogram per minute.”

However the more accurate representation of METs expenditure for different activities has been provided in more detail by the 2011 compendium of various physical activities.

.(Ainsworth et al., 2011)

1.2.2 Classification of physical activity

As per WHO, physical activity is classified on the basis of intensity as

- i. Vigorous intensity physical activity - In terms of caloric consumption as compared to sitting quietly, the caloric consumption for an individual doing vigorous intensity physical activity will be eight times more. As per CDC, talk test is the test which can be used to understand layman terms. According to this vigorous-physical activity is when the individual is not able to say a few words without pausing for a breath while doing it.(Measuring Physical Activity Intensity, Physical Activity, CDC, 2022)
- ii. Moderate intensity physical activity - In terms of caloric consumption as compared to sitting quietly, the caloric consumption for an individual doing moderate-intensity physical activity will be four times more. During moderate physical activity according to the CDC, the individual will be able to talk with some effort but not sing.(Measuring Physical Activity Intensity, Physical Activity, CDC, 2022).

iii. Travel based physical activity - In terms of caloric consumption as compared to sitting quietly, the caloric consumption for an individual involved in travel-based physical activity will be four times more.

iv. Sedentary activity - It is defined as waking behaviour while sitting, reclining or lying posture with low energy expenditure. In terms of caloric consumption the caloric consumption for an individual involved in sedentary activity will be 1.5 METs.

v. Physical inactivity - It is defined as a state when the individual is not meeting the daily recommended physical activity level and thus is not active. (WHO GPAQ analysis guide).

1.2.3 Daily recommendations for physical activity for adults (18 - 64 years old)

WHO has proposed recommendations for physical activity for different age groups including children and adolescents (5 - 17 years old), adults (18 - 64 years old), older adults aged 65 and above, pregnant and postpartum women, those individuals living with chronic diseases, children and adults living with disabilities. WHO recommends adults do at least 150 to 300 minutes of moderate-intensity aerobic physical activity or at least 75 to 150 minutes of vigorous aerobic physical activity. It also recommends doing muscle-strengthening activities for two or more days a week and limiting sedentary activity.

Youth is defined as an age between 15 - 29 years as per the National youth policy forming one of the most important times of an individual's life where they transition from a student to work professional to an adult with changing events. 27.5% of the total population of India includes youth (18-35 years old) according to India's 2011 census, this amounts to 333 million. The health status they hold during this time is very crucial as it gets reflected later on during their adulthood life.(Ansari, 2018).

1.2.4 Methods of measurement of physical activity

i. Self reported questionnaires

Physical activity can be measured by using these. These include different types depending on what needs to be captured for physical activity that is the duration, frequency or intensity. It also depends on which form, in terms of calories as METs or in terms of classifying on the basis of time duration as per the criteria suggested. The advantages of these are that they're cost effective and easy to use. However as they depend on participant's recall memory, they may be biased and inaccurate in measuring moderate and light physical activity levels. Examples include Global Physical Activity Questionnaire, International Physical Activity Questionnaire, Previous day physical activity recall, seven day physical activity recall and others.

ii. Self reported activity diaries and logs

iii. Devices like accelerometers, pedometers, fitness watches, and heart rate monitors.(Sylvia et al., 2014)

1.2.5 Factors affecting physical activity.

1.2.5.1 Socioeconomic and environmental factors

The urban vs rural divide and the effect of migration.

The International Organization for Migration which is a part of the United Nations system defines migrants as “an umbrella term, not defined under international law, reflecting the common lay understanding of a person who moves away from his or her place of usual residence, whether within a country or across an international border, temporarily or permanently, and for a variety of reasons. The term includes a number of well-defined legal categories of people, such as migrant workers; persons whose particular types of movements are legally-defined, such as smuggled migrants; as well as those whose status or means of movement are not specifically defined under international law, such as international students.”(*International Organization for Migration.*)

One of the studies compared means of achieving physical activity in high income socioeconomic (HES) and low socioeconomic groups (SES) living in one of the major metro cities of India. Here it was observed how those from low SES neighbourhood were able to meet the recommended PA levels due to travelling as they would majorly either travel on foot or by a motorcycle. Those from the high SES would achieve the recommended physical activity through leisure time activity as travel wise they would depend more on personal vehicles. It was also pointed out how cities lacked open public spaces for physical activity. Many barriers such as safety concerns, lack of proper street lights and roads, absence of playgrounds and parks posed as barriers for achieving physical activity in many areas. Having a dense residential area would mean more use of public transport and walking over private transport thus increasing the chances of achieving physical activity levels. (Adlakha et al., 2016)

The WHO Study on global AGEing and adult health (SAGE) conducted in multiple countries like India, Ghana, Mexico, Russia, South Africa and China showed that people in rural areas were more involved in active travel based PA however the scenario has been changing there too due to urbanisation. It compared the lifestyle habits in rural and urban areas on how physical activity levels are comparatively low in rural areas especially in females than males. It was also found that central obesity was quite higher in females than males especially in urban areas. According to this study, the physical activity level was 29.2% in urban areas and 32.6% in rural areas thus indicating not a very significant difference. (Oyebode et al., 2015)

Comparison between rural and migrated urban siblings of theirs was made in a study which stated how urban siblings had greater consumption of sugary food, fats and oily food as well as fruits, vegetables and legumes. Reflectively the urban siblings had greater weight and higher BMI than their rural counterparts. In another study conducted as a state wide NCD risk

factor survey in Punjab showed the prevalence of physical activity level to be 29.2 % in urban and 32.6% in rural areas. Due to modernisation and ease of availability of gadgets, urban siblings spent more time in sedentary jobs and had a higher screen time including television, mobile phones and computers. Sedentary lifestyle eventually led to obesity and subsequent non communicable disorders. (Tripathy et al., 2016).

The ICMR India Diabetes study (ICMR- INDIAB study) conducted in 4 states of Maharashtra, Jharkhand, Tamil Nadu and Chandigarh showed that those in urban areas were more physically inactive and reported more chronic disease (39.4%) as compared to the rural areas. This was explained due to more sedentary work demand and availability of modern appliances, transport in urbanised areas. (Anjana RM et al., 2014).

Amongst the urban and the rural divide, similar to other studies, the ICMR National non communicable disease survey conducted nationwide found that those in rural areas were more involved in moderate and vigorous intensity activities as compared to the urban counterparts who were more involved in sedentary and leisure activities. Rural area residents spent an average of 65.1 minutes doing physical activity daily (95% CI, 59.2–71.0) while the urban residents did half as compared to their rural counterparts. (Ramamoorthy et al., 2022).

1.2.5.2. Diet and physical activity

Due to the rapidly growing urbanisation all over including India, there has been a shift in dietary habits observed. More consumption of processed and refined food, readily available at an affordable market price has led to unhealthy eating habits. The WHO Study on global AGEing and adult health (SAGE) proved that there has been a rapid urbanisation of rural areas too due to which the boundary between urban and rural dietary patterns, obesity and physical activity has been disappearing soon. Diet wise consumption of fruits and vegetables

was seen to be inadequate in both rural and urban areas, irrespective of gender. (Oyebode et al., 2015).

Comparison between rural and migrated urban siblings of theirs was made in a NCD risk factor based study in Punjab which stated how urban siblings had greater consumption of sugary food, fats and oily food as well as fruits, vegetables and legumes. Reflectively the urban siblings had greater weight and higher BMI than their rural counterparts. (Tripathy et al., 2016) .

Studies have reported that India has an equal proportion of women aged 25 to 50 years old who are obese/overweight (BMI \geq 25 kg/m²) and those who are underweight (BMI < 18.5 kg/m²). This is due to the growing nutritional transition where food rich in nutrients has been replaced by high caloric food. This is especially seen in those belonging to lower socioeconomic class. The current health programs in India are focussed towards communicable diseases and reproductive healthcare which is important however there is a dire need for involvement of NCD related programs too for community health.

A study conducted in urban slums of Pune, Maharashtra found that on taking a look at the dietary pattern, it was seen that the majority had high consumption of unhealthy food while fruits and vegetables consumption was low in the population. This is because fried, unhealthy food is readily available in slums. It is considered to be more affordable and readily available in markets as compared to fruits and vegetables. Vegetable consumption was low per individual as these would be shared in the household. (Nagarkar and Kulkarni, 2018) .

1.2.5.3 Physical activity and mental health.

Research has suggested how those who undertake some level of physical activity or another have better sleep patterns and lesser complaints of sleep. Those with inadequate physical activity may feel fatigued easily. In Fact there is 39 % lessened odds of experiencing fatigue for those who are physically active. Regular physical activity not only improves sleep

schedule but also helps in lessening anxiety. However it has been researched that people who have anxiety usually have a lesser level of physical activity. People who perform regular PA have a 16.6% proportion of developing anxiety while those who do not are around 22.9%. This can be explained by several factors like difficulty in moving around, presence of pain and disability in those with anxiety. (Vancampfort et al., 2018)

1.2.5.4 Physical activity and chronic diseases.

A study on Association of behavioural risk factors with self-reported and symptom or measured chronic diseases among adult population (18–69 years) in India revealed that physical inactivity increased with an increase in age and was higher in those above high schooling. It was also higher in obese and overweight individuals and those that belonged to the higher socioeconomic class of the society. Around 28.6% of those who were physically inactive had self-reported the presence of a chronic disease. On carrying out logistic regression it was seen that moderate physical activity was less associated with chronic diseases like self reported arthritis, depression and stroke. However vigorous physical activity was more associated with symptoms of angina (OR: 1.55; 95% CI: 1.08–2.22), COPD (OR: 1.38; 95% CI: 1.05–1.81) and asthma (OR: 1.88; 95% CI: 1.30–2.73) than physical inactivity. Studies have shown that regular physical activity leads to decreased blood pressure. It also helps in controlling blood glucose levels due to insulin sensitivity increasing. About 35 chronic conditions like CHD, hypertension, depression, stroke, metabolic syndrome, non alcoholic fatty liver, pre diabetes and others. However, compared to self-reported diseases, vigorous activity was significantly more likely to be associated with the symptom or measured chronic diseases of COPD, asthma, and angina. One study showed that recreational alcohol consumption can lead to weight gain if there is inadequate physical activity maintained. Abdominal obesity is caused due to inadequate physical activity and having

consumption of unhealthy food rich in calories. However a major limitation of the study was that it counted physical activity in terms of duration and intensity in the past seven days but did not include if there were any changes before or after getting a disease. (Patel et al., 2019)

1.2.5.5 Physical activity and anthropometric measures.

In a study conducted in Delhi, India it was found that on comparing with the BMI levels, a higher proportion of those who were physically inactive was found in overweight individuals irrespective of their sex. Those who were carrying out moderate physical activity were less in proportion in the overweight category. In females it was seen that in the overweight category the odds of being in the lower physical activity group was 1.6 while that for males was only 1.2. (Devi et al., 2020)

In the ICMR based National non communicable disease survey, almost one third of adults who were overweight (BMI > 30 kg/m²) were physically inactive (31.7%; 95% CI, 29.3– 34.3) (Ramamoorthy et al., 2022)

1.2.6 Facilitators for physical activity

The concept of active travel has been considered recently for achieving required levels of physical activity in daily routine. This includes walking and cycling to places. Reports have suggested, those that make use of public transport have more chances of achieving the required physical activity level as compared to those who use private vehicles, around 10,000 steps more. (Villanueva et al. 2008). It also depends on the type of public transport used, where those who use trains do more physical activity than those who use a bus. (Miranda- Moreno et al., 2011)

Due to growing urbanisation and lack of space, certain researchers have also put forth the concept of Urban spaces. These have already been exercised in higher income countries.

Urban green spaces include parks, woodlands, plantation of street trees and shrubs in public spaces, and natural reserves. Efforts are being made to have these in LMICs too as they've been facing the double edged sword of both communicable as well as non communicable diseases.(Shuvo et al., 2020)

In one of the cross sectional studies in young adults the author has mentioned the need of including physical activity as part of the school curriculum with at least 50% of recommended moderate physical activity levels reached. Various activities should be incorporated during time spent in school so that physical activity can be conducted not just during specific classes but throughout the day. Curbing obesity in school going age itself has a positive impact in adulthood. Certain suggestions by the author includes creating awareness amongst the masses for physical activity, availability of facilities like gyms, bicycling tracks, walking pathways, playgrounds for the community to use, nutritional status and obesity levels of students in schools should be regularly monitored, community participatory activities like conducting health walks and incorporating means of physical activity in work places for working individuals.(Misra et al., 2012).

1.2.7 Physical activity and gender

The NCD risk factor based study in Punjab showed how light intensity physical activity was seen more in females while males were involved in vigorous physical activity. In the rural settings about 19.1% of females were not involved in vigorous physical activity than 6.3% of urban females. While considering the different domains, it was seen females irrespective of place were less involved in recreational physical activity than males.(Tripathy et al., 2016).

When it comes to physical activity due to travel, a study suggested how travel itself is a gendered concept as women tend to travel less as compared to men. Women, other than fulfilling the household responsibilities, also find it unsafe to make use of public transport

with reports suggesting them feeling vulnerable in such surroundings, incidences of sexual harassment and abuse by men make them less often to use public transport and at certain hours of the day only if required. (Phadke 2013). Gender inequalities are different in countries across the globe. In general, the travel concepts of women differ from men in terms of places travelled to, the distance, the amount of money spent. Women prefer walking or using slower modes of transport than men for example the report suggested how in Delhi 66% of females prefer walking than 40% of males. In terms of paid work participation rate, Indians have lowest levels of work participation of women and the work done by them is majorly unpaid household work. (Deshpande and Kabeer 2019). The 2011 Census data of India showed how only 17% women would travel from work to home in urban areas. (Goel et al., 2023).

1.2.8 Physical activity in women.

People often tend to presume that occupation related physical activity is rather rare and only possible for those such as manual labourers. One of the qualitative studies in Thiruvananthapuram, India, mentioned how women felt that household chores including cooking, washing clothes with hands, sweeping floors, taking care of children was enough work to be included as physical activity. The most they would be going for a walk in morning and evening as a form of physical activity. They considered that going to and fro to markets for grocery shopping, taking care of cattle, tailoring of clothes were a part of daily physical activity for them. The women aged between 25 to 60 years were asked to give examples of light, moderate and vigorous physical activity according to them. Most of them considered tasks like washing clothes, going to and fro to markets, mopping the floor as 'Vigorous' intensity physical activity while cooking, and taking care of a child was considered as 'Moderate' intensity activity. As per the Daily compendium of Physical activity, the women

considered light activity as moderate and moderate as vigorous thus making them believe that household chores were enough physical activity for them. Most of them were unaware about the required physical activity levels. Due to societal norms, women tend to stay more at home doing household chores while men would be outside working due to which there would be less movement of women outside. The study suggested how community level and policy level factors influence physical activity of individuals. This includes societal norms, the socioeconomic background of each community, availability of public spaces, less vehicular congestion on roads, having different zones set for physical activity would help in improving the physical activity levels of the people. Interventions are required to organise efforts and create awareness amongst women regarding physical activity requirements other than the one they perform in household chores. (Mathews et al., 2016).

In a research conducted in Jaipur, Rajasthan in women aged 35 to 70 years old, it was seen that women who were physically active had more of their energy expenditure in household chores while those who were inactive spent more time in sedentary activities like watching television, talking to neighbours, talking on telephone for long hours. Physical activity was measured here as cutoffs for Physical Activity Levels (PALs) which was measured in terms of frequency, intensity and time duration of different activities carried out throughout the day. The prevalence of physical inactivity in the population was 50% and 36.9% of them were low active. It was observed that sleep and household related activities were more while activities related to work, transport, exercise were comparatively less. It was seen that physical activity levels decreased with increasing age (80.9% in 60 - 69 years age group). It could be concluded that the older women had lesser participation in household work as they had their daughter in laws to take over the responsibilities. In the study, energy expenditure was measured and found out that the major energy expenditure was by sleeping (21%) and less than 1% was spent on exercising. Exercising included light exercises like yoga, walking.

