Review Article

Tools for Assessing Psychological Distress and Dietary Patterns among School Teachers: A Scoping Review

Aqilah Hadhirah Hazizi [1], *NurZetty Sofia Zainuddin [2], Divya Vanoh [2], Affizal Ahmad [3], Nani Draman [4], Hana Fauziyyah [1]

1. Nutrition Programme, School of Health Sciences, Universiti Sains Malaysia, Kelantan, Malaysia
2. Dietetic Programme, School of Health Sciences, Universiti Sains Malaysia, Kelantan, Malaysia
3. Speech Pathology Programme, School of Health Sciences, Universiti Sains Malaysia, Kelantan, Malaysia
4. Department of Family Medicine, School of Health Sciences, Universiti Sains Malaysia, Kelantan, Malaysia

*Corresponding Author: Email: zettysofia@usm.my

Abstract

Background: Unhealthy eating habits and behaviours among educators contribute to mental health issues, which profoundly affect both physical health and work-related wellness. The objectives of the review were to identify the prevalence of psychological distress and dietary habits among teachers and the tools used to assess psychological distress and dietary intake or behaviour in this population.

Methods: Three databases which are SCOPUS, PubMed and Web of Science were extensively searched to identify primary articles. Full articles were screened independently based on predefined inclusion and exclusion criteria. Fifteen studies published between 2016 and 2024 were included, following PRISMA-ScR guidelines.

Results: The prevalence of psychological distress ranged from 15% to 50%, with the most commonly used tools being the Patient Health Questionnaire (PHQ-9) and Job Content Questionnaire (JCQ). Regarding dietary behaviour, studies revealed that teachers tend to skip meals and reported moderate to high scores of Healthy Eating Index. The Food Frequency Questionnaire (FFQ) was the most commonly used tool for assessing nutritional intake.

Conclusion: Addressing these issues, interventions that incorporate emotional skills development, coping strategies and social support are required to explore this relationship in greater detail.

Keywords: Psychological distress; Mental health; Dietary habit; Nutritional intake; School teachers

Introduction

Psychological distress is a key indicator of impaired mental health and may reflect underlying mental disorders such as depression and anxiety (1). Depression is a mood disorder that impairs daily functioning and may arise as a short-term emotional response to serious health conditions, whereas anxiety is a mental disorder characterised by unpleasant feelings about future events and fear of current conditions (1). Stress, on the other hand, is a short-term mental health impairment that arises when individuals struggle to cope with environmental demand (1,2).

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Teaching is widely recognised as a profession associated with excessive occupational stress (3). Work-related stress in teaching refers to the dissatisfaction and disruption in physical and mental well-being experienced by teachers when their work demands exceed their abilities or fail to align with job requirements (4). Factors such as poor working conditions, high job demands and heavy workloads contribute to this challenging workplace environment (3,4).

The adverse effects of an unhealthy environment extend to unhealthy eating behaviours, further compromising teachers' well-being. These behaviours include meal skipping, emotional eating and frequent snacking (5). A study among public schools in three Malaysian states identified two primary dietary patterns among teachers: the Western diet (high in red meat) and the prudent diet (high in fruits and vegetables) (6).

The impact of psychological distress on dietary patterns has become particularly prevalent among school teachers. Psychological distress encompasses not only emotional symptoms such as depression and anxiety, but also somatic symptoms which may vary across regions and stressors (7). Validated and reliable tools in assessing the condition according to the psychosocial stressors leading to a more comprehensive data interpretation.

In light of these concerns, this scoping review gathers variety of studies that addresses both psychological distress and dietary patterns together. Despite focusing primarily on types of tools that can be used, this review will fill the gap of previous study by discussing the selection of tools and instruments according to the study objectives. This seeks to enrich the practical approaches in determining the best tools instrument to evaluate the teachers' psychological and dietary problems.

Materials and Methods

This review adhered to the framework proposed by Arksey and O' Malley, as enhanced by (Levac et al., 2010). It followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis extension for scoping reviews (PRISMA-ScR) guidelines (2018).

Identifying relevant study
The review identified studies from three databases: SCOPUS, PubMed and Web of Science, accessed through the Universiti Sains Malaysia library. A combination of Medical Subject Heading (MESH) terms and synonyms for stress, dietary intake and teachers were systematically operationalised using the Boolean Operator (AND/OR). The detailed search strategy is presented in Table 1.

