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# WORK RELATED MUSCULOSKELETAL DISORDERS (WRMSDs) IN HOUSEMAIDS OF MUMBAI METROPOLITAN REGION- A CROSS SECTIONAL STUDY

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***Abstract :*** When the workplace environment has a direct impact on the development of musculoskeletal disorders ,it is termed as WRMSDs. Housemaids work for continuous hours in irregular postures consisting of repetition, static postures for long hours and strain over muscles. They are unaware about ergonomics and how these factors impact their health. Due to repetitive strain, WRMSDs may reduce work efficiency and further reduce their quality of life. This study was conducted to check the WRMSDs in housemaids of Mumbai Metropolitan Region and it's correlation with age. A cross sectional study using Cornell Musculoskeletal Discomfort Questionnaire was conducted .Housemaids with minimum 1 year of experience aged between 20-60 years were included. Lower back , knee , neck and feet were the most affected regions in the population. And 31-40 was the most affected age group having higher scores of discomfort , severity and interference.

***IndexTerms*** **– Cornell musculoskeletal discomfort questionnaire, WRMSDs , musculoskeletal pain , housemaids.**

## I. INTRODUCTION

When the environment in which an individual works and the performance of that work has a direct impact on the development of musculoskeletal disorders, it is called as work related musculoskeletal disorders ( WRMSDs).[1] Work related musculoskeletal disorders arise from movements such as bending, straightening, gripping, holding, twisting, clenching , etc. These common movements are not particularly harmful in the routine activities of daily living. What makes them troublesome in work situations is the continuous repetition, often in a forceful manner, the speed of the movements and the lack of time for recovery between them.

WRMSDs are associated with work patterns that include:

- Fixed or constrained body positions.
- Continual repetition of movements.
- Considerable amount of force concentrated on hand wrist, ankles , knees.
- Speed of work that does not allow sufficient recovery between movements.

None of these factors will cause WRMSD, if acting individually . WRMSDs occur due to the combination and interaction among these factors.

Injuries obtained in the workplace are a consequence of a number of risk factors that are encountered in the working environment. These risk factors include mechanical compression, vibration, awkward posture, heat or cold, exertions, etc. Collectively, all of these factors result in excessive wear and tear on tissues over a prolonged period of time , which further results in cumulative trauma disorders and repetitive stress injuries.

A large majority of women in India work as housemaids or domestic help workers.[2] Prime duty of a housemaid is providing regular housekeeping. This includes sweeping, mopping, vacuuming, laundry and cleaning dishes, cooking, gardening or lawn maintenance. During different postures, our joints support the body frame by weight bearing. Each different posture comes with different angle of force and magnitude of force which further has an effect on the respective muscles and limbs of the joints. Also, housemaids generally do not have knowledge about ergonomics or about how their continuous postures or their work is affecting on their joints and muscles. Since , housemaids work in many households on daily basis , the exposure which the risk factors have on them increases tremendously.

Apart from the work, these women also have their own house work after they go home , which accounts for increased physical exertion. A study in housemaids in Kolkata(2020) suggests that housemaids are suffering from different grades of pain in different locations of the body.[3] WRMSDs collectively decrease the quality of life of the individual and also the work efficiency. Furthermore, musculoskeletal pain causes decrease in pain threshold and increases perceived discomfort.[4] Repetitive pain or overuse will cause increased level of inefficiency in the workplace and also hamper the individual's overall health.

Housemaids are prone to develop cardiovascular diseases due to their erroneous working postures and COG changes[5]. And such prolonged exposure to the current working conditions may bring about severe physical disability Such disabilities may drastically decrease the overall work productivity and also the individual's strength.

Being from lower socioeconomic background , there are no laws safeguarding their rights, no health security or insurance benefits, and no job security, hence housemaids usually tend to neglect the initial warning signs and this leads to a wider spectrum of musculoskeletal problems in them. Poverty , unemployment , ignorance ,Illiteracy, long hours of work with limited payment ,heavy back bending, routine physical work ,lack of job security, etc result in decreased quality of life[6]. Recent ILO study places the number of domestic workers at around 53 million. It also states that 83% of domestic workers are women and most of them are migrant workers[6]. Housemaids account for a major chunk of the unorganized sector and WRMSDs are commonly experienced among them. WRMSDs not only impose physical disorders in the individual but also result in sickness absenteeism and reduced quality of the work. WRMSDs cause a great impact due to severe long term pain issues, physical disability and accounts for a huge cost in the society.

## II. Need of study

Repetitive strain leads to musculoskeletal symptoms and reduced work efficiency. Due to lower socioeconomic status, such symptoms are usually neglected. Also, correlation between age groups and work related musculoskeletal disorders in housemaids has not been established before. Considering the above facts, if the effect WRMSDs have on housemaids can be checked , the initial warning signs of musculoskeletal system can be controlled and treated sooner and this would further prevent workplace injuries in housemaids. Hence this study was conducted.

## III. Aim

To study work related musculoskeletal disorders in housemaids of Mumbai Metropolitan Region.

## IV. Objective

1.To study about work related musculoskeletal disorders in housemaids

2.To study which age group is affected in housemaids the most.

3.To correlate between age groups and the work related musculoskeletal disorders.

## V. Hypothesis

**Null hypothesis :** There are no work related musculoskeletal disorders in housemaids of Mumbai metropolitan region.
**Alternative hypothesis : 1.**There are work related musculoskeletal disorders in housemaids of Mumbai metropolitan region.
**2.** There is correlation between the age groups and WRMSDs.

