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Prevalence and Contributing Factors of Low Back Pain among Healthcare Workers at Tertiary Care Centre

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Abstract
Introduction: *Low back pain (LBP) is an important public health issue, being of widespread and of a considerable negative social, psychosocial, and economic influence. Majority of health care professionals of almost all countries has the risk of musculoskeletal system disorders. LBP is considered one of the most important causes of morbidity among health care workers (HCWs) that affects their work.*
Low back pain (LBP) in HCWs generally results from an acute traumatic event, but it may also be caused by cumulative trauma. Mechanical LBP due to cumulative trauma tends to occur more commonly in the workplace. The risk groups of low back pain among healthcare professionals are physicians, dentists, nurses, physiotherapist, laboratory workers and caregivers. Health care workers are exposed to shift duties which affects their psychological and physical health. So, the present was planned to find out prevalence of LBP among HCWs and its contributing factors.
Material and Methods: *A cross sectional study was conducted in 190 HCWs, aged 18 years to 16 years, working at S.M.S. Hospital, Jaipur for more than one-year duration. All cadres of HCWs were included in sample population using probability proportionate to size (PPS).LBP was assessed by using SNMA criteria and its severity and psychological impact was assessed by using Visual Analogue Scale (VAS) and Perceived Stress Scale (PSS) respectively. Aggravating and relieving factors of LBP were studied. Numerical and count data was analyzed by using unpaired t-test and chi square test respectively. P-value <0.05 was taken as significant.*
Results: *24.74% of HCWs were suffering from LBP. Standing and flexion of spine were found most common aggravating factors (87.23% and 78.72% respectively). Rest was found as commonest relieving factor in 95.74% cases of LBP.*
Conclusion: *LBP is a major problem of HCWs and standing for long duration and flexion of spine are common aggravating factors. Rest is commonest relieving factor.*
Keywords: *Health Care Workers, Low Back Pain, Prevalence, Contributing factors.*

Introduction

Low back pain (LBP) is one of the most common musculoskeletal conditions in the general population. The burden of LBP is enormous in terms of quality of life, productivity, and employee absenteeism, making these common

conditions the single largest contributor to musculoskeletal disability worldwide.[1] It is ranked as the fifth reason for consulting a physician. Low back pain issues have been encountered as a health problem in all historical ages and its history goes back to BC1500[2]. Low back pain is witnessed in all cultures and ethnic groups. Approximately more than half of the general population will search for care for LBP at some point in their lives. It is observed that the point prevalence is 12 to 33%, annual prevalence is 22 to 65% and lifetime prevalence is 11 to 84% in all studies on low back pain.[2-3]

LBP is an important public health issue, being of widespread and of a considerable negative social, psychosocial, and economic influence. Frequently, it is more common among individuals with exhausting occupations; in the world, 37% of LBP is related to occupations in which professionals are exposed to vibrations or prolonged periods of standing, such as miners, health care workers, and professional drivers. A greater proportion of LBP is concomitant with the repetitive or prolonged awkward postures, which professionals within these jobs often undertake.[4]

Contributing factors of work-related LBP

LBP can be due to a number of factors including: individual characteristics, working conditions such as heavy physical work, ward static and dynamic working postures, as well as manual handling and lifting, lifestyle factors and psychological factors. In addition to the normal degenerative aging process, epidemiological studies reveal that poor ergonomic factors in the workplace contribute to low back disorders in a healthy back or accelerate existing changes in an already damaged back. Poor ergonomic work factors increase the load or strain on the back. A minority of cases of low back pain results from trauma to back, osteoporosis or prolonged corticosteroids use. Relatively less common are vertebral infections, tumors and bone metastasis.[5]

The working lives and psychosocial state of hospital workers are severely affected by LBP as their productivity and job satisfaction decrease and some may experience financial loss as a result of their injury. These problems are reflected in the work environment and may lead to deficiencies in care. Individuals with LBP also have difficulty in fulfilling their responsibilities and meeting their own needs and may feel inadequate in the workplace.[5]

