
Incidences of Work-Related Musculoskeletal Disorders among Housemaids: The Urban Poor Dwelling in Slums of Mumbai

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ABSTRACT

To decipher the incidences of MSDs among Indian Housemaids, the urban poor dwelling in the slums of Mumbai and to explore the possible relationship between MSDs and body composition of elderly and of the younger maids. Every occupation requires hard work. Housemaids carry out diverse household work that might range from cutting of vegetables in the kitchen to washing clothes. These dissimilar activities, often carried out with inappropriate postures over a number of years, predispose the housemaids to a plethora of musculoskeletal disorders. The present study will help to identify and alleviate these problems through early diagnosis and proactive interventions. Subjects belonging to the urban poor of low socio economic background were included in the study. A total of 41 maids volunteered to participate in the study and they were divided into two groups: Group A comprised 24 women between 41-60 years and Group B comprised 17 women in the age range of 20-40 years. Personal, social and occupational details of each women volunteer were collected through a structured interview. The body composition was accessed using a bioelectrical impedance analyzer. Work-related musculoskeletal disorders were assessed using the Nordic Musculoskeletal Questionnaire. Group A volunteers were found to be significantly heavier ($p < 0.01$), with significantly higher BMIs, body fat % and fat weight ($p < 0.01$), as compared to their Group B counterparts. Group A volunteers principally reported pain in the wrists / hands and back. By comparison, Group B volunteers mainly reported pain in the neck (89%), back (41.17%) and ankles/ feet (64.7%); the common area of pain for both the groups being the back. The study was able to demonstrate the high and alarming incidences of MSDs in housemaids, particularly those in the higher age group and belonging to the lower socioeconomic strata. Therefore, an in-depth study with wider ramification needs to be taken up in future.

Key words: Urban poor, Musculoskeletal Disorders, Body composition, Housemaids

INTRODUCTION

A large chunk of women population in India from the lower socioeconomic strata work as “housemaids”, who are required to carry out extensive household work, often for as long as 12-14 hours a day, with minimal pay.

Every occupation requires hard work. Housemaids carry out diverse household work that might range from cutting of vegetables in the kitchen to washing clothes. These dissimilar activities, often carried out with inappropriate postures over a number of years, predispose the

housemaids to a plethora of musculoskeletal disorders. Occupational health aims at identifying and alleviating these problems through early diagnosis and proactive interventions.

In a case study of Swedish women of age group 20-59 years, hours of domestic work per week was found to be 40 hours, which posed a risk of developing musculoskeletal disorders (MSD): pain in the neck, shoulders and lower back (Josephson et al,2003). Habib et al (2005), observed that over 2/3 of the 1869 married women who participated in a study reported an MSD as their most important health problem, 44% of them attributing their MSD to household work or to fatigue from household work. Prolonged standing / walking and repetitive movements particularly with upper limbs and shoulders result in MSDs, particularly for household tasks like washing dishes or clothes or cleaning the carpet (Rosano et al 2004). Women were also found to spend more time on household activities as compared to male and therefore were more likely than men to have MSDs that resulted in disability. However, tools to assess psychological factors, which are associated with, work related MSDs, such as discussion latitude and job satisfaction have not been adapted to the household context.

The prevalence of MSDs among the general population in India is not well-documented (Bihari et al, 2011). MSDs are the most common cause of long-term pain and physical disability globally affecting the quality of life of hundreds of million people. Musculoskeletal impairment afflicts nearly 25% of the adult population leading to chronic musculoskeletal pain (Woolf and Akesson, 2001). In spite of its enormous global impact; MSDs have not received the same quantum of attention as coronary heart diseases (CHD), diabetes, AIDS and cancer; this is possible because MSDs are largely chronic and non-fatal. The United Nation (UN) and the World Health Organisation (WHO) had declared the decade 2000-2010 as the 'bone and joint decade', with the aim of increasing the understanding of the burden posed by MSDs and how they affect the quality of life (Lidgren, 2003).

Studies on MSDs have indicated a strong gender bias, significantly affecting more women than men (Pingle and Pandit, 2003) in the same age group; MSDs make up 2% of the global disease burden. Bihari et al in 2011 observed that the incidence of back pain (lower/upper) was more than 50 % in all the volunteers who have participated in their study (17 % in females as compared to 11.1 % in males).