Table 1: Search strategies and research threads for databases

Search strategy	No. of studies
Keyword used: Food intake OR intake* OR food* OR "Macronutrient Intake" OR "Dietary Intake" AND stress* OR "Stress Overload" OR "Psychological Stress" AND teacher* OR "school employees" OR " school staff"	
SCOPUS database	76 documents
PubMed database	8 documents
Web of science	162 documents
Duplicates record removed	205 remained after removal
Studies not meeting the objective	153 removed
Studies removed with reason	34 studies removed
Studies having no full text	3 documents
Studies involved	15 documents

Inclusion criteria

The screening process followed Arksey and O' Malley's framework, two independent researchers (AH and HF) screened the titles. Studies with irrelevant titles were excluded, followed by abstracts assessments to determine eligibility based on the inclusion criteria mentioned in Table 2. Full-text articles were then reviewed concurrently with data extraction process. The extraction process was completed using a similar scoping review template from previous study. Then, it was checked by other author to avoid bias. Lastly, the analysis was done by sorting the studies according to the variable prevalence and common methodology. The schematic diagram of the article selection process is illustrated in Fig. 1.

Table 2: Inclusion and exclusion criteria

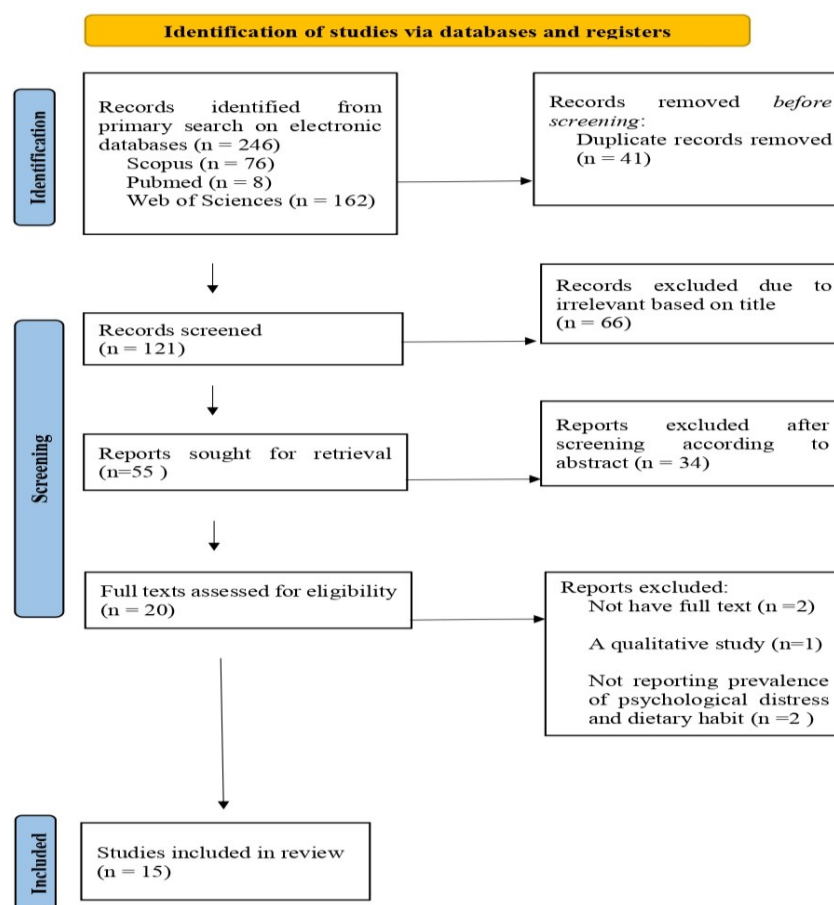| Inclusion criteria	Exclusion criteria
Observational or experimental studies	Review articles
Population among school teachers or educators	Animal studies
Articles from 2016 to 2024	Not published in English
State the prevalence of psychological distress and dietary habits	Did not have full text

Charting and summarizing data

Fig. 1: PRISMA Flowchart showing the results of search strategy and inclusion and exclusion of articles

Results

Out of 15 studies included in this review, eight assessed psychological distress, encompassing mental health, stress, anxiety or depression. Three studies focused on teachers' dietary habits, examining dietary patterns or dietary behaviours. The remaining four studies explored both psychological distress and dietary among school teachers. Table 3 presents the characteristics of these studies, organised by publication dates.

Background of Studies

This review includes data from 15 articles involving 101,856 school teachers. The sample sizes in the studies ranged from 74 to 43,845 participants. Most studies featured participants with a mean age range of 20 to 45 yr old. These articles were published between 2016 to 2024, with the majority published in 2018. Geographically, the studies span several regions, including Asia (n=2), Europe (n=3), North America (n=2), South America (n=1), West America (n=1).

