

WORK-RELATED MUSCULOSKELETAL DISORDERS (WRMSDs) AMONG HEALTHCARE WORKERS (HCWs)

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ABSTRACT

Healthcare professionals apply principles and procedures of evidence-based medicine and care to ensure the good health and well-being of their patients. They analyze, diagnose, and treat illness, injury, and other mental factors according to the patient's needs by applying preventive and curative measures. In this process of treating the sick, they experience discomfort themselves due to the long working hours, personal and work-related factors.

An exploratory study was conducted among 120 healthcare workers from 22 multispecialty, private hospitals, and clinics to investigate the incidence of Musculoskeletal Disorders (MSDs) among healthcare workers (HCWs). A self-constructed and validated questionnaire was used to analyze the Musculoskeletal Disorders (MSDs) along with Cornell modified Musculoskeletal Discomfort Questionnaire (CMDQ) to determine the body sites of pain experienced and its intensity.

Analysis of the results revealed that Neck, Lower back, and wrist (right) as body sites where maximum discomfort was experienced. The study established the crucial need for ergonomically designed equipment/furniture, awareness, and training programs to reduce Musculoskeletal Disorder (MSDs) among healthcare workers (HCWs).

Keywords: Healthcare Workers, Musculoskeletal Disorders, Occupational Health, Psychosocial Stressors, Ergonomics.

Introduction

The Healthcare system is known as the organized provision of medical care to individuals or a set of individuals (i.e., community). It includes a vast majority of work done in providing primary care (primary care is typically responsible for coordinating your care among specialists and other levels of care), secondary care (For example, Endocrinologists focus on hormone systems and some specialize in diseases like diabetes or thyroid disease), tertiary care (Tertiary care requires highly specialized equipment and expertise. Here, you will find procedures such as coronary artery bypass surgery, renal or hemodialysis, and some plastic surgeries or neurosurgeries), and quaternary care (Quaternary care is considered to be an extension of tertiary care. It is even more specialized and highly unusual) as well as in public health (<https://www.verywellhealth.com/primary-secondary-tertiary-and-quaternary-care-2615354>). According to the World Health Organization (WHO) (https://en.wikipedia.org/wiki/Health_professional), the health needs of targeted populations are fulfilled by these Healthcare Organizations.

The healthcare workforce faces unique health and safety challenges as documented by the National Institute for Occupational Safety and Health (NIOSH) (<https://www.cdc.gov/niosh/docs/96-115/default.html>). Musculoskeletal Disorders (MSDs) are one of the common factors leading to stress among Healthcare Workers (HCWs). The main aim is to understand the relationship between work-related

and personal factors with the prevalence of Musculoskeletal Disorders (MSDs) among Healthcare Workers (HCWs). OSHA's risk factors related to Musculoskeletal Disorders (MSDs):

- Physical work-related factors
- Organizational or psychosocial work-related factors
- Individual factors
- Factors relating to social content.

Work procedures, equipment, and environment are the constituents of Physical factors that lead to biomechanical stress in the muscles, tendons, spinal discs, and nerves. Principal physical work-related risk factors concerning MSDs include Force, repetition, awkward postures or long-term static postures, vibration, and work in low temperatures. Principal organizational factors that can lead to MSDs are daily exposure to physical risk factors and insufficient rest influences. Providing knowledge, skills, and information on working methods and techniques, and on working movements, postures and loads can reduce the risk of MSDs. Prior medical history, physical capacity, and age are very important. Other examples of individual non-occupational factors that may affect the occurrence of MSDs are obesity, pregnancy, rheumatoid arthritis, acute trauma, and endocrinological disorders.

Some important non-work risk factors relating to MSDs are provided by social context. Some types of sport, leisure activities, and housekeeping work at home can all increase susceptibility to MSDs (http://www.osha-mhsc.gov.sg/resources/files/pdf/E-fact_09_-_Workrelated_musculoskeletal_disorders_-_MSDs_-_an_introduction.pdf).

