A Geo-Medical Study of Low Back Pain Associated With Risk Factors Reported among Female School Teachers of Srinagar District, Jammu and Kashmir, India

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Abstract

Low Back Pain (LBP) is considered one of the most frequently reported causes of visits to healthcare establishments. In India, the prevalence of LBP is alarming with approximately 60% of people suffering from LBP. It has been observed that most people have experienced back discomfort at least once in their lives. Globally, LBP features amongst work-related disorders as a frequently prevailing issue in occupational settings. In the Indian scenario, the prevalence of LBP is generally found to be gender-specific. Females are reported to suffer more from LBP than males in the same working environment. Recent research suggests that school teachers exhibit a higher prevalence of LBP issues. Therefore, the present study focuses on enquiring about the occurrence of LBP and understanding the associated risk factors among female teachers. Simple random sampling is used to identify schools in 5 urban units of the Srinagar district. Binary logistic regression is employed to identify the risk factors, both at the workplace and at home. Married females (58.33 %) complained of LBP more than unmarried ones. At the workplace, prolonged standing (40%) was the most common self-reported risk factor for LBP. In general, prolonged standing, teaching hours, and mental health were found to be the three statistically significant risk factors contributing to LBP at the workplace. Amongst all the activities at home, domestic chores carried out by females (married and unmarried both) were the highest self-reported risk factor (78%), married women at 82.14% and unmarried women at 75.9%. The same was found statistically significant along with the additional factor being professional work done at home. The study establishes the need for a comprehensive strategy and preventive interventions in lowering the prevalence of LBP disability, especially among teachers, given the immense role they play in shaping our society.

1 INTRODUCTION

In India, the prevalence of Low Back Pain (LBP) is very alarming. Approximately 60% of people are suffering from LBP in India (Das, 2015). It is a disorder with a complex etiology (Walker, 2000). LBP is the term used to refer to the discomfort observed between the 12th rib and the inferior gluteal folds (low back), with or without leg pain due to various causes (Yilmaz and Kaya, 2009). It is, in fact, regarded as one of the most commonly cited causes of visits to healthcare establishments. On the economic front, this particular disorder in people causes absenteeism from work and is one of the major reasons for disability (Max Hospital, 2020). Various studies have observed LBP as gender-specific. The ratio of females to males suffering from LBP is high in the same working environment (Messing and Grosbois, 2001; Zahm and Blair, 2003; Sanne *et al.*, 2000). However, the reason for this gender segregation needs to be investigated from socioeconomic, cultural and medical perspectives. Historically such differences have been attributed to psychological factors but more recently strong evidence supports the role played by biological factors, particularly the "hormonal

mechanism" (Bailey, 2009). Recent studies have shown that women are more prone than men, to be impacted by chronic pain conditions of the musculoskeletal system (Leveille et al., 2005). It is also reported that when compared to males, females tend to have a lower pain threshold and report any pain more frequently (Chiu and Lam, 2007; Jin and Courtney, 2004).

The traditional model of occupational health and safety risk has shifted from injuries to illnesses arising from chronic diseases. This change is primarily caused by the increasing trend in occupational health problems, particularly Musculoskeletal Disorders (MSDs) and mental health disorders (Macdonald and Oakman, 2015). International Labour Organization's (ILO) 2011 data suggests that amongst all types of occupational injuries and illnesses, musculoskeletal issues alone constitute almost 33%. Moreover, 40% of all expenses incurred on managing and treating work-related disorders and injuries are accounted to be due to musculoskeletal problems, the primary contributor being LBP (Nag and Pradhan, 1992; Rajgopal, 2000; Tiwari et al., 2003; Bepko and Manasalis, 2016). The exact magnitude of occupational diseases in females in India is still unknown. Nevertheless, Leigh et al. (1999) estimated that globally 1102 million women suffer from occupation-related musculoskeletal diseases. In India, it is estimated to be 530062. Talking of the global scenario, amongst musculoskeletal work-related issues, LBP is one of the most frequently reported occupational disorders. Almost 80% of the human population worldwide complains of LBP issues at least once in their lifetime. A US-based study stated that LBP is so frequently reported that nearly 50% of adult humans have experienced low back discomfort for more than a day throughout the year and ranks it as the second highest reported cause for visits to primary care physicians and the third most common reason for surgery (Nurul et al., 2010).