Tools for Assessing Psychological Distress

According to the Diagnostic and Statistical Manual of Mental Disorder Fifth Edition (DSM-5), psychological distress is characterised by a mixture of symptoms, including anxiety, depression, difficulties in functioning, behavioural issues and specific personality traits (7). Validated and reliable tools used to measure psychological distress among school teachers include PHQ-9, CESD-10, GAD-7, GHQ-12, JCQ and PSS (8–14). These tools vary depending on the study's objectives and population.

For depression, two commonly used tools are the Patient Health Questionnaire (PHQ-9) (8,9) and the Center for Epidemiological Studies Depression Scale (CES-D) (12,15). Both tools assess depression symptoms using threshold values for severity levels (none, mild, moderate, or severe), however, PHQ-9 focuses more on depression severity, whereas CESD-10 is designed to evaluate the symptoms of depression (8,15). Only one study utilised the Goldberg Anxiety and Depres-

sion Scale (GADS) to examine how the workplace environment and personal life predict anxiety and depression (16). For anxiety evaluation, the Generalized Anxiety Disorder assessment (GAD-7) was employed. GAD-7, a seven-item tool, is commonly used in clinical practice and research to screen for generalised anxiety disorder (9).

Three other studies reported psychological distress in terms of mental health (10,11,17), using tools like the General Self Efficacy Questionnaire (GSE) and General Health Questionnaire-12 (GHQ-12). The GSE assesses an individual's ability to cope with stress and challenges, particularly concerning motivation and work-related performance (18). For stress, two tools namely Perceived Stress (PSS) and Job Content Questionnaire (JCQ) were used (13,14,19). PSS measures the extent to which individuals perceived life as unpredictable and uncontrollable over the past month and the latest version of PSS with ten items was commonly used (20). JCQ assesses the psychosocial characteristic of a job using a demand-control model (21). However, some studies in this review used non-validated, simplified questionnaires with binary 'yes' or 'no' responses to assess stress, depression, or mental health, which may lack diagnostic depth (17,19,22).

Tools for Assessing Dietary Intake or Habit

The assessment of dietary habits focuses on individual behavior and intake patterns. Among the seven studies that assessed dietary habits in this review, three examined dietary patterns (10,13,23), two focused on dietary habits (14,24) and two assessed diet quality (13,25). The most commonly used tool was the Food Frequency Questionnaire (10,23–25). One study employed an automated self-administered 24-hour diet recall (13). The FFQ captures usual dietary intake by querying the frequency of foods and beverages consumed over a specified period, often grouping items based on nutrient profiles (26). In contrast, 24-hour diet recall allows participants to provide an open-ended response about their food

and beverage consumption on the previous day (13).

Prevalence of Psychological Distress among School Teachers

The prevalence of psychological distress among school teachers, including depression, anxiety, mental health and, stress, ranged from of 15% to 50% (8,15,17,22,24). The highest prevalence (86%) was reported for mental health issues among teachers on long-term sick leave (11) while the lowest prevalence for depression was 8.9% (12). Two studies indicated varying levels of psychological distress based on factors as irritation, self-efficacy, psychological demand and decision latitude, which influence decision-making abilities (10,14).

Prevalence of Dietary Habits among School Teachers

Dietary habits among school teachers were reported in terms of percentages, mean scores, and intake patterns. Three studies highlighted healthy and favourable eating behaviours (17,24,25). Teachers commonly followed a Western diet high in red meat, with minor differences in prudent diets (rich in fruits and vegetables) across ethnic groups. About 26% of teachers skipped breakfast at least three days per week, skipped lunch at least four days per week and consumed fast food at least three days per week. Two studies assessed healthy eating index scores ranging from 0 to 100, with scores of 58 and 73 indicating moderate to high adherence to dietary guidelines (13,25).

Table 3: Sample size, participants characteristic, study design, exposure and outcome

Reference	Study design	Exposure		Outcome	
		Stress assessment	Dietary assessment	Prevalence of stress	Dietary report
(10)	Cross-sectional study	Mental Health: General Self efficacy scale and Irritation scale	Food frequency scale: consumption of 15 food items (Further analysis into dietary pattern).	Mean: General self efficacy (28.1), irritation (24.7) Low self efficacy and high irritation; poor mental health status	46.3% unfavourable dietary pattern 26.8% normal, 22% favourable
(23)	Cross-sectional study	Not being measured	Food frequency questionnaire: 136 items. (Further analysis into dietary pattern).	NA	Western dietary pattern (high in red meat): high consumption among Malay and Chinese but not Indian Prudent dietary pattern (high in legumes, vegetables and fruits): minor discrepancies among ethnics
(11)	Cross-sectional study	Mental Health : General Health Questionnaire-12	Not being measured	Mental impairment; LSFT : 86% WFT : 27%	NA
(24)	Cross-sectional study	Not mentioned	Food frequency and consumption recall	Stress : 34.8% Not stress : 65.2%	Dietary habit ; Good : 62.0% Not good : 38.0% (not mentioned scoring method)
(8)	Cross-sectional study	Patient Health Questionnaire, PHQ-9	Not being measured	Depression; Severe : 16% Mild or no symptoms : 85%	NA
(12)	Cross-sectional study	Centre for Epidemiologic Studies Depression scale (CESD-10)	Not being measured	Experience some depressive symptoms : 86.3% Clinically significant depressed : 8.9%	NA
(13)	Cross-sectional study	Job Content Questionnaire (JCQ)	An Automated Self-Administered 24-hour dietary recall system (calculate using Healthy Eating Index, HEI)	(Strain = 0.47± 0.09), higher demand (34.5 ± 6.1) and higher decision latitude (73.7 ± 8.5) yielding higher stress	HEI score : 58/100, total energy from carbohydrate (47%), protein (19%) and fat (34%). Dietary pattern ; low sugar and fibre intake, high saturated fat consumption