An exploratory study was conducted among 120 healthcare workers from 22 multispecialty, private hospitals, and clinics to investigate the incidence of Musculoskeletal Disorders among healthcare workers (HCWs). The reasons contributing to Musculoskeletal disorders are poor workstation design, physical environment (like exposure to heat and cold environment, low oxygen areas), adopting improper work posture, etc. If these challenges are overlooked, the accumulated stress, fatigue, body aches, and pain will result in adverse physical and mental conditions among Healthcare Workers (HCWs).

Rationale for the Study

Very little attention has been focused on the well-being and quality of life of the Healthcare Workers when it is this very force that delivers care and services to the sick and ailing. Many of the nurses, doctors who are treating the patient's illness are silently battling pain, body aches, and Musculoskeletal Disorders (MSDs), due to increased workload, rapidly expanding knowledge base, and increasing government regulations all while balancing their private and professional life. Many physicians and HCWs have lost sight of their health and well-being. The current Covid-19 pandemic has also highlighted the extent to which protecting health workers is the key to a functional efficient health care system. Healthcare Workers (HCWs) continue to play a vital role in relieving the anguish and saving many lives.

Objectives of the Study

The specific objectives of this study are to (i) recognize the association between work-related and personal (individual) factors with the prevalence of musculoskeletal disorders (MSDs) among the Healthcare workers (HCWs), (ii) analyze the incidence of body pains and aches; and (iii) recommend effective ergonomic intervention and preventive strategies to mitigate the onset of occupational stress among HCWs.

Brief Review of Literature

A study by Yasobant, S., and Rajkumar, P. (2013), to spread the awareness of work-related musculoskeletal disorders among HCWs held Work-Related Musculoskeletal Disorders (WRMSDs) accountable for distress in many working populations. WRMSDs not only reduce the quality of employee's life and decreasing productivity but also attributes to about 40% of all costs towards the treatment of work-related problems. The Healthcare profession is known to be at great risk for WMSDs. Lost work time or absenteeism, increase work restriction, transfer to another job, or disability than any other group of diseases are reported as causes of WMSDs. For the development of WMSDs, scientific researchers have identified physical, psychosocial/organizational, and individual occupational "risk factors". The majority of healthcare professionals reported WRMSDs at one or the other body part, the most commonly affected area was the lower back. This study revealed the most common job risk factor that led to the development of WRMSDs was working in the same or awkward or cramped

positions for a long period and handling several patients or samples a day. The study suggested an integrated health promotion model for the HCWs (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4280781/>).

Del Campo, M. T., et al reviewed literature on anxiety and depression being the risk factor of MSDs among HCWs. The study cited a high incidence of musculoskeletal disorders among healthcare workers. Their objective was to determine whether MSDs are associated with pre-existing anxiety and/or depression. A complete clinical diagnostic evaluation of the cases revealed the cervical region (38.7% of cases) as the most common area of pain, followed by the lumbar region (36.0%). Only a minority of the cases (17.8%0 required an MSDrelated temporary disability leave. The study avowed pre-existing anxiety and/or depression as a risk factor associated with incident MSD in Healthcare workers(<https://www.tandfonline.com/doi/abs/10.1080/19338244.2016.1154002>, n.d.).

