K-12 Teachers work stress: a systematic review of journal articles published from 2011 to 2022

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Abstract

This study reviewed research papers in the Web of Science database published between 2011and 2022. The review synthesized K–12 teacher work stress literature and summarized methods and limitations to analyse trends in the area. The review showed that the basic contents investigated in the published articles are stress copying strategies, stress reduction interventions, and effects of work stress's on teachers' personal characteristics. Besides, limited number of studies on K-12 teacher's work stress was also observed. In terms of research methods a significant proportion of published papers employed quantitative research methodologies followed by qualitative and mixed method studies. Most of the reviewed articles conducted in elementary and secondary schools in conjunction. Self-report methods only suited for assessing teachers' subjective psychological stress, not biological stress. Further studies should integrate subjective and biological stress measurements using ambulatory assessment methods to analyse stress in authentic educational settings.

Keywords: Teachers, Work stress, Systematic review, Ambulatory assessment, K-12 grades

Introduction

Teacher work stress is viewed as the occurrence of adverse and negative emotions, like anger, worry, tension, annoyance, or despair, that arise from multiple facets of a teacher's professional responsibilities. Teachers often report experiencing lower levels of mental well-being compared to those in other occupations (Kidger et al., 2016). The profession has been recognized as being exceedingly demanding, tough, and stressful across all levels of teaching (Chaudhuri et al., 2022). The situation can be attributed, in part, to the frequent implementation of educational reforms (Skinner et al., 2019), by governments worldwide aimed at bringing transformation and enhancement in the field of education, which often have significant implications for the occupational, emotional, and physical well-being of teachers (Lanner, 2010). Additionally, the development of stress is thought to arise from a combination of external and intrapersonal factors (Sapolsky, 2004). Numerous environmental factors are

commonly identified as significant contributors to teacher stress. These factors encompass external pressures, such as an overwhelming workload, time constraints, insufficient resources, excessive paperwork, and challenging student behaviour, as well as organizational elements, including the level of support from leadership, the overall school climate, and the scrutiny surrounding teacher effectiveness (Carroll et al., 2021). Insufficient attention has been given to the significance of intrapersonal aspects that can either alleviate or intensify stress, such as the regulation of emotions (Vesely et al., 2013), subjective well-being (Renshaw et al., 2015), cognitive evaluations (Chang, 2013), and personal characteristics (Kokkinos, 2007).

Although much study has been undertaken on a global basis, the findings have been inconsistent when looking at stress within the teaching population. For example, numerous empirical investigations have consistently shown that novice teachers in the early stages of their professional careers are susceptible to greater levels of stress, and this phenomenon is inclining throughout global contexts (De Nobile & McCormick, 2010). Across school levels, some studies have suggested that primary school teachers tend to experience higher levels of stress compared to their counterparts in high school (Chan et al., 2010). However, research conducted by the Organisation for Economic Co-operation and Development (OECD, 2020) has indicated different trends across various countries, suggesting that there are no significant overall differences in stress levels between educational levels. Yet De Nobile & McCormick, (2010) did not make a distinction between primary and secondary teachers but identified that classroom teachers had higher levels of stress compared to other types of educators. With such discrepancies in study results, it is now impossible to draw any strong conclusions regarding which educational level of teachers is more likely to experience stress. Therefore, due to this reason, the researchers were not motivated to stick to a specific level of education but rather intended to conduct a systematic review of articles published from kindergarten to secondary schools (K-12) within the years 2011 to 2022. Although the number of studies on teacher work stress is growing, very few researchers have paid attention to conducting a systematic review and analysis across the educational levels. For example, a systematic study recently conducted by von der Embse et al. (2019) was focused on comparing the type and effectiveness of teacher stress interventions. Maudgalya et al. (2006) also conducted a systematic review on workplace stress factors and 'burnout' among information technology professionals. The former was focused only on reviewing studies related to the effectiveness of teacher work stress interventions, and the latter study was limited to the study of work stress on information

technology professionals in teaching institutions. Conducting systematic reviews of teachers' work stress would have several benefits. For example, it would provide empirically supported information that may contribute to the formulation of policies and the implementation of practices within the education sector. By emphasizing the adverse effects of work-related stress on teachers, policymakers might formulate initiatives aimed at mitigating stress levels and enhancing teacher satisfaction and effectiveness. Additionally, it would help to detect gaps in the existing body of research pertaining to the subject of teachers' work stress; a review is required. This may provide valuable guidance for future study endeavours and assist researchers in directing their attention towards areas that need more exploration. By completing these missing sections, a more complete understanding of work-related stress among teachers may be attained.