Majority of health care professionals of almost all countries has the risk of musculoskeletal system disorders. LBP is considered one of the most important causes of morbidity among health care workers (HCW's) that affects their work and 18.7% of them with chronic LBP were using analgesic and or pain relief drugs.[4] Besides, a study in Sweden among HCWs showed a higher prevalence of LBP amounting 77% compared to many other occupational groups. Similarly, in Taiwan, a study showed that 72% of HCWs had LBP.[4] Even in India, cross sectional study done by Emmanuel et. al. in Christian Medical College, Vellore found 53.4% prevalence of LBP among 1284 nurses.[6] However, the study did not include all cadres of health care workers.

Low back pain (LBP) in HCWs generally results from an acute traumatic event, but it may also be caused by cumulative trauma.[7] Mechanical LBP due to cumulative trauma tends to occur more commonly in the workplace. Most commonly LBP among HCWs lies in the category of mechanical LBP.[8]

Pathophysiology of work-related LBP

The movements of the lumbar spine consist of the cumulative motions of the vertebrae, with 80-90% of the lumbar flexion/extension occurring at the L4-L5 and L5-S1 intervertebral disks. The lumbar spine position most at risk for producing LBP is forward flexion (bent forward), rotation (trunk twisted), and attempting to lift a heavy object with out-stretched hands. Axial loading of short duration is resisted by annular collagen fibres in the disk. Axial loading of a longer duration creates pressure to the annulus fibrosis and increased pressure to the endplates. If the annulus and endplate are intact, the loading forces can be adequately resisted. However, compressive

muscular forces may combine with the loading forces to increase intradiscal pressure that exceeds the strength of the annular fibers. Frequent complaints of pain in the lumbar spine are associated with paravertebral muscle tension caused by uncomfortable positions and premature degeneration of intervertebral discs due to excessive physical exertion. Repetitive, compressive loading of the disks in flexion (e.g., lifting) puts the disks at risk for an annular tear and internal disk disruption. Likewise, torsional forces on the disks can produce shear forces that may induce annular tears. The contents of the annulus fibrosis (nucleus pulposus) may leak through these tears.[9]

The risk groups of low back pain among healthcare professionals are physicians, dentists, nurses, physiotherapist, laboratory workers and caregivers. Health care workers are exposed to shift duties which affects their psychological and physical health. During their job, they used to work in a particular posture for longer than usual time and sometime have to use mechanical force to fix the things as a part of their job. These make them more vulnerable for LBP than other occupations and general population. In India limited studies are available among health care workers to understand burden of LBP and its pattern. Most of previously available studies missed all cadres of HCWs and focused upon nursing staff only. Therefore, present study was proposed to fill the gap in knowledge about LBP problem and its pattern among various cadres of HCWs and to throw light upon various risk factors, aggravating factors and relieving factors.

Methodology

Present cross-sectional study was conducted in department of PMR, S.M.S. Hospital, Jaipur between December 2018 to December 2019 in 190 consenting health care workers (HCWs) aged 18 years to 60 years working at S.M.S. Hospital, Jaipur for more than one-year duration.

Sample size and technique

Sample size of 190 HCWs was calculated at 95% confidence level and 15% relative allowable error expecting 53% prevalence of LBP in HCWs as found in the study of Simsek et. al.[2] Complete list of all HCWs was obtained from administrative office of S.M.S. Hospital, Jaipur and was categorized according to various cadres and place of working of HCW particular. In order to make sample representative, it was decided to stratified total sample size according to size of various cadres. From the category wise list, participants of each cadre were selected by using simple random sampling with the help of Random Number Table. Detailed history, thorough general and systemic examination was done of selected HCWs, using standard examination practices. Case of LBP was diagnosed using SNMA[10] criteria in detailed enquiry about aggravating and relieving factors was conducted. Severity of pain was assessed by using 10-point Visual Analogue Scale (VAS) and psychological impact was evaluated using Perceived Stress Scale (PSS). All findings were recorded and subjected to statistical analysis.