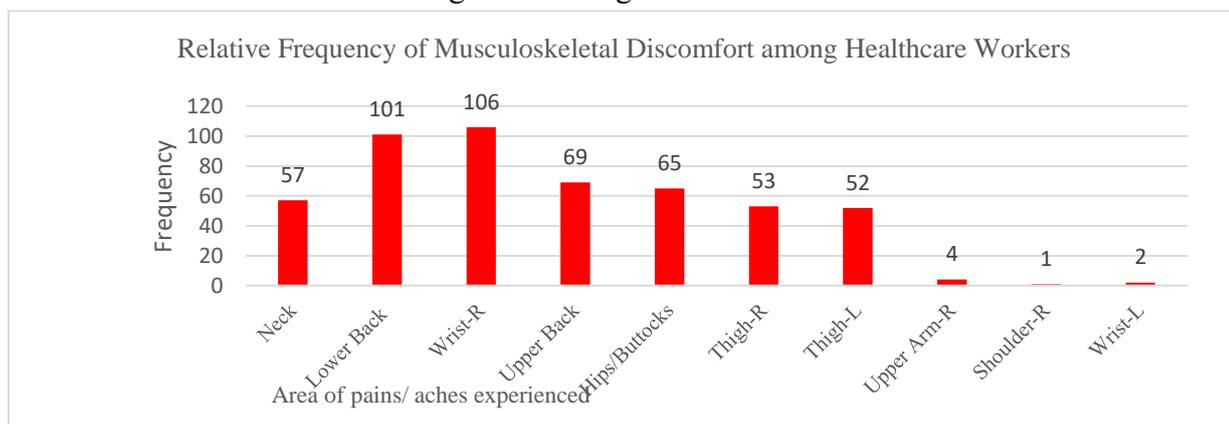
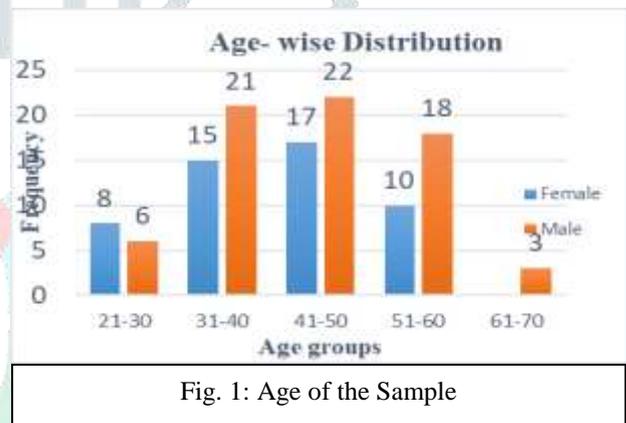
Methodology

The study focused on introspecting the physical hazard that is experienced by healthcare workers in a major Indian metro. The tools used for data collection area self-constructed and validated questionnaire and the Cornell Modified Discomfort Questionnaire (CMDQ). The data so collected were coded and systematically entered into an MS excel sheet and then analyzed.

Result & Discussions

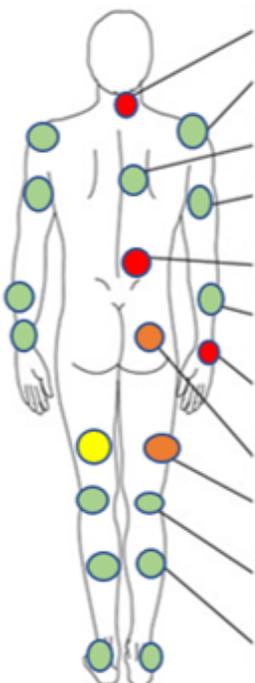
The highlights of the profile of the sample are as follows

- 50 (41.6%) consists of female healthcare workers. 70 (58.3%) consists of male healthcare workers. The highest number of healthcare workers that is 22 (18.3%) male and 17 (14.1%) females lie between 41-50 years of age.
- Work experience: 24 (20%) of healthcare workers have 1-10 years of experience between the age group 31-40. 20 (16.67%) of healthcare workers have 10.1-20 years of experience between 41-50 years of age. 48 (40%) of healthcare workers have 1-10 years of experience.
- 2 (68.3%) of Healthcare Workers reported their self-rated health as good. 31 (25.8%) of Healthcare Workers felt their health was average. 7 (0.58%) of healthcare workers reported their self-rated health as very good.
- 60% of the HCW who are in fixed-job type get rest breaks whereas 40% don't get rest breaks. Only 6% of workers in break-shift type get rest breaks. Only 34% of people in rotational type get rest breaks whereas the remaining 66% don't get rest breaks.