Occupation-wise the number of females working as school teachers in India has been constantly increasing. According to the U-DISE report (Unified District Information on School Education) 2019-20, the number of female teachers has grown considerably, clocking a 37% growth (13 lakhs absolute uplift) within the last seven years. The increase has been more profound in private schools. Whereas, dominance of male teachers in numbers and the growth in their representation are still more prevalent in government schools (Nazir, 2021). Recent research suggests that teaching is a stressful occupation (Kaur, 2011) and that discomfort in the low back is more prevalent among the school teacher populace (Elias et al., 2019). A study conducted on the health status of school teachers in Kerela revealed that continuous teaching hours in unaided schools and government schools lead to low back pain (Chakravarthy and Vivekanandhan, 2020). Similar research done in Uttar Pradesh reported that LBP significantly affects teachers and suggests that LBP may impact the working ability and the psychological well-being of teachers (Gupta and Sharma, 2018). A cross-sectional study on teachers done in China revealed that the presence of LBP was a common attribute among female teachers compared to their male counterparts (Yue et al., 2012). Many epidemiologic studies concluded that school teachers exhibited a higher risk for development of low back pain, though with a variation in their prevalence rate (Tsuboi et al., 2002; Atlas et al., 2007; Anuar et al., 2016; Vidal et al., 2021).

This paper aims to analyze the prevalence and risk factors of low back pain among the female high-school teachers of the Srinagar district. Kashmir Valley is the most urbanized valley of the fragile Himalayan ecosystem (Malik, 2012; Bhat et al., 2017) with the dominance of Srinagar as a primate city and the main urban center (Husaain and Imtiaz, 2016). Srinagar city comprises 37% of the urban populace of Jammu and Kashmir, with a 9-fold increase in the urban population growth from 122618 in 1901 to 1147617 in 2011 (Husaain and Imtiaz, 2016). This million-plus city is the epicenter of all political and socio-economic activities. The process of urbanization comes along with its share of advantages and disadvantages. Apart from social and cultural changes, urbanization leads to technological and economic changes. One of the benefits of urbanization is improvised educational facilities at the school, college, and university levels to develop the human resources entailing the participation of women in the economic system (Hussain and Imtiaz, 2016). Jammu and Kashmir has a literacy rate of 67.16% (Census, 2011). However, it still doesn't have a prominent education system when compared to the national level. Nevertheless, there has been significant progress in terms of the increasing number of schools and higher education institutions, which is aiding in boosting the level of education across its districts (Aditi, 2022). With this, the opportunities and thereby the engagement of teachers has also seen a rapid evolution. Teaching was for long thought of as a stable job that was comfortable for anyone given the predictable set of tasks that one was expected to perform. Socio-economic changes, new education policies and teaching models have brought about many changes in the teaching-learning process. Given the dynamic nature of the employment patterns and the global ecosystem as a whole, it has become imperative that the focus should be shifted from learning to methods of learning involving critical thinking, problem-solving and being innovative and multidisciplinary in approach. Thereby the past pattern of safe and stable work at schools has shifted to a state of stressful and unregulated work modes (Mariamal, 2012). However, at the same time, this transition has also contributed to making the entire process enjoyable. Therefore, to bridge the gap between the current outcomes and required needs, National Education Policy, 2020 (NEP, 2020) introduced revised and revamped teaching models and pedagogy tools to create a system that is in line with the deliverable goals of the 21st-century education setup and the sustainable development goal- 4 (SDG 4). Pedagogy practices adopted by teachers for conducting teaching-learning sessions using various strategies and approaches to ensure learning outcomes have put additional stress and burden on the teachers along with their committed

responsibilities. Sometimes, to meet the teaching objectives, the teaching process is impacted by difficult and unsuitable setups, which over-demand teachers to use their physical, cognitive and affective capacities (Cardoso *et al.*, 2009).

This demanding nature of the renewed education system is thus breeding avenues of health issues like LBP amongst teachers. Globally, researchers are of the view that the occupational stress of teachers affects them physically as well as mentally (Simazu *et al.*, 2003; Tang *et al.*, 2001; Pervez and Hanif, 2003). Researchers have attempted to study the occurrence of low back pain broadly for many occupations, with some suggesting correction of postures, while others suggesting the use of ergonomic furniture for schools (Nurul *et al.*, 2010; Lemoyne *et al.*, 2007). Nevertheless, the existence of LBP issues amongst female teachers and its associated risk factors requires attention and detailed analysis. It is worth noting that the initial episodes of LBP can be treated well within 2-4 weeks of occurrence. However, delays in treatment tend to lead towards the development of serious physical, social and mental problems (McKeon *et al.*, 2006; Nurul *et al.*, 2010).

