LOW BACK PAIN AND ITS ASSOCIATED FACTORS AMONG SECONDARY SCHOOL TEACHERS IN CUTTACK, ODISHA: A CROSS-SECTIONAL STUDY

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Abstract:

The purpose of the present study was to search the prevalence of low back pain and its associated factors in secondary school teachers of Cuttack, Odisha. For this purpose, 457 secondary school's teachers aged 26-60 years were contacted from various schools of Cuttack city, of those 191 teachers (76 male and 115 female) were confirmed for low back pain by self- informative questionnaire. Modified Oswestry Low Back Pain Disability Pain Questionnaire and a self-constructed questionnaire were applied to measure the socio-demographic and economic characteristics of the participants. The results revealed that the overall prevalence of LBP in the last 12 months among secondary school teachers was 41.79%, of those female teachers (60.20%) were affected more than their male counterparts. Some factors, such as excessive work load, sleeping disturbance (especially in female teachers), prolonged standing in classroom, physical inactivity affected adversely towards their health and wellbeing causing LBP in them. It was also found that the maximum male (75.00%) and female (58.26%) teachers had the minimum disability in Oswestry Disability Index category. It might be concluded that the addressing work-related and individual factors would be essential to decrease the magnitude of the problem.

Keywords: Low back pain, Prevalence, Associated factors, Secondary school teachers of Cuttack, Odisha.

Introduction:

Low back pain (LBP) is the most prevalent musculoskeletal condition worldwide (Pataro and Fernandes, 2014). It is estimated that about 70% to 85% of the global population experience low back pain at some time in their life (Tucer et al., 2009). The prevalence of LBP is increasing globally at the estimate of 60%-70% of people in developed countries. Furthermore, the annual incidence of LBP is approximated to be 5% with a prevalence of 15%-45% annually in developed countries (Nilahi, 2014). Low back pain also known as "lumbago" which is common musculoskeletal problems among the working populations including teachers, it has a substantial

effect on school teachers' quality of life, resulting in frequent sick leaves, functional impairment, absenteeism and early retirement (Gupta and Sharma, 2018). Teaching is regarded as a human service occupation. Teaching is a job which has the potential for high risk for MSD (Atlas et al., 2007). In recent time, many studies have documented teaching as a highly stressful occupation. The tasks of school teachers might be subjected to conditions that involved a constant use of a 'Head Down' posture during frequent reading, marking assignments and writing on boards. Poor posture and improper technique of lifting or carrying objects are the two very

common causes of LBP. Lifting heavy loads and materials, such as books, overhead projectors and other equipment rank as the main contributing factors. Among school teachers, the prevalence of LBP is much higher as compared to that of other occupational groups, ranging from 12% to 95%. Teachers also involved in high energy activities such as gymnastics and sports activities at schools are at higher risk of developing acute and chronic LBP injuries, which often result in permanent disability. (Nilahi, 2014).

Literature available on low back pain in teaching occupation suggests that teachers are subjected to various stressful conditions during performing their duties. As the prevalence of LBP and associated factors by the work-related characteristics of secondary school teachers in Cuttack, Odisha, is not well documented, the present study was planned.

Materials and Methods

The cross-sectional study was conducted from August 2020 to February, 2021, in Cuttack city of Odisha, India. As per the information provided by the District Education Office, Cuttack city has 476 secondary schools with 3765 regular teachers. The study was conducted with the sample of 457 secondary school teachers (12.14% of the entire population) both males and females with a minimum one year experience, aged between 26 to 60 years were collected from different secondary schools of Cuttack, Odisha. Of those, 191 teachers (76 male and 115 female) were confirmed for low back pain by self-informative questionnaire. Teachers who had any known chronic illness, neurological, musculoskeletal, cardiovascular or psychiatric illness with any prescribed medicine were excluded from the study. All the participating teachers signed their informed consent forms, including a permission to use the data only for academic purposes. The self-constructed questionnaire was applied to measure the socio-demographic and economic characteristics of the participants. The study was approved by Institutional Ethical Committee.

Anthropometric Measurements

Height and body weight of the subjects were measured after Lohmann et al. (1988) and Body Mass Index (BMI) was calculated from height and weight as follows: $BMI = \text{weight (kg)} / \text{height}^2 (\text{m}^2)$.