Statistical Analysis

Linear variables were summarised as mean and standard deviation whereas nominal/categorical variables were presented as proportions (%). Unpaired t-test was used for analysis of linear variables while nominal/categorical variables were analysed by using chi-square test. Correlation between ordinal variables was assessed by Spearmann correlation coefficient (rho).P-value <0.05 was taken as significant. MEDCALC 19.4 version software was used for all statistical calculations.

Results

Total 190 HCWs were selected for study, out of them 82.11% were male and rest 17.89% were females. Most of the HCWs (45.79%) were in age group 31 to 40 years followed by 21 to 30 years. Age of study participants ranged from 22 years to 59 years with average age of 37.49 ± 8.89 years. Male HCWs were significantly elder (38.09 ±

8.84 years) than female HCWs (34.77 ± 8.74 years). In the present study, 21.05% HCWs were doctors, 52.63% were nursing staff, 18.95% were lab technicians and 7.3% were ward boys (Table No.1).

The SNMA criteria was used in present study and found that 24.74% of HCWs were suffering from LBP as per case definition. It was evident from table no.2 that most of the cases of LBP felt increased pain in standing (87.23%) followed by flexion of spine (78.72%) and sitting (70.23%). Extension of spine was aggravating factor in least number of cases (14.89%).Above table also shows that 95.74% of cases found rest as most common

relieving factor followed by sitting (25.53%) and flexion of spine (2.13%).

As shown in table no.3, 97.87% of cases had tenderness as most common associated characteristic followed by radiation to lower limbs (40.43%), morning stiffness (31.91%) and claudication (2.13%). The mean PSS of cases was 8.66 ± 3.04 ranging from 4 to 14 with median score of 8. Similarly mean VAS score was 4.40 ± 1.33 ranging from 2 to 7 with median VAS of 4 (Table No.4). On clinical examination SLR test was found positive in 40.43% cases, Lasegue test was found positive in 38.30% cases whereas, bowstring test was positive in only 4% of cases of LBP to diagnose lumbar radiculopathy.

Table No.1: Distribution of HCW's according to cadre

Cadre	Working post	Number	Percentage
Doctors	Doctor	40	21.05
Total		**40**	**21.05**
Nursing Staff	Bone Marrow Transplant Unit	1	0.53
	GNM	1	0.53
	Physiotherapist	4	2.11
	Nurse	94	49.47
Total		**100**	**52.63**
Lab Technician	Computer Operator	1	0.53
	Data Operator	2	1.05
	ECG Technician	1	0.53
	Health Advisor	1	0.53
	Lab Assistant	1	0.53
	Lab Technician	17	8.95
	Pharmacist	10	5.26
	Programmer	1	0.53
	Radiographer	2	1.05
Total		**36**	**18.95**
Ward boy/Sweeper	Lift Operator	1	0.53
	Sweeper	1	0.53
	Ward Boy	12	6.32
Total		**14**	**7.37**
Grand Total		**190**	**100.00**

Table No.2: Distribution of cases according to aggravating and relieving factors of LBP

	Number	Percentage
Aggravating factors		
Sitting	33	70.21
Standing	41	87.23
Walking	9	19.15
Extension of Spine	7	14.89
Flexion of Spine	37	78.72
Lateral bending	15	31.91
Relieving factors		
Rest	45	95.74
Sitting	12	25.53
Flexion of spine	1	2.13
Extension	0	0.00

Table No.3: Distribution of cases according to associated features of LBP

Associated Features of LBP	Number	Percentage
Claudication	1	2.13
Radiation to Lower limbs	19	40.43
Morning stiffness	15	31.91
Tenderness	46	97.87