(Agrawal et al., 2015). A study conducted using the secondary data from the Study on Global Ageing and Adult Health (SAGE) from six states of India mentioned that females were more physically inactive which is 25.8% and also consumed less amount of fruits and vegetables in their diet as compared to men. (Patel et al., 2019). The National non communicable disease monitoring survey (NMMS), a pan India survey conducted by Indian Council of Medical Research (ICMR) in 2017-18 proved that the overall physical activity levels were low for women and for those living in urban areas. Around 48.8% of the homemakers were physically inactive. Men were more physically active than women at work while women were more involved in household related physical activity. (Ramamoorthy et al., 2022). A study conducted in Delhi amongst 418, 20 - 55 year olds described physical activity level in MET- min/week. It was almost double for males (400 MET- minutes/ week) as compared to females (265.3 MET- minutes/week). Only 30.3 % of females had an adequate level of moderate physical activity as compared to males which was 32.2%. In this study, 69.7% women were physically inactive which is in accordance with other studies where the percentage varies from 38 to 70%. This indicates the increasingly sedentary lifestyle of women in India. Males had a prevalence of 32.2% adequate physical activity while it was 30.3 % for females.(Devi et al., 2020).

1.2.9 Urban slums

The urban slum population is the proportion of urban population living in slum households. WHO defines a slum household as “a group of individuals living under the same roof lacking one or more of the following condition including access to improved water, access to improved sanitation, sufficient-living area, durability of housing and security of tenure.”

As per the Mumbai census report of 2011, under the Slum area (Improvement and Clearance) Act of 1956 enacted by the central government, slums are defined as

“(a) Areas where buildings are in any respect unfit for human habitation or (b) are by reasons of dilapidation, overcrowding, faulty arrangement and design of such buildings, narrowness or faulty arrangement of streets, lack of ventilation, light or sanitation facilities, or any combination of these factors, are detrimental to safety, health or morals.”

NCDs have been on a severe high in slums to an extent that it has been pushing people furthermore into poverty. According to a report, the slum population in developing countries went from 767 million to 828 million from 2000 to 2010. A major disadvantage in the slums is lack of access to better healthcare both from government or private sectors. Though there has been growing urbanisation especially in terms of diet consumption, so has been in decreased physical activity levels. The report on Commission on Social Determinants of Health suggests the need for upgrading the lifestyle of people in slums with respect to access to better roads, electricity, provision of clean water and affordable health services. A study conducted in Chennai, compared physical activity and behavioural attributes between the people from lower SES and higher SES. It proved that those from lower SES would reach the daily recommended level of physical activity through travel including use of public transport and walking while those from higher SES achieved it through physical activity for recreational purposes like gym, yoga classes and others. Those from lower SES depended on public transport for travel rather than having their own personal vehicle. (Lumagbas et al., 2018), (Adlakha et al., 2016).

1.2.10 Physical activity in women residing in urban slums.

A study on obesity and its effects on middle aged women of slums in Pune city of Maharashtra also calculated the physical activity levels of them. It showed around 64.7% of them had low levels of physical activity. About 39.4% of the population was engaged in walking as a form of physical activity. As the study was done in the middle aged population, their ability to perform physical activity was also taken into consideration by mentioning the

activities they were not able to perform adequately. These include climbing up stairs, squatting, bending down, walking, lifting weights which are two to three kgs. The anthropometric measures suggested that about 48% were overweight and 30% were in the obese category. Majority of these participants who fell in these categories had difficulty in carrying out activities like walking, climbing stairs. Women were seen to be at a major disadvantage due to sociocultural norms. In terms of physical activity too, women participated less in these activities with only 39.4% women involved. Even the activities were majorly limited to those inside the house or household activities as slums have severe space issues. There would be safety concerns or going out for exercising is not culturally and socially acceptable. Interventions like brisk walking which reduce calories have been suggested by the authors, as also the need of community interventions. (Nagarkar and Kulkarni, 2018)

1.3 Rationale

According to WHO reports, 28% of adults over 18 years were physically inactive with more proportion seen in women (32%). Outdoor activities have become difficult in metropolitan cities like Mumbai due to rapid urbanisation, and lack of infrastructure for undertaking, out physical activities especially in urban slums. Harmful gender norms such as restriction on women's movement, safety concerns, public spaces being predominantly occupied by men, and fear of sexual harassment pose as structural barriers to the growth and well-being of women. Girls and women have to balance their studies, work as well as caring for the family members and doing the unpaid household chores. Therefore they barely get time to themselves. Women would prefer taking evening walks, going to markets if asked to do physical activity and prefer a company to do so. Studies have shown the prevalence of physical activity in women to be ranging anywhere from 40 to 60% depending on the age group, socioeconomic status, education and employment they engage in. Limited studies have

quantitatively explored the physical activity levels in young women especially in urban slum regions. Studies for finding out physical activity levels in young women in India are majorly done in educational institutions and socioeconomically better-off communities.

1.4 Research question

What is the level of physical activity in young women of 18-25 years age residing in an urban slum region of a ward in Mumbai city?

What are the barriers and facilitators for undertaking physical activity?

1.5 Objectives of the study

- i. To assess the level of physical activity in young women (18-25 years) in an urban slum region of Mumbai city using GPAQ
- ii. To study the barriers and facilitators of physical activity.

CHAPTER 2

METHODS

2.1 Study design

A descriptive cross sectional study based on a structured questionnaire and physical examinations.

2.2 Study setting

The study was conducted in Mumbai city of Maharashtra. Mumbai is divided into 24 different administrative (A to T) wards. M ward includes M West and M East wards. The study was conducted in three major slum colonies in M West ward of the suburban region of Mumbai city which is no different from the other wards. The M West ward itself is divided into seven subwards numbered from 149 to 155.



Fig.2.1 Location of Mumbai

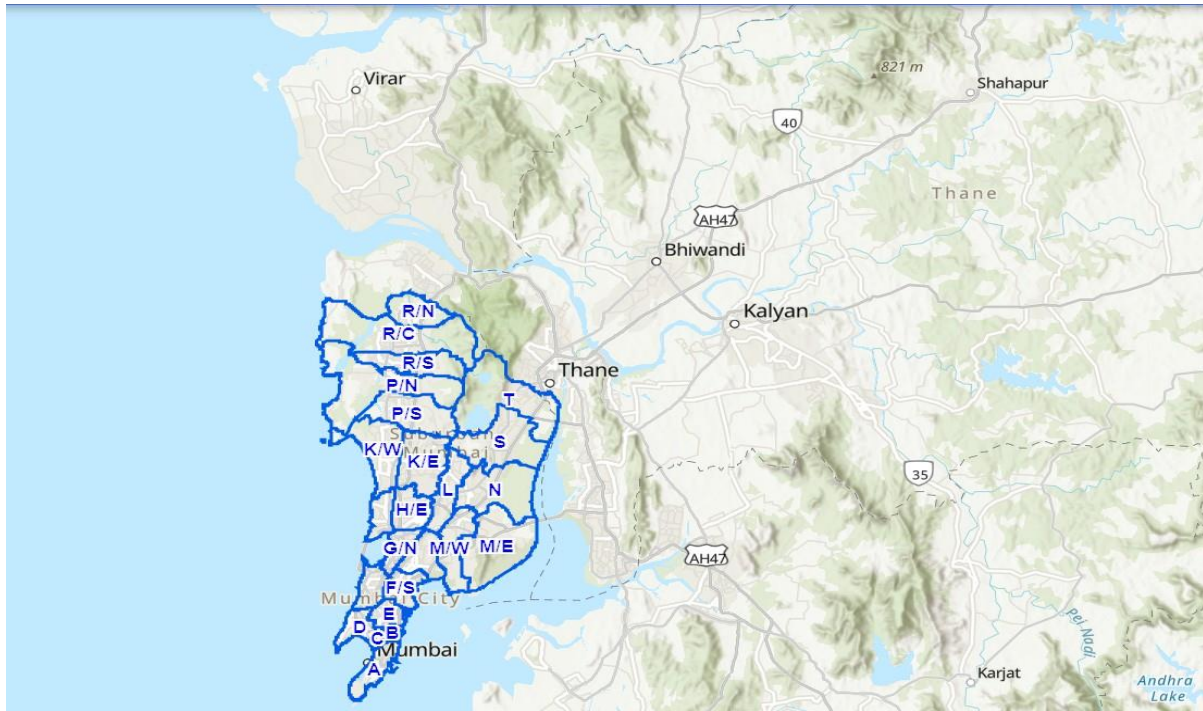


Fig 2.2 Map of administrative wards of Mumbai city.

2.3 Study population

Young adult women (18 - 25 years) residing in the ward number 151 of the M west ward of Mumbai city.

2.3.1 Inclusion criteria

Young (18-25 years) who could give informed consent. Both married and unmarried women were included as well as those with children.

2.3.2 Exclusion criteria

Girls < 18 years of age. Those women with physical, mental disability. Pregnant women.

2.4 Sampling criteria

Cluster random sampling method is used for the participant recruitment. In this method, the required sample size is achieved by selecting clusters in the area of the study, an equal number of participants are chosen from each cluster. Anganwadi centres were considered to be the central location point of each cluster. The ward has three colonies and in total 24

Anganwadis were selected at random from the list of 47 Anganwadis with the help of the R command *set.seed(123); sample (c(1:41), size=21, replace =F*

2.5 Sample size estimation

The sample size was calculated using OpenEpi software 3.01. The population of ward number 151 is around 1.7 lakhs. As per the literature, the prevalence of physical activity in women 18-25 years old in a study based in Bengaluru was 46.2%. Thus, considering a confidence interval of 95%, 6 % precision, non response rate of 10% and design effect of 1.2, the sample size was estimated as 352.

2.6 Sample selection procedure

Cluster sampling was used to select the participants. Anganwadi centre was taken as a landmark location and each acted as a cluster. The Anganwadis were evenly distributed amongst the ward 151. Each Anganwadi area was taken as a cluster for the study purpose. The selected Anganwadi was taken as the starting point of the cluster. The first house selected was the one on the right side of the selected Anganwadi centre and subsequent houses on the right side were visited by the PI. The principal investigator enrolled considered the participants as per the inclusion and exclusion criteria of the study. From each such cluster, 15 participants were selected. In case a house has more than one eligible participant one was selected through lottery method

2.7 Data collection technique

The PI undertook a household survey administering a structured interview schedule. The selected participants were briefed about the study and after getting a signed consent from the participants, they were interviewed in privacy. It was done at their home and at a time that was convenient to the participant and the researcher. The response was captured using a structured interview schedule in the Open Data Kit (ODK) utility from our institution's server by the PI. It was found in the pilot study that, although questions in the research tool were

simple, some could be confusing for the participants therefore the PI administered the interview schedule.

The data collection was undertaken by the PI herself over a time period of around two months (19th April - 8th June 2023) with the assistance of a volunteer staff of the NGO in the area.

Anthropometric measurements and Blood pressure measurement was undertaken by the PI at the time of the house visit for the interview itself.

2.7.1 Data collection instruments

Global Physical Activity Questionnaire (GPAQ) was used to collect data regarding the level of physical activity of the participants. GPAQ was developed back in 2002 for physical activity surveillance. It has been used worldwide throughout countries as it is also included in the WHO STEPwise approach to NCD risk factor surveillance (STEPS). The GPAQ includes measuring physical activity level in majorly three domains of work/occupation related, travel related and leisure time/recreational activities related physical activity. Along with this we have also included certain questions from the WHO based Global School Health Survey (GSHS) questionnaire which has a domain on physical activity. Both of the tools have been validated for Indian scenarios and have their Hindi translation available. A self structured interview for assessing the barriers and facilitators was used with reference from Barriers to physical activity quiz by CDC.

Instruments used for physical measurements

Height measurement was undertaken by using a standardised SECA C€ 0123 stadiometer.

Weight measurement was undertaken by using a standardised SECA 813, flat electronic weighing machine.

Waist circumference measurement was undertaken by using SECA measuring tape.

Blood pressure measurement was undertaken by using Omron HEM - 7120 digital battery operated automatic blood pressure monitors.

2.7.2 Procedures:

2.7.2.1 Blood pressure measurement

Participants were asked to sit upright and at rest with their legs uncrossed. Placing the left arm of the participant on a table with their palm facing upwards, ask them to roll up their sleeve and position the cuff above the elbow so that the lower band is positioned 1-2 cm above the elbow joint. The cuff was wrapped securely onto the arm and securely fastened with Velcro. The elbow was kept supported such that the cuff was at the height of the participant's heart. After waiting for 2-3 minutes, the procedure was repeated to take another reading. If there was a variation of more than 10 mm of Hg for systolic blood pressure and more than 6 mm of Hg for diastolic blood pressure then a third reading was taken. Mean of the second and third reading was taken as the final for analysis.

2.7.2.2 Height measurement

Standardised SECA C€ 0123 stadiometer was used for measuring height. The participant was asked to remove their footwear, headgear or any fancy hairdo. They were asked to stand with feet together, heels against the board, knees straight. The participant was asked to look straight so that their eyes are at ear level. A flat board was used and kept on the participant's head to mark their height against the wall. The participant was then asked to move away and the entire length was measured from floor to the mark. The height was recorded as part of the interview schedule itself.

2.7.2.3 Weight measurement

Standardised SECA 813, a flat electronic weighing machine was used for measuring weight in kilograms. The weight scale was kept on a firm, flat surface. The participants were asked to remove their footwear and socks. They should also take off any heavy accessories like

belts and have empty pockets. The participant was asked to step in the weighing scale. They were asked to stand still, face forward, arms placed on the side. The weight is recorded was part of the interview schedule itself.

2.7.2.4 Waist circumference measurement

Waist circumference was measured directly on light clothing. It was taken at the end of a normal expiration, the participant was asked to keep their arms relaxed on either side of the body. It was taken at the midpoint between the lower margin of the last palpable rib and the top of the iliac crest.

2.8 Data storage and analysis

Data entry was done by using the SCTIMST ODK (Open Data Kit) system, a digital data collection provided by SCTIMST. Participant's consent was taken on paper and preserved with the PI until data acceptance of thesis in keeping with regulatory requirements. After data collection, data was cleaned and recoded. Data was analysed by the principal investigator itself by using the R software version 4.2.1 under the supervision of a guide. Descriptive statistics include participant's socio demographic details, BMI, blood pressure. Variables for barriers and facilitators were mostly categorised as binary 'Yes' and 'No'. Continuous variables were presented as mean and standard deviation while categorical variables as proportion in percentages. Physical activity as per intensity and in various domains was measured in terms of number of days in a week and minutes spent while doing it. Sedentary activity was also measured in domains like while travelling, while doing some recreational activity, sedentary time spent in school/college/work and during screen time, in minutes spent in a usual day. Participants were termed as physically active if they engage in a combination of minimum 75 minutes of vigorous aerobic physical activity and 150 minutes of moderate aerobic physical activity in a week. Thus physical activity was measured as a categorical binary variable. Metabolic Equivalents (METs) were calculated as 1 MET is equivalent to

the amount of energy spent while sitting. Thus for Moderate intensity activity it is 4 METs and for Vigorous activity it is 8 METs. For sedentary activity it is 1.5 METs. These values are multiplied on the bases of their frequency and duration. All of the values were added to create a composite scale for GPAQ and compared with WHO's recommended daily physical activity levels. The scores for the tool used were calculated by making use of the WHO GPAQ analysis guide.

2.9 Variables under study

2.9.1 Dependent variables

Physical activity - Physically active if > 150 minutes of moderate intensity physical activity and > 75 minutes of vigorous intensity physical activity in a week by an individual.

Blood pressure (Hypertension) - Systolic Blood Pressure (SBP) > 130mm of Hg/ Diastolic Blood Pressure (DBP) > 85 mm of Hg.

Body Mass Index (BMI)

Abdominal obesity

2.9.2 Independent variables

Demographic details such as age, marital status, number of family members, father's education and occupation, mother's education and occupation, if married then husband's education and occupation, number of children in the family, living with in-laws if married or separately.

Socioeconomic variables such as educational status, occupational status, work status, type of ration card.

Variables for sedentary activity in different domains

Barriers and facilitators for physical activity including

- Physical environment
- Social environment
- Personal attributes like morbidity profile

Diet related variables including type of diet consumed, number of fruits and raw vegetables consumed weekly, number of times outside food not cooked at home consumed in a week.