Thus, it becomes imperative to drive attention towards the health of teachers who work tirelessly for a noble cause and the development of the nation. The epidemiological model of Kashmir Valley reports that it has surpassed the stage of infectious and communicable disease and has shifted to a new stage of chronic diseases attributed to socio-economic, socio-cultural, and changing lifestyle patterns. With rising urbanization which in turn gives rise to employment opportunities, the health is adversely getting affected of the working populace. Given the prominence of the theme and the dearth of existing studies in this area, therefore, the researchers attempt to analyze the prevalence of low back pain and its associated risk factors among the female high school teachers of the Srinagar district.

2   MATERIAL AND METHODS

2.1   Data Collection

This research involved an epidemiological analysis of the female high school teacher's Musculoskeletal Disorder (MSD) with a primary focus on low back pain. The paper employed primary data collected with the help of a self-reporting questionnaire. Before data collection process, a short briefing was done. The schools selected were government-recognized private schools with more than 500 students located in the urban areas of the Srinagar district. Random sampling approach was used for the target private schools that were located in the 5 urban units of the Srinagar district, i.e. Srinagar town - Municipal Corporation (M Corp) + Out growths (OG), Badami-Bagh, Khonmoh, Nowgam and Lasjan. Teachers' name lists were obtained from the respective school administration department. Teachers were divided into 2 categories (Form teacher + subject teacher and subject teacher). Teachers giving a minimum of 30 classes on average in a week and who met the criteria of a minimum of one year of experience and were not under any major medication were invited

to participate in the study as respondents. A questionnaire comprising three parts- respondent's background, Nordic questionnaire, and general health questionnaire, was distributed amongst 250 respondents who volunteered to participate. Every participant was also duly sought consent from and informed about the details of the procedure to be employed by giving them a consent letter and a detailed document that described the procedure of the study.

2.2   Design of Questionnaire

The questionnaire is designed in a simple tick-box format comprising three parts. The first part covered demographic characteristics such as age, gender, marital status, years of formal education and teaching experience. To investigate musculoskeletal problems, the second part of the questionnaire was based on the standardized Nordic questionnaire (Kuorinka *et al.*, 1987) which is used to assess the body parts with Musculoskeletal Disorders (MSDs) and symptoms most often encountered in the occupational setting. MSD questions were defined on the anatomical diagram such that they could help focus on the reporting of symptoms pertaining to specific body parts, experienced in the span of the last 1 year. A 12-month recall period is considered an appropriate timescale in other Asian studies (Smith *et al.*, 2006; Smith *et al.*, 2004; Chiou *et al.*, 1994). The third part comprised of (GHQ-12) General Health Questionnaire 12 (Goldberg and Hilier, 1979) to identify the psychosocial factors. This questionnaire is a popular standard used for the measurement of minor psychological discomfort. It is comprised of 6 positive and 6 negative items to assess positive and negative mental health. It included questions like, 'Have you been able to concentrate well on what you are doing? Have your worries made you lose a lot of sleep?' The scoring was based on the Likert scale with 0 implying not at all, 1 meaning sometimes, 2 meaning more than sometimes, and 3 implying often. To address the risk factors associated with low back pain, activities both at the workplace and at home were taken into consideration. The questionnaire exhibited decent reliability when measured as per Cronbach's alpha of more than 0.75. To determine the descriptive statistics (its prevalence and factors contributing to low back pain), univariate analysis is used. To analyze the associated risk factors, binary logistic regression is employed to identify statistically significant variables.

3   RESULTS

3.1   Socio-Demographic Characteristics

Table 1 reports the socio-demographic characteristics of the 250 respondents. Only female teachers were taken for the study. Unmarried respondents made up 66.4% of the sample whereas married were at 33.6%. The majority of respondents (51.6%) were postgraduates with an average age of 31 years and a minimum of 5.3 years of professional experience. The percentage of the subject teacher (teachers teaching any specific subject) was found to be the highest (68.4%) with a continuous work duration of (3.2 hours) on average and the Form teacher+subject teacher (Classroom in charge of

respective classes) was relatively low at (31.6%). 63.6% of the respondents exhibited results that were reflective of a poor mental health status and were indicative of stress and anxiety related issues.