Table 3: Continued...

(16)	Cluster randomized control trial	Goldberg Anxiety and Depression Questionnaire	Not being measured	Mean depressive score from baseline to follow up; Control: 1.92 ± 0.52 - 2.13 ± 0.56 TT: 1.96 ± 0.55 - 2.01 ± 0.57 TTPA: 2.01 ± 0.54 - 2.08 ± 0.53 Mean anxiety score from baseline to follow up; Control: 2.04 ± 0.61 - 2.33 ± 0.70 TT: 2.08 ± 0.64 - 2.12 ± 0.71 TTPA: 2.10 ±0.75 - 2.22 ± 0.69	NA
(15)	Cross-sectional study	Centre for Epidemiologic Studies Depression scale (CESD-10)	Not being measured	38% elevated depressive symptoms	NA
(17)	Cross-sectional study	Change in mental health : Yes or No answer (not validated and not reliable tools)	A validated questionnaire used in Brazilian population called VIGITEL	Change in mental health; Yes : 35.8% No : 64.2%	Healthy food consumption profile; Healthy food : 41.3% Unhealthy food : 14% (consumption profile defined as the changes in consumption frequency of healthy and unhealthy foods before and during pandemic)
(19)	Cross-sectional study	Single-item question on stress; categorised into never, sometimes, often (adapted from RAND Health)	Not being measured	Perceived stress (85%) ; 37.7% stressed sometimes and 47.7% stressed often	NA
(22)	Cohort study	One item question ; adapted from depression screener	Not being measured	Before COVID-19 : 17% of teachers were depressed During COVID-19 : 33%	NA
(9)	Cohort study	Depression; Patient Health Questionnaire (PHQ-9) Anxiety; Generalized Anxiety Disorder (GAD-7)	Not being measured	Teacher/child care workers had fewer depressive symptoms than non-keyworkers consistently across the 12-month observational period.	NA
(14)	Cross-sectional study	Stress; Perceived Stress Scale, Job stress; Job Content Questionnaire	Eating habit : Project EAT-III survey,	Perceived stress score : 2.57 Job stress : Job demand (2.9), decision authority (3.4), skill discretion (3.9). (moderate to high stress)	27% skipped breakfast at least three days per week; 26% skipped lunch at least four days per week; 26% our sample of teachers ate fast food at least three days per week.
(25)	Cross-sectional study	Not being measured	Food Frequency Questionnaire : 24 items (Diet Quality measured using Diet Quality Index (DQI)	NA	Diet quality index % :73.1 ± 10.0

LSFT: Female teachers on long term sick leave, WFT: Working female teachers, TT: teachers training group, TTPA: teachers training plus parental awareness, RAND: research and development, NA: Not Applicable

Discussion

Exposure to challenging conditions, such as psychosocial stressors in schools, often results in exhaustion if individuals fail to adapt effectively (4). This review highlights a high prevalence of psychological distress among school teachers. Three studies reported in elevated depressive symptoms (12,15,22), three others indicated moderate to high levels of stress (13,14,19) and two identified poor mental health statuses (10,11). Additionally, dietary habits were shown to be adversely affected, with findings such as meal-skipping tendencies, (14) and unfavourable eating patterns, including high fat consumption (10,13).

Psychological Distress Tools

The Depression, Anxiety and Stress Scale (DASS), Back Depression Inventory (BDI), Self-

Rating Depression Scale (SDS), CES-D, PHQ-9, GAD-7, GHQ-12, JCQ and PSS are among the validated and reliable tools to assess psychological distress in the general population (27,28). In this review, the PHQ-9 and CESD-10 were the most commonly employed tools for measuring depression (8,9,12,15).

