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ASSOCIATION BETWEEN PSYCHOLOGICAL STRESS, SLEEP QUALITY AND OVERWEIGHT AMONG SCHOOL TEACHERS IN PUNE

An Analytical Cross-Sectional Observational Study

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Abstract *:* Background: Teaching is an occupation with a heavy workload, emotional demands and administrative duties that may affect mental health, sleep and body weight. Aim: To examine the association of psychological stress and sleep quality with overweight among schoolteachers in Pune. Methods: This cross-sectional observational study recruited 65 teachers from public and private schools of Pune through convenience sampling. Height and weight were measured to compute body mass index (BMI), and overweight was defined by Asian cut-offs. Perceived stress was recorded with the Perceived Stress Scale (PSS-10) and sleep quality with the Pittsburgh Sleep Quality Index (PSQI). Data were analysed in IBM SPSS version 27 using descriptive statistics and the Shapiro–Wilk test, with $p < 0.05$ taken as significant. Results: Participants had a mean age of 41.54 ± 4.63 years and a mean BMI of 24.15 ± 0.55 kg/m². Moderate stress was found in 70.8% of teachers, high stress in 23.1% and low stress in 6.2%. Every participant (100%) scored above the PSQI cut-off of 5 (mean 14.46 ± 4.64). Neither stress ($p = 0.098$) nor sleep quality ($p = 0.877$) differed significantly across teaching-experience groups. Conclusion: Moderate perceived stress and poor sleep quality were very common in the sampled teachers, which supports the need for occupational health promotion and lifestyle management in schools. Correlation analysis among BMI, stress and sleep is needed in future work.

IndexTerms - Psychological stress, sleep quality, overweight, body mass index, school teachers, PSS-10, PSQI.

I. INTRODUCTION

Teachers shape the intellectual and social growth of children, yet their duties reach well beyond the classroom. Lesson preparation, assessment, committee assignments, meetings with parents and student counselling all add to an already full day. A considerable share of teachers report stress and burnout, and women are often more exposed because they also carry childcare and elder-care duties at home [1]. Prolonged strain of this kind can weaken mental health and everyday health behaviour [2, 3].

Excess body weight has become a leading public health problem. The World Health Organization estimates that over 2.5 billion adults are overweight and that more than 890 million of them live with obesity [4]. Sleep, too, has worsened worldwide as a result of modern routines, screen exposure and long working hours [5, 6]. Short or disturbed sleep upsets appetite-regulating hormones and metabolism, encourages the intake of energy-dense food, lowers physical activity, and has been linked with higher BMI and obesity [7–9].

Insufficient sleep is further related to cognitive decline, hormonal imbalance and cardiovascular risk [10]; it also raises perceived stress and weakens emotional coping [6]. Restorative sleep, on the other hand, assists recovery from stress [11], whereas long-standing stress is tied to immune dysregulation and altered eating and sleeping patterns [12]. The way a person responds to stress depends on resilience, social support and the work environment [13]. Regular physical activity helps in weight control and improves metabolic health and mood [14, 15].

Teachers in primary and secondary schools deal with large classes, emotional demands, continuing professional development and learners of varied abilities. The resulting physical and mental fatigue makes it harder to eat well, exercise and sleep adequately [2, 16]. Age, family responsibilities and pressures built into the education system can magnify these difficulties, so teachers' lifestyles deserve to be examined from a holistic standpoint [3, 17].

Sleep duration is simple to record but does not necessarily reflect how well a person sleeps; someone may spend enough hours in bed and still sleep poorly. Poor sleep quality disturbs bodily functions, produces emotional and physical effects comparable to mild depression, and is associated with metabolic syndrome, impaired glucose handling, poorer blood-pressure control, higher cardiovascular risk and a lower quality of life [18, 19].

II. NEED OF THE STUDY

Obesity, stress and disturbed sleep can feed one another in a vicious cycle, yet this combination has received little attention in the teaching profession. Indian data describing how excess body weight relates to the stress profile of teachers are limited, particularly with reference to the cultural and workplace conditions of Indian schools. The present work therefore quantifies sleep disturbance and perceived stress with validated instruments and relates them to body weight status in schoolteachers of Pune. Its findings can inform wellness programmes aimed at better teacher well-being, lower absenteeism and greater classroom effectiveness.

III. AIM AND OBJECTIVES

Aim: To examine the relationship of body weight status with psychological stress and sleep quality among schoolteachers in Pune, with emphasis on patterns of association.