Prevalence of Musculoskeletal Pain and Discomfort

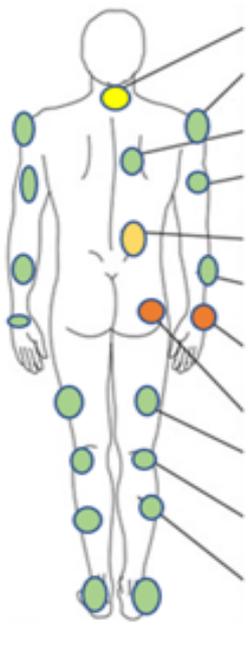
Table 1: Body sites of Pain, Aches and Discomfort Experienced



Body site	0		1		2		3		4		total
	f	%	f	%	f	%	f	%	f	%	
Neck	7	6	52	43.3	25	21	33	27.5	3	3	120
Shoulder (RIGHT)	120	100.0	0	0.0	0	0	0	0.0	0	0	120
Shoulder (LEFT)	120	100.0	0	0.0	0	0	0	0.0	0	0	120
Upper Back	120	100.0	0	0.0	0	0	0	0.0	0	0	120
Upper Arm (RIGHT)	116	96.7	1	0.8	3	3	0	0.0	0	0	120
Upper Arm (LEFT)	120	100.0	0	0.0	0	0	0	0.0	0	0	120
Lower Back	19	15.8	24	20.0	31	26	36	30.0	10	8	120
Forearm (RIGHT)	120	100.0	0	0.0	0	0	0	0.0	0	0	120
Forearm (LEFT)	120	100.0	0	0.0	0	0	0	0.0	0	0	120
Wrist (RIGHT)	21	17.5	23	19.2	34	28	39	32.5	3	3	120
Wrist (LEFT)	118	98.3	1	0.8	1	1	0	0.0	0	0	120
Hip	55	45.8	1	0.8	63	53	1	0.8	0	0	120
Thigh (RIGHT)	60	50.0	8	6.7	38	32	14	11.7	0	0	120
Thigh (LEFT)	73	60.8	9	7.5	36	30	2	1.7	0	0	120
Knee (RIGHT)	120	100.0	0	0.0	0	0	0	0.0	0	0	120
Knee (LEFT)	120	100.0	0	0.0	0	0	0	0.0	0	0	120
Lower Leg (RIGHT)	120	100.0	0	0.0	0	0	0	0.0	0	0	120
Lower Leg (LEFT)	120	100.0	0	0.0	0	0	0	0.0	0	0	120
Foot (RIGHT)	120	100.0	0	0.0	0	0	0	0.0	0	0	120
Foot (LEFT)	120	100.0	0	0.0	0	0	0	0.0	0	0	120

7(5.8%) respondents experienced body aches & pains, out of which most had 21-30 years of work experience, 48(40%) had 1-10 years of experience. 15(12.5%) of M.B.B.S. and 9(7.5%) Ayurveda and Homeopathy practicing respondents experienced aches and pains. Aging is associated with diminished physical health and that was a major cause of concern especially during the pandemic. Low immunity and