The PHQ-9, developed by Kroenke et al (2001), is a nine-item questionnaire designed to screen for depression in primary care settings by evaluating each of diagnostic criterion of major depressive episode. Its reliability was further validated among psychiatric samples by Beard et al. 2016. On the other hand, the CESD-10, a shortened version of the original CES-D, was developed by Irwin et al. (2015) to reduce the burden completing the tool, particularly for older adults. The CES-D uses a dichotomous response format and has an administration time of approximately two minutes. Both PHQ-9 and CESD-10 are valued for their brevity, as they consist of nine and ten items respectively, requiring about five minutes to complete and being simple to score (29). However, their intended uses differ: the PHQ-9 primarily evaluates depression severity, while CES-D-10 is widely used for assessing depressive symptoms (8,15). Both tools provide comparable results when scored according to standardised guidelines, with higher scores indicating greater depression severity or sensitivity to symptoms.

For assessing job stress, all the studies in this review utilised the Job Content Questionnaire (JCQ) as their screening tool (13,14). The JCQ, developed by Kerasek et al. (1998), measures psychosocial characteristics through three scales: decision latitude, psychological demand and social support, to determine job strain and job demand. Decision latitude encompasses job control, including skill discretion and decision authority, while social support includes both supervisor and co-worker support (21). High job strain results from combination of high job demand and low job control, leading to elevated stress levels.

Perceived stress was assessed using the Perceived Stress Scale (PSS) in the reviewed studies (14). PSS, a reliable and validated tool, had been trans-

lated into 25 languages and widely used across various populations. Originally constructed by Cohen et al. (1983) as a 14-items scale, a shorter 10-items version was introduced five years later based on factor analysis (30). The PSS has been used with diverse populations, including general public (31), older adults (32) and community dwellers (33). Unlike dichotomous questions, the PSS assesses perceived stress levels by evaluating perceived stress levels through the extend which an individual views their life as overloaded and uncontrollable, rather than measuring specific stressful life events (20).

Three studies in this review used a single-item question, which are neither validated nor reliable for measuring psychological distress. For instance, a study in Denmark used the single item question, 'In the last two weeks, how often have you felt stressed? (34). Another study Tulsa measured depression with single-item question asking participants if they had felt sad, empty or depressed most of the day or lost interest in activities they usually enjoy for two weeks or longer over the past year. This question was adapted from the RAND Health depression screener and participants affirmatively responding were classified as depressed (22).

Tools Used for Dietary Assessment

Methods of self-reported dietary intake can be categorized into recall method such as dietary history, 24-hour diet recall, food frequency questionnaires (FFQ) as well as real-time record such as food diaries and duplicate portions (35). Among these, FFQ was the most commonly used tool to measure dietary intake among teachers in this review (10,23–25). The FFQ assesses an individual's usual intake over a longer specified period querying the frequency of intake and portion sizes of foods consumed (35). Foods and beverages listed in the FFQ are typically grouped into the categories, enabling the tool to assess nutrient energy intake, macronutrient distribution, and micronutrient levels within a population (35).

Despite the consistent use of FFQ, dietary outcomes varied significantly across studies in this

review. These variations can be attributed to the diverse objectives of the studies, such as identifying nutritional intake (10,13,14,17,23–25), analysing dietary patterns (10,13,23) or evaluating diet quality (13,25). For instance, diet quality among teachers was categorised as healthy or unhealthy by consolidating 15 categories from 24 food groups into a food frequency index, with scores ranging from 0 to 30, higher scores indicating healthier eating behaviours (13,25). Additionally, the FFQ facilitated analysis of total energy intake from food groups, enabling assessment of diet quality through measures such as diet diversity, diet quality index and diet equilibrium (25).

In this review, only one study employed an automated self-administered 24-hours dietary recall to assess dietary intake among the school teachers (36). The study reported dietary quality and patterns, including diet quality scores, mean total energy intake, and percentage distribution of carbohydrate, protein and fats (36). Diet quality incorporates multiple concepts, including healthy food choices, nutrient adequacy, portion moderation, balance and variety (37). Indices commonly used to measure diet quality follow one of two approaches: posteriori which employs statistical methods to derive dietary patterns, or a priori, which uses predefined indices based on the current nutrition knowledge (37). Examples of indices used in this review include the Diet Quality Index (DQI) and Healthy Eating Index (HEI) (13,25). The DQI utilises a priori scoring to assess adherence to dietary recommendations (38) while The HEI evaluates overall diet quality relative to the Dietary Guideline for American (DGA) (39). Beyond a priori and posteriori approaches, dietary patterns can also be constructed through observational studies on food avoidance or clinical trials assigning specific patterns (40). Only one study in this review assessed teachers' dietary habits by analysing meal-skipping frequency and food consumption (14).