To sum up, although the review of teachers work stress has aroused attention from researchers, there is a wide variety in the contents used while reviewing teachers' work stress, and there is a lack of synthesis of ideas related to the cause, effect, and interventions of teachers at kindergarten, primary, and secondary schools. Hence, in the previous review studies, a comprehensive analysis of the main contents of teachers' work stress, the methodologies used, and the limitations inherent in the studies of teachers' work stress were not the main emphasis. Given the various study approaches to teachers' stress present in the literature and the emerging trend of emphasis on familiar issues related to teachers' work stress, there is a need to systematically review trends in the field of teachers' work stress studies. This study attempts to (a) synthesize the different literature on teachers' work stress from K–12 grades and (b) summarize the research methods and limitations provided in the previous studies of teachers' work stress. Thus, to direct this literature review, the present study addresses the following research questions:

(1) What are the basic contents of teachers' work stress investigated in the published articles?

(2) Which countries made a contribution to the articles published between 2011 to 2022 based on the location of the first author

(3) What are the research methods used by the authors across the whole articles published between 2011 to 2022

(4) What are the basic limitations concluded, by the author, from the published articles

Method
Data Gathering

Articles published in indexed journals often get more attention and have a bigger influence on the field, according to (Duman et al., 2015). To identify the relevant domains of teachers' work stress studies at the primary and secondary school level, the authors conducted an initial search on the Web of Science (WoS) website, as it is a significant source of academic articles that are well-indexed and offers a search engine for those publications (Akçayır & Akçayır, 2018). The researchers used the search function and input the key words related to teachers' work stress "Work Stress" or "occupational stress" or "Job Stress" And "Teachers" And "Kindergarten" And ("Primary School " or "Elementary School") And ("Secondary School" or "Junior High School"). The scope of the search was restricted to scholarly articles published in English-language, peer-reviewed journals between the years 2011 and 2022. The search phrases were inputted both autonomously and in conjunction. The last search was conducted on 17 December 2022.

Inclusion and Exclusion criteria

In our initial search, a total of 990 articles were found. Subsequently, the title and abstract review were completed using the open-source Rayyan software (Ouzzani et al., 2016) and filtered based on the specified inclusion criteria: a) Studies focused on teachers' work stress; b) Studies published from 2011 to 2022; c) Participants in the studies were teachers' of kindergarten, primary, and secondary schools (K–12 grades) regardless of their sex or gender; d) Studies published in English; e) Articles published in social science citation indexed (SSCI) journals f) articles in which survey and cross-sectional designs were employed; g) articles that followed a quantitative approach. Furthermore, the review of the titles and abstracts of these articles was made based on the following exclusion criteria: a) articles that do not fulfil the inclusion criteria; b) articles that are systematic and literature reviews; and c) articles that have a clinical and pathological nature.

Studies were excluded if and only if they clearly did not meet the inclusion criteria. Each of the two reviewers reviewed the same 990 abstracts and tracked include/exclude decisions. The agreement percentage was 88.7%, based on Cohen's kappa inter-rater reliability percentage, and a meeting was held to reach consensus on the discrepancies. Therefore, as shown in Figure 1, 18 journals were selected for further analysis by removing 881 non-teacher work stress articles, 74 articles related to teachers' work stress but not at the school level, and 17 articles published in languages other than English.
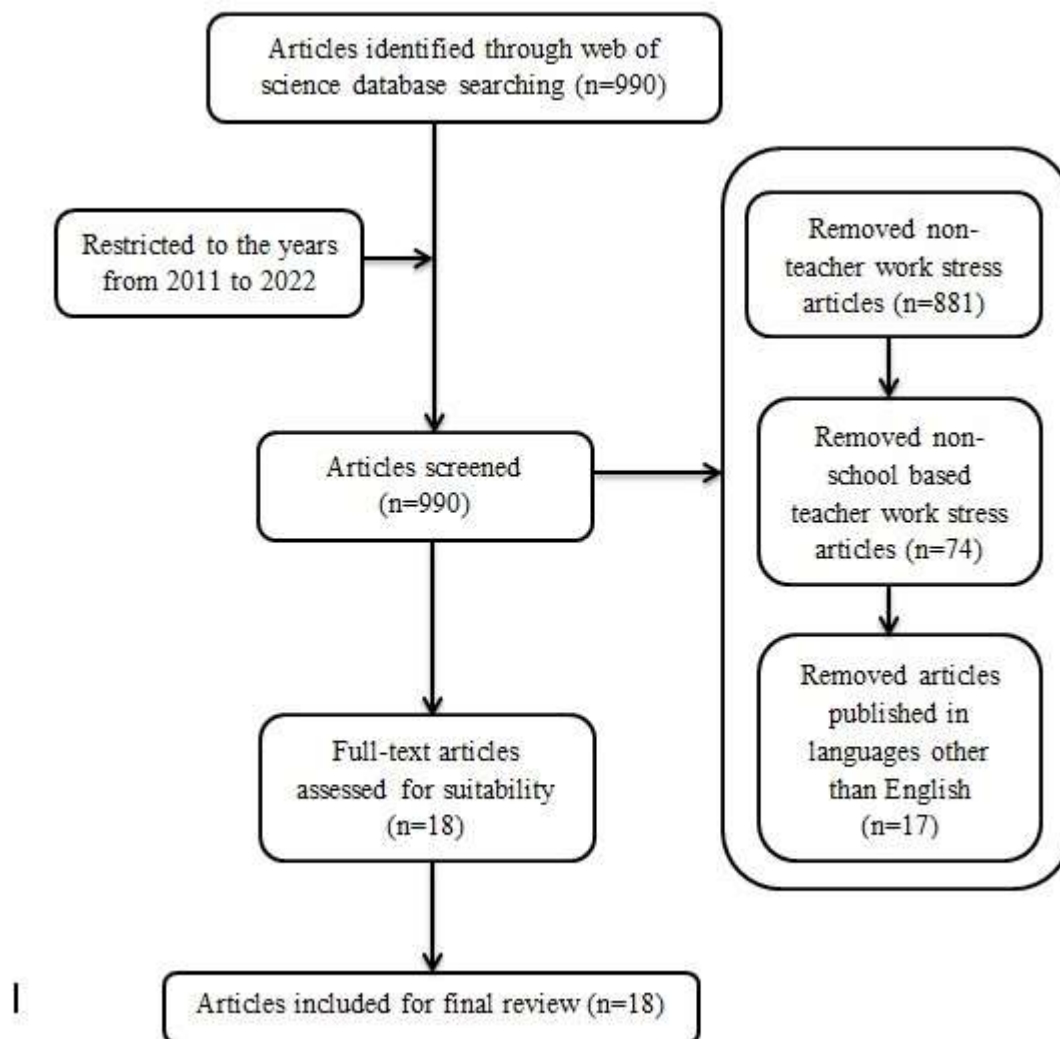
Figure 1. Flowchart of the search and screening process