Objectives: (1) to measure BMI and classify overweight among teaching professionals; (2) to assess psychological stress using the Perceived Stress Scale; (3) to evaluate sleep quality using the Pittsburgh Sleep Quality Index; and (4) to explore the relationship among stress, sleep disturbance and overweight.

IV. REVIEW OF LITERATURE

A cross-sectional study of 427 academic staff at Jimma University found poor sleep quality in 32.3% and a mean BMI of 22.7 kg/m²; sleep quality was inversely related to BMI indirectly, through depression and unhealthy eating [20]. Among 50 school teachers, 62% reported moderate stress and 60% good sleep, and stress was positively associated with poor sleep and negatively with physical activity, which points to a two-way link between sleep and stress [21]. In college faculty, better sleep showed a weak but significant correlation with lower stress ($r = 0.291$, $p = 0.018$) [22]. A 6-week workplace yoga programme reduced pain, stress and fatigue and improved sleep in 50 female teachers with chronic musculoskeletal pain [23].

Among 635 K-12 teachers in the United States during the COVID-19 pandemic, 71.5% reported poor sleep and 61.4% high stress, and more physical activity went with better sleep and lower stress [24]. In 242 public school teachers, those sleeping poorly had higher BMI and roughly twice the likelihood of thoracic, wrist, low-back and ankle/foot pain [25]; musculoskeletal pain was reported by 73.5% of 525 teachers in another survey [26]. Poor sleep and stress among school teachers have also been documented in a developing-country setting and in private schools of Surat, India [27, 28].

V. RESEARCH METHODOLOGY

5.1 Study design and participants

An observational, cross-sectional (correlational) study was conducted among teachers of public and private schools in Pune, Maharashtra, selected by convenience sampling. The final sample comprised 65 teachers. Ethical approval was obtained from the institutional committee, and all participants gave written informed consent.

5.2 Selection criteria

Inclusion criteria: full-time employed teachers; at least one year of teaching experience; willingness to give written informed consent; target age group of 35–45 years; and BMI of 23.0–24.9 kg/m² (overweight by Asian classification). Exclusion criteria: teachers on long-term leave (medical or sabbatical); pregnant or postpartum (< 6 months) teachers; and those with a diagnosed sleep disorder unrelated to stress (for example sleep apnoea) or a severe psychiatric condition.

5.3 Outcome measures

Body mass index was calculated from measured height and weight as weight (kg) divided by height squared (m²) and classified using the Asian cut-offs. Perceived stress was measured with the 10-item Perceived Stress Scale, scored 0–40 and categorised as low (0–13), moderate (14–26) or high (27–40). Sleep quality was measured with the Pittsburgh Sleep Quality Index, a self-rated questionnaire covering seven components (subjective sleep quality, latency, duration, habitual efficiency, disturbances, use of sleep medication and daytime dysfunction) that sum to a global score of 0–21; a global score above 5 denotes poor sleep quality [29].

5.4 Procedure

Eligible teachers in Pune were approached after ethical clearance. The purpose and procedure of the study were explained, and those who met the criteria and consented were enrolled. Height and weight were recorded and BMI was classified by the Asian criteria. The PSS-10 and PSQI were then administered, and the responses were checked for completeness before scoring and analysis.

5.5 Statistical analysis

Data were entered in Microsoft Excel 2021 and analysed using IBM SPSS version 27. Means, standard deviations, minimum and maximum values were computed for demographic and clinical variables, and frequencies and percentages for categories. The Shapiro–Wilk test was applied to check normality, and groups defined by teaching experience were compared. A p value below 0.05 was regarded as statistically significant. Graphs were prepared in Excel.

VI. RESULTS AND DISCUSSION

6.1 Characteristics of participants

Sixty-five teachers (64 women, 98.5%; 1 man, 1.5%) took part. Their mean age was 41.54 ± 4.63 years (range 31–50) and mean teaching experience 14.08 ± 6.93 years. The mean BMI of 24.15 ± 0.55 kg/m² (range 23.00–24.90) shows a very narrow, uniform spread of body weight status (Table 1, Table 2, Figures 1 and 2).

table 1: descriptive statistics of the study variables (n = 65)