2.10 Study definitions

Age - Calculated from the date, month and year of birth as provided by the participant

Level of education- categorised into upto secondary schooling, Junior college(11-12th), Diploma/Graduation, Post graduation

Work status - Yes/No

If working then - Full time or part time

Occupation was classified for the participant as well as for the family members as unskilled, semi skilled, skilled, professional, none. This classification was made as from the reference from the Ministry of Labour, Govt. of India.

Marital status was classified as unmarried, married, separated/divorced.

In terms of family details, members of the family, number of children below five years in the family, education and occupation of father, mother, husband if married was undertaken.

Living status if married, that is with in-laws or separately as this factor may influence

physical activity.

If the participant is currently going to school/college, than the various activities they're involved in as per the Global School Health Survey (GSHS) by WHO. These were classified as per intensity, number of days in a week and duration of activity.

Sedentary activity

Activities with MET levels less than or equal to 1.5 METs during travel, in school/college/work, during screen time (watching television , using mobile phone, working on computer/laptop at home/college/work) and while engaging in a recreational activity measured in terms of average minutes in a usual day.

Table 2.1 mentions the variables which have been considered as barriers and facilitators for physical activity in the study participants.

TABLE 2.1 BARRIERS AND FACILITATORS VARIABLES

Physical environment	Social environment	Personal attributes (Morbidity profile)
Facilities available in surrounding Yes/No	Family provides encouragement for physical activity	Any Chronic disease in past 6 months Yes/No

Physical environment	Social environment	Personal attributes (Morbidity profile)
<p>If Yes then which</p> <p>Parks</p> <p>Gyms</p> <p>Open grounds</p> <p>Dance/Karate/swimming classes</p> <p>Others</p>	<p>Any member of family already doing regular physical activity</p>	<p>If Yes then</p> <p>Respiratory</p> <p>GIT</p> <p>Skin/Eye/Ear</p> <p>Cardiovascular</p> <p>Diabetes</p>
<p>Access to facilities</p> <p>Yes/No</p>	<p>Factor preventing from doing physical activity</p> <p>Study pressure</p> <p>Work pressure/timings</p> <p>Tutions/college timings</p> <p>Dress code</p> <p>Child care</p> <p>Restriction from family</p> <p>Busy schedule</p> <p>Household chores</p>	<p>Any reproductive health condition in last 6 months</p> <p>Yes/No</p>

Physical environment	Social environment	Personal attributes (Morbidity profile)
Neighbourhood safety Yes/No	Any form of encouragement from school/college	If Yes then Irregular menstruation i. Scanty (<3 days) ii. Prolonged (> 5 days) Frequent menses(<21 days) Late menses (>35 days) Lower abdominal pain Painful periods Weakness/Fatigue Foul odour
If neighbourhood safety No then why? Alcoholics/Drug addicts Traffic/Vehicle problem Stray animals Less street lights Open drainage/ garbage	Any specific games played by you once in a week Running Kho Kho Kabaddi Badminton Cricket Football Carrom Chess	

Physical environment	Social environment	Personal attributes (Morbidity profile)
Any physical activity at home like exercise, yoga, zumba, dance Yes/No	Motivated to do physical activity Yes/No	
	Any bedridden person at home Yes/No	
	Anyone else to take care of child at home Yes/No	

Anthropometric measures

Height in centimetres

Weight in kilograms

Waist circumference in centimetres

Body Mass Index calculated by using formula $BMI = \text{weight (in kgs)}/\text{height (in metres square)}$ As per WHO criteria,

Underweight if BMI < 18.5 kg/m²

Normal if BMI ≥ 18.5 - 24.5 kg/m²

Overweight if BMI ≥ 25 kg/m² - 29.5 kg/m²

Obese if BMI ≥ 30 kg/m².

Abdominal obesity - Obese if Waist circumference ≥ 80 cm for women as per internationally accepted criteria.

Diet related variables

- i. Type of diet consumed - Vegetarian/Mixed diet
- ii. Number of times fruits consumed weekly
- iii. Number of times raw vegetables consumed weekly
- iv. Number of times outside food not cooked at home consumed in a week.

Blood pressure (Hypertension)

- i. Systolic Blood Pressure (SBP) ≥ 140mm of Hg
- ii. Diastolic Blood Pressure (DBP) ≥ 90 mm of Hg.

Physical activity variables as per WHO STEPS survey GPAQ

Vigorous activity at work/home

Moderate activity at work/home

Activity during travel

Vigorous activity as recreational activity

Moderate activity as recreational activity

Rest time

2.11 Ethical considerations

Ethical clearance for this study was obtained from the Institutional Ethics Committee (IEC) of Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST), Thiruvananthapuram. Permission letter was taken from the President of the KGVF NGO working in the M West ward, specifically the slum colonies.

2.12 Consent

The participant will be participating in the study only after duly signing the informed consent form available in both English and Hindi. Participant's names will not be included in any report from this project. In the consent forms, although the participant's name, signature will be taken, it will be made sure by the PI to keep it safe and not let it have any effect on the study. It is mentioned that participant's confidentiality will be maintained and the data will not be shared either with their parents, family members or peers.

2.13 Funding

It is a self funded project undertaken by the PI for the purpose of fulfilling the requirements of MPH course curriculum

CHAPTER 3

RESULTS

This chapter briefly describes the outcome of data analysis in concordance with the study objectives. A total of 360 individuals participated in the survey. Response was collected from all of them and those with incomplete information were discarded from the analysis, thus the data of total 352 participants was included for analysis.

Data was analysed using R version 4.2.1

3.1 Univariate analysis

3.1.1 Socio-Demographic details of the participants

Table 1 describes the socio-demographic characteristic details of the study participants. The mean and SD of age of the participants of the study population was 21 ± 2.3 years. Just over a third of the participants (37%) had education upto secondary schooling , one third had (33%) had till junior college and the rest one third (30%) had higher qualification. Occupation wise only 20% of them were working and many were full time working. Amongst 71 of those who were working, 39% had a skilled occupation while 31% were professionals. Only 14.2% of them were married out of the total study population. Out of the study population, 93% of them had Orange coloured ration cards which indicates they belonged to the APL low category with an an annual income of rupees 15000 to 1 lakh according to the Maharashtra ration card regulations. Sixty six of the individuals did not have a ration card applicable in Maharashtra as they have migrated for their livelihood from Rajasthan and are living on rent in slums of Mumbai.

TABLE 3.1 SOCIODEMOGRAPHIC VARIABLES

VARIABLE NAME n= 352	CATEGORY	NUMBER	(%)
Education ^a	Upto secondary schooling	128	(37%)
	Junior college (11-12 th)	110	(33%)
	Diploma/Graduation and above	114	(30%)
Work status	Working – No	281	(80%)
	Working- Yes	71	(20%)
	Amongst working, (n=71)		
	Part time	23	(32%)
Occupation	Full time	48	(68%)
	Unskilled/Semi skilled	21	(24%)
	Skilled	28	(39%)
Marital status ^b	Professional	22	(31%)
	Unmarried	300	(85.2%)
Income status (Ration card)	Married	52	(14.2%)
	Yellow (BPL)	3	(0.8%)
	Orange (APL low)	267	(75.8%)
	White (APL high)	16	(4.5%)
	No Ration Card	66	(18.75%)

Education^a - There was only one person without any formal education

Marital status^b - Two of them were divorced/ separated.

3.1.2 Physical measurements of the participants

1. The mean and SD of height of the participants was $153 \pm (5.6)$ cm while that for weight was $48.77 \pm (9.9)$ kgs, respectively.
2. Mean and SD for waist circumference was $72.1 \pm (10.50)$ cm.
3. Using the formula for calculating the Body Mass Index (BMI) as weight in kilogram/height in metres square, BMI was calculated for the participants.
4. The mean and SD for BMI of the participants was $20.82 \pm (3.99)$ kg/m².
5. As given in Fig.3.1, about 112(32%) of the population had a BMI of less than 18.5 kg/m² and were thus underweight. About 40(11%) had BMI between 25 kg/m² to 29.9kg/m² and were overweight. While nine (3%) had BMI more than 30 kg/m² and were obese.

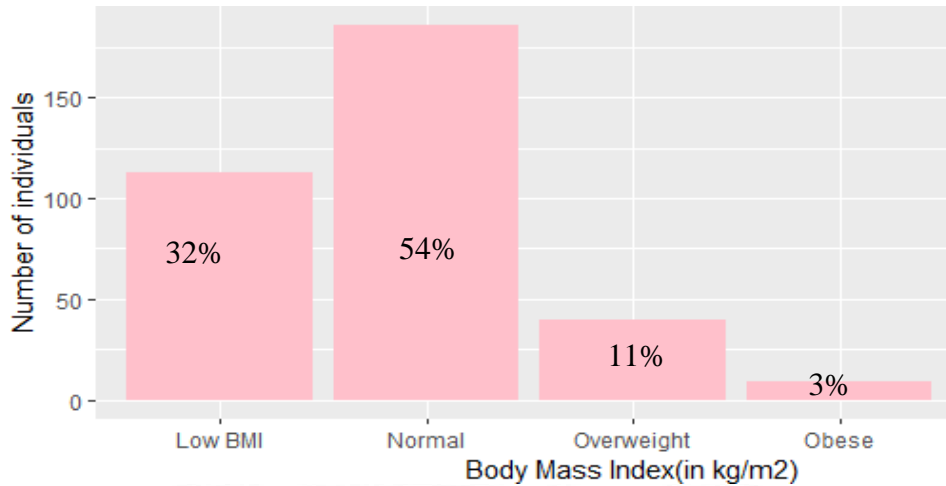


Fig. 3.1 - Distribution of BMI amongst the study population.

6. As per the criteria for abdominal central obesity criteria and from Fig.3.2, 71(21%) of the study participants had a waist circumference greater than or equal to 80 cm.

7. Systolic and Diastolic Blood Pressure of the participants.

Mean and SD of systolic blood pressure (SBP) was $106.7 \pm (10.2)$ mm of Hg while for Diastolic blood pressure it was $72.7 \pm (8.4)$ mm of Hg respectively. Around 68(20%) of the study participants had lesser than normal blood pressure considering the normal as 120 mm of Hg systolic blood pressure and 80 mm of Hg diastolic blood pressure. While eleven (3%) women were hypertensive with a systolic blood pressure of greater than 140 mm of Hg or diastolic blood pressure of greater than 90 mm of Hg.

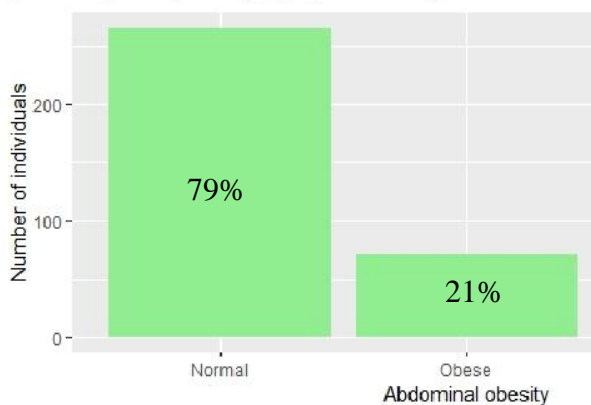


Fig. 3.2 - Distribution of abdominal obesity

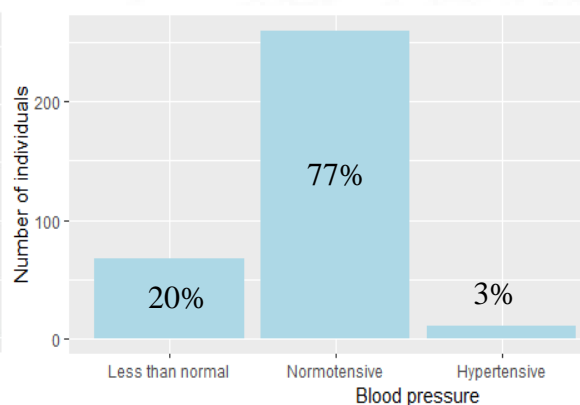


Fig. 3.3 - Distribution of blood pressure

3.1.3 Outcome variable

According to the WHO GPAQ analysis guide, physical activity can be measured either in terms of METs or in the amount of total minutes of vigorous and moderate physical activity done. An individual is termed as physically active if they satisfy the criteria of minimum of 600 METs of physical activity in a week or a combination of a minimum of 150 minutes of moderate and 75 minutes of vigorous physical activity weekly. Taking the second criteria in consideration, the final results showed that about 30% of the population is physically inactive while the rest are physically active. Physical activity was measured in three domains of physical activity at work/home, physical activity during travel and recreational physical activity.

Table 3.2 shows the distribution of physical activity in the population in various domains and on the basis of intensity.

It is seen that although a large part of the study population is physically active, the contribution of total recreational physical activity (both moderate and vigorous recreational physical activity) meant for health benefit is in only 99(28.1 %) of the study population.

TABLE 3.2 PHYSICAL ACTIVITY IN VARIOUS DOMAINS.

Variable n= 352	Category	Number (%)
Vigorous activity at home/work	Yes	98 (28.0%)
	No	254 (72.0%)
Moderate activity at home/work	Yes	341 (97%)
	No	11 (3.0%)
Vigorous recreational activity	Yes	16 (4.5%)
	No	336 (95.5%)
Moderate recreational activity	Yes	95 (27.0%)
	No	257 (73.0%)
Total recreational activity	Yes	99 (28.1%)
	No	253 (71.8%)

3.1.4 Sedentary activity

Sedentary activity/behaviour according to the Sedentary Behaviour Research Network is defined as “any waking behaviour such as sitting or leaning with an energy expenditure of 1.5 METs or less”.

i. The average time spent sitting sedentary in school/college or work was 270 minutes which is around 4.5 hours. The median for this was 240 minutes with an interquartile range of 240 - 300 minutes.

ii. The average time spent sitting sedentary while travelling by bus, train or any four wheeler was 33 minutes with a median of 30 minutes and an interquartile range of 15 to 45 minutes.

iii. For those involved in some or the other recreational activity like walking, yoga, exercise at home or in gym facilities, the average time spent sedentary was 10 minutes. The median was 5 minutes and an interquartile range of 0 to 15 minutes.

iv. The average time spent sedentary during screen time (watching television, using mobile phone, working on laptop or computer) was 165 minutes which is 2 hours and 20 minutes. The median was 120 minutes and an interquartile range of 60 to 240 minutes.

v. The average rest time amongst the participants was 160 minutes weekly which is about 22 minutes daily.

3.1.5 Barriers and facilitators

About 257(73%) of the total study population had access to some or the other facility for physical activity nearby, these included gardens, parks, gyms and yoga classes nearby. About 68% had access to these facilities that is these were present at walkable distance. In terms of neighbourhood safety, (308) 88% felt their neighbourhood was safe enough while the rest (44)12% did not due to complaints like presence of alcoholics/drug addicts in the vicinity, not enough street lights and at times men loitering around. About 28% of the

population was engaged in some form of physical activity at home including basic exercise, yoga or dance while completing daily chores. Almost an equal number of women in the population 190 (54%) mentioned their family encouraging them to engage in physical activity while 149 (42%) of them had some or the other member of the family involved in physical activity. In terms of factors preventing them from undertaking physical activity, most of them mentioned busy schedules and time spent in completing household chores as the important barriers followed by work or college timings clashing with their schedule leaving them with no time for physical activity. Badminton (10%) was the most played game format in the community. Out of the 70 individuals who had a child below five years of age, 45 of them had someone else at home to take care of the child in case the participant is not at home. About 26(7.3%) of the participants had some chronic disease condition in the past six months while 153(43.5%) out of the total participants had faced a reproductive disease condition in the past six months. Amongst those with reproductive disease conditions, 94 (27%) of the study participants complained of suffering from weakness and fatigue, 28(8%) had painful menstrual experience, 27(7.7%) had late menses, 23 (6.5%) had irregular menstruation, 42 (12%) had a history of anaemia in the past six months.

3.2 Bivariate analysis

Bivariate analysis of sociodemographic variables with physical activity was done using the R software version 4.1.2.

Fig.3.4 shows the distribution of physical activity with respect to age of the participant. Here it is seen that the median age of the participants who are physically active and those who are inactive is the same which is 21 years. The IQR for age is more spread in the physically active group as compared to that of the inactive group. It is more skewed for the physically inactive group.