3.2 Prevalence of Low Back pain

The majority of the total respondents reported musculoskeletal disorders of one or the other type. Low back pain was the most common. 55.33% of the total respondents reported low back pain (Table 2). The prevalence of low back pain was commonly seen in half of the population (53.33 %) with the majority among married females (58.33%). Out of the two categories, low back pain was more prevalent amongst the Form teachers +subject teachers' category at 62.50%.

Table 3 depicts the main self-reported factors responsible for low back pain among teachers at the workplace. Prolonged standing ranks the highest at 40%. Standing during morning assemblies, classroom lectures and writing on the board were the contributing factors. The second main factor was found to be prolonged sitting at 26.7%. Most of the teachers complained of less ergonomic furniture available for the teachers in the classroom and the staffroom. It was observed, that the subject teacher sitting for long hours on the plastic-made chairs complained more of low back pain than others. It was followed by working on computers and others at 20%. 10% of the respondents who reported low back pain were not sure of the contributing factors. 8.47% of the respondents complained of other reasons like climbing stairs and physical activities like walking

around the campus. The least contributing factor was lifting loads at 6.67%.

3.3 Analyses of Low Back Pain and Risk Factors at the Workplace

Table 4 depicts the risk factor analysis of low back pain among respondents with the selected factors. The risk of low back pain amongst the respondents significantly increased (3 times more) with prolonged standing (OR: 3.0, 95% CI: 1.13-7.96). The teaching hours increased the risk by 1.052 times (OR: 1.052 95% CI: 0.67-1.63) followed by the mental score (OR: 0.592, 95% CI: 0.28-1.0). No other risk factor showed a significant association with low back pain.

3.4 Self-Reported Factors Responsible for Low Back Pain and Risk Factors at Home

Table 5 depicts self-reported activities that contribute to the prevalence of low back pain amongst females both married and unmarried back home. Amongst all the activities, domestic chores carried out by females (married and unmarried) ranked the highest with 78% in total with married at 82.14% and unmarried at 75.9%. The burden of domestic responsibility is a common factor in married females. After marriage, they cater to the needs of their husband's family along with motherhood. Out of the total married females, motherhood was attained by just 28.8%. Leaving jobs after motherhood is a common factor for low employment levels among females as the burden of responsibilities increases. Professional work stands at the second position (75.2%) with the highest percentage for unmarried females than married 84.94% and 55.95% respectively. During the interview, it was noted that unmarried

Table 1. Socio-demographic background of female respondents

Variables	Percentage/Mean (N= 250)	Variables	Percentage/Mean (N= 250)
Marital status		Job responsibility	
Married	33.6%	Subject teacher	68.4%
Single	66.4%	Form teacher and subject teacher	31.6%
Educational level		Mental health status	
Graduate	30.8%	Good	36.4%
Post graduate	51.6%	Poor	63.6%
Doctorate	17.6%	Mean age (Year)	31
		Work experience (Year)	5.3
		Work duration (h)	3.2

Table 2. LBP prevalence in one-year amongst the respondents

Variable	Yes (%)	No (%)
Low back pain	53.33	46.67
Marital Status		
Married	58.33	41.67
Unmarried	46.23	53.77
Job Responsibility		
Form teachers and Subject teacher	62.50	37.50
Subject teacher	42.86	57.14

Table 3. Respondents' perceptions of activities contributing to LBP issues at the workplace

Activity	N (%)	Rank
Lifting load	6.67	6
Prolonged sitting	26.67	2
Prolonged standing	40.00	1
Others (Physical activities, walking up and down the stairs)	8.47	5
Working with computer	20	3
Not sure	10	4

female teachers were more comfortable taking professional work to their homes than married ones. The latter tried and preferred completing the extra work during free periods and recess time thereby putting additional stress on them. Personal chores rank 4th (25.2%) with more percentage of unmarried females (26.51 %) as they have less burden of overall domestic duties than married females.

3.5 Analysis of Low Back Pain and Risk Factors at the Workplace

The statistical analysis (Table 6) of the risk factors contributing to low back pain among female teachers back home showed that two risk factors i.e., domestic chores and professional work increased the risk of low back pain amongst female teachers both married and unmarried. Domestic chores like cleaning, and cooking increased the risk of LBP 5.527 times (OR: 5.527, 95 CI: 2.347-7.036). Professional work done at home by teachers like homework and exam paper checking, and preparing lesson plans increased the risk by 0.79 times (OR: 0.797, 95% CI 0.003. Motherhood did not play a significant role. It could be because the total number of respondents who attained motherhood was relatively low.