## VI. Methodology

**Study design:** Cross sectional study

**Sampling:** Convenience sampling

**Sample size:** 100
**Duration :** 1. 5 years
**Inclusion criteria:**

-Housemaids working in the Mumbai Metropolitan Region
-Housemaids aged 20 to 60 years .
-Housemaids having minimum work experience of 1 year or more.
-Housemaids having basic language proficiency in Marathi , Hindi.

**Exclusion criteria:**

- Any physical or mental impairments like amputations , neurological deficit, loss of cognition, mental retardation etc.

- Housemaids who are not willing to participate

**Instrumentation:**

- Cornell musculoskeletal Discomfort Questionnaire

The Cornell Musculoskeletal Discomfort Questionnaire (CMDQ) was developed by Professor Alan Hedge and Ergonomics students of the Cornell University .

The CMDQ is a 54-item questionnaire that includes a body chart and questions about musculoskeletal ache, pain or discomfort.

The validity of CMDQ -

Kappa coefficients ranged between 0.617 - 0.917[7].

The reliability-

Kappa coefficients ranged between 0.564-0.948, 0.589-0.972 and 0.598-0.944 for frequency, severity , interference scales respectively[7].

The rating goes as follows:

Never = 0

1-2 times/week = 1.5

3-4 times/week = 3.5

Every day = 5

Several times every day = 10

By multiplying the above Frequency score (0,1.5 , 3.5, 5, 10) by the Discomfort score (1,2,3) by the Interference score (1,2,3), final discomfort score is obtained.

## VII. PROCEDURE

-Participants were randomly selected according to the inclusion and exclusion criteria- housemaids working in Mumbai metropolitan region aged between 20 to 60 years of age.

-A consent form ( translated in marathi and hindi language ) was signed by the participants prior to the study.

-The consent form included the purpose of the study and the signature of the participants.

-Initially ,demographic data was collected of each participant - Age, weight, height, number of working hours and number of years working . A government ID was checked for proof of age.

-The participants were explained the questionnaire completely. The participants could any query related to the questionnaire. I helped the participant to understand the questionnaire if the participant had any problem in reading it out .

-Cornell musculoskeletal discomfort questionnaire[7] was given to each participant and discomfort , severity and interference was marked .

-Each participant's demographic data and the CMDQ was stapled together .