Data extraction and data analysis

The articles included in the final collection were classified and summarized using a data extraction form, including: the general information such as the authors', the title of the paper, the journal in which it was published, the year of publication, and the keywords associated with the section; The contents of the study (i.e., country, research aims and questions, research methods, design, limitations, and the recommendation provided); participant characteristics (i.e., level of the school, number of participants, and sample size).

Results
Descriptive findings
All 18 (100%) studies included in the analysis were comprised of peer-reviewed journal

publications. Additionally, out of the whole collection of studies, 6 (33.33%) were published between 2011 and 2015, and the rest, 12 (66.67%), were published from 2016 to 2022. The majority of research that was summarized in the study had been undertaken in the United States and China, with 6 and 4 papers, respectively. A limited number of studies (n = 8, or 44.44% of the total) have been conducted in various countries, including Netherland, UK, Finland, Norway, Japan, Taiwan, Malaysia, and Indonesia.

The basic contents of teachers' work stress investigated in the published article

As shown in Table 1, two basic contents related to teachers work stress were identified: 1) Stress copying strategies or stress reduction interventions 2) Effects of work stress on teachers' personal factors. The main stress coping strategies depicted in the majority of articles were value stream mapping, mindfulness-based stress reduction interventions, and other specific techniques like relaxation exercises, time management, etc. The effect of work stress on teachers' personal factors such as psychological capital, turnover intention, self-efficacy, occupational commitment, work-related well-being, physical health, absenteeism, and presenteeism were also some of the effects observed in the studies.

Table 1: Characteristics of the reviewed studies

Authors', Year, Title	Country of study	Journal	Research aims	Research Methodology and Design	Study participants and Sample size	Study limitations	Study recommendations
Riezebos & Huisman, (2020) • Value stream mapping in education: addressing work stress	Netherlands	International journal of quality & reliability management	To develop a value stream mapping for education approach and examines its use as a rational coping strategy for teams of teachers and other employees to overcome work-related stressors.	Qualitative Approach (Action Research)	Primary education Professionals (Sample size not stated)	Value stream mapping for education has been validated at a single school, but further testing at other schools is welcome	Value stream mapping is found to be useful in educational settings as long as the educational context is respected in the approach
Huang et al. (2015) • Relationships Among Physical Education Teachers' Psychological Capital, Work Stress, And Creative Teaching	Taiwan	Journal of Baltic science education	To explore the relationships among physical education teachers' psychological capital, work stress, and creative teaching at junior and senior high school levels	Quantitative Approach	Junior and senior high school physical education teachers (n= 395)	The chosen method did not help the researchers to determine the physical aspects of the teachers in relation to stress.	suggested that physical education teachers should actively and appropriately participate in leisure activities to relax and reduce work stress.
Putri et al. (2020) • Risk factor analysis of work stress and muscle pain among high school teachers in Makassar	Indonesia	Enfermeria clinica	To determine relationship between work stress levels and muscle pain among high school teachers in Makassar	Quantitative (Cross-sectional)	High school teachers (n=37)	No	No
Yu et al. (2015) • The Effect of Work Stress on Job Burnout Among Teachers: The	China	Social indicators research	To examine the impact of work stress on job burnout, mainly focused on confirmation of the mediator role of self-efficacy	Quantitative	Middle school teachers (n=387)	No	No