Modified Oswestry Low Back Pain Disability Pain Questionnaire

The ODI was originally developed as a self-assessment tool to assess the percentage of low back pain in patients. This questionnaire has been designed to give the therapist information as to how participant's low back pain has affected their ability to manage in everyday life. Participants were requested to answer every question by placing a mark in the one box. A sum of all the points was multiplied by 2, this represented a disability percentage. Subsequent interpretation of these calculated scores contained 5 ranges: from minimal to total disability as follows: < 20% - minimal, 21-40% - moderate, 41-60% - moderate to serious, 61-80% - serious and 81-100% - very serious or total disability. The ODI has good face validity and content validity acceptable internal consistency.

Work related characteristics

Associated factors were estimated by work related characteristics. It contained 17 number of questions: prolonged standing during teaching or not, length of standing during teaching (2-5 hr or >5 hr), frequency of teaching class (one class per day or moving from class to class), length of break time between sessions (<20 min, up to 1 hr or >1 hr), working per week (<30 min or >=30 hr), sleeping time per day (<6 hr, 6-9 hr or >=10 hr), have prolonged sleeping or not, reason for prolonged sitting at work (for exam marking, for assignment marking or other reasons), type of seat frequently used at office (swivel chair, normal chair or bench), also contained data regarding the work shift pattern, shifting of heavy materials or not, had extracurricular activity or not, had regular physical exercise or not, time for physical exercise (<=5 hr or >5 hr), had training on safety at work or not, had discouragement and depressions and experience of any verbal or physical violence.

Statistical Analysis

Standard descriptive statistics (percentages) were analyzed for variables of the subjects using SPSS (Statistical Package for Social Science) version 20.0. To indicate statistical significance, 5% level of probability was used.

Results

Table 1 showed the prevalence, socio-demographic and economic characteristics of the secondary school teachers of Cuyyack. Out of 457 secondary school teachers, 191 were found to have low back pain (41.79%). Over half of the teachers (59.21% male and 53.04% female) were of age group more than 40 years. In BMI categories, predominantly 60.52% male and

47.83% female teachers were found underweight. The teachers were predominantly (96.05% males and 98.26% females) Hindu by religion. As per educational status, the maximum male teachers (59.21%) were post-graduate and female teachers (54.78%) were graduate. Majority of the teachers (84.21% male and 77.39% female) were married. So for work experience was concerned, the maximum male teachers (46.05%) had the experience above 25 to 35 years, whereas, the maximum female teachers (41.74%) had the experience between 11 to 24 years. The maximum number of teachers (32.89% male and 26.96% female) enjoyed the salary of Rs 25000 – 35000 per month, with no extra source of income (77.63% males and 85.22% females).

Table 1: Prevalence, socio-demographic and economic characteristics of secondary school teachers in Cuttack, Odisha

Variables	Frequency		Percentage	
Low back pain patients	191		41.79%	
Gender				
Males	76		39.79%	
Females	115		60.20%	
Age (years)	Males		Females	
	Frequency	Percentage	Frequency	Percentage
<30	10	13.15%	20	17.39%
31-40	21	27.63%	34	29.56%
>40	45	59.21%	61	53.04%
BMI (kg/m ²)				
<18.5	46	60.52%	55	47.83%
25-29.9	26	34.21%	40	40.86%
>=30	4	5.26%	13	11.30%
Religion				
Hindu	73	96.05%	113	98.26%
Muslim	3	3.94%	2	1.73%
Educational Status				
Secondary	0		1	0.87%
Higher secondary	2	2.63%	1	0.87%
Graduate	29	38.15%	63	54.78%
Post graduate	45	59.21%	49	42.61%
PHD	0		1	0.87%
Marital Status				

Single	12	15.79%	26	22.61%
Married	64	84.21%	89	77.39%
Divorced /Widow	0		0	
Work experience (years)				
<10	10	13.16%	32	27.83%
11-24	31	40.79%	48	41.74%
>=25-35	35	46.05%	35	30.43%
Monthly Salary (Rupees)				
5,000-15,000	1	1.31%	3	2.61%
15,000-25,000	6	7.89%	23	20%
25,000-35,000	25	32.89%	31	26.96%
35,000-45,000	15	19.74%	18	15.65%
45,000-55,000	4	5.26%	6	5.22%
55,000-65,000	6	7.89%	13	11.30%
65,000-75,000	19	25%	21	18.26%
Extra source of income				
Yes	17	22.37%	17	14.78%
No	59	77.63%	98	85.22%