Variable	Mean	SD	Minimum	Maximum
Age (years)	41.54	4.63	31.00	50.00
Teaching experience (years)	14.08	6.93	1.00	29.00
Height (cm)	151.91	6.10	139.00	167.00
Weight (kg)	61.88	4.96	50.00	70.00
BMI (kg/m²)	24.15	0.55	23.00	24.90
PSS total score (0–40)	23.72	5.13	8.00	35.00
PSQI global score (0–21)	14.46	4.64	6.00	21.00

table 2: age-wise distribution of participants

Age group	No. of participants	Percentage (%)
30–39 years	23	35.4
40–44 years	22	33.8
45–50 years	20	30.8
Total	65	100.0

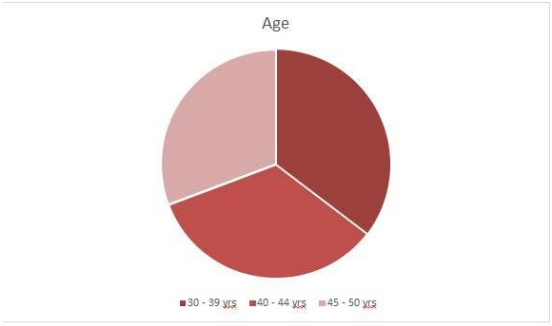

figure 1: age-wise distribution of participants

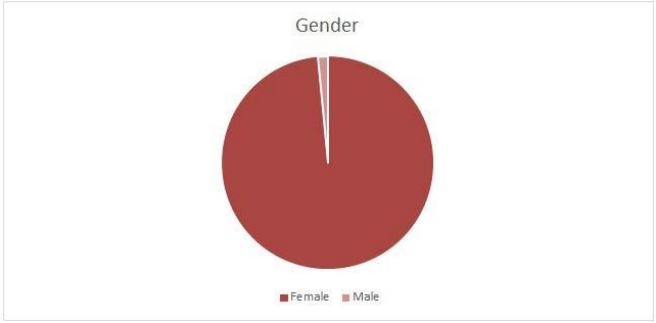

figure 2: gender-wise distribution of participants

6.2 Normality of data

The Shapiro–Wilk test showed that age, teaching experience and height were normally distributed ($p > 0.05$), whereas weight, BMI, PSS score and PSQI score departed from normality ($p \leq 0.005$) (Table 3).

table 3: shapiro–wilk test of normality

Variable	W statistic	p value	Distribution
Age (years)	0.973	0.167	Normal
Teaching experience (years)	0.974	0.178	Normal
Height (cm)	0.965	0.059	Normal
Weight (kg)	0.924	0.001	Not normal
BMI (kg/m²)	0.944	0.005	Not normal
PSS total score	0.932	0.001	Not normal
PSQI global score	0.925	0.001	Not normal

6.3 Perceived stress

The mean PSS score was 23.72 ± 5.13. Moderate stress was found in 46 teachers (70.8%), high stress in 15 (23.1%) and low stress in only 4 (6.2%) (Table 4). Mean PSS scores rose steadily with experience, from 21.90 ± 6.39 in teachers with 1–10 years to 24.19 ± 4.28 with 11–20 years and 25.67 ± 4.01 with 21–30 years, but the difference was not statistically significant (test value 2.416, $p = 0.098$) (Table 5).

table 4: severity of perceived stress (pss)

Category	No. of participants	Percentage (%)
Low stress (0–13)	4	6.2
Moderate stress (14–26)	46	70.8
High stress (27–40)	15	23.1
Total	65	100.0

table 5: perceived stress across teaching-experience groups

Experience group	n	Mean	SD	Test value	p value
1–10 years	21	21.90	6.39	2.416	0.098 (NS)
11–20 years	32	24.19	4.28		
21–30 years	12	25.67	4.01		

6.4 Sleep quality

The mean PSQI global score was 14.46 ± 4.64, and all 65 teachers (100%) scored above the cut-off of 5, so none had good sleep quality (Table 6). Scores were similar across experience groups (14.62 ± 4.20, 14.59 ± 5.02 and 13.83 ± 4.65; test value 0.132, $p = 0.877$) (Table 7).

table 6: sleep quality category (psqi)

Category	No. of participants	Percentage (%)
Good sleep quality (≤ 5)	0	0.0
Poor sleep quality (> 5)	65	100.0
Total	65	100.0

table 7: sleep quality across teaching-experience groups

Experience group	n	Mean	SD	Test value	p value
1–10 years	21	14.62	4.20	0.132	0.877 (NS)
11–20 years	32	14.59	5.02		
21–30 years	12	13.83	4.65		

6.5 Discussion

This study explored perceived stress, sleep quality and body weight status among schoolteachers of Pune. A mean PSS score of 23.72 ± 5.13 with 70.8% of teachers in the moderate category, and a PSQI score above 5 in every teacher, show a heavy burden of stress and sleep disturbance in this sample.