-After data collection , the data was divided into 4 sub age groups-

20 to 30 years of age

31 to 40 years of age

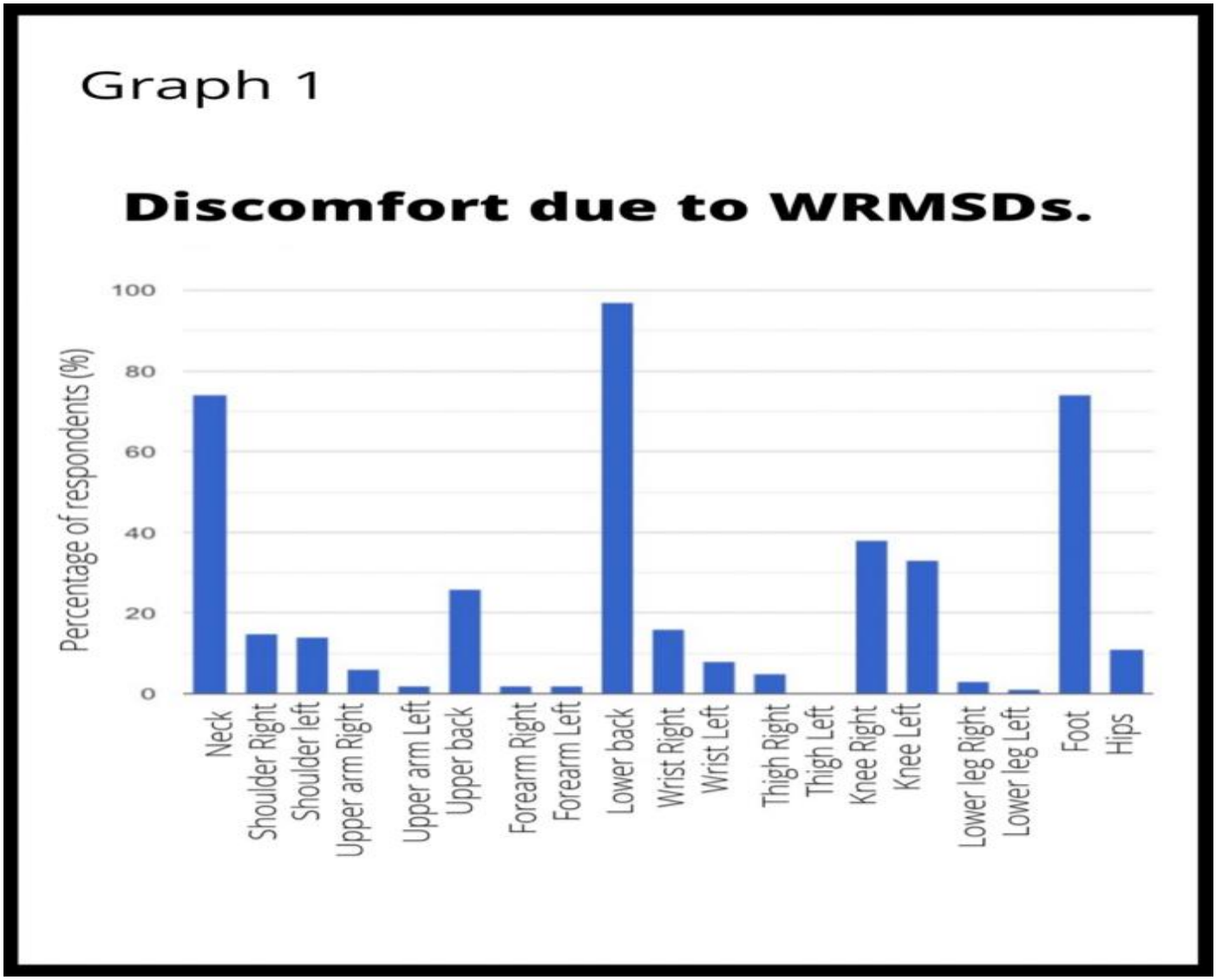
41 to 50 years of age

51 to 60 years of age.

-The musculoskeletal discomfort , severity and interference was analysed .

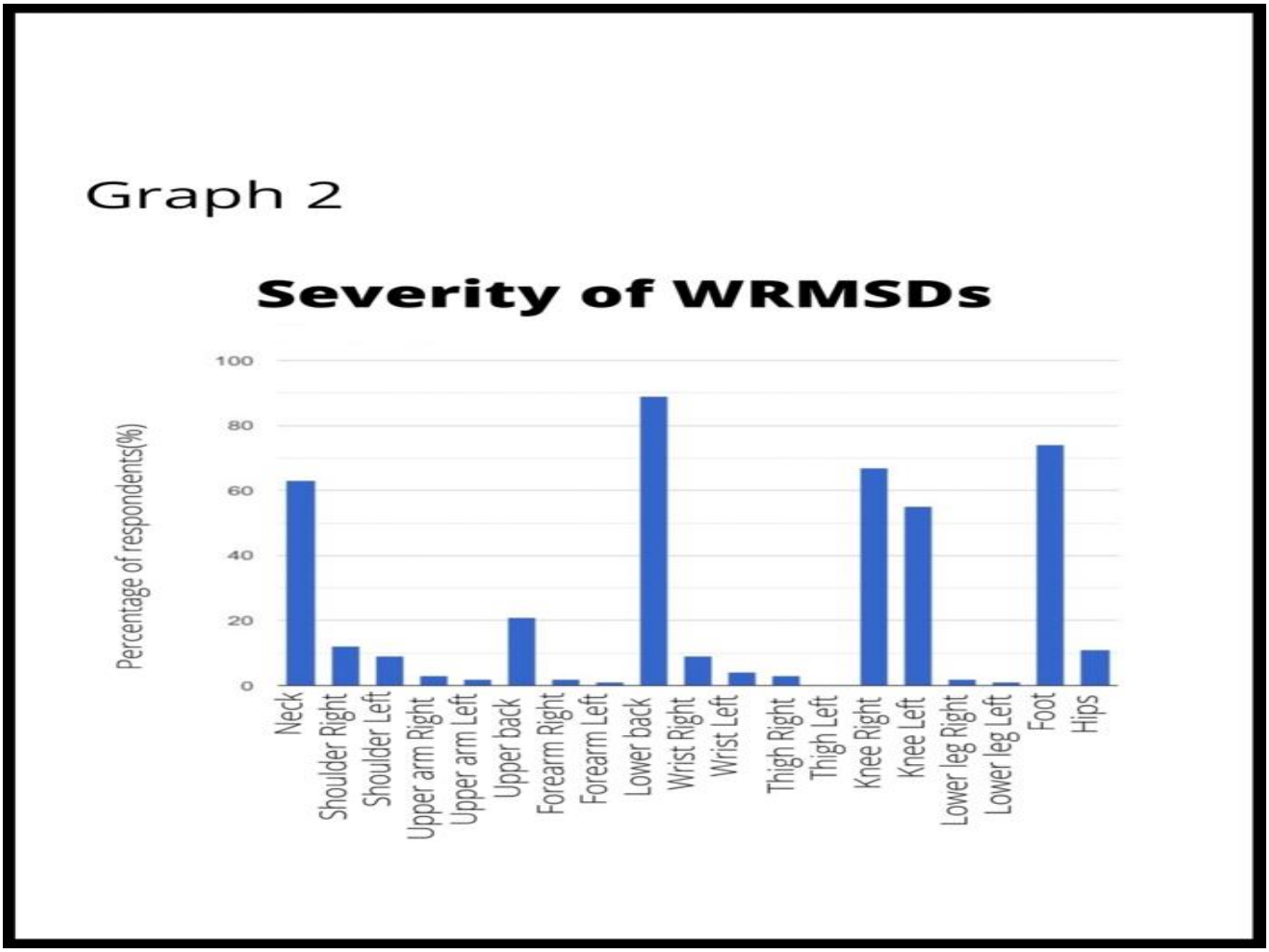
-Correlation was established between the musculoskeletal disorders and the age groups.