Those who had an education of schooling (upto 10th), out of total 128 of them 108(84.3%) were physically active. While out of the 110 in junior college, only 75 (68.1%) were physically active. In terms of those with higher education (Diploma/Graduation/Post Graduation), only 64(56%) out of the total 114 were physically active.

Out of the total 300 unmarried, 212(70%) were physically active. This number was more as compared to the married where out of the total 52, only 35(67%) of them were physically active. Out of the 71 working, 56(79%) of them were physically active

Occupation wise, amongst the 50 who were skilled/professional, 40(80%) were physically active. Amongst those who were unskilled/semi skilled, out of total 21 about 16(76.2%) were physically active.

In terms of income status, of the total 267 Orange colour ration card holders, 185(69%) were physically active.

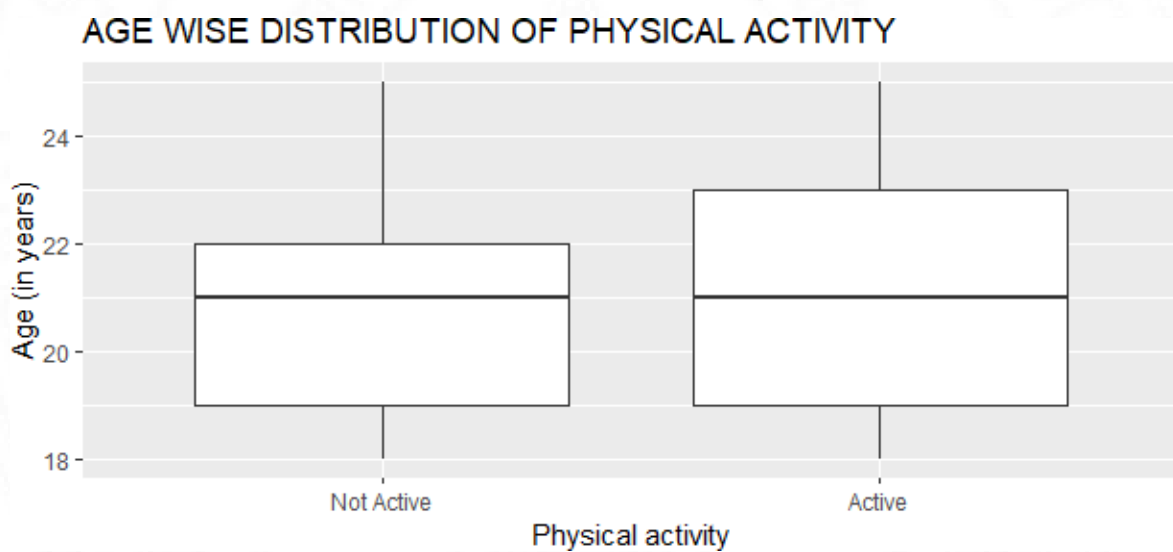


Fig. 3.4 - Box plot of age and physical activity.

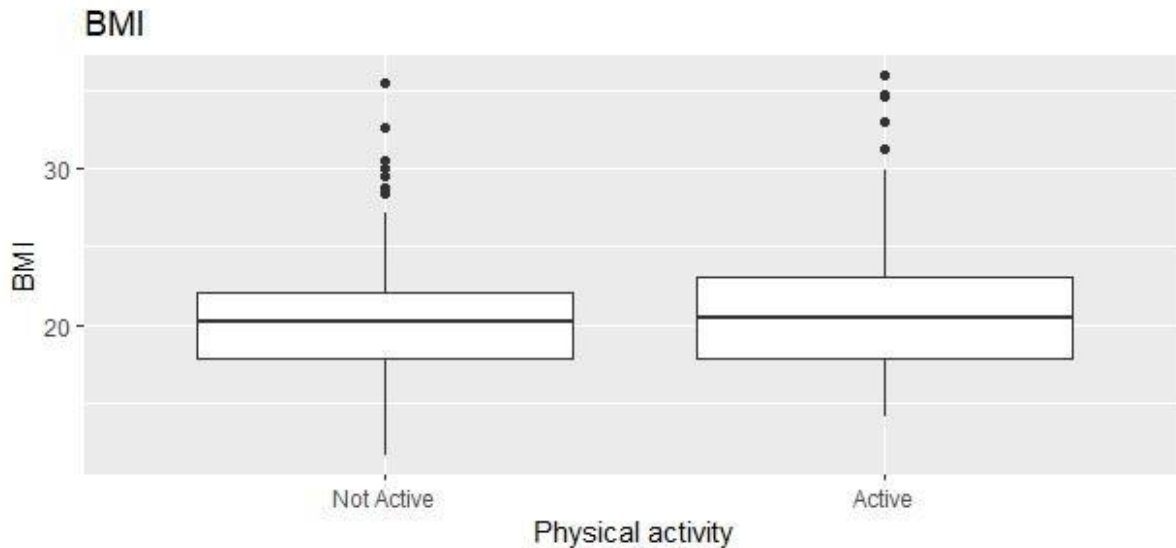


Fig.3.5 - Boxplot of BMI with physical activity

From table 3.3 we can see that the average time spent in physical activity in the study population is most in moderate physical activity at work/home which is 287.5 minutes. In terms of MET value, this is 1150 METs weekly spent. While less amount of time and calories are spent in any form of recreational physical activity.

TABLE 3.3 AVERAGE TIME AND MET FOR EACH PHYSICAL ACTIVITY DOMAIN.

Variable	Average time(mts^a) (weekly)	Average MET (weekly)
Vigorous activity at work/home	22.5	180
Moderate activity at work/home	287.5	1150
Vigorous recreational activity	4.3	34.3
Moderate recreational activity	27.9	111.8
Travel based activity	44.1	176.5

^a – in minutes

One MET is defined as “the caloric energy used/spent when sitting still or resting and is equivalent to the caloric consumption of one kilocalorie per kilogram per hour or equal to the oxygen cost of sitting quietly and is equivalent to 3.5 millilitre per kilogram per minute.”

For Vigorous physical activity we calculate - 8 METs

For Moderate physical activity we calculate - 4 METs

For Travel based physical activity we calculate - 4 METs

Table 3.4 shows the association between physical activity and the barriers and facilitators to it. Here it was seen that 222(72%) of the participants who felt that their neighbourhood was safe enough were physically active and there was a positive association between them. The association was statistically significant. Out of those 247 who were physically active, 34 of them performed physical activity at home itself while the rest 170 did not. The association between the two was positive and statistically significant.

TABLE 3.4 BARRIERS AND FACILITATORS OF PHYSICAL ACTIVITY.

Variable n= 352	Physically active n= 105	Physically inactive n= 247	Chi square p value
Access to facilities for physical activity			
No (n=111)	77(69.4%)	34(30.6%)	0.821
Yes (n=241)	170(70.5%)	71(29.4%)	
Neighbourhood safety			
No (n=42)	23(54.7%)	19(45.2%)	0.034*
Yes(n=308)	222(72.0%)	86(28%)	
Family encouragement for physical activity			
No (n= 162)	109(67.2%)	53(32.7%)	0.329
Yes (n=190)	138(72.6%)	52(27.3%)	
Any other member Of family doing physical activity			
No (n= 203)	142(69.9%)	61(30.4%)	1
Yes (n= 149)	105(70.4%)	44(29.5%)	

Variable n= 352	Physically active n=247	Physically inactive n= 105	Chi square p value
Bed ridden person at home			
No (n= 336)	234(69·6%)	102(30·3%)	0·476
Yes (n= 16)	13(81·2%)	3(18·7%)	
Motivated to do physical activity			
No (n= 112)	75(67·0%)	37(33·0%)	0·439
Yes (n=240)	172(71·6%)	68(28·3%)	
Any chronic disease in past 6 months			
No (n= 326)	226(69·3%)	100(30·7%)	0·315
Yes (n= 26)	21(80·7%)	5(19·3%)	
Any reproductive Issue in past 6 months			
No (n= 183)	126(68·9%)	57(31·1%)	0·923
Yes (n= 153)	107(70·0%)	46(30·0%)	

In terms of recreational physical activity and sociodemographic variables, those who had higher education (Diploma/Graduation/Post graduation) of the total 114, only 40(35%) of them are engaged in recreational physical activity and are more in number as compared to the other two categories. Amongst those in Junior college (110) only 34(31%) are doing some form of recreational physical activity. While those who have education until schooling, out of 128 only 25(19%) are doing recreational physical activity.

In the unmarried group (300), 92(30%) are engaged in doing recreational physical activity. This was more than the married counterparts where out of 52, only 7(13%) were engaged in recreational physical activity.

Out of the 71 working, only 23(32%) of them were involved in recreational physical activity. Occupation wise, those with Skilled/professional occupation were doing more recreational activity than the others. Out of total 50, 18(36%) were engaged in recreational physical activity. From table 3.5 it is seen that of those who had facilities for physical activity near their home, only 88 (34·2%) of them were engaged in recreational physical activity. Out of the total 241

who had access to these facilities for physical activity, only 80 (33.2%) of them were engaged in recreational activity. In terms of those encouraged by family to do physical activity (190) only 75 (39.5%) were actually doing recreational activity. Participants who have someone from their family involved in physical activity (149), 58 of them (38.9%) are also engaged in recreational physical activity. Within the group of participants having reproductive disease conditions in the past six months (153), only 42 (27.5%) were engaged in some or the other recreational physical activity. Amongst those motivated to do physical activity (240), 88 (36.7%) are engaged in recreational physical activity.

TABLE 3.5 BARRIERS AND FACILITATORS WITH RECREATIONAL ACTIVITY

Variable n= 352(100%)	Recreational activity Yes n= 99	Recreational activity No n= 253	Chi square p value
Recreational physical activity at home			
No (n= 255)	53(20.7%)	202(79.3%)	
Yes (n= 97)	46(47.4%)	51(52.6%)	<0.001
Facilities for physical activity			
No(n= 95)	11(11.6%)	84(88.4%)	
Yes(n= 257)	88(34.2%)	169(65.7%)	<0.001
Access to facilities for physical activity			
No (n= 111)	19(17.1%)	92(82.9%)	
Yes (n= 241)	80(33.2%)	161(66.8%)	<0.002
Any other member Of family doing physical activity			
No (n= 203)	41(20.2%)	162(79.8%)	
Yes (n= 149)	58(38.9%)	91(61.1%)	<0.001
Bed ridden person at home(n= 16)			
No	95(28.3%)	241(71.7%)	
Yes	4(25%)	12(75%)	>0.99
Motivated to do physical activity			
No (n= 112)	11(9.8%)	101(90.2%)	
Yes (n= 240)	88(36.7%)	152(63.3%)	<0.001

Variable n= 352(100%)	Recreational activity Yes n= 99	Recreational activity No n=253	Chisquare p value
Any reproductive issue in past 6 months			
No (n= 183)	52(28.4%)	131(71.6%)	0.945
Yes (n= 194)	42(27.5%)	152(63.3%)	
Family encouragement for physical activity			
No (n= 162)	24(14.8%)	138(85.2%)	<0.001
Yes (n= 190)	75(39.5%)	115(60.5%)	
Neighbourhood safety			
No (n= 308)	14(33.3%)	28(66.7%)	0.554
Yes (n= 42)	85(27.5%)	223(72.4%)	

3.3 Multivariate analysis.

On doing multivariate regression analysis for physical activity with variables, from table 3.6, it was found that there was a positive association between physical activity and study participant's mother's work status, taking homemaker as the reference comparison group. The adjusted odds of being physically active were 2.3 times more in those if the mother had skilled/professional occupation. For father's occupation, although by bivariate regression analysis, father's occupation as skilled/professional showed a positive association, on doing multivariate regression analysis, this was not found to be statistically significant and thus excluded. Those participants who did not have a father (or whose father were no longer working) had 3.8 times more odds of being physically active than the rest. However, as mother's and father's occupation could be correlated, out of the two only mother's occupation was considered in the model. Those participants who felt their neighbourhood was safe enough had almost twice the odds of being physically active than those who did not. Women who were engaged in physical activity at home had almost twice the odds of being physically active than those who did not. All of these associations were statistically significant.

TABLE 3.6 MULTIVARIATE ANALYSIS FOR PHYSICAL ACTIVITY WITH CRUDE AND ADJUSTED ODDS RATIO

Variable	COR ^a (95% C.I.)	p value	AOR ^b (95% C.I.)	p value
Neighbourhood safety				
No	1	Ref.	1	Ref.
Yes	2.13(1.10-4.11)	0.024	2.32(1.15-4.71)	0.019
Recreational physical activity at home				
No	1	Ref.	1	Ref.
Yes	1.92(1.12-3.43)	0.021	2.18(1.26-4.39)	0.009
Mother's occupation				
Homemaker	1	Ref.	1	Ref.
Skilled/professional	2.83(1.68-4.91)	<0.001	2.33(1.26-4.39)	0.008
Others	1.39(0.69-2.94)	0.4	1.34(0.63-2.94)	0.5

COR^a – Crude Odds Ratio

AOR^b- Adjusted Odds Ratio

The model included for this on multivariate regression analysis is

Physical activity = Neighbourhood safety + Recreational physical activity at home + Mother's occupation (Skilled/Professional).

Table 3.7 shows the multivariate regression analysis for recreational physical activity and it was seen that variables which were significantly associated in bivariate analysis like family providing encouragement for physical activity and access to facilities were not associated with doing multivariate analysis and thus not included in the model. Through multivariate regression analysis it was seen that it can be concluded that the odds of engaging in recreational activity was almost five times more in those who had some facilities for physical activity in their surroundings as compared to those who did not. The odds of engaging in recreational physical activity was almost twice more in those who had some member of the family involved in physical activity as compared to those who did not. Those participants

who were engaged in some form of physical activity at home itself had 2.5 times the odds of engaging in physical activity for recreational purposes than others. While those who were motivated enough to do physical activity had four times more odds of being involved in recreational physical activity than others.

TABLE 3.7 MULTIVARIATE ANALYSIS FOR RECREATIONAL ACTIVITY WITH CRUDE AND ADJUSTED ODDS RATIO

Variable	COR (95% C.I.)	p value	AOR (95% C.I.)	p value
Facilities for physical activity				
No	1	Ref.	1	Ref.
Yes	3.98(2.09-8.04)	<0.001	4.97(1.36-19.1)	0.016*
Any other member Of family doing physical activity				
No	1	Ref.	1	Ref.
Yes	2.52(1.57-4.07)	<0.001	1.83(1.01-3.33)	0.048*
Recreational physical activity at home				
No	1	Ref.	1	Ref.
Yes	3.44(2.09-5.69)	<0.001	2.48(1.37-4.53)	0.003*
Motivated to do physical activity				
No	1	Ref.	1	Ref.
Yes	5.32(2.81-11.0)	<0.001	4.07(1.4-10.1)	0.001*

* p value is significant

The model included for this on multivariate regression analysis is

Recreational physical activity = Income status (Ration card) + BMI category + Recreational physical activity at home + Facilities for physical activity + Any member of the family doing physical activity + Motivated to do physical activity.

CHAPTER 4

DISCUSSION AND CONCLUSION

4.1 Discussion and finding

4.1.1 About the study

This was a community based cross-sectional study among 352 young women in the age group of 18 to 25 years living in an urban slum region of M West ward (Kurla east) of Mumbai city, Maharashtra. This study explored the physical activity levels in these women and the associated barriers and facilitators they face. The study population included women from migrated families engaged in household footwear-making business. Most of the families have migrated from Rajasthan, living in rental houses in the slum colonies of Mumbai due to financial constraints and ease of doing business as the shoe market is present in the vicinity of the main roads.

4.1.2 Physical activity in the study population

As per the study analysis it was found that 70% of the young women in the study were physically active according to the World Health Organization's criteria for classifying individuals as physically active or not. Literature has shown that physical activity varies with population. Physical activity was found to be less in women compared to men and more women were involved in mild and moderate physical activity while men were more involved in vigorous physical activity. (Podder et al., 2020). Although the prevalence for physically active was higher in this study as compared to others, the population in other studies involved young college going women (Gupta et al., 2019). Also in this study, the women belong to lower socioeconomic groups.