According to Bailey, the choice of dietary assessment method depends on the study design, objectives, and the reference timeframe whether short-term or long-term (26). The FFQ, which evaluates dietary intake over months or years,

effectively captures habitual dietary patterns over time, accounting for seasonal, cultural and occasional variations (26). However, grouping foods and beverages in the FFQ limits the granularity of data, making it less precise for assessing absolute nutrient intake compared to other methods (26). Addressing this issue, careful selection of questionnaire type is crucial. FFQs can be designed as quantitative, qualitative and semi-quantitative (26).

Prevalence of Psychological Distress

Psychological distress was reported across studies as encompassing mental health status, depression, anxiety and stress. Overall, 12 studies explored psychological distress among teachers (8,11–17,19,22–24).

Two studies assessed mental health status reporting poor mental health prevalence among school teachers, ranging from 26% to 36% (11,17). One study found that among teachers who had taken sick leave, 65.1% were diagnosed with at least one mental disorder. Additionally, the turnover rate due to mental health issues was 57.6% in elementary schools, and 58.1% in high schools (41). In contrast, a study among kindergarten teachers using GSE scale highlighted poor mental with a low mean self-efficacy score (28.1) and a high irritation score (24.7) (10). The self-efficacy scale measures teachers' coping mechanisms in response to challenges, while the irritation scale assesses emotional and cognitive strain in a job context (10). Low self-efficacy among teachers is often attributed to high job demands and inadequate job management which can lead to a loss of control and heightened irritation due to job stress or interpersonal conflict at work (41).

Four studies reported the prevalence of depression among teachers, with rates ranging from a high of 86.3% (12) to a low of 16% (8). These findings align with previous reviews of depression, stress, and anxiety among teachers, which reported prevalence rates ranging from 0.6% and 85.7%, (27). Dealing with unmotivated or underperforming students, can diminish teachers' motivation and trigger negative emotional responses

which then lead to exhaustion and affect teachers' emotional well-being (4).

The prevalence of stress among teachers ranged from 37% to 85%, consistent with another review that reported a stress range of 8.3% to 87.1% (27). Work-related stress in teachers can manifest as physical or psychological stress, both influenced by internal and external factors such as job satisfaction, workload and social support, all of which impact job performance (42). For example, high workloads and long working hours, coupled with inadequate social support can evoke negative emotions and exacerbate psychological distress (4).

Report on Dietary Habits of Teachers
Dietary outcomes in this review were reported as dietary patterns, dietary behaviours and dietary quality in this review. One study pattern highlighted that 46.3% of school teachers experienced unfavorable eating patterns (10). Two other studies categorised teachers eating patterns based on the type of foods most commonly consumed (13,23). The findings revealed unhealthy eating patterns, with Western diets- high in red meat- were predominant among Malay and Chinese teachers in Malaysia (23). Another study reported that teachers' energy intake fell within recommendation ranges: with 47% of total energy came from carbohydrate, 19% from protein and 34% from fat (13). However, high-fat consumption was also noted (13). Minor discrepancies were observed in ethnic groups practicing a prudent diet high in fruits and vegetables (23). The high-fat consumption among teachers may be linked to emotional responses to psychological distress, serving as an escape from emotional distress (43). One study reported unhealthy eating habits among teachers, finding that 27% skipped breakfast three days per week, 26% skipped lunch four days a week and 26% ate fast foods three days a week (14). A similar study found that, 49.5% of teachers skipped main meals, particularly breakfast (42.8%) and lunch (55.2%) (44). Such unhealthy eating habit may result from teacher's job demands, which disrupt their normal eating. Stress factors in teacher's job demands, disrupt

their normal eating schedules and this work environment contribute to elevated cortisol levels, inducing stress-related eating behaviours (43).

Conclusion

Despite structured searches to identify relevant articles, the review focuses solely on the studies that have both stress and dietary data, making it possible that some critical studies were missed. The findings suggest that teachers' eating patterns may be influenced by emotional responses to work-related stress. Future interventions should address these challenges by focusing on problem solving strategies, including; enhancing social support networks, promoting healthy living and mental health promotion which contribute to improved physical health among teachers.

Journalism Ethics considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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Conflict of Interest

The authors declare no conflict of interest.

References

1. Mirzaei M, Mojtaba S, Ardekani Y, et al (2019). Prevalence of Depression, Anxiety and Stress among Adult Population: Results of Yazd Health Study. *Iran J Psychiatry*, 14 (2):137-146.

2. Ramón-Arbués E, Gea-Caballero V, Granada-López JM, et al (2020). The prevalence of depression, anxiety and stress and their associated factors in college students. *Int J Environ Res Public Health*, 17(19):7001.