4 DISCUSSION

The main objective of the present paper was to analyze the occurrence of low back pain and its associated risk factors among the female high school teachers of the Srinagar district. To understand the problem of LBP better, risk factors contributing to low back pain both at the workplace and at home were studied. Musculoskeletal disease is a common factor in female occupations. School teachers, in particular, are more prone to work-related musculoskeletal problems with a severe impact on the lower back, neck, shoulder, wrist/hand and knee pain. A substantial amount of time spent on activities like lifting loads, prolonged standing, and improper posture by teachers put stress on overall health (Cho *et al*., 2012). The paper investigated that almost half of the respondents complained of low back pain (53.33%). A study carried out by Damayanti *et al.* (2017) in the Northern and Eastern India stated that 33.80% of teachers reported LBP whereas, 39% reported upper back pain. A study done in Toothukudi town, a district of Tamil Nadu, investigated that 66.15% of teachers (both males and females) complained of LBP; commonly associated risk factors being prolonged standing, repeated walking in the classroom and hand movements during writing on the blackboard (Mariammal *et al.*, 2012). The prevalence of LBP issues

Table 4. Relationship between low back pain with risk factors at the workplace

Factors	Odds ratio	95% C.I.	p-value
Age	0.448	0.277 - 0.724	0.13
Married	0.429	0.174 - 1.05	0.66
Teaching years	0.662	0.469 - 0.934	0.24
Teaching hours	1.052*	0.67 - 1.63*	0.03*
Qualification	0.671	0.328 - 1.37	0.71
Job responsibility classroom teacher)	0.143	0.53 - 0.387	.087
Prolonged sitting	1.28	0.475 - 3.48	0.33
Prolonged standing	3.0*	1.13 - 7.96*	0.01*
Working on computer	1.286	0.475 - 3.48	0.42
Mental score	0.592*	0.28 - 1.0*	0.01*

*Significant = p< 0.05

Table 5. Respondent's perceptions on activities that contribute to low back pain back home

Activity	Married (%)	Unmarried (%)	Overall (%)	Ranking
Personal chores	22.62	26.51	25.2	4
Professional work (Preparing lesson plans, exam paper checking, Homework checking)	55.95	84.94	75.2	2
Domestic chores for family (cooking, cleaning, etc.)	82.14	75.9	78	1
Motherhood (Child careering/parenting)	73.81	NA	28.8	3

Table 6. Relationship between low back pain with risk factors at home

Factors	Odds ratio	95% C.I	p-value
Personal chores	1.174	0.783 - 1.811	0.350
Domestic chores	5.527	2.347 - 7.036	0.030
Professional work	0.797	0.123 - 5.149	0.003
Motherhood	1.047	0.258 – 4.241	0.949

was commonly seen more in married female teachers (58.33 %). While interviewing the respondents, it was observed that along with the professional burden, the extra amount of domestic responsibilities back home contributed to LBP amongst married teachers as compared to unmarried teachers with fewer or no domestic responsibilities. Domestic responsibilities and professional work were the significant risk factors of LBP at home. Household activities like cleaning, sweeping floors, washing utensils, and cooking were some major chores mentioned by the respondents. Apart from musculoskeletal disorders, it affected their overall health. In a personal interview session, some respondents (both married and unmarried) complained of severe LBP during the onset of menstruation. With little or no relief from the workload, teachers found it hard to cope with the pain and discomfort. Many respondents complained of fatigue and body pain before and after school hours which affected their overall performance at school and resulted in absenteeism. From an occupational health perspective, global studies on working women have reported back discomfort during menstruation as being a major contributing factor (Tissot and Messing, 1995; Svensson et al., 1990; Wijnhoven et al., 2006). Chakravarthy and Vivekanandhan (2020) revealed that married female teachers are more prone to LBP and are influenced by extra domestic burden, sleep duration, and daily exercise. A similar study was carried out in Brazil which investigated the occurrence of MSDs and the interplay of different attributes and work-related aspects via a cross-sectional study. Significant associations were found between marital status, number of children, age, and sex (Bandpei et al., 2014). Arju (2018) while conducting a study on LBP among housewives concluded that increasing duration of married life increases the period of domestic activities performed, thereby developing LBP problems. Cardoso et al. (2009) stated that a high prevalence of musculoskeletal pain was majorly found in three body segments of teachers i.e. (lower limbs (41.1%), upper limbs (23.7%) and back (41.1%) with high-level education, marital status with three or more kids as the statistically significant factors. Kristiansson et al. (1996) said, women, undergoing biological changes after marriage are at a substantial risk factor for LBP resulting in severe interference in work, sleep and daily activities. Biological changes in the body after marriage like pregnancy, childbearing, child-rearing and physical changes in the peri-menopausal stage are additional causes of LBP in married women (Bailey, 2005). Retrospective and prospective studies have estimated that at the age of 35 years, while only 15% of non-pregnant women experience the beginning of LBP issues, this occurrence is more pronounced amongst pregnant women who are 50-60% prone to the onset of this pain (Ostgaard et al., 1991).