4.1.3 Trends in physical activity

Physical activity is divided into different domains as physical activity at work/home, physical activity during travel and recreational physical activity, it was seen that due to their nature of work and societal norms, the physical activity contributions in these women was more due to activity at work or home. This finding of the study was in accordance with previous research including the ICMR based National non communicable disease survey (Ramamoorthy et al., 2022) where it was proved how women were more involved in household and caring related activities which are considered unpaid labour work. A small number of women were involved in any kind of recreational activity that is 28% in this study.

4.1.4 Physical activity in different domains

As part of helping in their family business, the women from the study population would be working daily 8 to 10 hours with hardly any breaks in between in footwear making which was more of a sedentary work. Some of them used sewing machines and hammers for embossing designs on the footwear every day for one to two hours and required great strength. They were also burdened with completing household work like cooking, mopping floors, washing clothes and utensils with hands, some taking care of children, visiting markets, taking children to school/classes and back. It was found that due to this women were more involved in moderate physical activity at work/home (97%) than vigorous activity at home/work (28%). This can be seen by the average time spent (287.5 minutes) by women weekly which is much more for moderate physical activity at work/home than in other domains. Those who were working out of their home were also mainly involved in work that required them to be active and on their feet. Travelling to college or the workplace was usually by walking or by making use of public transport. Due to this they felt they need not do physical activity separately as they barely had any time for themselves and were active all day. Similar findings were repeated in the study done by (Mathews et al., 2016). As per

literature women usually have lesser consumption of fruits and raw vegetables in their diet while readily available snacks and fried items are consumed more and this was also seen to be true in this study (Jayamani et al., 2013).

4.1.5 Facilitators of physical activity

An added disadvantage for the study population was the socioeconomic background and living conditions. Metropolitan cities like Mumbai have space issues and lack of infrastructure for the general public to resort to means of physical activity like walking. (Adlakha et al., 2016). Results on barriers and facilitators for physical activity showed that women who were encouraged by their family, who had someone in their family doing regular recreational physical activity, who felt motivated themselves to do physical activity or felt that their neighbourhood was safe enough were more involved in physical activity related to exercise and for health benefit. In terms of education, as deduced from the results section, although women who had education upto schooling were more physically active, those who had a higher education of diploma/graduation/post graduation were more involved in recreational activity. As per literature, factors like socioeconomic status, gender, BMI, age are some factors which influence physical activity levels in individuals. (Patel et al., 2019) (Agrawal et al., 2015). However in this study, socioeconomic status wise most of the population belonged to the middle class and gender wise all were women due to the study's criteria. Thus no association could be made out of these with physical activity. Age distribution showed skewness in those who are physically inactive towards the older age group which was true as per the literature. (Agrawal et al., 2015). Almost one third of the participants were in the underweight category while 14% of the study population belonged to the overweight and obese category. As a result of this, they either were not motivated enough to do any form of exercise, lacked stamina to perform any or felt that they instead needed to gain weight. Many studies have researched the role of BMI and obesity with respect to

physical activity stating how they're directly related.(Devi et al., 2020). In the present study too it was seen that amongst the study population, those who were physically inactive were more skewed towards the underweight age group. However there was no association seen between the two in this study.

4.1.6 Barriers to physical activity

Results of the study showed that most participants (73%) had some facility for physical activity in their vicinity like gyms, parks, open grounds and yoga classes. However the participants mentioned how due to societal norms, fear of being judged and harassment, family restriction on not going alone or need of a company were some barriers due to which they could not make use of these facilities for physical activity. A large section of the population mentioned that they were not motivated enough to undertake regular physical activity even , this was in parallel with literature.(Gupta et al., 2019). It was mentioned that individuals belonging to the youth category had more internal barriers like lack of energy and will power than external barriers like availability of facilities for physical activity.(Gupta et al., 2019) Many of the participants also had some or the other form of reproductive disorders (46%) including anaemia (12%) and menstrual irregularities due to which they were always in a state of weakness and fatigue.

Summary

Women in India are burdened by unpaid labour at home and work which is not sufficiently acknowledged. Thus they miss out on opportunities such as having time to themselves. Providing mere facilities in the open spaces is not enough for them, they also need to find spare time for themselves, and the society needs to be more inclusive of their needs making sure that they feel comfortable enough to use these facilities. The study setting has government run yoga classes, however, only two batches are running in the morning, thus clashing with the daily activities of women. There is also a need to motivate the youth for

regular physical activity. In a heavily urbanised city like Mumbai, where time is of the essence, finding time for themselves is a struggle for most individuals. Nutrition, inadequate access to healthcare and education, restricted freedom of movement, the need to support the family and responsibilities of taking care of a child or an elderly or disabled individual are certain factors which hinder women's growth and autonomy. These are to be kept in mind when we vouch for them to achieve a certain physical activity recommendations. Thus, we can understand that the path to reach recommended physical activity level have multiple factors which needs to be tackled before achieving the set targets.

4.2 Strengths of the study

- i. There are limited studies assessing the physical activity levels of women living in urban slums of India. Most of them are done in college-going youth or the general population with a wider age group. There are some qualitative studies on understanding physical activity behaviour in urban slums of India but none of them focuses on the barriers and facilitators faced by individuals for it. Therefore, the researcher felt that the study stands out.
- ii. The study focuses on the young women population in order to understand their outlook on physical activity using the WHO STEPs survey based GPAQ questionnaire which is validated for Indian settings.
- iii. Data collection was done by a single observer so the chances of inter observer bias is less.
- iv. Anthropometric measurements were taken by making use of standardised instruments.

4.3 Limitations of the study

- i. As the study is conducted in a specific population residing in a specific region, the generalizability of it may be of question. However, most of the urban slums usually have similar living conditions and social backgrounds as in the study site.
- ii. Physical activity is generally challenging to capture accurately either by using questionnaire /interview tools or by making use of instruments/devices like pedometers. The

questionnaire itself may have limitations as the data is captured by asking the study participants about past episodes indicating a chance of recall bias. Literature says that GPAQ tends to overestimate physical activity, hence there could be a response/measurement bias.

iii. Data collection was done by cross sectional study design. The associations observed do not infer causality.

4.4. Conclusion.

The study assesses the level of physical activity in young women (18-25 years) residing in urban slum regions of Mumbai city. It also helps in understanding the barriers and facilitators they face while undertaking these, which could further help in devising policies. WHO and national guidelines have set down targets, including the Global Action Plan on Physical Activity (2018-2030) which aims to improve the surroundings, redevelop policies, propose better infrastructure and create awareness amongst the people for physical activity. From the study, it becomes evident that it is necessary to understand women's role in society including their responsibilities at home and work to enable them to achieve the requirements of the national policy.

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6. ANNEXURES

TOOL USED FOR THE STUDY.

SR.NO	DOMAIN
1.	SOCIODEMOGRAPHIC DETAILS
a	Personal information
b	Family information
2.	TIME SPENT DOING PHYSICAL ACTIVITY IN DIFFERENT SETTINGS
3.	SEDENTARY BEHAVIOUR
4.	BARRIERS TO PHYSICAL ACTIVITY
a	Physical Environment
b	Social Environment
c	Personal attributes
5.	ANTHROPOMETRIC MEASUREMENTS
6.	GPAQ

6.1 INTERVIEW SCHEDULE IN ENGLISH

Serial Number -

Ward name -

A DESCRIPTIVE STUDY ON PHYSICAL ACTIVITY LEVEL AND ITS CORRELATES IN YOUNG WOMEN (18-25 YEARS) OF AN URBAN SLUM REGION IN MUMBAI CITY.

SOCIODEMOGRAPHIC DETAILS

General Information

CODE	QUESTION	ANSWER
A1	Date of Birth	Day..... Month..... Year.....
A2	What is your completed age? (on the day of the interview)years
A3	What is your highest level of education? (tick whichever box is appropriate)	i. No formal education ii. School(1-10th) <input type="checkbox"/> iii. Junior college(11-12th) <input type="checkbox"/> a. Science <input type="checkbox"/> b. Commerce <input type="checkbox"/>

		<p>Mother <input type="checkbox"/></p> <p>Father <input type="checkbox"/></p> <p>Siblings - Brother/Sister <input type="checkbox"/></p> <p>Both <input type="checkbox"/></p> <p>Grandparents <input type="checkbox"/></p> <p>Cousins <input type="checkbox"/></p> <p>Mother in law <input type="checkbox"/></p> <p>Father in law <input type="checkbox"/></p> <p>Sister in law <input type="checkbox"/></p> <p>Brother in law <input type="checkbox"/></p> <p>Uncle/Aunt <input type="checkbox"/></p>
B2	<p>What is your father's education? (applicable only if unmarried) (tick the appropriate answer)</p>	<p>i. Literate- with schooling - Without schooling</p> <p>ii. Graduate</p> <p>iii. Post Graduate</p>
B3	<p>What is your mother's education? (applicable only if unmarried) (tick the appropriate answer)</p>	<p>i. Literate- with schooling -without schooling</p> <p>ii. Graduate</p> <p>iii. Post Graduate</p>
B4	<p>What is your husband's education? (applicable only if married)</p>	<p>i. Literate- with schooling -without schooling</p>

		ii. Graduate iii. Post Graduate
B5	What is your fathers’s occupation? (applicable only if unmarried)	i. Skilled <input type="checkbox"/> ii. Unskilled <input type="checkbox"/> iii. Semi Skilled <input type="checkbox"/>
B5	What is your mother’s occupation? (applicable only if unmarried)	i. Skilled <input type="checkbox"/> ii. Unskilled <input type="checkbox"/> iii. Semi skilled <input type="checkbox"/>
B6	What is your husband’s occupation? (applicable only if married)	i. Skilled <input type="checkbox"/> ii. Unskilled <input type="checkbox"/> iii. Semi skilled <input type="checkbox"/>
B7	Where do you live if married? (applicable only if married)	i. With in laws ii. Separately without in laws
B8	What is the colour of your ration card?	Yellow Red White

Next, I am going to ask you about the time spent doing different types of physical activity in a week. As you answer these questions please do not think only of the past week (which might be different from what you usually do – like there might have been a family occasion

last week or you could have been out vacationing last week) instead think of a ‘typical’ or a ‘usual’ week.

Please answer these questions even if you do not consider yourself to be a physically active person. For the sake of better understanding, we are dividing physical activity into those done in educational institutes (school/college), at home and that for recreational activity. We are interested in only those physical activities which last for more than 10 minutes at a stretch.

First I will ask about time spent in educational institutions (school/college).

CODE	QUESTIONS	RESPONSE		
C1	Are you in the last 12 months going to an educational institution (school/college)? Or have done so in the last 12 months? (Enter yes if the participant has been attending classes during the past 12 months.)	YES/NO (tick whichever is appropriate)		
	For each of the following occasions ,tell us the type of activity - Moderate or Vigorous, number of days activity is done and the duration for which you do			

	any physical activity while you are in your educational institute (school/college)			
	OCCASION (Should be physically active at least for 10 minutes in a stretch)	Type of activity usually done during this occasion (No activity = 0 Moderate = 1 Vigorous = 2) If no activity skip to next occasion	Days per week DAYS	Duration of session (in minutes) (Cannot be less than 10 minutes - if lesser than 10 minutes then should not be considered for recording) MINUTES
C2a	During Assembly			
C2b	Lunch Break			
C2c	Before/After college timings			
C2d	Special coaching			

For the following questions, ask the participant about sitting or reclining at work, at home, getting to and from places, or with friends including time spent [sitting at a desk, sitting with friends, travelling in car, bus, train, reading, playing cards or watching television], but do not include time spent sleeping.

[INSERT EXAMPLES] (USE SHOWCARD)

SEDENTARY BEHAVIOUR

D1	How much time do you usually spend sitting or reclining at work/in school/college on a typical day?	Hours <input type="text"/> Minutes <input type="text"/>	
D2	How much time do you usually spend sitting or reclining when travelling (by bus/train/rickshaw) on a typical day?	Hours <input type="text"/> Minutes <input type="text"/>	
D3	How much time do you usually spend sitting or reclining while doing sports, fitness or recreational (leisure) activities on a typical day?	Hours <input type="text"/> Minutes <input type="text"/>	
D4	During a typical or usual day , how much time do you spend sitting and watching television, working on the computer, playing games/ using social media on mobile/tablet?	Hours <input type="text"/> Minutes <input type="text"/>	

BARRIERS TO PHYSICAL ACTIVITY

PARTICIPANT WILL BE ASKED TO ANSWER ONLY THOSE ANSWERS

APPLICABLE FOR LAST 6 MONTHS

PHYSICAL ENVIRONMENT

E1	Are there any facilities available in your neighbourhood space for undertaking physical activity?		YES <input type="checkbox"/> NO <input type="checkbox"/>
E2	If YES, which are the facilities available in your neighbourhood space for physical activity? (tick the appropriate box/boxes)		Parks <input type="checkbox"/> Gyms <input type="checkbox"/> Open grounds <input type="checkbox"/> Dance/Karate/Swimming classes <input type="checkbox"/> None of the above <input type="checkbox"/> Specify if any other
E3	Do you have access to these facilities? (at a walkable distance)		YES <input type="checkbox"/> NO <input type="checkbox"/>

E4	Do you think your neighbourhood is safe enough for PA? (tick on the appropriate answer)		YES <input type="checkbox"/> NO <input type="checkbox"/>
E5	If No, why? (tick on the appropriate answer)		Alcoholics/Drug addicts <input type="checkbox"/> Traffic/vehicle problem <input type="checkbox"/> Stray animals <input type="checkbox"/> Less street lights <input type="checkbox"/> Open drainage/garbage on road <input type="checkbox"/> Others (specify)
E6	Do you perform PA like exercising, yoga, zumba, dance or others at your home itself?		YES <input type="checkbox"/> NO <input type="checkbox"/> If YES, specify

SOCIAL ENVIRONMENT

E7	Does your family provide	YES <input type="checkbox"/>
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	any support/encouragement for Physical activity? (tick on the appropriate box)	NO <input type="checkbox"/>
E8	Any member of the family involved in daily Physical activity like gym, walk, yoga, any sports? (tick the appropriate box)	YES <input type="checkbox"/> NO <input type="checkbox"/>
E9	Any factor preventing you from doing regular Physical activity (tick the appropriate box/boxes)	Study pressure <input type="checkbox"/> Work pressure/timings <input type="checkbox"/> Tutions /college timings <input type="checkbox"/> Dress code <input type="checkbox"/> Child care <input type="checkbox"/> Restriction from family <input type="checkbox"/> Busy schedule hence no time <input type="checkbox"/> Household chores <input type="checkbox"/> Any other please specify
E10	Any form of encouragement from school/college/work for Physical activity eg PE	YES <input type="checkbox"/> NO <input type="checkbox"/>

	<p>period, games, sports events, training camps (tick the appropriate box)</p>	<p>NA <input type="checkbox"/></p> <p>If yes, please specify</p>
E11	<p>Any specific games played by you every once in a week? (tick the appropriate box/boxes)</p>	<p>Running <input type="checkbox"/></p> <p>Kho Kho <input type="checkbox"/></p> <p>Kabaddi <input type="checkbox"/></p> <p>Badminton <input type="checkbox"/></p> <p>Cricket <input type="checkbox"/></p> <p>Football <input type="checkbox"/></p> <p>Carrom <input type="checkbox"/></p> <p>Chess <input type="checkbox"/></p> <p>Any other</p>
E12	<p>Do you yourself feel motivated or think physical activity is important for you to do?</p>	<p>YES <input type="checkbox"/></p> <p>NO <input type="checkbox"/></p> <p>If No then why specify</p>
E13	<p>Is there any bedridden person living with you in your home?</p>	<p>YES <input type="checkbox"/></p> <p>NO <input type="checkbox"/></p>
E14	<p>Is there anyone else in your</p>	<p>YES <input type="checkbox"/></p>

	home to take care of the child if you go out for work/education/leisure / recreational activity?	NO <input type="checkbox"/>
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PERSONAL ATTRIBUTES (MORBIDITY PROFILE)

E14	Do you have any chronic disease conditions or have you been hospitalised for any condition in the last 6 months? Please mark which if Yes.	No Yes - Respiratory <input type="checkbox"/> GIT <input type="checkbox"/> Skin/Eye/Ear <input type="checkbox"/> Cardiovascular <input type="checkbox"/> Diabetes <input type="checkbox"/> Any other, please specify
E15	Did you have any of the mentioned reproductive health problems in the last 6 months? (tick the appropriate box/boxes)	NO <input type="checkbox"/> YES, Irregular menstruation <input type="checkbox"/> i.Scanty (<3 days) ii.Prolonged(>5 days) Frequent menses (<21 days) <input type="checkbox"/> Late menses (>35 days) <input type="checkbox"/> Lower abdominal pain <input type="checkbox"/>

		Painful periods <input type="checkbox"/> Weakness/Fatigue <input type="checkbox"/> Foul odour <input type="checkbox"/> Vaginal discharge+fever <input type="checkbox"/> Burning while passing urine <input type="checkbox"/> Any other, please specify
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ANTHROPOMETRIC MEASUREMENTS

These will be checked by the interviewer post the questionnaire.