Table No.4: PSS & VAS of cases of LBP

	N	Mean	SD	Median	Min.	Max.
PSS	47	8.66	3.04	8	4	14
VAS	47	4.40	1.33	4	2	7

Table No. 5: Clinical examination of cases of LBP

SLR Test (N=47)	Number	Percentage
Bilateral Positive	7	14.89
Unilateral positive	12	25.53
WNL	28	59.57
Lasegue Test		
Negative	29	61.70
Positive	18	38.30
Bowstring Test (N=47)		
Negative	43	91.49
Positive	4	8.51
FABER Test (N=47)		
Bilateral Positive	6	12.77
Unilateral positive	5	10.64
WNL	36	76.60
FAIR test (N=47)		
Negative	47	100.00
Positive	0	0.00

Discussion

In the present study, SNMA criteria was used and found that 24.74% of HCWs were suffering from LBP as per case definition which was corroborative with 28% prevalence of LBP in the study by Johnson and Edward[11] in south-south Nigeria and 30% prevalence in the study by Cunningham et. al.[3] However, Wong et. al.[7] found 72.5% prevalence of LBP in his study in Malaysia. Alnaami et. al.[4] also found quit higher prevalence i.e. 73.9% in HCWs in south western Saudi Arabia. Wide variations in LBP may be attributed to differences in case definitions, study population and criteria used in various studies.

In this study, most of the cases had LBP of sudden onset (68.09%), moderate severity (70.21%) and localized to lower back (95.74%) which was well supported by Karahan et. al.[5]where they found 63% of HCWs were having moderate LBP.

Similarly, in study of Simsek et. al.[2], moderate pain was found in 52.8% of LBP cases.LBP duration of less than one year was found in 57.45% cases of LBP in present study, which was again consistent with the finding of Karahan et. al.[5] they observed that 95.5% had LBP within a year.

Standing and flexion of spine were found most common aggravating factors in the present study (87.23% and 78.72% respectively) followed by sitting (70.21%), lateral bending (31.91%), walking (19.15%) and extension of spine (14.89%). In accordance to present study, Mohseni-Bandpei et. al.[12] found prolong standing, repeated movements and awkward postures as most prevalent aggravating factors (85.2%, 50.2% and 48.4% respectively). Johnson et. al.[11] found prolong standing as common risk factors in their study. Bending and prolong positions were

strongly associated with LBP in study of Dlungwane et. al.[13] as similar to present study. Prolong standing or sitting were most frequent activities reported to be associated with LBP among HCWs of south western Nigeria by Omokhodion et. al.[14] in accordance to present study. Alzidani et. al.[15] also observed similar findings to present study and concluded overall standing time as associated characteristic of LBP.

In this study, rest was most common relieving factor in 95.74% of cases of LBP followed by sitting in 25.53% as similar to the study of Mohseni-Bandpei et. al.[12], where rest was most common relieving factor found in 89.5% cases of Iranian surgeons. Homaid et. al.[16] also concluded rest (51.72%) and analgesics (43.68%) to be the most common pain relievers.

The mean PSS among cases was 8.66 which was quite low than study of Simsek et. al.[2], where mean PSS was 22.19% in LBP cases. This difference may be explained due to difference in study location and study population as in India, sociocultural fabric of family works as stress buster to keep stress level low.In present study, mean VAS score was 4.4 which was comparable to study of Simsek et. al.[2] where it was 4.02.Significant positive correlation found between VAS and PSS (rho= 0.714; P<0.05) in present study.On clinical examination SLR test was found positive in 40.43% cases, Lasegue test was found positive in 38.30% whereas, bowstring test was positive in only 4% of cases of LBP to diagnose lumbar radiculopathy. Sacroiliac joint pathologies were found positive as per FABER test in 23.40 % cases whereas none of the case was detected of piriformis syndrome when clinically tested by FAIR test.All superficial reflexes and deep tendon reflexes were within normal limits. Motor and sensory examinations were also found normal.

Conclusion

It was concluded from present study that LBP is a major problem among HCWs. Awkward positioning for longer duration and lifting objects are very usual in health care profession, which make them more susceptible for LBP. Commonest aggravating factors among cases of this study was standing followed by flexion of spine and sitting. Rest was found relieving factor in most patients of LBP of this study followed by sitting.

Conflict of Interest: Nil.

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