Results showed that LBP was more pronounced amongst the teachers with dual responsibilities i.e. Subject teacher + Form teacher (62.50%) as compared to the Subject teachers (Teachers teaching any specific subject) 42.86%. Teachers with dual responsibilities i.e. the responsibility of teaching their respective subjects

and taking charge of any given class are subjected to many risk factors leading to low back pain. Their responsibilities include classroom attendance, maintaining records and results, conducting exams and parent-teaching meetings, putting a check on overall classroom discipline and absenteeism of students as a whole and teaching their respective subjects to other classes as well). This adds to the workload of these teachers, thereby, burdening them further. Private schools mostly have more than one campus building which demands frequent up and down of the teachers to deliver lectures. With an average working hour of 3.2 hours in a day, (subject + form teachers) reported strain in their muscle joints. Out of the self-reported activities that contributed to the LBP, prolonged standing (40%) was reported to be the highest risk factor along with prolonged sitting (26.7%). Teachers reported prolonged standing while delivering the lectures and staying focused to maintain classroom discipline, extra duty during exams, and extra-curricular activities also played a part. Tavakoli-Fard et al. (2016) stated that the workplace is a substantial source of many occupational injuries and illnesses as well as associated disability. Working conditions such as repetitive work, prolonged standing, and carrying heavy loads could be a source of some musculoskeletal conditions (Arsalani et al., 2014; Luttmann et al., 2003). Different working conditions and teaching activities like student assessment, homework evaluation, correction of exam submissions, and computer work) that demand sitting for prolonged periods or extended periods spent standing could be strong risk factors for MSDs (Bandpei et al., 2014). Chong and Chan (2010) and Chan et al. (2010) investigated that teachers in high school are prone to physical disabilities due to long periods spent standing and repetitive walking within the classroom and repetitive movements of hands during activities like blackboard writings. Lack of ergonomic awareness like sitting on uncomfortable plastic chairs for hours, homework checks and exam paper checking led to rising issues in the lower back among the teachers. This is evidenced by a study done in Botswana (2014) study which says that the problem of low back pain in developing countries is worse due to suboptimal working conditions and a lack of ergonomic awareness (Erick et al., 2014).

Other self-reported risk factors are working on a computer at 20%, not sure (respondents who are not sure of the factors that led to LBP problems in them) at 10%, and others at 8.47%, (Physical activities, walking up and down the stairs) and lifting loads 6.47%.

Statistical analysis revealed that only some of the identified factors were statistically significant as per the evaluations done over the regression model. Only three significant risk factors were associated with the occurrence of low back pain. Respondents who self-reported prolonged standing as the main cause for their LBP are 3 times more at risk (OR: 3.0 95% CI: 1.13-7.96).) followed by teaching hours (OR: 1.052, 95% CI: 0.67-1.63). Long teaching hours and prolonged standing go hand in hand. Prolonged standing for long hours

within the classroom led to onset of back pain among teachers. Teachers require a considerable amount of physical strength while moving back and forth during classroom lectures and writing on the blackboard sometimes for extended hours. All of this takes a toll on their muscles and joint problems. These findings are similar to Sampaio *et al.* (2004), Barros *et al.* (2007) and Cardoso *et al.* (2009) which stated that physical load established by teachers like orthostatic position, walking within and beyond the classroom, carrying loads might be correlated with the occurrence of MSDs. Araujo (2005) stated that Indian schools are yet to get digitized and still use the blackboard traditionally. Inappropriate postures while standing for hours aggravate the problem of LBP. A recent study on LBP prevalence and its associated risk factors in secondary school teachers in Cuttack, Odisha conducted by (Behera and Koley, 2021) reported that 60.20% females reported of LBP due to prolonged standing in the classroom and excessive workload similar studies were carried out by Lemoyne *et al.* (2007) and Azariah *et al.* (2011).