The work related characteristics of secondary school teachers in Cuttack, Odisha was shown in Table 2. The maximum teachers (56.58% male and 84.35% female) had the habit of prolonged standing during teaching with 2-5 hours of standing during teaching (77.63% males and 59.13% females respectively). The maximum male teachers (59.21%) had one class per day, whereas 62.61% female teachers had the tusks of teaching moving from class to class with the length of break time between sessions more than one hour in 48.68% male teachers and less than 20 minutes in female teachers. The maximum teachers (78.95% male and 60.87% female) had less than 30 hours working load per week. 38.16% male teachers had more than 10 hours sleeping time per day, whereas 59.13% female teachers had less than 6 hours sleeping time per day. The maximum (55.26%) male teachers had prolonged sleeping time whereas, 72.17% female teachers had no prolonged sleeping time. The maximum male teachers (47.37%) gave the reason for prolonged sitting at work for assignment marking, and 64.35% female teachers showed the reason for exam marking. The maximum (46.05% each) male teachers frequently used normal chair and bench to sit at office, whereas, 59.13% female teachers used

bench only to sit. As per work shift pattern was concerned, the maximum (64.47%) male teachers and 46.95% female teachers shifted their work pattern once for week. The maximum (73.68% male and 57.39% female) teachers did not have the record of shifting of heavy material. The maximum (65.79% male and 70.43% female) teachers had extracurricular activity. The maximum male teachers (56.58%) had regular physical exercise, whereas maximum female teachers (78.26%) did not have regular physical exercise. The maximum (38.16% male and 15.65% female) teachers had the time for physical exercise less than five hours. The maximum male teachers (57.89%) did not have training on safety at work, whereas, the maximum female teachers (76.52%) had training on safety at work. The maximum (60.52%) male and (62.61%) female teachers had discouragement and depression. The maximum (69.73%) male and 65.22% female teachers did not have experience of any verbal or physical violence.

Table 3 showed the Oswestry disability index-wise distribution of the subjects. The maximum male (75.00%) and female (58.26%) teachers had the minimum disability in Oswestry Disability Index category.

Table 2: Work-related characteristics of secondary school teachers in Cuttack, Odisha

Variables	Males		Females	
	Frequency	Percentage	Frequency	Percentage
Prolonged standing during teaching				
Yes	43	56.58%	97	84.35%
No	33	43.42%	18	15.65%
Length of standing during teaching				
2-5hr	59	77.63%	68	59.13%
>5hr	17	22.37%	47	40.87%
Frequency of teaching class				
One class per day	45	59.21%	43	37.39%
Moving from class to class	31	40.79%	72	62.61%
Length of break time between sessions				
<20min	20	26.31%	61	53.04%
Up to 1 hr	19	25%	38	33.04%
>1hr	37	48.68%	16	13.91%
Working per week				
<30hr	60	78.95%	70	60.87%
>=30hr	16	21.05%	45	39.13%
Sleeping time per day				
<6hr	25	32.89%	68	59.13%
6-9hr	22	28.95%	34	29.56%
>=10hr	29	38.16%	13	11.30%
Have prolonged sleeping				
Yes	42	55.26%	32	27.83%
No	34	44.74%	83	72.17%
Reason for prolonged sitting at work				
For exam marking	32	42.10%	74	64.35%
For assignment marking	36	47.37%	36	31.30%
Other reason	8	10.52%	5	4.34%
Type of seats frequently used at office				
Swivel chair	6	7.89%	6	5.21%
Normal chair	35	46.05%	41	35.65%
Bench	35	46.05%	68	59.13%
Work shift pattern				
Only morning	13	17.10%	24	20.87%
Whole shift	14	18.42%	37	32.17%
Once for week	49	64.47%	54	46.95%
Shifting of heavy material				
Yes	20	26.31%	49	42.60%
No	56	73.68%	66	57.39%
Have extracurricular activity				
Yes	50	65.79%	81	70.43%
No	26	34.21%	34	29.56%
Have regular physical exercise				
Yes	43	56.58%	25	21.74%