F1	Height (in cms)	
F2	Weight (in kgs)	
F3	Waist circumference(in cms)	
F4	Blood pressure (2 readings)	SBP1 DBP1 SBP2 DBP2

DIETARY INVOLVEMENT

G1	Type of Diet	Vegetarian Non Vegetarian
G2	Number of times fruits servings included in a meal in	

	a day	
G3	Number of times raw vegetables servings included in a meal in a day	
G4	Number of times you eat food which is not home cooked in a day	

GPAQ

Think about the time you spend doing work at home/work place. Work includes things that you have to do such as paid or unpaid work , study/training, household chores, harvesting food/crops, fishing, caring for siblings, fetching water , seeking employment, also include loitering or whiling away time.

In answering the following questions, ' Vigorous-Intensity activities' are activities that require hard physical effort and cause large increases in breathing or heart rate, 'Moderate Intensity activities' are activities that require effort and cause small increases in breathing or heart rate.

P1	Does your work at home or elsewhere involve vigorous intensity activity that causes large increases in breathing or heart rate like carrying or lifting heavy loads, running while doing errands,	YES <input type="checkbox"/> NO <input type="checkbox"/>	If No, go to P4
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	digging for cultivation?		
P2	<p>In a typical week on how many days do you do vigorous intensity activities as part of your work at home or elsewhere?</p> <p>(Typical week means a week when the participant is engaged in his/her usual activities. Valid responses range from 1-7)</p>	<p>Number of days</p> <input type="checkbox"/>	
P3	<p>How much time do you spend doing vigorous intensity activity at home/elsewhere on a typical day that performs such work?</p> <p>(Ask the participant to think of a typical day she can recall in which she was engaged in vigorous activities at school/college/work. The participant should also consider these activities undertaken continuously for 10 minutes or more. Probe very high responses (over 4 hours) to verify.)</p>	<p>Hours <input type="checkbox"/></p> <p>Minutes <input type="checkbox"/></p>	
P4	Does your work at home or	YES <input type="checkbox"/>	If No , go to P7

	<p>elsewhere involve moderate intensity activity that causes small increases in breathing or heart rate for at least 10 minutes continuously such as brisk walking while carrying groceries from the market, manual washing of clothes, dry sweeping of floor, gardening at home, etc.</p> <p>(Ask the participant to think about moderate-intensity activities at work only. Activities are regarded as moderate intensity if they cause small increases in breathing or heart rate)</p>	<p>NO <input type="checkbox"/></p>	
<p>P5</p>	<p>In a typical week, how many days do you do moderate intensity activities as part of your work?</p> <p>(Typical week means a week when the participant is engaged in his/her usual activities. Valid responses range from 1-7)</p>	<p>Number of days <input type="checkbox"/></p>	
<p>P6</p>	<p>How much time do you spend doing moderate- intensity activity at</p>	<p>Hours <input type="checkbox"/></p>	

	<p>work on a typical day?</p> <p>(Ask the participant to think of a typical day she can recall in which she was engaged in moderate activities at school/college/work.</p> <p>The participant should also consider these activities undertaken continuously for 10 minutes or more. Probe very high responses (over 4 hours) to verify.)</p>	<p>Minutes <input type="checkbox"/></p>	
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Next, tell me about travel to school/college/market/tuition or elsewhere even if it is part of the journey.

P7	<p>Do you usually walk or cycle for at least 10 minutes continuously to get to and from places? (tick the appropriate option)</p>	<p>Yes, <input checked="" type="checkbox"/></p> <p>Walk.....1 <input type="checkbox"/> <input checked="" type="checkbox"/></p> <p>Yes, <input checked="" type="checkbox"/></p> <p>Bicycle....2 <input type="checkbox"/></p> <p>No.....3 <input type="checkbox"/></p>	<p>If No go to P10</p>
P8	<p>If Yes, how many days in a week do you walk or cycle for at least 10 minutes continuously to get to and from places ?(Enter the number of days per week)</p>	<p>Number of days</p> <p><input type="checkbox"/> <input type="checkbox"/></p>	

P9	On each day that you walk/cycle, how much time do you spend doing so (both onward and return journeys put together)? (Enter the duration)	Minutes <input type="checkbox"/> Hours <input type="checkbox"/>	
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While answering the next questions please exclude any activities that you have already mentioned in the questions on vigorous or moderate physical activity or travelling from or to places. Now I would like to ask you about sports, fitness and recreational activities.

P10	Do you do any vigorous intensity sports , fitness or recreational (leisure) activities that cause large increases in breathing or heart rate like running for at least 10 minutes continuously? Please add all the activities and answer. (USE SHOWCARD) (Ask the participant to think about recreational vigorous activities only. Activities are regarded as vigorous intensity if they cause large increases in breathing and/or heart rate. Typical week means a week when the participant is engaged in his/her	YES <input type="checkbox"/> NO <input type="checkbox"/>	If NO go to P13
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	usual activities)		
P11	In a typical week on how many days do you do vigorous intensity sports, fitness or recreational activities?(Ask the participant to think about recreational moderate activities only. Activities are regarded as moderate intensity if they cause large increases in breathing and/or heart rate. Typical week means a week when the participant is engaged in his/her usual activities)	Number of days <input type="checkbox"/>	
P12	How much time do you spend doing vigorous intensity sports, fitness or recreational activities on a typical day? (Typical day means a day when the participant is engaged in his/her usual activities in the school/college.)	Hours <input type="checkbox"/> Minutes <input type="checkbox"/>	
P13	Do you do any moderate intensity sports, fitness or recreational (leisure) activities that causes a	YES <input type="checkbox"/>	If No, go to P16

	small increase in breathing or heart rate such as brisk walking (cycling, swimming) for atleast 10 minutes continuously?	NO <input type="checkbox"/>	
P14	In a typical week, on how many days do you do moderate - intensity sports, fitness or recreational (leisure) activities?	Number of days <input type="checkbox"/>	
P15	How much time do you spend doing moderate- intensity sports, fitness or recreational (leisure) activities on a typical day?	Hours <input type="checkbox"/> Minutes <input type="checkbox"/>	
P16	How much time do you usually spend sitting or reclining on a typical day?	Hours <input type="checkbox"/> Minutes <input type="checkbox"/>	

6.2 INTERVIEW SCHEDULE IN HINDI

!9नावलक

() मक संय -

वड 1 का नाम -

मई शहर म8 एक शहर : लम ;े= क यव महलाओं (18-25 वष1 क आय) म8 दैनक शक गतावध : तर और इसके

सहसंश पर एक वणनामक अडययना'

समाजशाक्ष'ीय *ववरण

सामाक्ष जानकारी

कोड	सवाल	जवाब
A1	जम क तारख	दिन..... महना..... वष.....
A2	आपक पण 1 आय डया है? वष1
A3	आपका उचतम)शःा : तर डया है? (जो भी उपयडत हो उस पर सहक का नशान लगाएं)	i. कोई औपचारक)शःा नहकं ii. : कल(1-10वै) <input type="checkbox"/> iii. जनयर कालेज(11- 12वै) <input type="checkbox"/>

		<p>a. विमान <input type="checkbox"/></p> <p>b. commerce <input type="checkbox"/></p> <p>c. कला <input type="checkbox"/></p> <p>iv. बडेलोम/ : नाटक</p> <p>v. पोर्टेजेशन</p>
A4	<p>क्या आप अभी कार्यरत/जोब करती हैं?</p> <p>(जो भी उपयुक्त हो उस पर सहक का धनशान लगाएं)</p>	<p>i. हैं a. पण क ालक <input type="checkbox"/></p> <p>b. पाट टाइम <input type="checkbox"/></p> <p>ii. नहीं <input type="checkbox"/></p>
A5	<p>अगर नौकर कर रहे हैं, तो आपका पेशा क्या है?</p>	<p>i. कशल <input type="checkbox"/></p> <p>ii. अकशल <input type="checkbox"/></p> <p>iii. अिध कशल <input type="checkbox"/></p>
A6	<p>आपका वैवाहिक ि:थत क्या है?</p>	<p>i. विवाहित</p> <p>ii. अविवाहित</p> <p>iii. अलग/तलकशद</p>

B1	<p>आपके परिवार के सदस्य कौन हैं?</p> <p>(उपयुक्त बॉक्स/बॉक्स पर टिक करें)</p>	<p>पति <input type="checkbox"/></p> <p>बच्चे <input type="checkbox"/></p> <p>यदि हैं तो बच्चे का संख्या</p> <p>बच्चे/बच्चों का उ।</p> <p>.....</p> <p>माँ <input type="checkbox"/></p> <p>पिता <input type="checkbox"/></p> <p>भाई/बहन <input type="checkbox"/></p> <p>दोनों <input type="checkbox"/></p> <p>दादा-दादी <input type="checkbox"/></p> <p>चचेरे भाई/बहन <input type="checkbox"/></p> <p>सास <input type="checkbox"/></p> <p>ससर <input type="checkbox"/></p>
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		भाभी <input type="checkbox"/> बहनोई <input type="checkbox"/> अंकल/आंटक <input type="checkbox"/>
B2	आपके पिता का शोका व्यक्त है? (उचित उमर पर एनशान लगाएं) (केवल आववाहित होने पर ला)	i. सल; र- : कलक) श; ा के साथ नबना : क लक) श; ा के ii. ेजएट iii. पोसत ेजएट
B3	आपका माता का शोका व्यक्त है? (उचित उमर पर एनशान लगाएं) (केवल आववाहित होने पर ला)	i. सल; र- : कलक) श; ा के साथ नबना : क लक) श; ा के ii. ेजएट iii. पोसत ेजएट
B4	आपके पति का शोका व्यक्त (केवल आववाहित होने पर ला)	i. सल; र- : कलक) श; ा के साथ नबना : क लक) श; ा के ii. ेजएट iii. पोसत ेजएट

B5	आपके पिता का व्यवसाय क्या है (केवल आवश्यक होने पर लागू)	i. कशल ii. अकशल iii. अधि कशल
B6	आपके माता का व्यवसाय क्या है (केवल आवश्यक होने पर लागू)	i. कशल ii. अकशल iii. अधि कशल
B7	आपके पति का व्यवसाय क्या है (केवल आवश्यक होने पर लागू)	i. कशल ii. अकशल iii. अधि कशल
B8	आपके रशन कार्ड का रंग कैसा है?	पीला लाल सफेद
B9	यदि आप आवश्यक ह तो आप कहाँ रहती ह?	i. ससुराल वाल के साथ ii. नबना ससुराल के अलग

अब मैं आपसे एक सौभाग्य हूँ तो मैं आपके विवरण शीघ्रतः (यथाशक्ति) नबनाये गए सम्प्रेषण में

पूछूँगी।

यह ज़रूर है कि 90 नैनो का उमर देने के समय आप अपने एक सामाजिक हक के बारे में सोचें। केवल एक सप्ताह के बारे में

मैं (यदि आपका हक आपके सामाजिक हक से अलग भी हो सकता है)

जैसे कि कोई पारिवारिक समारोह हो सकता है या आप घमने के लिए कहें बाहर गए हो सकते हैं।

क) वजह से आपके सामाजिक खानपान में बदलाव आया हो सकता है। इस लिए यह ज़रूर है कि एक सामाजिक / टिप (टाइपकल)

हक के बारे में सोचें।

अगर आप अपने आप को शारीरिक रूप से (या शील नहीं मानते तो भी इन 90 नैनो का उमर ज़रूर, ज्यादा बेहतर समझ के लिए)

हमने शारीरिक (या शीलता को) शोका संथा में अथवा घर पर अथवा मनोरंजन के लिए करवाई (या शीलता में बाधा है।

सबसे पहले मैं आपसे शोका संथा में शारीरिक (या शीलता में नवाये गए समारोह में पछती है

अन (मांक)	शान	लेटर (या)		
C1	यदि आजकल (पछले 12 महीने) आप रकसी शोका संथान में पढ़ाई कर रहे हैं?	है/ नहीं (जो उचित लगे उस शक का एनशन लगायें)		
	इन सभी अवसर पर शोका संथा में आप रकतने दिन अथवा दिन दिन र (या शील होते हैं उन में कौन शारीरिक रूप से र (या शील होते हैं			

	अवसर (याद रखें केवल उन अवसरों को गिने जब आप कम से कम 10) मिनट तक र (याशील रहते हैं)	इस !कार क गृहतावध आमतौर पर इस अवसर के दौरान क जाती है (कोई गृहतावध नहीं = 0 मसयम = 1 जोरदार = 2) (गृहतावध नहीं है तो अगले अवसर पर शुरू	हृतेष रकतने दिन	सेषन क अवध (मिनट म8))मिनट
C2a	सबह क असठबलक			
C2b	लंच क			
C2c	कालेज के शुरु होने या खतम होने			
C2d	रकसी (>8 क खास कोचिंग)			

एन) न) लेखत !9नन के लिए, ! हतभागी से काम पर, घर पर, :थान पर आने-जाने, या दो: तन के साथ समय नबताने [दो: क पर बठने,

दो: तन के साथ बठने, कार, बस, इन म8 या-1 करने, पढ़ने, [क देलकावजन दे खना], तो-कन सोने म8 नबताया गया समय शो) मल

नहीं है।

[उदाहरण डालें] (शोकाड 1 का !योग क8)

आसीन 0यवहार

D1	एक सामाह्य दिन म8 आप आमतौर पर काम पर/ : कल/कॉलेज म8 बठने या करने म8 रकतना समय व्यतीत करते ह?	घंटे <input type="checkbox"/>)मनट <input type="checkbox"/>
D2	एक सामाह्य दिन म8 यात्रा करते समय (बस/ट्रेन/रिजिस्ट्रार से) आप आमतौर पर क्या लेटने म8 रकतना समय व्यतीत करते ह?	घंटे <input type="checkbox"/>)मनट <input type="checkbox"/>
D3	रकसी सामाह्य दिन म8 आप आमतौर पर खेलकद, रफटनेस या मनोरंजक (अवकाश) गतिवाधयन म8 बठने या लेटने म8 रकतना समय व्यतीत करते ह?	घंटे <input type="checkbox"/>)मनट <input type="checkbox"/>
D4	एक सामाह्य दिन म8 आप रकतना समय बैठ कर या लेट कर टक वी दे खने या कं सट र पर काम करने या फोन या टेबलेट पर गेम खेलने म8 समय व्यतीत करते ह?	घंटे <input type="checkbox"/>)मनट <input type="checkbox"/>

शार23रक ग6त*व8ध के ;लए बाधाएं

! एतभाग से केवल उरकं उमर का उमर देने के)लए कहा जाएगा जो पछले 6 महकन से लाग ह ।

भाएतक वताकरण

E1	यया आपके पड़ोस म8 शरकरक गतिवाध करने के)लए कोई सावधा उपलब्ध है?	हाँ <input type="checkbox"/>	नहक <input type="checkbox"/>
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E2	<p>आपके पड़ोस में शारीरिक गतिविधि के लिए कौन-कौन सी सावधानियाँ उपलब्ध हैं?</p> <p>(उपयुक्त बाँस पर टिक करें)</p>	<p>पाक</p> <p>जिम</p> <p>खले मैदान</p> <p>नृत्य/कराटे/ताइक्वाण्डो</p> <p>कोई भी नहीं</p> <p>उपरोक्त में से कोई नहीं, यदि कोई अन्य है तो बताएं</p> <p>.....</p>
E3	<p>क्या आप इन सावधानियों तक पहुंच पाते हैं?</p>	<p>हाँ <input type="checkbox"/></p> <p>नहीं <input type="checkbox"/></p> <p>हाँ घर पर <input type="checkbox"/></p>
E4	<p>क्या आपको लगता है कि आपका पड़ोस शारीरिक गतिविधि के लिए पर्याप्त सुरक्षित है?</p> <p>(उचित उमर पर टिक करें)</p>	<p>हाँ <input type="checkbox"/></p> <p>नहीं <input type="checkbox"/></p>