The mental health status increased the risk by 0.592 (OR: 0.592, 95% CI: 0.28-1.0). Mental health status is an important risk factor for low back pain. It is observed that low back pain affects the population differently. It affects a person not just physically but mentally as well (Silman, 1987). Gupta and Sharma (2018) in their study stated that psychological loss in overall body function due to LBP causes insomnia, physical instability, depression, and anxiety thereby puts a negative impact on work performance. Studies also reveal that psychosocial problems could be related to low income, monotonous work, and job dissatisfaction (Das, 2015). Daily activities of teachers like prolonged standing, constant walking through the classroom and writing on the blackboard for theories, feedback, and assessments have adverse effects on their physical and mental health (Damayanti, 2017). While interviewing the respondents it was noted that high levels of stress and anxiety in teachers are significantly associated with LBP problems. Investigations revealed that teachers while teaching in classrooms with a large enrolment of students, with persistent work stress and constant shouting with prolonged standing for hours affect the mental health of the teachers. In the race of competing with each other in terms of excellence, the over-demanding administrative setup of the schools like salary cuts, extra teaching hours, and physical exertion during class lectures is draining teachers physically as well as mentally. Field observations revealed that some schools did not allow teachers to sit in the classroom while delivering lectures. To confirm the same, personal interview sessions with respondents revealed that often teachers are forced to work outside their body's capabilities and limitations. Due to this, a few teachers were on the verge of leaving their jobs. These findings are consistent with the Chinese study done on secondary school teachers investigating that risk factors like high workload coupled with an unfriendly atmosphere at the school were significantly associated with Musculoskeletal Disorders (Chiu and La, 2007; Cardoso, 2009). An epidemiological survey was done on

higher secondary school teachers in Kanpur wherein the study suggested that LBP significantly impacts the working ability and the psychological well-being of the teachers (Gupta and Sharma, 2018). Recent studies have quoted that psychosocial stress has emerged at the workplace and takes a heavy toll on the mental health of teachers (Bongers *et al.*, 1993; Bongers *et al.*, 2002; Smith *et al.*, 2006; Horng *et al.*, 2008). Abel and Sewell (1998) in a comparative study done in Georgia and North Carolina suggested that pupil misbehavior, time pressure and poor working conditions were significantly associated with the poor mental health of the teachers (Abel and Sewell, 1998). In the same year, a study done in Hong Kong on secondary school teachers investigated similar results (Chan, 1998).

5   CONCLUSION

Overall, the study reveals that LBP is reasonably frequent amongst the female high school teachers of the Srinagar district. The analysis revealed that married females are more prone to LBP than unmarried female teachers. Risk analysis was done separately for the contributing factors at the workplace and at home for a better understanding of the problem. Results revealed that domestic responsibilities ranked the highest self-reported activity contributing to LBP back home. Statistical analysis of the same showed that along with domestic responsibility, professional work was a statistically significant risk factor contributing to LBP. Talking of the workplace, prolonged standing was perceived as the main self-reported activity which resulted in the LBP problem among the respondents. Moreover, statistical results showed that prolonged standing, teaching hours and mental health status were statistically significant and were the main contributors to low back pain. The investigations of the study indicate that the overall atmosphere at the workplace has a pivotal role in the prevalence of LBP among teachers. Multiple preventative strategies will help in reducing these conditions. In the present scenario, greater emphasis should now be placed on the mental health of the employees by understanding the value of work-life balance and maintaining a healthy workplace environment. Introducing ergonomic education in every occupational setting is a must. A healthy ergonomic workstation helps in achieving maximum human performance. Teachers play an important role in shaping our society therefore to keep them fit and engaged comprehensive approaches and preventive measures should be taken to prevent and reduce the underestimated problem of LBP disability.

ABBREVIATIONS

GHQ: General Health Questionnaire; **LBP**: Low Back Pain; **MSDs**: Musculoskeletal Disorders.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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