No	33	43.42%	90	78.26%
Time for physical exercise				
<=5hr	29	38.16%	18	15.65%
>5hr	14	18.42%	7	6.08%
No	33	43.42%	90	78.26%
Have training on safety at work				
Yes	32	42.10%	88	76.52%
No	44	57.89%	27	23.47%
Have discouragement & depression				
Yes	46	60.52%	72	62.61%
No	30	39.47%	43	37.39%
Experience of any verbal or physical violence				
Yes	23	30.26%	40	34.78%
No	53	69.73%	75	65.22%

Table 3: Oswestry disability index-wise distribution of the subjects

Oswestry Disability index category	Males		Females	
	Frequency	Percentage	Frequency	Percentage
Minimal disability	57	75%	67	58.26%
Moderate disability	16	21.05%	38	33.04%
Severe disability	2	2.63%	8	6.95%
Crippled	1	1.31%	2	1.74%
Bed bound	0		0	

Discussion

In the present study, the overall prevalence of LBP in the last 12 months among secondary school teachers was found 41.79% which lied in the line with the studies conducted in Malaysia (40.4%) (Hinmikaiye and Bamishaiye, 2012). Tsuboi et al. (2002) reported the prevalence of LBP 20.4% in male and 23.2% female teachers in Japan. The prevalence of LBP was found higher as compared to the findings of the above mentioned studies might be because of poor facilities in our schools, low morale and poor socio-economic conditions, lack of awareness about how to decrease and control excessive work load in schools. In the present study, 60.20% female teachers suffered from LBP as compared to male teachers (39.39%). It was because

female teachers were culturally and socially obliged to perform almost all home activities which results in a heavier work load and greater risk to LBP than male teachers. In addition, since

females tend to have a lower pain threshold than men, they were more likely to report problems than men.

The findings of the present study found that sleeping disturbance (especially in female teachers), lack of regular physical exercise and prolonged standing in classroom were significantly associated with LBP. This was in agreement with the reports from African and Asian countries (Chong and Chan, 2010; Kebede et al., 2019). The reasons might be, due to insufficient sleep, teachers got inadequate rest which aggravated health with increased stress. Prolonged standing or sitting (with neck flexed during marking and reading) habits were also found significantly high in the teachers. All these factors were closely related to LBP (Kovac et al., 2013; Yue et al., 2012; Erick and Smith, 2011; Samad et al., 2010). Prolonged standing in an inappropriate posture for several hours in the classroom might cause excessive strains on the

lumbar spine resulting LBP. Activities such as carrying loads (books, copies, overhead projectors etc.) to the classroom, twisting movements (turning from the boards to the class and back again), down head activities (correcting assignments, marking the copies etc.), poking chin while working in computers aggravated LBP in teachers (John-Son et al., 2011; Gullu et al., 2012; Hakanen et al., 2006; Kebede et al., 2019). Physical inactivity might weaken the abdominal muscles further causing LBP in teachers (Lemoyne et al., 2007). Toumi et al. (1991) reported that musculoskeletal disease affected adversely in working ability. It was also found that LBP had a significant negative impact on working ability (Cheng et al., 2008) and the psychological wellbeing of the teachers (Yalmaz and Dedal, 2012). In fact, teachers play a versatile role not just educating students but acting a role model in building nations. Their action, general behaviour, moral character, pose, posture directly influence the students (Morrison, 2005; Erick and Smith, 2014). It is reported that musculoskeletal disorder developed over a period of time and was caused by work itself or by the employee's work environment (Morrison, 2005).

The present study showed the maximum male (75.00%) and female (58.26%) teachers had the minimum disability in Oswestry Disability Index category. It increased with the increasing age (Erich and Smith, 2013) and experience (Ilmarinen et al., 1997). All these above mentioned factors were found to affect on LBP in secondary teachers.

One of the limitations of the cross-sectional study was that, the LBP status of the teachers was not verified by clinical diagnosis, but based on self-reporting, might resulting from some recall bias.

Conclusion

It might be concluded from the findings of the present study that the prevalence of LBP in secondary school teachers of Odisha was 41.10%, with female teachers had the prevalence more than males. Some factors, such as excessive work load, sleeping disturbance (especially in female teachers), prolonged standing in classroom,

physical inactivity affected adversely towards their health and wellbeing causing LBP in them. The maximum teachers (both male and female) had the minimum disability in Oswestry Disability Index category. Thus, the addressing work-related and individual factors would be essential to decrease the magnitude of the problem.

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