Mediating Role of Self-efficacy							
Gluschkoff et al. (2016) • Work stress, poor recovery and burnout in teachers	Finland	Occupational medicine-oxford	To examine recovery as a mediator in the relationship between work stress and burnout among teachers	Quantitative (Cross-sectional)	Primary school teachers (n=76)	No	Interventions targeting sleep, relaxation and overall leisure time recovery activities could help employees to recover from work stress and reduce the risk of burnout, which would complement workplace burnout intervention programmes
Steinhardt et al. (2011) • Chronic Work Stress and Depressive Symptoms: Assessing the Mediating Role of Teacher Burnout	USA	Stress and health	To investigate the relationship between stress, the mediating role of burnout, and depressive symptoms was examined	Quantitative (Cross-sectional)	Middle and high school teachers (n=267)	• Cross-sectional design cannot help to determine causal inference and • Temporal precedence. self-report survey data has potential for inaccurate responses due to lack of self-awareness	In addition to assessing predictors of job burnout and depressive symptoms, further research should also assess the predictors of job engagement and positive health outcomes
Klassen et al. (2013) • Pre-service teachers' work stress, self-efficacy, and occupational commitment in four countries	United Kingdom	European journal of psychology of education	To examine the teaching-related stress, self-efficacy, and occupational commitment of pre-service teachers from two culturally western	(Quantitative)Survey Design	Primary and secondary school (n= 1,187)	samples from Four countries did not measure cultural beliefs, which vary within countries as well as across countries	• Intervention studies that focus on reducing pre-service teachers' stress using theory-based approaches are welcomed

			and two culturally eastern countries			the reliability of the workplace stress measure was not optimal, ranging from .65 to .71, with a mean alpha of .68	• Further studies that investigate how the sources of job stress are changing for recent generations of pre-service teachers are needed
Li & Zhang (2019) • Kindergarten teachers' work stress and work-related well-being	China	Social behaviour and personality	To examine the role of psychological capital (mediating) and social support (moderating) in the relationship between occupational stress and work-related well-being	Quantitative (Cross-sectional)	kindergarten teacher participants(n= 615)	The impact of the dynamic changes in kindergarten teachers' occupational stress on their work-related wellbeing was not examined.	Other mediating variables such as psychological flexibility and anti-frustration ability should be tested
Gloria et al. (2013) • Positive affectivity predicts successful and unsuccessful adaptation to stress	USA	Motivation and emotion	To test whether positive affect predicted successful and unsuccessful adaptation to stress	Quantitative (Cross-sectional)	Elementary and secondary school teachers (n = 267)	• the self-report nature of the survey instrument may have influenced the results with inherent errors and biases • the snowball sampling procedure to complete the surveys may have resulted in a biased sample that may not be well-	The finding of this study provide support for the broaden-and-build theory of positive emotions as an effective theoretical framework for developing stress management programs, enhancing positive affect, and promoting resilience among public school teachers.

						representative of the true teacher population	
Katz et al. (2018) • Educators' emotion regulation strategies and their physiological indicators of chronic stress over 1year	USA	Stress and health	To investigate the changes in educators' physiological level of stress	Quantitative (longitudinal study)	Middle school teachers (n= 30)	• Only cortisol was assessed as a physiological indicator of allostatic load (AL) and other indicators were not collected. • There small sample size and is an overrepresentation of women,	Larger samples and longer longitudinal studies will be necessary to examine the downstream effects on health care utilization and costs, and whether these stressor are directly related to whether teachers leave the profession
Landsbergis et al. (2020) • Job Stress and Health of Elementary and Secondary School Educators in the United States	USA	New solutions-a journal of environmental and occupational health policy	To examine the job Stress and Health of Elementary and Secondary School Educators	Quantitative	Elementary and secondary school educators (n= 829)	• Researcher's inability to adjust for measures of social class (such as education or income) • The use of self-report questions to measure working conditions and worker health and the low response rate to the educator survey.	Need for further research on labour management collaborative programs in education. In addition, the economic, social, and political trends that appear to be increasing stressors among educators need to be addressed
Bjørndal et al. (2022) • Stress-coping Strategies amongst	Norway	Scandinavian journal of educational research	To provide insight into the strategies for coping with stress that newly qualified	Qualitative (Longitudinal study)	Primary and Secondary School Teachers (n= 46)	• Teachers who coped with stress at work did not express this in the interviews	• Design or intervention studies can be developed in