E5	यदि नहीं, तो क्यों?	शराबी / ड्रग एडिक्टेड्स यातायात/वाहन क> समस्या आवारा जानवर :आँट लाइट कम सड़क पर खला नाला/कचरा अंधा (एनफोर्टेड कर)
E6	क्या आप अपने घर पर व्यायाम, योग, जिबनक्या या अंधा शारकरक गतावाध करते ह?	हाँ 0 नहीं 0 यदि हाँ, तो एनफोर्टेड कर

सामाजिक वातावरण

E7	क्या आपका परिवार शारकरक गतावाध के) लिए कोई	हाँ 0
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	<p>सहायता ! दान करता है? (उपयुक्त बॉस पर टिक करें)</p>	<p>नहीं <input type="checkbox"/></p>
E8	<p>परिवार का कोई सदस्य दैनिक शौचालय गेटावधि जैसे जिम, बैंक, योग, कोई खेल मठ शौचालय मल है? (उपयुक्त बॉस पर टिक करें)</p>	<p>हां <input type="checkbox"/></p> <p>नहीं <input type="checkbox"/></p>
E9	<p>शौचालय गेटावधि मठ बाधा डालने वाला कोई भी कारक (उपयुक्त बॉस/बॉस पर टिक करें)</p>	<p>परकः <input type="checkbox"/></p> <p>काम का दबाव/समय <input type="checkbox"/></p> <p>व्यसन / कॉलेज का समय <input type="checkbox"/></p> <p>बेस कोड <input type="checkbox"/></p> <p>परिवार से ! दूरबन्ध <input type="checkbox"/></p> <p>बच्चे को देखभाल <input type="checkbox"/></p> <p>व्यस्त कार्य (म इस) लिए समय नहीं है <input type="checkbox"/></p> <p>घर के काम <input type="checkbox"/></p>

		अक्षय (Enfद1:ट कर8)
E10	शारकरक गEतावजध के) लए : कल/कॉलेज से !ोQसाहन ककोई भी wप जैसे पी. ई अवजध, खेल, खेल आयोजन, !) श;ण) शIवर (उपयZत बाँZस पर fटक कर8)	हं नहकं यfद हं, तो Zय। Enfद1:ट कर8
E11	आपके िवारा आमतौर पर खेल। जाने वाल। कोई खेल? (उपयZत बाँZस/बाँZस पर fटक कर8)	भागन। <input type="checkbox"/> खो खो <input type="checkbox"/> कबडडी <input type="checkbox"/> बैड)मटन <input type="checkbox"/> r (के ट <input type="checkbox"/> फ़टबाँल <input type="checkbox"/> कैस <input type="checkbox"/>

		शतरंज <input type="checkbox"/> कोई दस रा
E12	Zया आप खद को िरत महसस करते ह या सोचतेहक आपके)लए शरकरक गहतावध करना महवपण 1 है?	हां नहकं यद नहकं, तो Zया एनद1 कः
E13	Zया आपके घर मः कोई अपाहज ंयत आपके सथ है?	हां नहकं
E14	यद आप काम/शः/ा/अवकाश/मनोरंजक गहतावधके)लए बाहर जाते ह तो Zया आपके घर मः बचके को करने वाला कोई और है?	हां नहकं

ंयतगत गण

E15	Zया आपको कोई परनी बीमारक कः िथत है या आप फलते 6 महना मः रकसी भी हालत मः अः पताल मः भतः सहकपय। उचिनत कः यद ह।	नहकं <input type="checkbox"/> हां - 9वसन <input type="checkbox"/>
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		<p>जीआईटक <input type="checkbox"/></p> <p>श्रवण / आंख / कान <input type="checkbox"/></p> <p>काष्ठ / लोहा : कलर <input type="checkbox"/></p> <p>मधमेह <input type="checkbox"/></p> <p>कोई अक्षय, कपय। एन। द। ट क।</p> <p>.....</p>
E16	<p>य। आपको पछले 6 महान। म। कोई उलखत ! जनन</p> <p>व।: ये समय। हई है?</p> <p>(उपयुक्त बॉस/बॉस पर टक क।)</p>	<p>नहं <input type="checkbox"/></p> <p>हं,</p> <p>अनय) मत मा) सक</p> <p>धम/। पीरयंस <input type="checkbox"/></p> <p>i. कम (<3 दिन)</p> <p>ii. अजधक (>5 दिन)</p> <p>बार-बार मा) सक धम। (<21 दिन)</p> <p><input type="checkbox"/></p>

		<p>देर से मासक धम1 (>35 दिन) <input type="checkbox"/></p> <p>पेट के एनचले fह:से म8 दद1 <input type="checkbox"/></p> <p>दद1 नाक अवजध <input type="checkbox"/></p> <p>कमजोर/थकान <input type="checkbox"/></p> <p>दग ध यZत गंध <input type="checkbox"/></p> <p>यो:न ाव + बखार <input type="checkbox"/></p> <p>पेशाब करते समय जलन होना <input type="checkbox"/></p> <p>कोई अक्षय, कपय। एनद1 िट कर8</p>
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मानवशास्त्रीय माप

!9नावलक के बाद सां:ाQकारकता1 िवारा इनक> जांच क> जाएगी।

F1	ल) बाई (स8ट:मोटर म8)	
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F2	वजन (रकलोलोम म8)	
F3	कमर पारध (स8टकमोटर म8)	
F4	रतचप	एसबीपी1 डीबीपी1 एसबीपी2 डीबीपी2

आहार संबंधी भागीदार

G1	आहार का !कार	शाकाहारक मांसाहारक
G2	एक दिन म8 भोजन म8 शा)मल फलN क> संभय।	
G3	एक दिन म8 रकतनी बार क\ची सिंजयN को भोजन म8 शा)मल रकया जाताह	
G4	एक दिन म8 आप रकतनी बार घर का बना खान। नहं खते ह	

GPAQ

आब आप घर पर करने वाले काय1 के बारे म8 सोच8 (अगर आप : कल या कालेज म8 जतेहो वहां नबताये गए समय को इस म8

न गने) काय1 म8 यह सब आता है काय1 िजसके)ले आपको भगतान)मलता है या

नहं)मलता है, पढाई, रकसी !कार क> हेनग, घर के काम-काज, फसल क> कटाई, मछलाक पकड़ना

करना या नौकर क> तलाश करनासमय ोयथ1 करने अथवा आवारागद को भी एस म8 शा)मल क8 ।

अगले कुछ 19 न के उमर देते समय यह स्थान रखे रक भारक मेहनत शारकरक र (या का अथ है वह र (याएं िजसमे शरर को ज़ोर लगाना पड़ता है और िजस से 9 वास लेने तथा दिय गत काफ) बढ़ जाती है । मसयम मेहनत शारकरक र (या का अथ है वह र (याएं िजसमे शरर को कुछ कम ज़ोर लगाना पड़ता है और िजस से 9 वास लेने तथा दिय गत थोड़ी हक बढ़ती है ।

P1	<p>यया आपका काम (घर पर भारक मेहनत वालक शारकरक BC या िजस से 9 वास लेने तथा दिय गत काफ) बढ़ जाती है) करना पड़ती है जो रक आप कमसे कम 10) मिनट तक लगातार करते हो (जैसे भार उठाना, भारक सामान लेना, या खदाई या एनमण काय)</p>	<p>हैं</p> <p>नहक</p>	<p>यद नहकं, तो P4 पर जाएं</p>
P2	<p>एक सामांय हकते म8 आप अपने घर या काम के दौरान रकतने भारक मेहनत वालक शारकरक र (या करते ह ?</p> <p>(सामांय हकते का अथ है एक सताह जब ! एतभागी अपनी गतवधयन म8 यः त रहती है। मांय ! एतर (याए 1-7 तक होती ह)</p>	<p>दिन</p> <p>क)</p> <p>संय</p>	
P3	<p>एक सामांय दिन जब आप घर या काम के दौरान भारक मेहनत वालक शारकरक र (या करते ह , तो उस म8 रकतने समय नबताते ह ?</p>	<p>) मिनट</p> <p>घंटे</p>	
P4	<p>यया आपको अपने रोजमा के काम म8 मडयम मेहनत वालक शारकरक र (या करना पड़ती है िजस से 9 वास लेने तथा दिय गत कुछ बढ़ जाती है जो क</p>	<p>हैं</p> <p>नहक</p>	<p>यद नहकं, तो P7 पर जाएं</p>

	<p>कम से कम 10)मिनट तक लगातार करते हो (जैसे तेज चलना , कुछ झूठ कर लाना से जाना, हाथ से कपड़े धोना , घर में झाड़ू या पोछा लगाना, कूड़े से पानी निकालना, पीने का पानी बोरे से भर कर लाना, घर में बागवानी करना इत्यादि)</p>		
P5	<p>एक सप्ताह में आप अपने काम के दौरान कितने दिन मध्यम गति से चलते हैं ?</p> <p>(या करते हैं ?)</p> <p>(1) शहर से आने का अर्थ है एक सप्ताह में ! एतद्भाषी अपनी समस्त गतिविधियों में व्यस्त रहता है।</p> <p>मध्यम ! एतद् (या 1-7 तक है)</p>	<p>दिन</p> <p>क</p> <p>संख्या</p>	
P6	<p>एक सप्ताह में : दिन जब आप घर या काम के दौरान मध्यम गति से चलते हैं ?</p> <p>शहर से आने का अर्थ है, तो उस समय कितने दिन बताते हैं ?</p> <p>(! एतद्भाषी से उस शहर में आने के बारे में सोचने के) लिए कहें कि वह कर सकती है, जिसमें वह</p> <p>: कल/कॉलेज/काय : थल पर मध्यम गति से चलते हैं मध्यम गति से चलती हैं ! एतद्भाषी को भी विचार करना</p> <p>चाहिए कि गतिविधियों में 10)मिनट या उससे अधिक समय तक चलें जाते हैं। सड़क पार करने के</p> <p>लिए बहुत उच्च ! एतद् (या 4 घंटे से अधिक जानें)</p>	<p>)मिनट</p> <p>घंटे</p>	

अगला आप मंजूर : कल या कॉलेज या बाजार या वॉशिंग के) लिए आने जाने के बारे में मध्यम बताएं।

P7	<p>यदि आप : कल या कालेज या बाजार या व्यशन के) लिए आने जाने के) लिए पैदल चल कर या साइकल चला कर आते हैं (परीक्षा : ता या रफर साते का कछ फहःसा)</p> <p>(याद रखें केवल तब बताएं जब आप कम से कम 10) मिनट चल कर या साइकल चला के जाते हैं)</p>	<p>चल.....1 <input type="checkbox"/></p> <p>साइकल....2 <input type="checkbox"/></p> <p>नहीं.....3 <input type="checkbox"/></p> <p>दोनों.....4 <input type="checkbox"/></p>	यदि नहीं तो P10 पर जाएं
P8	<p>यदि हाँ, चल कर या साइकल चला कर आते जाते ह तो अगले मिनट कतने मिनट साइकल चला कर या पैदल चल कर आते जाते ह ?</p>	मिनट का संख्या	
P9	<p>एक ऐसे मिनट जब आप साइकल चला कर या पैदल चल कर आते जाते ह, तो उस मिनट कतने मिनट बताते ह? (आगे जाने के) या जोड़ कर बताएं)</p>	<p>) मिनट</p> <p>घंटे</p>	

अगले !9न का जवाब दते समय उन सब गतिविधय को हटा दो जो आप उपर पछे भाग या मसम

मेहनत वाला गतिविधय या कहकं आने जाने के सवाल के जवाब म8 बता चके ह । अब मैं आगे

कद, अपने को चतः तदः तखने तथा मनोरंजक (>डाओं के बारे म8 !9न पछगी ।

P10	<p>एक सामान्य हकते म8 उपरोक्त के अलावा आप कतने मिनट समय भारत मेहनतवाला शारकफरक र (या करते ह जो क आपके मनोरंजन के) लिए होती है</p> <p>जैसे फट बाल खेलना? सब को जोड़ कर कल समय बताएं। (उपयोग ! ! एतभागी को केवल मनोरंजक जोरदार गतिविधय के बारे म8 सेनेके) लिए कह। गतिविधय को जोरदार तीव्रता के wप म8 माना जाता है यदि वे</p> <p>9वास और/या षदय गत म8 बड़ी विध का कारण बनते ह। (व) शकत सका मतलब एक सतह होता है जब ! एतभागी यः त होती है</p>	हाँ	यदि
		नहीं	नहीं,
		नहीं	तो
			P13

			पर जाएं
P11	एक सामाह्य हते म8 आप रकतने दिन भार2 मेहनत वाले खेलन या गेटावधयन म8 भाग लेते ह?	दिन क संय	
P12	एक सामाह्य दिन जब आप भार2 मेहनत वाले खेलन या मंजक गेटावधयन म8 भाग लेते ह, तो उस म8 रकतन समय बताते ह?	मनट घंटे	
P13	य आप रकसी मध्यम मेहनत वाले खेलन या मनोरंजक गेटावधयन म8 भाग लेते ह जिस से 9वास लेने तथा दिय गेट कछ बढ़ जाती है अथ जो रक कम से कम 10)मनट तक लगातार करते हो जैसे रक तेज चलना, साइरक)लमं, तैराक), वोलबॉल खेलन।	हैं नहक तो P16 पर जाएं	यदि नहीं, तो P16 पर जाएं
P14	एक सामाह्य हते म8 आप रकतने दिन मध्यम मेहनत वाले मनोरंजक गेटावधयन म8 भाग लेते ह?	दिन क संय	
P15	एक सामाह्य दिन जब आप मध्यम मेहनत वाले खेलन या मंजक गेटावधयन म8 भाग लेते ह, तो उस म8 रकतन समय बताते ह?	मनट घंटे	
P16	रकसी सामाह्य दिन म8 आप आमतौर पर खेलकद, रफटनेस या मंजक (अवकाश) गेटावधयन म8 बठने या लेटने म8 रकतन समय यतीते	मनट	

			षडे	
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REFERENCE FOR QUESTIONNAIRE - ENGLISH AND HINDI

GPAQ - WHO and (Mathur et al., 2021)

Prevalence and Correlates of Insufficient Physical Activity Among Adults Aged 18–69 Years in India: Findings From the National Noncommunicable Disease Monitoring Survey

6.3 PARTICIPANTS INFORMATION SHEET (IN ENGLISH)

‘A DESCRIPTIVE STUDY ON PHYSICAL ACTIVITY LEVEL AND ITS CORRELATES IN YOUNG WOMEN (18-25 YEARS) OF AN URBAN SLUM REGION IN MUMBAI CITY.’

I am Sanskruti Sharma, a BDS graduate and currently studying Master of Public Health in Achutha Menon Centre for Health Science Studies (AMCHSS) at Sree Chitra Tirunal Institute for Medical Science and Technology (SCTIMST) , Trivandrum, Kerala.. As part of my MPH course I will be undertaking a study on ‘A DESCRIPTIVE STUDY ON PHYSICAL ACTIVITY LEVEL AND ITS CORRELATES IN YOUNG WOMEN (18-25 YEARS) OF AN URBAN SLUM REGION IN MUMBAI CITY.’

For this study I will be making use of a tool GPAQ and a self made questionnaire asking the participating girls about their physical activity levels, the barriers they face while achieving it and any chronic disease they have. Including the participant in the study would mean that the researcher will be asking the questions from the questionnaire to her who will be completing it. Participation in this study does not pose any risk to the participant. As part of this the researcher will also be taking height, weight and waist circumference (only over clothing) for calculating BMI (Body Mass Index) and Blood pressure measurement by using a digital Blood pressure machine. There may be slight discomfort when the measurements are made however it will be done with utmost care. If the participant is not willing then their measurements will not be taken.

The GPAQ tool used will only be about knowing your amount and duration of physical activity while working, travelling and resting. The questionnaire will help us know the relation between your physical activity levels and the barriers and facilitators to it.