## VIII. RESULTS



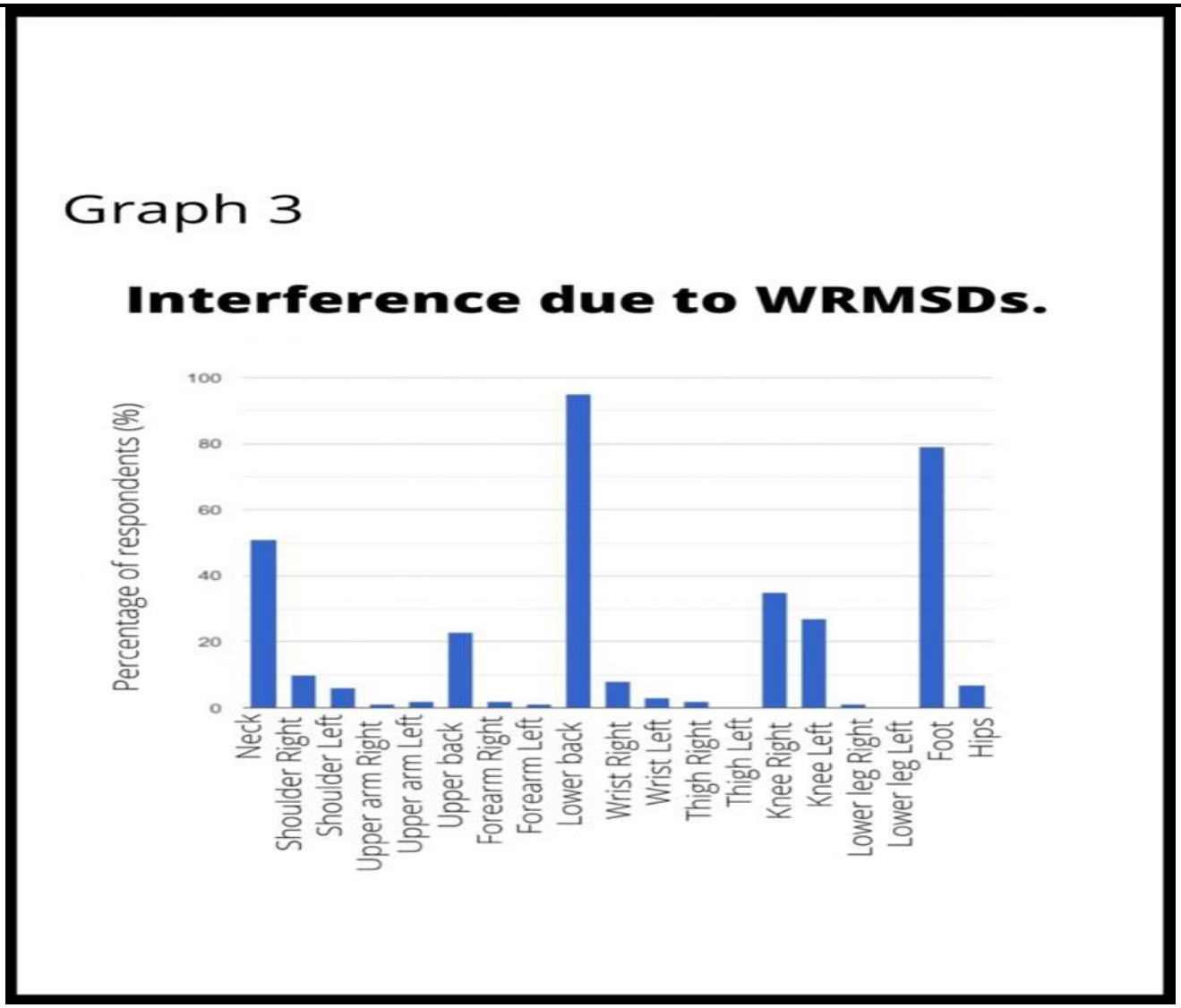

Inference- Discomfort due to WRMSDs is highest in lower back region followed by neck and foot .