Newly Qualified Primary and Lower Secondary School Teachers with a Master's Degree in Norway			primary and lower secondary school teachers employ in their daily work after three years in the profession and the characteristics of these strategies.			as the interview guide contained many questions covering a range of topics. • The lack of other data sources or the use of other methods that could have provided us with additional information.	teacher education as well as follow-up studies to ascertain whether the teachers actually adopt the learned strategies in service and whether they reduce stress at work. • Need to further investigate how school culture and management can contribute to improving NQTs 'stress management.
Lensen et al. (2021) • Mindfulness-based stress reduction intervention for elementary school teachers: a mixed method study	Netherland	Trials	To describe the protocol for a randomized controlled study (RCT) comparing an 8-week mindfulness-based stress reduction (MBSR) intervention with a wait list control condition in primary school teachers.	Mixed method	Primary school teachers (n=155)	The study population based on initial recruitment and the pilot study will be predominantly from urban areas. This might limit generalizability	The MBSR programme is effective among teachers, further research should be set up with a broader diversity in the setting of schools and mindfulness trainers.

Paquette & Rieg (2016) • Stressors and coping strategies through the lens of Early Childhood/Special Education pre-service teachers	USA	Teaching and teacher education	To identify stressors, coping strategies, and methods to be used by university supervisors to assist those ECSP pre-service teachers with whom they supervised.	mixed-methods	ECSP pre-service teachers (n=187)	• A small sample size from one higher education institution; therefore, the findings cannot be generalized • There were no clear delineations between the ratings so what some pre-service teachers perceived as being most of the time, others may have perceived as being some of the time.	• Add focus groups or interviews to add to the depth of the qualitative responses listed on the survey tool; (2) Include a wider population • Study various content areas of student teachers, other than early childhood with special education; • Expand the study to include all components of resilience, rather than focusing solely on coping skills;
Dooley et al. (2020) • Does Servant Leadership Moderate the Relationship between Job Stress and Physical Health?	China	Sustainability	To investigate the relationship between hindrance job stress, depersonalization, and physical health; investigate if servant leadership, in fact moderates the relationship between hindrance job stress and depersonalization, as well as physical health	Quantitative (Cross-sectional)	High school teachers (n=857)	• This research did not introduce a temporal separation between the measures of the predictor and outcome variables • This study did not record the epartment and school information because the majority of teachers felt uncomfortable about	• To find no relationship between servant leadership and depersonalization, as well as employees' health, means that further research is warranted in this area. • Future research could use a longitudinal study to

						the release of this information	examine whether causal relationships exist between variables of interests
Deguchi et al. (2018) • Gender differences in the relationships between perceived individual-level occupational stress and hazardous alcohol consumption among Japanese teachers: A cross-sectional study	Japan	Plos one	To clarify gender differences in the relationships between perceived individual-level occupational stress and HAC among Japanese teachers	Quantitative (Cross-sectional)	• Primary schools,(n=299) • Junior high schools, (n=130), high schools, (n=21)	• The sample Size was small, Only Japanese Teachers were surveyed, and the data were obtained from one city in Japan • The moderate response rate for our survey questionnaire (66.5%) might Have led to a selection bias • Could not perform a Multilevel analysis (school level) Because of a lack of school identifiers	Future study needs to consider individual factors, such as personality or temperament as we previously reported
Howard & Howard (2020) • The effect of perceived stress on absenteeism and presenteeism in public school teachers	USA	Journal of workplace behavioural health	To assess the relationship between the perceived stress of public school teachers and the frequency of total illness days	Quantitative (Cross-sectional)	Primary and Secondary school teachers (n=2,542)	• The study did not seek to measure the economic costs associated with illness days, either absenteeism or presenteeism • The underlying factors leading to higher stress levels were not addressed in	Establishing the linkages among the determinants of stress, the frequency of illness days, and resulting economic costs should be the research focus for future studies

						this study, but are necessary for full understanding of the role of stress in teacher health	
Moy et al. (2014) • Cohort study on clustering of lifestyle risk factors and understanding its association with stress on health and wellbeing among school teachers in Malaysia (CLUSTer) - a study protocol	Malaysia	BMC public health	To extensively study teachers in Malaysia with respect to clustering of lifestyle risk factors and stress, and subsequently, to follow-up the population for important health outcomes.	Quantitative (Cross-sectional)	Primary and secondary school teachers (n=10,000)	Due to the voluntary participation of cohort members, there may be an under-representation of those with lower health awareness although in preliminary analyses both participants and non-participants have a similar educational status.	No