The emerging medical approach emphasizes identification of the health risk and employing appropriate ergonomic interventions for its prevention. Habib et al (2010), observed that housemaids do not take frequent breaks (which women workers in the organized sectors do), which may further aggravate their problems. It has also been observed that certain daily activities performed by housemaids such as frequent lifting of objects or children over 11 kg, correlated well with low back disorders and psychosomatic strain (Josephson et al, 2003; Hall, 1992). Gunn et al (2011) observed that volunteers with the higher body fats were more prone to MSDs. Moreover, coming from lower socioeconomic strata, they have socio psychological

stress at home and at work, which was also found to be associated with the precipitation of low back disorder (Yip, 2001). Based on the above, the present study was taken up, with the following aim and objectives:

METHODOLOGY

Subjects: Housemaids belonging to low socio economic backgrounds were randomly selected for the study. An NGO in Mumbai was contacted to provide the volunteers. A total of 41 women participated in the study and they were divided into two groups: Group A comprised 24 women between 41-60 years and Group B comprised 17 women in the age range of 20-40 years.

Personal Information: Personal, social and occupational details of each women volunteer were collected through a structured interview and all information was noted on a pre- tested questionnaire. The personal details comprised information regarding age, occupation, dietary practices, smoking, addictions, education and income. The questionnaire included information regarding past incidence of pain pertaining to the MSD.

Clinical examination: Nordic Musculoskeletal questionnaire was employed to capture the responses regarding location, degree and duration of pain. Additionally, information regarding medications used to alleviate pain was collected by personal interview. The investigation depended on self-reported symptoms along with their location. A 'pain diagram' was prepared showing a sketch of the human body in a standing posture (rear view), along with body locations marked with arrows. Each volunteer was asked to point out the body locations where pain was felt. In the neck, shoulders, upper back, upper arms, lower back, forearms, wrists, hip/buttock, thighs, knees, lower legs, ankles was recorded. A general clinical examination was done to rule out chronic morbidities and to make a probable diagnosis.

Methods: The volunteers were explained the details of various procedures involved in carrying out the study, thereafter, the following physical dimension were recorded as below:

1. Weight in kgs
2. Height in cms
3. Waist /hip ratio
4. Decimal age was computed from their date of birth

Each of the volunteers was made to lie down on a reclining chair and was ask to remain in this position for about 30 minutes. 30 sec pulse count was carried out by palpating the radial artery. The 30 sec pulse count was multiplied by 2 to get the pulse rate. The volunteer was made to continue to lie down and the body composition was accessed using the bioelectrical impedance analyzer (Quadscan4000, Body stat ltd, British Isles). Thereafter, each volunteer answered to the Nordic Musculoskeletal Questionnaire from which the incidence of MSDs was then computed.

Suitable statistical tools were employed to compare and interpret the data.

RESULTS AND DISCUSSION

Table 1 depicts the physical and the selected physiological determinants taken up for the studies of all the 41 women volunteers who participated in this study (bunched into a single group).

The mean decimal age of the volunteers was observed to be 41.88(±9.493) years, the high standard deviation indicating the large variation in age. The mean height was observed to be 149.54 cm, weight 58.01 kg and the BMI was observed to be 25.85 (which was classified as ‘Overweight’ as per WHO/CDC Norms but were ‘Obese’ as per ICMR guidelines (WHO Report, 2000).

The mean waist/ hip ratio were observed to be 0.89, which was more than the acceptable limits for normal population. The cut–offs for waist circumference for Indian men and women as per new ICMR guidelines are 90 and 80 cm respectively (as compared to globally reported 102 cm and 88 cm, respectively).

Table 1 (A): Table depicting the Physical determinants of the women volunteers

(n)	Decimal age (yrs)	Height (cm)	Weight (kg)	BMI	Waist/hip ratio	Body fat %	Fat Weight (kg)	LBM (kg)	RHR (beats/min)
41	41.88 (±9.49)	149.54 (±5.46)	58.01 (±12.85)	25.85 (±5.06)	0.89 (±0.13)	35.04 (±9.53)	20.99 (±8.48)	37.16 (±6.81)	86 (±12.21)

*Figures in parenthesis denotes (±sd)

Table 1 (B): Table depicting incidences of MSDs among women volunteers

(n)	MSDs Overall (%)	Neck (%)	Shoulder (%)	Elbows (%)	Wrist/hands (%)	Hips/Thigh (%)	Legs / knees (%)	Back (%)	Ankles/ Feet (%)
41	95	12.2	4.9	4.9	12.2	2.5	47.3	53.65	9.7

The mean body fat percentage was found to be 35.04 % indicating presence of high levels of storage fats. The mean absolute fat weight was observed to be 20.99 kg.