Graph 2

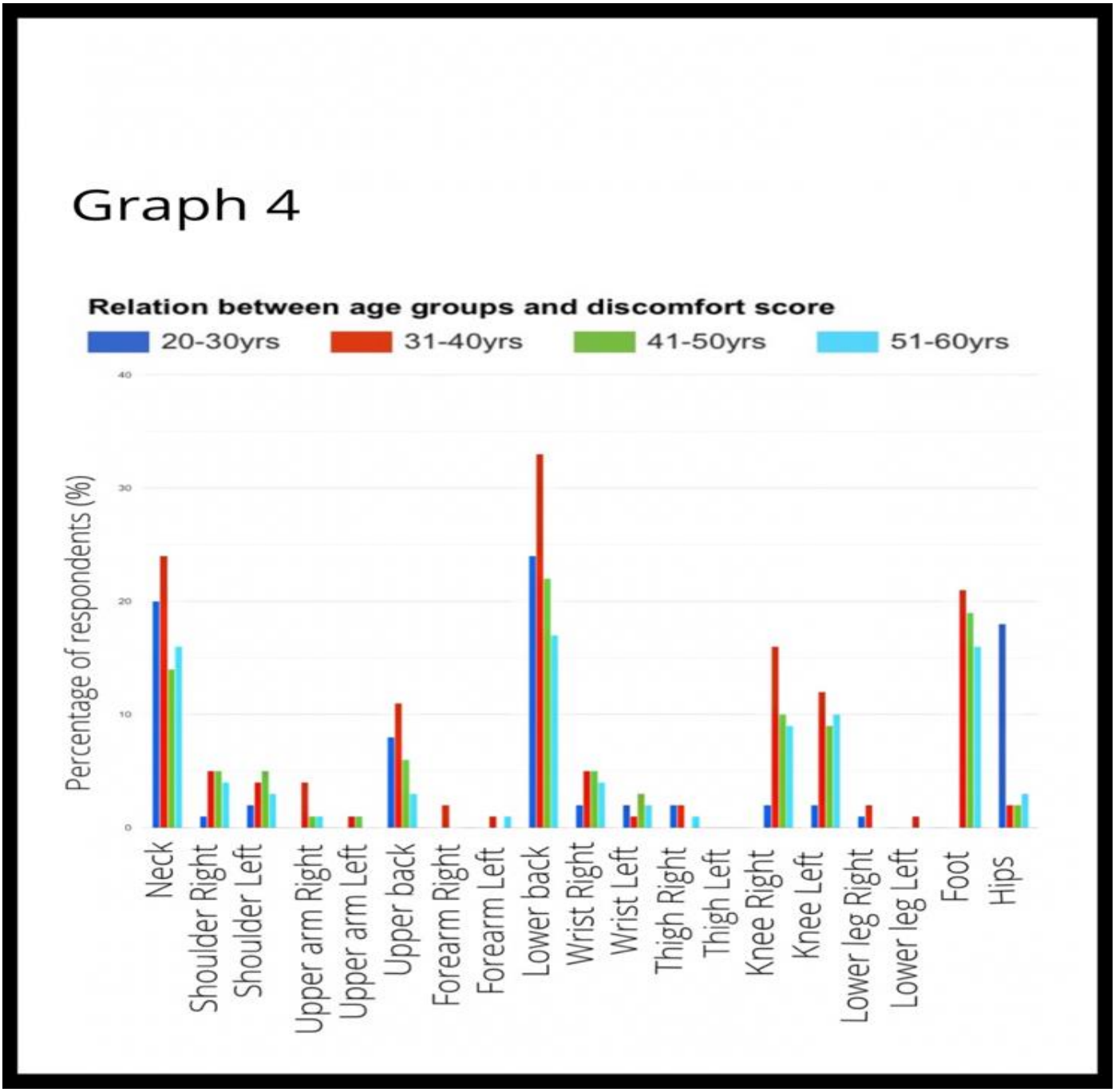



Inference- Severity due to WRMSDs is highest in lower back region followed by neck , foot and knee joints.