Stress copying strategies or stress reduction interventions

Among the 18 reviewed journals, 4 studies by (Riezebos & Huisman, 2020; Bjørndal et al., 2022; Lensen et al., 2021 and Paquette & Rieg, 2016) explained value stream mapping, mindfulness-based stress reduction interventions, and other specific techniques like relaxation exercises and time management. In the study about value stream mapping, the authors claimed that the use of value stream mapping in the field of education is rather uncommon (Riezebos & Huisman, 2020). The academic literature has provided few occasions for the use of this concept, as shown by the works of Alp (Alp, 2001). The study was able to develop a new value stream map (VSM), i.e., a stream map for education (SM4EDU) approach, validate it in an actual educational problem of teachers' work stress, and also examine whether and how it enables teachers to manage stress. Although the study held that, through the examination of the value stream map, individuals may get insightful information regarding how their current practices are affecting their levels of stress and helping them to identify particular areas that need adjustment, before being able to use it in an educational context, the tool should undergo a transformation to become more generic and suitable for other areas as well. The study of Riezebos & Huisman, (2020) did not indicate that to produce an accurate and thorough value stream map, it may take a lot of time and work. Teachers' who are already under a lot of stress and may not have the time or resources to devote to this procedure may find it difficult. Additionally, it may just provide a short-term fix and not immediately treat the underlying causes of stress. To provide a comprehensive approach to stress management, it should be supplemented with other coping mechanisms that address personal wellbeing and work-life balance. While there aren't many studies on value stream mapping as a stress management technique, Riezebos & Huisman (2020) studies frequently neglect or understudy a few key areas. For instance, the study did not consider individual differences in the use of value stream mapping techniques. Since each individual possesses different coping styles, preferences, and stress triggers, the same value stream mapping techniques will not be effective for everyone. Moreover, while developing the new value stream mapping approach, which is stream mapping for education (SM4EDU), the emotional well-being and resilience of the teachers' might have been considered so as to strengthen the impact of the approach.

In the study by Lensen et al. (2021) the authors figured out if a mindfulness-based stress reduction intervention, in contrast to a wait list control condition, is more successful in reducing perceived stress in primary school teachers. Additionally, the study employed randomized controlled trials and control groups that helped to compare the effects of mindfulness-based stress reduction to other interventions, and it clearly identified the effects of mindfulness-based stress reduction interventions on absenteeism, mental health, teaching skills, the experienced classroom climate of teachers, and the pupil-teacher relationship. The research tried to examine the effectiveness of mindfulness-based stress reduction (MBSR) techniques with a wider range of moderating (school weight, age, previous or present psychiatric disorders, and teachers' years of experience) and mediating (self-compassion, mindfulness skill, and emotion regulation skill) variables. Even though the study did not include subjects from different cultural backgrounds and socioeconomic statuses, it helped to understand the importance of mindfulness to reduce stress by providing knowledge about behavioural patterns, creating emotional awareness, and developing emotional control (Tang et al., 2015a).

The other two studies by Paquette & Rieg (2016) and Bjørndal et al. (2022) focused on specific stress coping strategies. As depicted on Table 1, with regards to stress coping strategies, the studies introduced techniques such as being open with and getting support from colleagues and family, shielding and escaping to a space that acts as a refuge from work, learning established stress-coping strategies, and planning, structuring, and lowering ambitions (Bjørndal et al., 2022). These coping strategies were recommended to be used by the primary and lower secondary teachers in Norway, based on the theoretical basis of Lazarus & Folkman (1984), which is problem-focused and emotion-focused coping strategies and relationship-focused coping (Stephenson et al., 2016). The study carried out a qualitative data analysis based on the Braun & Clarke's, (2019) approach to thematic analysis (TA), which is reflexive TA. However, the analysis approach should have been used with the other approach or in such a way that the research is not exposed to subjective interpretation and bias (Holloway & Todres, 2003). In the study by Paquette & Rieg (2016) different coping strategies were identified as a result of the qualitative analysis of data obtained from early childhood and special education teachers. However, to provide insight into stressors, the study result would have included all components of resilience and interview data from experienced teachers.

Work stress causes and its effect on teachers' personal factors

As per the understanding obtained from the review, teachers' work stress causes depressive symptoms (Steinhardt et al., 2011) and has a direct effect on their physical health (Dooley et al., 2020; Landsbergis et

