

# Influence Of Neural Adaptation On Repetitive Stress Pathology Among Women Sweepers: A Narrative Study.

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## ABSTRACT

*Sweepers is a profession that have repetitive motion and prolonged duration that increase musculoskeletal disorder. Sweepers have a higher prevalence of musculoskeletal disorder due to nature of work. Repetitive stress works on physiological system to adapt the body to the prolonged exposure threat by neuronal response of the cell. A qualitative study using a narrative approach was carried on women sweepers to provide a data that supports the health care professional on handling work related musculoskeletal disorder. The study included women with work experience of 5 years and age from 35 to 55 years and having musculoskeletal pain. Each participant took part in the interview that had questions about their personal habits, home environment, work environment and stories behind their survival. The result was reflected in the words of sweepers about physical stress, psychological stress and social stress. This study provides a unique understanding of sweeper women experiencing stress and dealing all the dimensions of stress. Our study provides a qualitative support to these results by indicating that there was no absenteeism and compromise of working style among the women sweepers. This narrative approach concludes that there is a positive influence of neural adaptation on repetitive stress among women sweepers.*

**KEYWORDS:**Neural Adaptation, Repetitive Stress Pathology, Women Sweepers, Narrative Study, Work Related Stress.

## BACKGROUND

Sweepers is a profession that have repetitive motion and prolonged duration that increase musculoskeletal disorder. The sweeper community in India have majority of women employers with middle age to old age. Prevalence of work related musculoskeletal disorder in hospital sweepers is 81.48%. The nature of work for sweepers is 8 hours a day with frequent sweeping and rest.

Repetitive motion of upper extremities while sweeping is major cause for musculoskeletal disorder. Repetitive stress includes work load factors, static loads, posture and exertion of external force<sup>5,15</sup>. Duration of physical exposure is a major contributor for repetitive stress while psychological and social factor to be considered to evaluate an effective repetitive stress.

Neural adaptation is a change in neuronal response due to preceding stimulation of the cell. Repetitive Stress initiate adaptive process that allow the body to physiologically cope with prolonged exposure to threat<sup>14</sup>. A study concludes most of the stress are adaptive which is beneficial to the survival of organism.

The adult brain is more adaptive to structural plasticity that involves growth and shrinkage of dendritic trees, synapses, limited amount of neurogenesis in the forebrain and hippocampus. Stress hormone help to mediate this process of adaptive structural plasticity<sup>13</sup>. They do this by release of neurotransmitter and other intra and extra cellular mediators.

A narrative approach was administered to find out the influence of neural adaptation and habituation on repetitive stress pathology among women sweepers. The purpose of this study is to setup a qualitative data on sweepers experiencing repetitive stress and the mechanism behind their adaptation to it. This may further be helpful in handling the work-related musculoskeletal discomfort and influence of stress on patient's perspective.

## **MATERIALS AND METHOD**

**STUDY DESIGN:** A qualitative study using narrative approach to analyse the stories that women sweepers experience on stress.

**STUDY SETUP:** The study setup was SRM MEDICAL COLLEGE HOSPITAL AND RESEARCH CENTER, KATTANKULKATHUR which included four floor with different departments of health care. Each department had two sweepers to sweep the floor.

**PROCEDURE:** A sample of 10 women sweepers were recruited from the study setting. The inclusion criteria for the study was sweeper with minimum experience of 5 years and in the age of 35 to 55 and are prevalent to work related musculoskeletal disorder. Each participant took part in an interview. The interview started with general questions that include their demographic data mainly age and hand dominance and progressed with any history of work-related musculoskeletal disorder and asked to mark musculoskeletal pain using the body chart. Secondly, personal history was collected including sleep pattern, diet pattern and difficulties in sleeping and consuming food. Thirdly the socio-economic history was collected to investigate about the financial status and survival. The session ended with the environmental history about the home and work environment stress.

## **FINDINGS**

The result of this study demonstrates that women Sweeper experiencing repetitive stress can be divided into the following physical stress, psychological stress and socio-economical stress.

### **Physical Stress**

One of the most common stress experienced by all the participants is physical stress. Physical stress is due to work related musculoskeletal disorder. The prevalence of physical stress common women sweepers are in shoulder, knee and low back.

One of the women sweeper participant told that *"I have been working in the institution for 10years. I start my work at 8am and complete by 4pm that includes 8 hours of work per day. I daily experience pain while performing the task but I don't let my pain hinder my performance. I work with pain daily."*

Another women sweeper registered that *"I don't experience pain while sweeping but once I complete the task I feel the pain and I won't be able to lift my shoulders."*

Another women sweeper describes that *"if any one member of sweeping team is absent and that work load is assigned to another sweeper which eventually increase the physical stress"*.