Overall, it was observed that incidence of MSD was 95% of which 12.2% reported neck pain; 4.9% reported shoulder pain and pain at the elbows, 12.2% reported pain at the wrist / hand; 53.65% had back pain (4.9% upper back pain and 41% reported low back pain). Overall, 29.3% reported pain in the legs (2.5 percent for the thighs, and 18 percent reported pain in the knees, 9.7 percent reported pains in ankle/feet.

The mean resting heart rate was observed to be 86 beats / min.

When the volunteers were divided into two groups, as per their age (Group A: age range 41 to 60 years; Group B: age range: 20 to 40 years), the following was observed as tabulated in Tables 2 (A) and 2 (B).

The mean height of Group A volunteers was observed to be 149.92 cm, weight 62.75 kg and the BMI was observed to be 27.86 (which is classified as ‘Overweight’ as per WHO/CDC norms but ‘Obese’ as per ICMR guidelines).

The mean waist/ hip ratio of Group A volunteers was observed to be 0.89, which was more than the acceptable limits for normal population. As mentioned earlier, the cut-offs for waist circumference for Indian men and women as per new ICMR guidelines are 90 and 80 cm respectively (as compared to globally reported 102 cm and 88 cm, respectively).

The mean body fat percentage of Group A volunteers was found to be 38.58 % indicating presence of high levels of storage fats; the mean absolute fat weight was shown to be 24.45 kg.

Overall, in Group A volunteers, it was observed that incidence of MSD was 100%. All volunteers reported MSDs in one region / joint or another. 8.34% reported neck pain; 4.1% reported shoulder pain and 12.5% reported pain at the elbows. 16.67% reported pain at the wrist / hand; an overwhelming 79.16% reported back pain. Incidence of pain in the legs was 29.16% (at the knees), and 4.16% reported pain in ankle/feet.

Table 2 (A) compared the physical determinants and the resting heart rate of the housemaids; group A comprising housemaids (n = 24), in the age range of 41 to 60 years and group B comprising housemaids in the age range of 20 to 40 years (n = 17)

Table 2 (A): Table comparing the selected Physical determinants and resting heart rate of the women volunteers of Group A (age >40 and =60 yrs) and Group B (age=20 and =40 yrs)

(n)	Decimal age (yrs)	Height (cm)	Weight (kg)	BMI	Waist/hip ratio	Body fat %	Fat Weight (kg)	LBM (kg)	RHR (beats/min)
Group A 24	48.46 (±5.030)	149.92 (±5.030)	62.75 (±10.792)	27.86 (±4.212)	0.89 (±0.071)	38.58 (±7.873)	24.45 (±7.425)	38.3 (±6.721)	85 (±11.745)
Group B 17	32.6 (±5.680)	149.0 (±6.144)	51.33 (±12.835)	23.02 (±4.915)	0.89 (±0.194)	23 (±9.637)	16.10 (±7.576)	35.55 (±6.824)	87.24 (±13.070)
'students t-test'	1.581E-10 (p<0.01)	0.61615745 (NS)	0.005390208 (p<0.01)	0.0024991 (p<0.01)	0.872243338 (NS)	0.00520561 (p<0.01)	0.0012889 (p<0.01)	0.00520561 (NS)	0.5361561 (NS)

In Group B volunteers, the mean height was observed to be 149 cm, weight 51.33 kg and the BMI was observed to be 23.02 (which was classified as ‘Overweight’ as per WHO/CDC Norms but were ‘Obese’ as per ICMR guidelines).

The mean waist/ hip ratio were observed to be 0.89, which was more than the acceptable limits for normal population. The mean body fat percentage was found to be 23 percent indicating presence of high levels of storage fats the mean absolute fat weight was shown to be 16.10 kg.