Table 2: Pain, Aches, Discomfort interfering with the ability to perform tasks



Body site	0		1		2		3		4	
	f	%	f	%	f	%	f	%	f	%
Neck	63	52.5	18	15.0	28	23	7	5.8	4	3
Shoulder (RIGHT)	119	99.2	1	0.8	0	0	0	0.0	0	0
Shoulder (LEFT)	120	100	0	0.0	0	0	0	0.0	0	0
Upper Back	120	100	0	0.0	0	0	0	0.0	0	0
Upper Arm (RIGHT)	120	100	0	0.0	0	0	0	0.0	0	0
Upper Arm (LEFT)	120	100	0	0.0	0	0	0	0.0	0	0
Lower Back	85	70.8	20	16.7	10	8	5	4.2	0	0
Forearm (RIGHT)	120	100	0	0.0	0	0	0	0.0	0	0
Forearm (LEFT)	120	100	0	0.0	0	0	0	0.0	0	0
Wrist (RIGHT)	42	35	23	19.2	15	13	30	25.0	10	8
Wrist (LEFT)	117	97.5	3	2.5	0	0	0	0.0	0	0
Hip	59	49.2	7	5.8	12	10	42	35.0	0	0
Thigh (RIGHT)	120	100	0	0.0	0	0	0	0.0	0	0
Thigh (LEFT)	120	100	0	0.0	0	0	0	0.0	0	0
Knee (RIGHT)	120	100	0	0.0	0	0	0	0.0	0	0
Knee (LEFT)	120	100	0	0.0	0	0	0	0.0	0	0
Lower Leg (RIGHT)	120	100	0	0.0	0	0	0	0.0	0	0
Lower Leg (LEFT)	120	100	0	0.0	0	0	0	0.0	0	0
Foot (RIGHT)	120	100	0	0.0	0	0	0	0.0	0	0
Foot (LEFT)	120	100	0	0.0	0	0	0	0.0	0	0

front-end exposure to global crises physically impacted healthcare workers. Good work-life balance is achieved when a person can follow the 8-8-8 rule; i.e., 8 hours of sleep, 8 hours of work, and 8 hours of leisure time, without 75 compromising any. It was found that the right-hand wrist is an area with the highest discomfort, pain experienced i.e., 105(88%), according to CMDQ analysis. Healthcare workers experience discomfort pain in the righthand wrist due to continuous use and repetitive movements while working/documentation during working hours.

Around 78(65%) said right-hand wrist pain/discomfort did interfere with their work environment. According to the researcher's findings Healthcare workers reported that Neck area 113(94.2%), Lower back area 101(84.2%), and right-hand wrist 99(82.5%) experienced the most uncomfortable pains and aches than the other areas such as hips/buttocks 78(65%), thighs 72(60%). And the pain in the left-hand wrist, right upper arm, was slightly uncomfortable than the rest. And in the areas, such as shoulder left and right, upper back, left upper arm, forearms, knees, lower leg reported mild discomfort only. 60(50.2%) are affected in their work due to Hips/Buttocks pain and discomfort. And 34(29%) say lower back pain affects their work output in a certain way. Regardless of these, they continue working through it affects their health and work performance. Due to pains in the shoulder and left hand, the working ability was hampered among a few Healthcare workers. Pain in the upper arms, upper back, thighs, and knee did not interfere much with healthcare workers working ability.

Due to bending repeatedly while working, 101(84.2%) of healthcare workers experienced pain/aches in the Lower Back area not having ergonomically sound furniture's in the workplace, resorting to awkward postures during surgeries. 68(57%) Healthcare workers had discomfort/pain in the upper back while 64(54%) experienced it in the hip/buttocks area. Few experienced discomfort and pain in the thighs and neck area as well with resulting in 68(57%) in the neck area, 63(53%) in the right thigh, and 62(52%) in the left thighs. And in other areas like shoulder, forearm, knees and lower leg showed low to no pain. Neck 56(47%) and Upper back 53(44%) were also other common areas where most healthcare workers experienced pains. From the previous study, it was found that excessive workload was a major cause of stress and emotional exhaustion. Back pain 57(47.2%) due to standing for long hours, lack exercise, and shifting patients also decreased efficiency and increased absenteeism. Stiffness in the neck and shoulders 52(43.4%) was largely due to continuous tensing of muscles due to stress(<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2822165/>, n.d.).

Previously conducted studies also identified similar ergonomic hazards, muscle aches/sprains, elbow/wrist/neck pain, body posture issues, excessive stretching of muscles, and bending/twisting at work(https://scholar.google.co.in/scholar?hl=en&as_sdt=0%2C5&as_vis=1&q=ergonomic+hazards+and+musculoskeletal+disorders+among+workers+oh+health+care+facilities&btnG=#d=gs_qabs&u=%23p%3D9p_G8YpQj1wJn., n.d.).