3. Ozoemena EL, Agbaje OS, Ogundu L, et al (2021). Psychological distress, burnout, and coping strategies among Nigerian primary school teachers: a school-based cross-sectional study. *BMC Public Health*, 21(1): 2327.

4. Asaloei SI, Wolomasi AK, Werang BR (2020). Work-related stress and performance among primary school teachers. *Int J Eval & Res in Educ*, 9(2):352–358.

5. Koutelidakis A, Argyri K, Almoraie NM (2023). Associations between dietary intake, physical activity, and obesity among public school teachers in Jeddah, Saudi Arabia. *Front Nutr,* 10:1081928.

6. Eng JY, Moy FM, Bulgiba A, et al (2020). Dose–response relationship between western diet and being overweight among teachers in Malaysia. *Nutrients*, 12(10):3092.

7. Sayih Belay A, Guangul MM, Asmare WN, et al (2021). Prevalence and Associated Factors of Psychological Distress among Nurses in Public Hospitals, Southwest, Ethiopia: A cross-sectional Study. *Ethiop J Health Sci,* 31(6):1247-1256.

8. Soria-Saucedo R, Lopez-Ridaura R, Lajous M, et al (2018). The prevalence and correlates of severe depression in a cohort of Mexican teachers. *J Affect Disord*, 234:109–116.

9. Bu F, Mak HW, Fancourt D, et al (2022). Comparing the mental health trajectories of four different types of keyworkers with non-keyworkers: 12-month follow-up observational study of 21 874 adults in England during the COVID-19 pandemic. *Br J Psychiatry,* 220(5):1-8.

10. Wirth T, Kozak A, Schedlbauer G, et al (2016). Health behaviour, health status and occupational prospects of apprentice nurses and kindergarten teachers in Germany: a cross-sectional study. *J Occup Med Toxicol*, 11(1):26.

11. Brütting J, Druschke D, Spitzer S, et al (2018). Health status of long-term sick leave and working female teachers in Germany: A cross-sectional study. *Int J Occup Med Environ Health*, 31(2): 227–242.

12. Roberts AM, Gallagher KC, Daro AM, et al (2019). Workforce well-being: Personal and workplace contributions to early educators' depression across settings. *J Appl Dev Psychol,* 61:4–12.

13. Schultz NS, Chui KKH, Economos CD, et al (2020). Impact of physical activity, diet quality and stress on cardiometabolic health in school employees. *Prev Med Rep,* 20:101243.

14. Sisson SB, Malek-Lasater A, Ford TG, et al (2023). Predictors of Overweight and Obesity in Early Care and Education Teachers during COVID-19. *Int J Environ Res Public Health,* 20(3): 2763.

15. Johnson AD, Phillips DA, Schochet ON, et al (2021). To Whom Little Is Given, Much Is Expected: ECE Teacher Stressors and Supports as Determinants of Classroom Quality. *Early Child Res Q*, 54:13–30.

16. Peele M, Wolf S (2020). Predictors of anxiety and depressive symptoms among teachers in Ghana: Evidence from a randomized controlled trial. *Soc Sci Med*, 253:112957.

17. de Souza Cunha C, Haikal DS, Silva RRV, et al (2022). Association between lifestyle and emotional aspects of food consumption during the COVID-19 pandemic. *Nutr Metab Cardiovasc Dis*, 32(3):734–742.

18. Zeng G, Fung S fu, Li J, et al (2022). Evaluating the psychometric properties and factor structure of the general self-efficacy scale in China. *Curr Psychol*, 41(6):3970–3980.

19. Parthasarathy N, Li F, Zhang F, et al (2022). A Cross-Sectional Study Analyzing Predictors of Perceived Stress Among Elementary School Teachers During the COVID-19 Pandemic. *Workplace Health Saf,*70(4):180–187.

20. Nielsen MG, Ornbol E, Vestergaard M, et al (2016). The construct validity of the Perceived Stress Scale. *J Psychosom Res,* 84:22–30.

21. Karasek R, Brisson Q, Kawakami N, et al (1998). The Job Content Questionnaire (JCQ): An Instrument for Internationally Comparative

Assessments of Psychosocial Job Characteristics. *J Occup Health Psychol,* 3(4):322-55.

22. Martin A, Partika A, Castle S, et al (2022). Both sides of the screen: Predictors of parents' and teachers' depression and food insecurity during COVID-19-related distance learning. *Early Child Res Q,* 60:237–249.

23. Eng JY, Moy FM, Bulgiba A, et al (2018). Consistency and Generalizability of Dietary Patterns in a Multiethnic Working Population. *J Acad Nutr Diet,* 118(7):1249-1262.