al., 2020), work related well-being (Li & Zhang, 2019), commitment to continue teaching (Klassen et al., 2013), creative teaching, self-efficacy, hope, and optimism of psychological capital (Huang et al., 2015), illness days in teachers and absenteeism, job burnout (Yu et al., 2015; Gluschkoff et al., 2016). All the reviewed studies discussed that when teachers encounter an overwhelming workload, insufficient support, and inadequate resources, they may suffer feelings of being overwhelmed, emotionally depleted, and disconnected from their job duties. This phenomenon has the potential to result in heightened levels of stress among teachers (Steinhardt et al., 2011). Additionally, it was found that prolonged and consistent exposure to elevated levels of stress may have a negative impact on the teachers' mental and physical well-being (Li & Zhang, 2019), and they may become disillusioned in their chosen occupation, potentially resulting in a heightened susceptibility to both physical and mental health challenges. Consequently, this may contribute to an escalation in instances of sick leave or other kinds of absenteeism (Howard & Howard, 2020). On the other hand, as depicted in Figure 2, these studies also attempted to see the effect of work stress on the personal characteristics of teachers through the mediating and moderating role of various factors. Except for variables such as self-efficacy and poor recovery, which were partially mediated, the rest were found to fully mediate the effect of teachers' work stress on their counter-outcome variables. Besides, servant leadership was not found to moderate the effect of teachers' work stress on physical health and depersonalization, but social support was found to moderate the effect of teachers' work stress on work-related well-being.
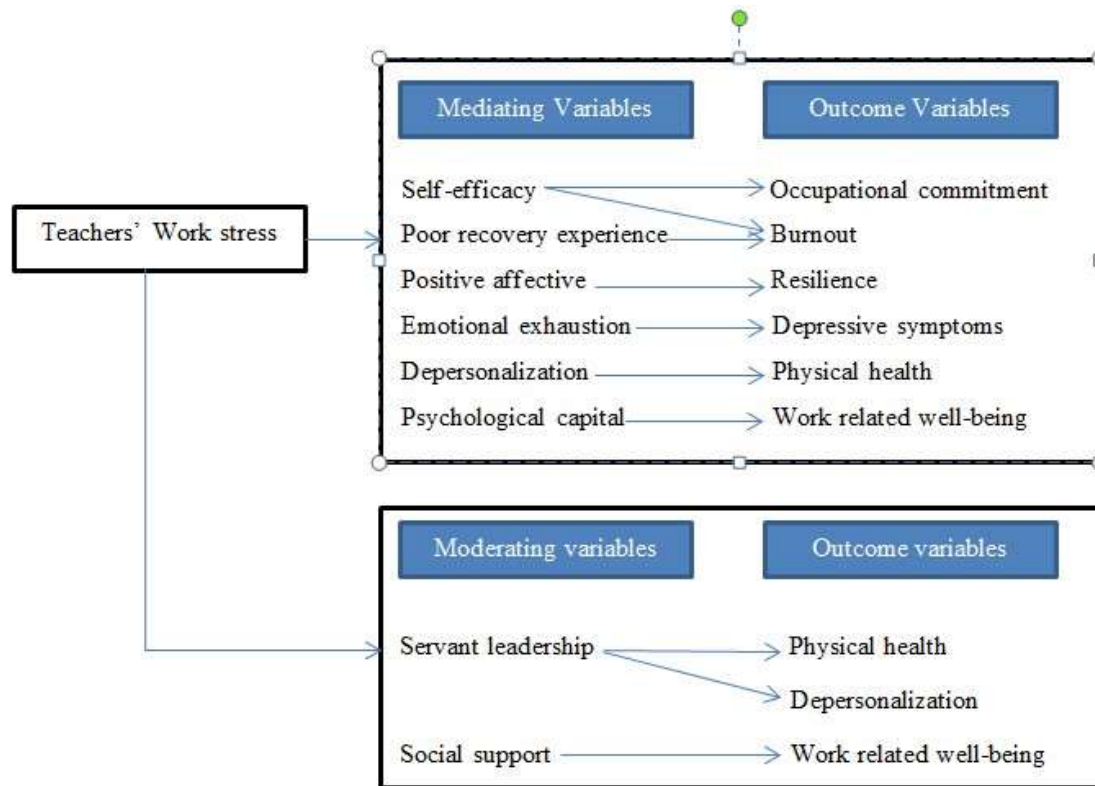
Figure 2. Moderating and mediating factors related to the effect of teachers' work stress

Author's country

The countries of the main authors who contributed to the publication of research articles pertaining to teachers' work stress in kindergarten, primary, and secondary schools (K–12 grades) from 2011 to 2022. Figure 4 illustrates that the USA has the highest number of published articles (n = 6), while the United Kingdom (UK), Taiwan, Norway, Japan, Finland, Indonesia, and Malaysia contributed 1 article each to the research articles. The Netherlands and China contributed 2 and 3 research articles, respectively. The findings revealed that the USA has the highest number of relevant publications in relation to teacher work stress in K–12 grades. In the US, teachers often experience elevated levels of stress due to the social and political pressures associated with the responsibility of preparing the succeeding generation, as well as the intricate bureaucratic systems involved (Goldstein, 2014). Such considerable stress experienced in the teaching profession contributes significantly to the occurrence of elevated rates of turnover. Considering this, different studies have been emerging to assert the justification that "when educational personnel are provided with chances to assume leadership positions and when the burden of accountability is distributed among the faculty rather than being addressed individually, teachers tend to view the administration as a source of support rather than as a source of demands