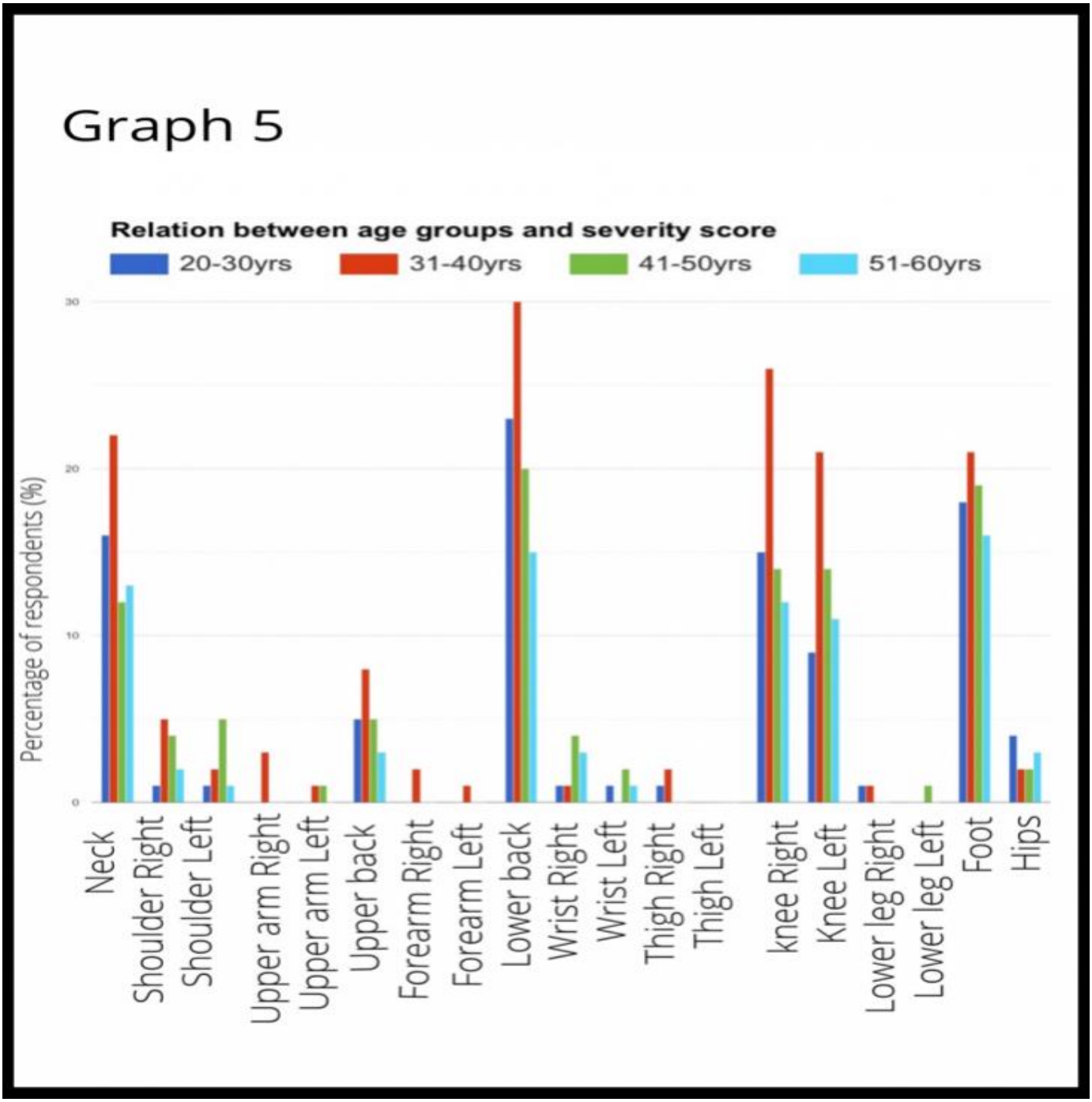
Graph 3



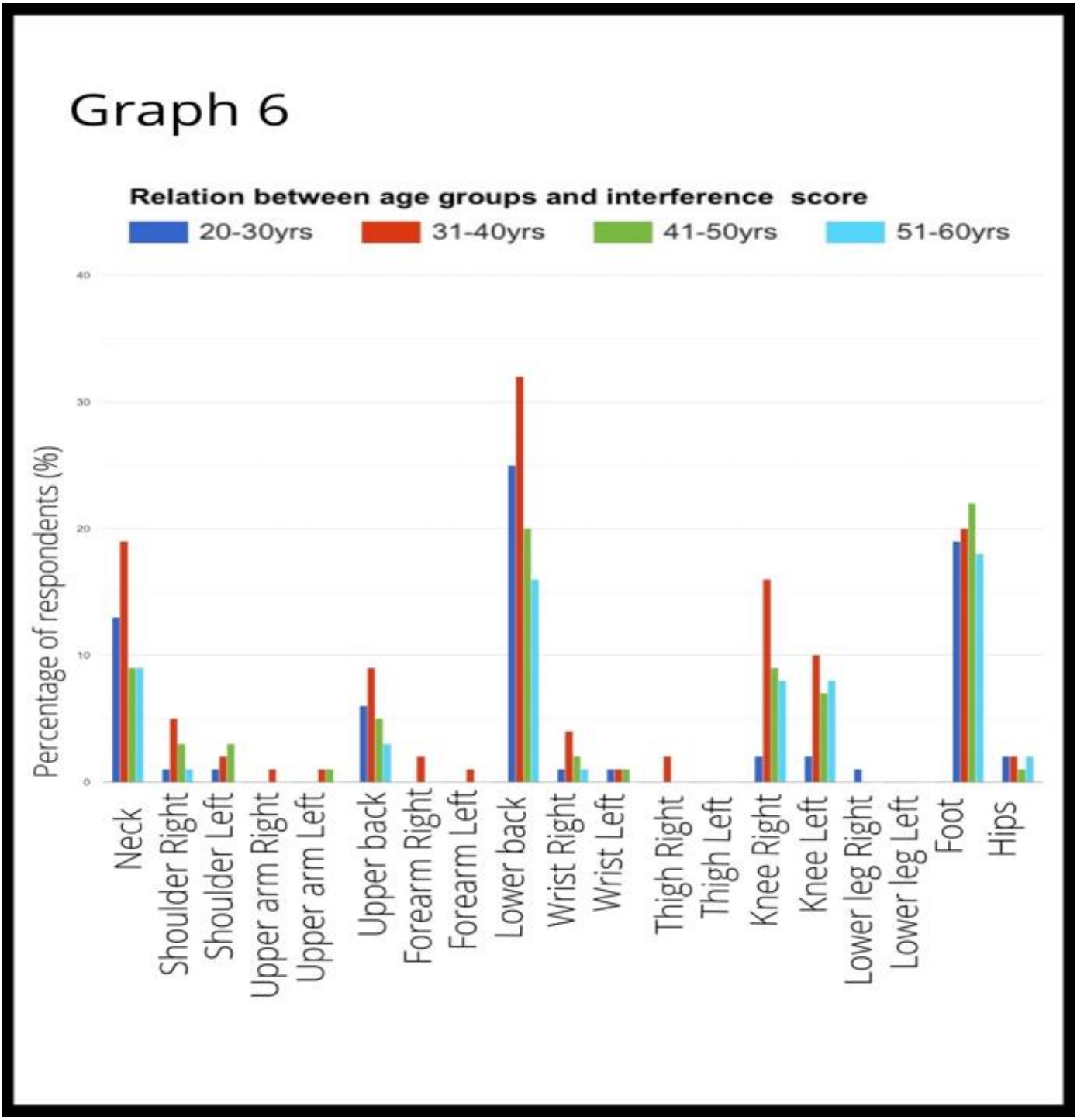

Inference – WRMSDs show highest interference in lower back along with foot and neck region.