### **Psychological Stress**

Women population are always targeted when it comes to psychological stress due to their hormonal imbalance they face many changes both internally and externally.

Women with age more than 40 years who are in pre menopause stage have experienced higher psychological stress compared to the younger women sweepers. People with psychological stress have higher association with higher perception of pain.

A women sweeper describes that *"I get irritated when the day starts and have to perform the task"*.

Another women said that *"I am mentally weak and cannot bear the pain. Recently I also visited the hospital but my pain complaints still persists and cannot sleep at night due to the pain"*.

Another women said that “*During performing the task of sweeping I get tensed when someone do not respect my job*”.

### **Socio Economic Stress**

The women sweepers are coming from poor socio economic class. Most of the women sweepers are the only bread winners of the family.

A women sweeper said that “*I live in poorly structured area and have to support the family to make it economically stable*”.

Another women participant said that “*My husband is a drunkard and has to work as sweeper for my survival*”.

An illiterate women describes that “*I lost my husband at young age and want to educate my son to make his life bright*”. Thus she had no other option and started working as sweeper.

Another women at the age of 55 working as a women sweeper said that “*My son left after marriage and made my survival a question*”. Thus the women opted to become a sweeper.

### **DISCUSSION**

Generally, neural adaptation depends on rate of stimulus, frequency, speed, direction. Interestingly adaptation does not simply change the amplitude of neurons response to specific stimulus but change in neurons tuning.

Physiotherapist who commonly deals with work related musculoskeletal disorders of various occupation should consider the repetitive stress of an individual during their task at workplace irrespective of their profession. The given task may be a physical or mental task but stress the individual going to face is a combination of physical, mental and social dimensions.

The physical stress is a major complaint of all the participants. The physical stress is due to many factors that include repetitive motion, compensatory posture during work, work related musculoskeletal disorder<sup>6</sup>. They easily get fatigued or tired even performing smaller task. The participants experienced the physical stress either during the task performed or after the completion of task or at the night. Since the nature of job demands more physical work, the role of physical stress was well documented using the pain history and body chart markings.

The psychological stress include anxiety and depression of a women. They often feel irritated or frustrated while performing the task. They also start crying when someone starts annoying them. Women sweepers also experience inadequate sleep. The cause behind this could also be a hormonal imbalance of women and pressure at workplace. A study on psychological stress on athletes were classified as perceived stress that include their performance demand, overload training and pressure. This eventually develops the psychological imbalance and result in depression and anxiety and decrease the overall performance and withdrawal of task<sup>2</sup>. According to **cohen et al(1983)**, perceived stress include both positive and negative outcome. The positive outcome include counter stress represents ones confidence how she can cope up any challenge or distress.

The socio economic factors can be seen in two aspects. One of the aspect provide a positive stance for the women is their social environment that make them to work and survive while the other aspect make women socially a weaker group. A study on social context of women health reports that socio economic determinants are underlying factor for poor health. This include poverty, housing condition, working environment, food insecurity and social exclusion<sup>1</sup>. A study by **charney 2004, Krishnan et al 2007** says that chronic social stress is active neurobiological process that linked with various neurotransmitters and neuropeptides<sup>8,9,11</sup>. But there are relatively lack of social stress investigation on women and their adaptation.

This study provides the data analysing the dimensions of stress the women sweeper community experience and how they overcome their stress. Most physiotherapist fail to consider the

psychological and social stress which may influence the work-related musculoskeletal pain. This study can be used to apply for the effective treatment strategy not only for sweepers but also for solid waste pickers and scavenger's community who face similar level of stress.

## CONCLUSION

This study provides a unique understanding of sweeper women experiencing stress and dealing all the dimensions of stress. There are studies that conclude repetitive stress activates neural system and neurotransmitters at higher level and produce a coping mechanism. Our study provides a qualitative support to these results by indicating that there was no absenteeism and compromise of working style among the women sweepers. This narrative approach concludes that there is a positive influence of neural adaptation on repetitive stress among women sweepers. If adaptation mechanism fails then the stress may have negative impact which may decrease the performance and withdrawal of the task. Thus considering neural adaptation as domain on treating work related stress pathology is integral to produce a better outcome.

## Conflict Of Interest

All authors declare that we have no conflicts of interest and disclose that we have no financial and personal relationships with other people or organizations that could inappropriately influence this work.

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## Ethical Clearance

This article was submitted to the scientific committee of SRM institute of science and technology and got approval. Since it is a narrative study there is no requirement of ethical clearance.

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