All the information provided by the participant will not be shared with anyone including parents, community health workers, neighbours and friends. It will remain between the participant and me that is the investigator. Also there will be no need for them to write down their name, phone number, address on the questionnaire.

I have taken permission from the concerned authority for conducting this study. Your participation is valuable but also voluntary.

For any queries please contact,

Dr. Sanskruti Sharma, Master of Public Health Scholar, Achutha Menon Centre For Health Science Studies (AMCHSS), Sree Chitra Tirunal Institute For Medical Science and Technology (SCTIMST) , Trivandrum, Kerala.

Dr. Srinivas G.

Member Secretary

Institutional Review Board

SCTIMST, Trivandrum, 695011

Office - 04712524689

Email id - iec.mem.sec@sctimst.ac.in

INFORMED CONSENT

I have read the information sheet provided to me and have understood the entire contents I have got opportunities to clarify my doubts.

I voluntarily agreed to participate in the study. I have understood that I can withdraw this consent any time without affecting any of my entitlements.

PLEASE TICK THE RESPONSE

YES, I am willing to participate

NO, I am not willing to participate

6.4 PARTICIPANT INFORMATION SHEET IN HINDI

प्रतिभागियों की सूचना पत्र (हिंदी में)

'मुंबई शहर में एक शहरी स्लम क्षेत्र की युवा महिलाओं (18-25 वर्ष की आयु) में शारीरिक गतिविधि स्तर और इसके सहसंबंधों पर एक वर्णनात्मक अध्ययन।'

मैं संस्कृति शर्मा हूँ, एक बीडीएस स्नातक और वर्तमान में श्री चित्रा तिरुनल इंस्टीट्यूट फॉर मेडिकल साइंस एंड टेक्नोलॉजी (एससीटीआईएमएसटी), त्रिवेंद्रम, केरल में अच्युत मेनन सेंटर फॉर हेल्थ साइंस स्टडीज (एएमसीएचएसएस) में मास्टर ऑफ पब्लिक हेल्थ की पढ़ाई कर रही हूँ। मेरे एमपीएच पाठ्यक्रम के हिस्से के रूप में मैं 'मुंबई शहर में एक शहरी स्लम क्षेत्र की युवा महिलाओं (18-25 वर्ष की आयु) में दैनिक शारीरिक गतिविधि स्तर और इसके सहसंबंधों पर एक वर्णनात्मक अध्ययन।' पर एक अध्ययन करूंगी।

इस अध्ययन के लिए मैं एक टूल *GPAQ* और एक स्व-निर्मित प्रश्नावली का उपयोग करूंगी, जिसमें भाग लेने वाली लड़कियों से उनके शारीरिक गतिविधि के स्तर और इसे प्राप्त करने के दौरान आने वाली बाधाओं के बारे में पूछा जाएगा। अध्ययन में प्रतिभागी को शामिल करने का अर्थ यह होगा कि शोधकर्ता उसे प्रश्नावली वितरित करेगी जो इसे पूरा करेगी। इस अध्ययन में भाग लेने से प्रतिभागी को कोई जोखिम नहीं होता है। इसके भाग के रूप में बीएमआई (बॉडी मास इंडेक्स) की गणना के लिए शोधकर्ता ऊंचाई, वजन और कमर की परिधि (केवल कपड़ों पर) भी लेगा। माप करते समय थोड़ी परेशानी हो सकती है।

सकती है हालांकि इसे अत्यंत सावधानी के साथ रखा जाएगा। यदि ! तभी इच्छक नहीं है तो उक्त माप नहीं लक जायेगी।

उपयोग किया जाने वाला **GPAQ** टूल केवल काम करने, यात्रा करने और आराम करने के दौरान आपकी मात्रा और शारीरिक गतिविधि की अवधि जानने के बारे में होगा। प्रश्नावली आपकी शारीरिक गतिविधि के स्तरों और इसमें आने वाली बाधाओं और सहायकों के बीच के संबंध को जानने में हमारी मदद करेगी।

आपके द्वारा प्रदान की जाने वाली सभी जानकारी माता-पिता, सामुदायिक स्वास्थ्य कार्यकर्ता, पड़ोसियों और आपके मित्रों सहित किसी के साथ साझा नहीं की जाएगी। यह आपके और मेरे बीच रहेगा। साथ ही आपको प्रश्नावली पर अपना नाम, फोन नंबर, पता लिखने की कोई आवश्यकता नहीं होगी।

मैंने इस अध्ययन के संचालन के लिए संबंधित प्राधिकरण से अनुमति ली है। आपकी भागीदारी मूल्यवान है लेकिन स्वैच्छिक भी है।

किसी भी प्रश्न के लिए कृपया संपर्क करें

डॉ. संस्कृति शर्मा, मास्टर ऑफ पब्लिक हेल्थ : कॉलर, अत्यंत मेनन सडर फॉर हेल्थ साइंस : टडीज

(AMCHSS), सी जेम्स एतनल इंस्टीट्यूट

फॉर मेडिकल साइंस एंड टेक्नोलॉजी (SCTIMST), नंबर 86,

केरल।

मोबाइल नंबर - 8369216288, ईमेल आईडी - sanskritisharma@sctimst.ac.in

डॉ श्रीनिवास जी.

सदस्य सचिव

संस्थागत समीक्षा बोर्ड

एससीटीआईएमएसटी, त्रिवेंद्रम, 695011

ऑफिस - 04712524689

ईमेल आईडी - iec.mem.sec@sctimst.ac.in

सहमत सहमत

मने मझे ! दान क संज्ञाना शीट को पढ़) लया है और पर k सामेी को समझ) लया है, मझे अपनी

शंकाओं को : पढ़ करने का अवसर) मला है।

म : वे छा के अध्ययन म8 भाग लेने के) लिए सहमत हई। म समझ गया हं रक म अपनी रकसी को ! भावत रकए नबना रकसी भी

समय इस सहमते को वापस ले सकती हं।

कपया ! एतः (या पर फटक कर8

हं, म भाग लेने को तैयार ह

नहं, म भाग लेने को तैयार नहं ह

6.5 CONSENT FORM IN ENGLISH

I....., resident of
....., aged..... Years hereby state that I have read the information provided to me regarding the study '**A DESCRIPTIVE STUDY ON PHYSICAL ACTIVITY LEVEL AND ITS CORRELATES IN YOUNG WOMEN (18-25 YEARS) OF AN URBAN SLUM REGION IN MUMBAI CITY.**' I understand that my participation in the study is entirely based on my consent and it is voluntary. I realise that the study will do no harm to me and there are no direct benefits to me by taking part in the study. I also understand that my identity and personal information will be kept confidential.

I voluntarily choose to participate in this study. I have duly received the participant information sheet provided by the investigator.

Name

Signature

Date

6.6 CONSENT FORM IN HINDI

सहमत फॉर्म- 18 साल और उससे ऊपर के Ectभागया के ;लए

म , Eनवासी , आय वष1 एतदिवारा बताती हं

rक मेरे पास है असयन के संबंध म8 मझे !दान क गई जानकारी पढ़8 'मई शहर म8 एक शहर :लम

:े= क यव महलाओं (18-25 वष1 क आय) म8 हैनक शरकरक गेतावध : तर और इसके सपर एक वणनामक असयना'

म समझती हं rक असयन म8 मेर भादिस k तरह से मेरक सहमत पर आधारत है और यह

:वै छक है। मझे एहसास है rक असयन से मझे कोई नकसान नहं होगा और इससे मझे कोई

लाभ नहं होगा असयन म8 भाग लेने से। म यह भी समझती हं rक मेरक पहचान और जानकारी गोपनीय रखी जाएगी।

म :वे छ से इस असयन म8 भाग लेने का चनाव करती हं। मझे अवेपक विवारा !दान क ई

! Eतभागी सचना प= विवधत !ात हो गया है।

नाम

ह: तार

तारख



श्री चित्रा तिरुनाल आयुर्विज्ञान और प्रौद्योगिकी संस्थान, त्रिवेन्द्रम
तिरुवनन्तपुरम - ६९५०११, केरल, इंडिया

SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES AND TECHNOLOGY, TRIVANDRUM
Thiruvananthapuram - 695 011, Kerala, India
(An Institute of National Importance under Govt. of India)

Grams : Chitramet, Phone : +91-471-2443152, Fax : +91-471-2550728 / 2446433, E-mail : sct@sctimst.ac.in, Website : www.sctimst.ac.in

Institutional Ethics Committee
(IEC Regn No. ECR/189/Inst/KL/2013/RR-21)

SCT/IEC/2001/MARCH/2023

18.04.2022

Dr. Sharma Sanskruti Madhusudhan
MPH Student, AMCHSS
SCTIMST, Thiruvananthapuram

Dear Dr. Sharma Sanskruti Madhusudhan,

The Institutional Ethics Committee held on 18th March, 2023, reviewed and discussed your application to conduct the study titled "A DESCRIPTIVE STUDY ON DAILY PHYSICAL ACTIVITY LEVEL AND ITS CORRELATES IN YOUNG WOMEN (18-25 YEARS OLD) OF AN URBAN SLUM REGION IN MUMBAI CITY (IEC/2001)".

The following members of the Ethics Committee were present at the meeting held on 18th March, 2023.

SL. No.	Member Name	Highest Degree	Gender	Scientific /Non Scientific	Affiliation with Institution(s)
1.	Smt. Sathi Nair	MA (English Literature)	Female	Lay Person	No
2.	Dr. Pradeep S	MBBS, MD	Male	Basic Medical Scientist	No
3.	Dr. Christina George	MD Psychiatry	Female	Clinician	No
4.	Dr. P. Manickam	BSMS, MSc (Epid), PhD	Male	Health Science Expert/ Social Scientist	No
5.	Adv. Priya Kaimal	LLM, MBL	Female	Legal Expert	No
6.	Dr. Biju Soman	MBBS, MD, DPH, MSc, DLSHTM	Male	Basic Medical Scientist	Yes
7.	Dr. Syam K	MBBS, MD, DM	Male	Clinician	Yes
8.	Dr. Srinivas G	PhD	Male	Basic Medical Scientist (Member Secretary)	Yes

The following documents were reviewed:

Original submission

1. Checklist Form
2. Covering letter addressed to the Chairman, IEC, SCTIMST dated 03.03.2023
3. Responses/Amendments made based on the Reviewer's comments
4. IEC Application Form
5. Declaration Form
6. Research Proposal
7. CV of Principal Investigator and Guide
8. Interview schedule in English and Hindi
9. Participant Information Sheet and Informed Consent in English and Hindi
10. SRC Recommendation Letter

Revised submission

1. Copy of IEC Recommendation letter dated 03.04.2023
2. Checklist Form
3. Covering letter addressed to the Chairman, IEC, SCTIMST dated 04.04.2023
4. IEC Application Form
5. Declaration Form
6. Research Proposal
7. Tool used for the study
8. CV of Principal Investigator and Guide
9. Interview schedule in English and Hindi
10. Participant Information Sheet and Consent Form in English and Hindi

IEC Decision

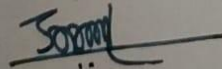
The IEC approved the conduct of the study in the present form.

Remarks:

The Institutional Ethics Committee expects to be informed about the progress of the study, any SAE occurring in the course of the study, any changes in the protocol and patient information/informed consent and asks to be provided a copy of the final report.

There was no member of the study team / Guide who participated in voting / decision making process. The ethics committee is organized and operated according to the requirements of Good Clinical Practice and the requirements of the Indian Council of Medical Research (ICMR).

Sincerely,



Dr. G. Srinivas
Member Secretary, IEC


MEMBER SECRETARY
INSTITUTIONAL ETHICS COMMITTEE (IEC)
SCTIMST, THIRUVANANTHAPURAM



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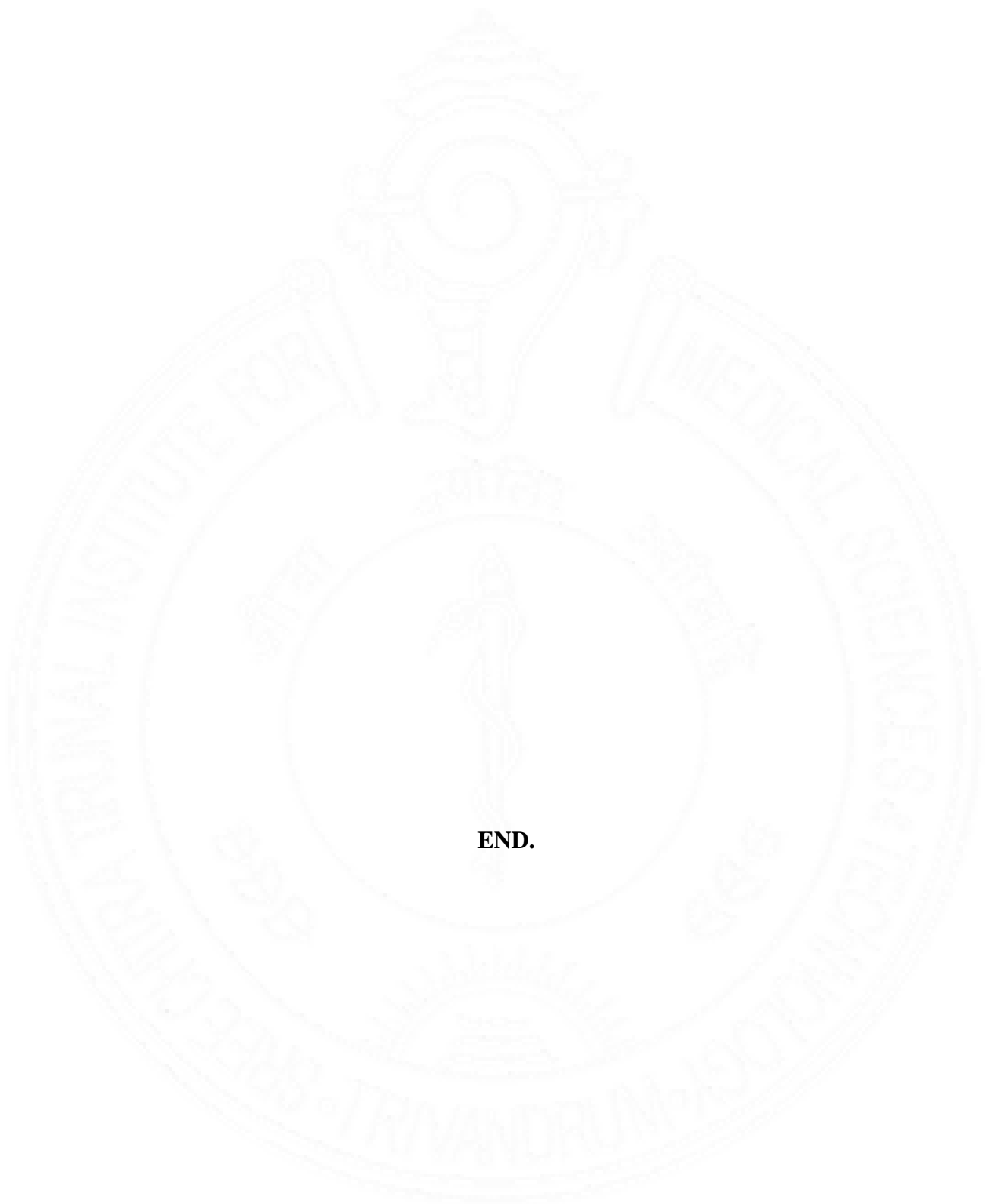
Sources included in the report

SA	HPV protocol-V0.9.docx Document HPV protocol-V0.9.docx (D159393448)	 3
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Entire Document

A DESCRIPTIVE STUDY ON PHYSICAL ACTIVITY LEVEL AND ITS CORRELATES IN YOUNG WOMEN (18-25 YEARS) OF AN URBAN SLUM REGION IN MUMBAI CITY.
DR SANSKRUTI M SHARMA Dissertation submitted in partial fulfilment of the requirements for the award of the degree of Master of Public Health
ACHUTHA MENON CENTRE FOR HEALTH SCIENCE STUDIES SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES AND TECHNOLOGY, TRIVANDRUM. Thiruvananthapuram, Kerala , India - 695011 AUGUST 2023
ACKNOWLEDGEMENTS
DECLARATION
CERTIFICATE
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END.