24. Banudi L, Ino Ischak W, Koro S, et al (2018). Prediction Model of Obesity Among Teachers in Senior High School in Kendari. *Belitung Nurs J,* 4(4):411-419.

25. Verhavert Y, Deliens T, Van Cauwenberg J, et al (2024). Associations of lifestyle with burnout risk and recovery need in Flemish secondary schoolteachers: a cross-sectional study. *Sci Rep,* 14(1):3268.

26. Bailey RL (2021). Overview of dietary assessment methods for measuring intakes of foods, beverages, and dietary supplements in research studies. *Curr Opin Biotechnol,* 70:91–96.

27. Agyapong B, Obuobi-Donkor G, Burback L, et al (2022). Stress, Burnout, Anxiety and Depression among Teachers: A Scoping Review. *Int J Environ Res Public Health,* 19(17): 10706.

28. Majid NLA, Vanoh D, Zainuddin NZS, et al (2024). Post bariatric surgery complications, nutritional and psychological status. *Asia Pac J Clin Nutr,* 33(2):162–175.

29. Miller P, Newby D, Walkom E, et al (2021). The performance and accuracy of depression screening tools capable of self-administration in primary care: A systematic review and meta-analysis. *Eur J Psychiatry,* 35(1):1–18.

30. Khalili R, Sirati nir M, Ebadi A, et al (2017). Validity and reliability of the Cohen 10-item Perceived Stress Scale in patients with chronic headache: Persian version. *Asian J Psychiatr,* 26:136–140.

31. Huang F, Wang H, Wang Z, et al (2020). Psychometric properties of the perceived stress scale in a community sample of Chinese. *BMC Psychiatry,* 20(1):130.

32. Jiang JM, Seng EK, Zimmerman ME, Sliwinski M, et al (2017). Evaluation of the Reliability, Validity, and Predictive Validity of the Sub-

scales of the Perceived Stress Scale in Older Adults. *J Alzheimers Dis,* 59(3):987–996.

33. Baik SH, Fox RS, Mills SD, et al (2019). Reliability and validity of the Perceived Stress Scale-10 in Hispanic Americans with English or Spanish language preference. *J Health Psychol,* 24(5):628–639.

34. Thorsen SV, Pedersen J, Flyvholm MA, et al (2019). Perceived stress and sickness absence: a prospective study of 17,795 employees in Denmark. *Int Arch Occup Environ Health,* 92(6):821–828.

35. Shahar S, Shahril MR, Abdullah N, et al (2021). Development and relative validity of a semi-quantitative food frequency questionnaire to estimate dietary intake among a multi-ethnic population in the malaysian cohort project. *Nutrients,* 13(4):1163.

36. Schultz NS, Chui KKH, Economos CD, et al (2019). A Qualitative Investigation of Factors that Influence School Employee Health Behaviors: Implications for Wellness Programming. *J Sch Health,* 89(11):890–898.

37. McAuley EA, MacLaughlin HL, Hannan-Jones MT, et al (2023). Effectiveness of diet quality indices in measuring a change in diet quality over time: a systematic review and meta-analysis of randomized controlled trials. *Nutr Rev,* 81(4):361–383.

38. Hlaing-hlaing H, Pezdirc K, Tavener M, et al (2020). Diet quality indices used in australian and new zealand adults: A systematic review and critical appraisal. *Nutrients,* 12(12):3777.

39. Shams-White MM, Pannucci TRE, Lerman JL, et al (2023). Healthy Eating Index-2020: Review and Update Process to Reflect the Dietary Guidelines for Americans, 2020-2025. *J Acad Nutr Diet,* 123(9):1280–1288.

40. English LK, Ard JD, Bailey RL, et al (2021). Evaluation of Dietary Patterns and All-Cause Mortality A Systematic Review. *JAMA Netw Open,* 4(8): e2122277.

41. Kuwato M, Hirano Y (2020). Sense of coherence, occupational stressors, and mental health among Japanese high school teachers in Nagasaki prefecture: A multiple regression analysis. *BMC Public Health,* 20(1):1355.

42. Risal Tawil M, Purbha Sakti B, Ramli A, et al (2023). The Influence of Workload, Demographic Factors and Hardiness on Teachers'

Work Stress. *Journal on Education,* 5(4):15631-15636.

43. Cotter EW, Kelly NR (2018). Stress-related eating, mindfulness, and obesity. *Health Psychol,* 37(6):516–525.

44. Kangalgil M, Yardimci H, Özçelik A (2017). Evaluate the Eating Habits of Teachers Working in Various Primary Schools in Ankara. *J Sci Res Rep,* 15(5):1–11.