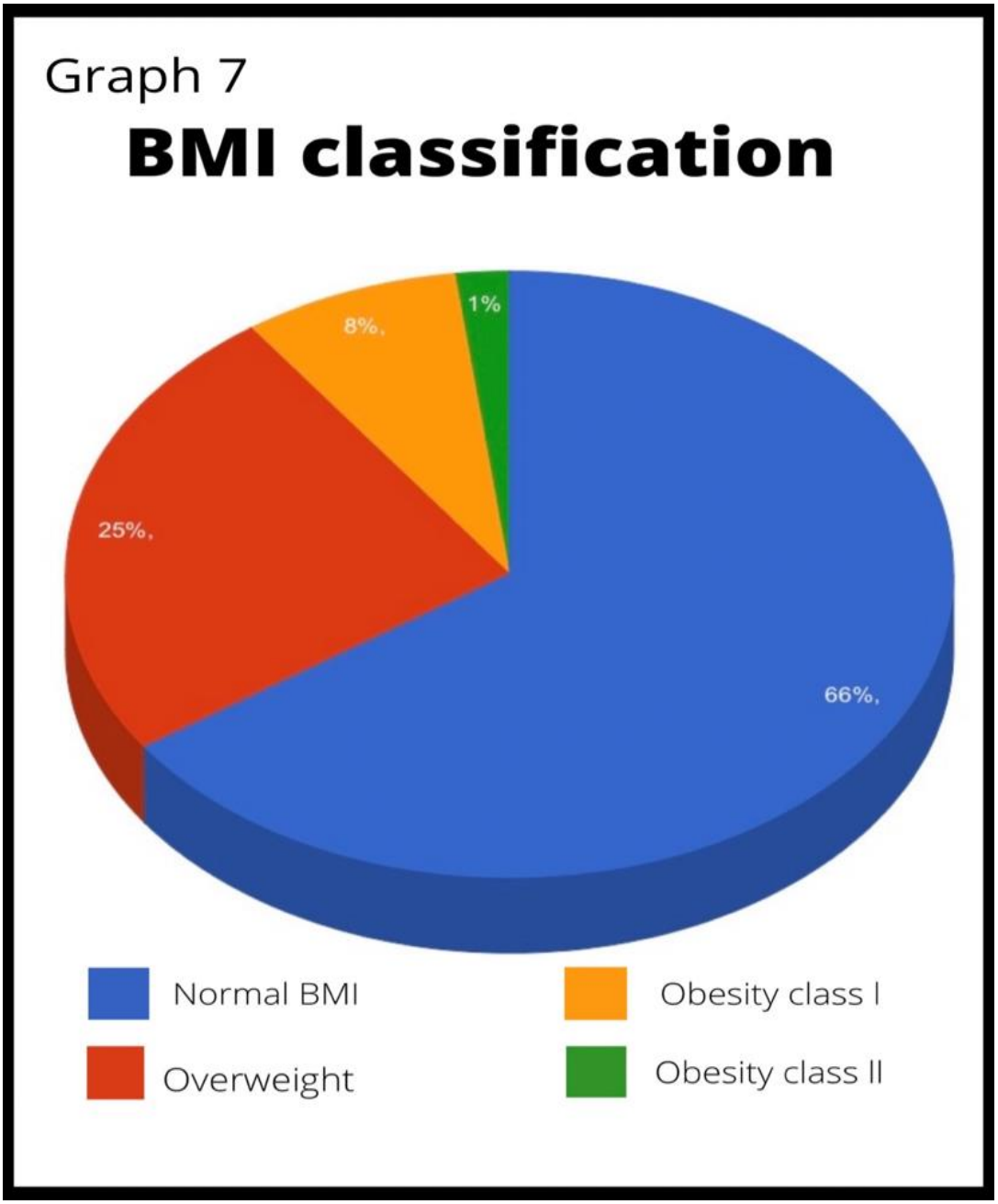

Inference - 31-40 age group is the most affected in terms of discomfort, severity and interference due to WRMSDs followed by 20-30 years age group . Lower back ,Neck and foot show high percentages in all age groups .




Inference – 31-40 show highest percentages in lower back and foot region. In all age groups, forearm , thigh , and lower leg show minimum severity scores .




Inference – 31-40 years age group is the most affected followed by the 20-30 years age group . 51-60 years is the least affected age group .




Inference – 66% majority fall under the normal BMI category . 25% fall under the overweight category . Whereas 8% are reported as obesity class I and 1% as obesity class II.

**IX. DISCUSSION**

The current study is carried out among housemaids of Mumbai Metropolitan Region by using Cornell Musculoskeletal Discomfort Questionnaire to investigate WRMSDs. Work Related Musculoskeletal Disorders are manifested by chronic pain accompanied by objective changes that can affect muscles, tendons and peripheral nerves . WRMSDs by nature and symptomatology trigger a state of stress that results in muscle tension which further worsens the pain 9. Housemaids form the major chunk of the domestic help sector. Their work patterns include prolonged working hours, irregular schedules, physical overload, increasing strain on joints and minimum break periods between work.

The data collected shows minimum working hours in a day as 8 hours. From the data collected , activities which housemaids perform on a daily basis consist of cooking, sweeping the floor , brooming and cleaning. Mostly these housemaids carry out all the activities in each household where they work .Also , they need to do the same chores back at their own home. These common activities have irreparable consequences. Cooking includes standing for prolonged periods. This puts longitudinal stress on the joint surfaces especially the knee joint. Also , cooking for long hours and continuously over months gives rise to increased stress on the feet too. This further gives rise to musculoskeletal discomfort and pain. Sweeping the floor in full squat position again puts the knee joint and the hip in stress overload . Also the foot carries the entire body weight and hence is prone to strain. Few housemaids also reported sweeping and brooming in standing with trunk bent forwards. This position results in pain in lower back region . Cleaning and dusting

include movements primarily of wrist and shoulder joints. Dusting consists of spinal twists , bending and lateral flexion with repetitive wrist flexion and extension. These repetitive movements which are performed at alternating speeds cause wear and tear in the microstructure of the joints. Long working hours include risk factors such as repetitiveness of anterior flexion and spinal twists and dynamic work in prolonged standing positions[10]. These factors are responsible in the occurrence of pain and discomfort[10]

According to the data collected , neck shows discomfort of 74%. Majorly all the activities show presence of neck flexion for long duration of hours. The neck shows severity of 63%. It is also reported that there is scapular muscle weakness associated with neck pain in housemaids[11] . The constant forward flexion eventually increases stress on the joint and reduces the cervical stability . The most affected region is the lower back . Previous study states that lower back pain is highly prevalent in India and it adversely affects the quality of life[12.]The lumbar region carries weight of the entire spine and has constant strain due to the repetitive and improper postures during work . It is reported that primary instability of the lumbar vertebrae is the commonest cause in occurrence of lower back pain[13] . Housemaids report discomfort of 97% which is the highest with 89% severity . Majorly , lower back reports as the highest interference with 95%. In a previous study, it is concluded that development of WRMSDs is associated with prime affection of lower back, neck and knee joints[14]. In the current data, majority of participants (66%) have normal BMI . 25% are overweight . 8% constitute as obesity class 1 and 1% as obesity class 2. Hence weight is not playing a significant role in occurrence of WRMSDs.