Overall, it was observed that incidence of MSD in Group B volunteers was 86%, of which, 89% reported neck pain; 23.5% reported shoulder pain and 5.88% reported pain at the elbows. 11.7% of Group B volunteers reported pain at the wrist / hand; 41.17% had back pain and 64.7% reported pain in the ankles / feet.

The results depict the fact that the BMI for all 41 women volunteers who participated in the study computes to 25.85; however, when we observe BMI of group A women (aged between 41-60 years), the BMI was found to be 27.86. This corresponds to ‘overweight’ as per WHO-CDC norms, although, as mentioned, the revised ICMR norms for Indians categorizes the BMI as ‘obese’.

Table 2 (B): Comparison of incidences of MSDs in the two groups of housemaids

(n)	MSDs Overall (%)	Neck (%)	Shoulder (%)	Elbows (%)	Wrist/hands (%)	Hips/Thigh (%)	Legs/knees (%)	Back (%)	Ankles / Feet (%)
Group A (24)	100	8.34	4.16	12.5	16.67	0	29.16	79.16	4.16
Group B (17)	86	89	23.5	5.88	11.7	11.7	5.88	41.17	64.7

When ‘student’s t test’ (unpaired, two-tailed) was employed to compare the means of the selected variables between the volunteers of Groups A and B, the following was observed:

As expected, the mean ages of the two groups were significantly different at $p < 0.01$. There were, however, no significant differences in their heights. Group A volunteers were found to be significantly heavier ($p < 0.01$), with significantly higher BMIs, body fat % and fat weight ($p < 0.01$), as compared to their Group B counterparts.

Overweight and obesity are important risk factors for MSDs, the risk being 1.7 times more in case of a BMI < 24.9 (Bihari et al 2011). Furthermore, this group of women exhibited a fat percentage of 38.58, which is very high. A high statistical significant association between pains in joints, knees, limbs, lower leg with high body fat % and BMI has been observed (Rogger et

al, 2008; Coggon et al, 2000; Bihari et al, 2011). Globally, the incidences of MSDs have increased by 25% in the last 10 years (DCPP, 2011). The present study exhibited the presence of 100% MSDs in women of 40–60 age range. Although, the present sample size deters any formative conclusions, it seems tempting to conjecture that the high propensity of MSDs in the present sample may be attributable to a combination of factors, a high BMI, obesity, inadequate diet, inappropriate posture at work and improper lifestyle.

When the incidences of MSDs were compared, several interesting observations were made. It was found that Group B volunteers comprising the younger housemaids suffered more from neck pain (89%) as against only 8.34% in their aged counterparts. Group B also exhibited higher levels of pain in the shoulders (23.5%), as against only 4.16% reported by the Group A volunteers. This aging group of housemaids exhibited more pains in the wrists / hands (16.67% vs. 11.7%), legs / knees (29.16% vs. 5.88%) and back (79.16% vs. 41.17%). Group B volunteers, the younger housemaids, on the other hand, in comparison with their aging counterparts, reported higher incidences of pain in the ankle / feet (64.7% vs. 4.16%).

CONCLUSIONS

The present study has been able to quantify and assess the body composition of Indian housemaids (limited to the assessment of the fat and muscles masses) and displayed values which indicate high levels of fat mass associated with the housemaids belonging to the lower socioeconomic strata of the society. The study also was able to demonstrate the high and alarming incidences of MSDs in Indian housemaids, particularly those in the higher age group. High BMI as well as a high fat percentage were the two of the several predisposing factors for MSDs, which was also demonstrated in the study. When comparisons were made of incidences of MSDs, both groups of women reported ‘back pain’, while MSDs in the older women was primarily in the wrists / hands while in the younger age group, it was the neck. The study was constrained by a relatively small sample size, which makes it difficult to arrive at definitive conclusions. However, the pointers and trends are quite strong and they indicate an alarming rise in MSD in housemaids belonging to the lower socioeconomic strata. Therefore, an in-depth study with wider ramifications needs to be taken up in future.

STATEMENT OF RELEVANCE

The present study attempted to decipher the incidences of MSDs in Indian housemaids belonging to the lower socioeconomic strata, the urban poor dwelling in slums of Mumbai and compared the MSDs afflicting the young as well as the old. The study quantified the body composition and explored the possible differences in the body composition of elderly women and those of the younger ones.

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