Suggestions

- **Hazard Identification:** Hazard identification is the crucial first step of any risk assessment. Conducting a susceptibility assessment which will help assess the posture, and also analyze the effectiveness of the existing program. Using health risk assessment checklist such as Cornell Musculoskeletal Discomfort Questionnaire (CMDQ), Job Characteristic Index (JCI), NIOSH Generic Job test questionnaire, QEC (Quick Exposure Checklist) will help to identify risk factors the HCWs are exposed to on daily basis.
- **Evaluation of Risk:** The purpose of the risk assessment, is to eliminate or reduce the remaining risk (residual risk) by adopting the appropriate control measures to a lower level.

Suggested Control measures: There are three major control methods to eliminate the hazard. They are:

1. **Engineering Controls:** These are measures taken to physically modify a job or job task with the intent to eradicate the exposure to potential hazards using Isolation, Ventilation, and Insulation. Using different tools, furniture, and equipment to minimize awkward and/or static postures. Redesigning a workstation to make it ergonomic-friendly to minimize the need for excessive reaching or bending.
2. **Administrative Controls:** Administrative controls are management-directed work practices and policies designed to reduce or prevent exposure to various physical, ergonomic, or psychosocial hazards, such as providing training on MSD hazards and how to prevent them by increasing their awareness and the ability to recognize and change inappropriate habits and practices. Good Housekeeping, disinfection, and sterilization and the establishment of stricter policies for the use and maintenance of tools and equipment.

3. Personal Controls: Personal Protective Equipment (PPEs) are the least effective method for hazard control. PPE is used in healthcare settings to create a barrier between healthcare workers and an infectious agent from the patient and to reduce the risk of transmitting micro-organisms from the patient(s) to the HCW and vice versa. The choice of PPE should be based on a risk assessment of potential exposure.

The major findings of the research are:

One of the key factors causing Musculoskeletal Disorder (MSDS) among healthcare workers was poor workstation design. Neck, Lower back, and wrist (right hand) was body sites where healthcare workers experience most discomfort and are at a high risk of acquiring Musculoskeletal Disorder (MSD). It can be concluded that a lack of awareness of the availability of ergonomically designed furniture further aggravated the health issue.

For better reach and understanding, the researchers plan to share the outcome of this research to help improve occupational health among the HCWs. E-booklets, containing desirable working postures and pain relief exercises would be shared, which would help alleviate negative stressors and increase job satisfaction. The organizations would be encouraged to undergo a predesigned “Risk/Posture, Discomfort Assessment”, which is a management strategy for tackling pains and aches in the workplace. It includes several key areas such as working schedule, job type, physical environment, level of communication, and employee’s expectation at work. Posture development training, in-service and continuing education, and awareness about Musculoskeletal Disorder (MSD) would increase satisfaction among Healthcare Workers. To enrich Healthcare Workers (HCWs) with productive tackling strategies from body pains and aches and helping them maintain a healthy work-life balance, Online workshops will be organized. Preventive strategies to mitigate the onset of Musculoskeletal Disorder (MSD) among Healthcare Workers (HCWs) would be recommended, which will help avoid or tackle the Musculoskeletal Disorder (MSD) among Healthcare Workers (HCWs).

Laws to enforce regular risk assessment even in a small setting are the need of the hour. Employees have to be well trained on being mindful and operating with ergonomic tools and equipment fit for individual workers. The importance of having an ergonomist in the workplace can play a vital role in reducing physical body pain/ Musculoskeletal Disorder (MSD) among Healthcare Workers (HCWs). This will lead to better health outcomes and help in sensitizing people about their physical health too, which will ultimately lead to a better standard of living.

Author Statement

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Informed Agreement: A written informed consent was taken from all 121 participants.

Dispute of Interest: The authors declare that they have no conflict of interest.

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