The frequent occurrence of moderate-to-high stress fits the findings of Rana and Soodan, who studied 412 college teachers in Punjab and reported that occupational and personal stress affected burnout, job satisfaction and health, with the organisational environment playing a role [30]. Corbett et al. surveyed 1,136 Australian teachers and found that over 30% had high burnout, while those practising three or more positive health behaviours had lower odds of distress and burnout; working hours, teaching load and experience were also related to psychosocial health [31]. In the present sample, stress did not differ significantly by experience ($p = 0.098$). Differences in populations, sample sizes, instruments and analysis may account for this, and the result indicates only that no significant difference was detected here, not that experience has no bearing on stress. Burnout and organisational factors were not measured, so they cannot be named as causes of the stress observed.

Universal poor sleep (mean PSQI 14.46) is a notable finding. Rafiq and Tariq, studying 200 teachers in Punjab, Pakistan, reported that poorer sleep went with greater psychological distress and that social support partly mediated the link [32], and a pilot study in school teachers found stress and sleep quality to predict each other [21]. Because the PSS–PSQI correlation coefficient was not computed in the present analysis, it cannot be concluded that teachers with higher stress also slept worse. Ma et al. observed that short sleep and sedentary behaviour were associated with anxiety and depression in Chinese teachers during COVID-19, while physical activity related to depression [33]. Physical activity, screen exposure and sleep habits were not recorded here, and they may help explain the high PSQI scores.

Regarding body weight, Schultz et al., in 74 school employees (mean BMI 25.6 kg/m²), found that higher occupational stress weakened the protective relation between moderate-to-vigorous physical activity and BMI [34]. A meta-analysis linked psychological stress with metabolic syndrome [35], and meta-analyses of short sleep duration reported a higher risk of obesity in adults, with a pooled odds ratio of 1.45 (95% CI 1.25–1.67) in prospective studies [36, 37]. These studies, however, examined physical activity, metabolic syndrome or sleep duration rather than PSS and PSQI scores in relation to BMI. In addition, the very narrow BMI range of the present sample (23.0–24.9 kg/m²) restricts the ability to detect any relationship, and the BMI–stress and BMI–sleep coefficients still need to be reported before a conclusion on those associations can be drawn.

Taken together, the results show that moderate stress and poor sleep quality are common among the sampled teachers. The available statistical results, however, do not establish an association between BMI, stress and sleep quality.

VII. LIMITATIONS

The sample was small (n = 65) and chosen by convenience, which limits generalisability. The cross-sectional design cannot establish causality. The narrow BMI range reduced the scope for comparison, the gender distribution was heavily skewed towards women, and self-reported questionnaires may have introduced reporting bias.

VIII. FUTURE SCOPE

Future studies should record physical activity, diet, sedentary behaviour, teaching workload, working hours and work–life balance to understand their influence on stress, sleep and BMI. Correlation and regression analyses, adjusted for confounders, should be performed to test the strength of the associations among BMI, stress and sleep quality. Larger and more diverse samples from different schools and regions, covering normal-weight, overweight and obese teachers, would improve representativeness and permit comparison across BMI categories.

IX. CLINICAL IMPLICATIONS

Psychological well-being and sleep quality should be treated as part of occupational health promotion for school teachers. The high proportion with moderate-to-high stress and poor sleep suggests a need for workplace health programmes. Physiotherapists and other health professionals can contribute by encouraging regular physical activity, relaxation and breathing exercises and ergonomic practices. Sleep-hygiene education, such as regular sleep schedules, avoiding screens, caffeine and heavy meals before bedtime, and a suitable sleeping environment, may also be beneficial.

X. CONCLUSION

Most of the schoolteachers in this Pune sample experienced moderate psychological stress (70.8%), a further 23.1% had high stress, and all of them (100%) had poor sleep quality on the PSQI. The mean BMI of 24.15 ± 0.55 kg/m² lay within the selected range of 23.0–24.9 kg/m². Stress and sleep scores did not differ significantly across teaching-experience groups ($p = 0.098$ and $p = 0.877$). Correlation analysis is required to clarify how BMI, stress and sleep quality are related.

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