Discomfort is primarily reported in the lower back followed by foot , neck and knee joints . Foot and neck show equal percent of discomfort that is 74% , whereas knee joint shows 38% on the right side and 33% on the left side. Upper back shows discomfort of 28% which is due to constant slouched position during washing utensils and sweeping. Lower leg and forearm show the least level of discomfort that is 1% and 2% respectively.

In terms of severity of WRMSDs, lower back , foot and right knee are majorly affected. Lower back reports 88% severity followed by foot with 74% and knee joint with 67% on the right side . Neck shows 63% severity of WRMSDs. Hip shows severity of 11%. Left thigh shows no symptoms in terms of WRMSDs.

The discomfort , pain and aches give rise to disturbances in the daily work patterns . Due to minimum wages these housemaids do not look after the initial signs of pain or aches.This interference caused by WRMSDs is highest in lower back region which is 93% followed by foot which shows interference of 79%. Neck shows 50% interference in daily work patterns along with knee joint showing 35% on right side and 27% interference on left side . Upper arm shows the lowest interference of 1% and 2% on the right and left side respectively. Lower leg and thigh show no interference due to WRMSDs. As the joint bears the stress of the activities , regions like lower leg and thigh show minimum affection .

The participants vary in age from 20 to 60 years. According to the data collected , majority of WRMSDs are reported in the 31-40 age group followed by 20-30 age group.31-40 years is the age group of maximum workload in a day . Apart from the work, these housemaids have to perform the same chores in their own houses . This increases the impact of work on their body.

The 31-40 age group shows high percentages of discomfort , severity and interference . In this age group, lower back is recorded as high as 33% (discomfort ) , 30% (severity ) and 32% (interference ) due to WRMSDs. Neck shows 24% discomfort with 22% severity and 19% interference due to WRMSDs. Followed by this , foot shows 21% discomfort and severity each with 20% interference due to WRMSDs. Right Knee joint shows high severity percentage which is 16% along with 16% in terms of discomfort and interference due to WRMSDs. Thigh and forearm regions show minimum to no discomfort and interference due to WRMSDs.

In 20-30 age group , lower back is the highest in discomfort which is 24% with 23% severity of symptoms and 25% interference due to WRMSDs. This age group is relatively young and agile compared to other age groups. Hence 20-30 years show minimum percentages and is not highly affected. Foot shows equal percentages of discomfort and severity of symptoms which is 18% with 19% interference due to WRMSDs. Neck shows 20% discomfort but lower percentages of severity and interference which is 16% and 13% respectively. Upper arm and forearm show no discomfort and interference due to WRMSDs.

As the age progresses , physical ailments gradually start due to which housemaids fail to perform their work with efficiency . The discomfort caused in previous years of age grows considerably resulting in decrease in their total working hours. This gradual reduction in work patterns is the prime factor for decrease in WRMSDs in the older age group.

41-50 age group is relatively older than the previous age groups. These housemaids have help at their own house by the younger females for doing the household chores. Also , due to older age these housemaids reported taking more frequent breaks or leaves from their daily work . As a result , the occurrence of WRMSDs is seen at lower percentages in this age group . This age group shows high percentages in terms of discomfort in lower back and foot regions only . Lower back shows 22% discomfort due to WRMSDs and 20% each in severity and interference due to WRMSDs. Foot shows highest interference which is 22% along with 19% each in terms of discomfort and severity of WRMSDs. Knee joint shows highest severity percentage which is 14% on each side and lowest interference percentage which is 9% and 7% on right and left side respectively.

In the oldest age group of 51-60 years, the work efficiency decreases more significantly . These housemaids reported the minimum working hours in a day . Also , it is seen that older housemaids are not given strenuous activities in the household and also they are cared for by the owners. Their activities include mostly cooking only . Due to the above reasons , WRMSDS are seen in lowest percentages in this age group . Although , in this age group lower back has high percentages which is 17% discomfort, 15% severity and 16% interference due to WRMSDs. Thigh region and forearm show minimum percentages .Collectively , lower back is the most affected region of the body which is then followed by foot and neck regions.

Further the study can be continued with an increased sample size and more involvement of the older age groups . Also , WRMSDs on the dominant sides of the joints can be assessed in relation to the non dominant sides.

## X. Conclusion

- There is prevalence of WRMSDs in housemaids . Majorly , lower back , foot , neck and knee joints are affected .
- 31-40 age group is the most affected age group due to WRMSDS followed by age group of 20-30 years.

## XI. Clinical implications

1.A screening tool can be used in primary physiotherapy centres for early diagnosis of WRMSDs.
2.Since the study shows lower back , neck and foot are majorly affected . Housemaids and related professionals should be assessed for these regions specifically .

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