and stress". As a result, they demonstrate increased levels of commitment to their profession (Johnson et al., 2014). Additionally, in the US, in order to assist teachers in effectively navigating the intricate bureaucracy of all levels of education, teacher education programs are including and integrating good communication strategies into the curriculum. The potential explanation for the elevated quantity of published articles pertaining to teachers' work stress in kindergarten, primary, and secondary schools in the USA may be attributed to the aforementioned explanations.
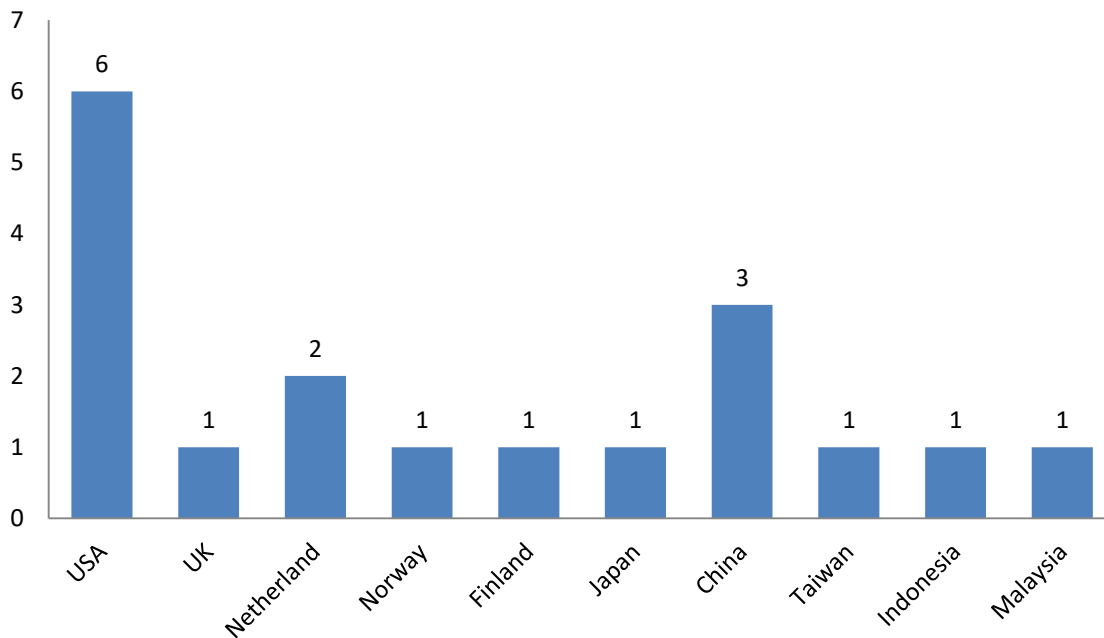

Figure 3. Countries published articles related to teachers' work stress at primary and secondary school level (2011-2022).

Research methods and participants

Different research methodologies, including quantitative, qualitative, and mixed, were used to gather and analyse data to answer the research questions. From the 18 publications that were selected, 14 (77.8%) utilized quantitative research techniques, 2 (11.1%) used qualitative methods, and 2 (11.1%) used mixed methods. The findings indicate that a significant proportion of published papers examining teachers' work stress employed quantitative research methodologies. Specifically, all of these studies were empirical in nature. Furthermore, the majority of participants involved in the research were from primary schools (n = 4) and primary and secondary schools (n = 4). To mention some of the studies that employed the above methods, Katz et al. (2018) carried out a longitudinal experimental study on 30 middle school teachers to examine whether the teachers' physiological signs of chronic stress change over the course of the year and the influence of their

emotion regulation strategies on the changes in the physiological indicators of chronic stress. The method enabled the researchers to report on diurnal cortisol data collected at three time points over the course of a year. The longitudinal data acquired from teachers has unique features. Moreover, the study provides an original attempt at investigating the association between self-reported emotion regulation strategies and variations in diurnal cortisol levels throughout a span of time.

In the other longitudinal study by Bjørndal et al. (2022) a qualitative study was conducted on 27 primary and secondary school teachers so as to examine the research question: What do you find most challenging about working as a teacher? And 2) how do you deal with challenges such as stress in your daily life? The analysis approach used by the researchers was based on thematic analysis (TA), which was formulated by Braun & Clarke, (2019). As a new paradigm, the study was able to add and test a new approach, reflexive TA (RTA), which gives researchers an active role in the knowledge production process through their reflexive engagement. As this approach is theoretically flexible and suits questions related to people's experiences, views, and perceptions (Braun & Clarke, 2019), it would get due attention by the researchers intended on examining individuals' stress coping strategies while they engage in certain kinds of jobs. Moreover, in a study by Lensen et al. (2021), a mixed approach was employed to investigate the effectiveness of mindfulness-based stress reduction (MBSR) in contrast to a wait list control condition in reducing perceived stress in 155 primary education teachers divided over three school years. In the study, a randomized control trail (RCT) design was used, through which teachers were randomly assigned either to the MBSR program or the waiting list control condition. Once the MBSR training, developed by Kabat-Zinn, (2013), was provided, data obtained via questionnaire were analysed quantitatively using R (R Core Team, 2020), and interview data was analysed qualitatively using Atlas.Ti. As per the hope obtained from the previous studies, it can be concluded that MBSR is a promising intervention for stress reduction (Tang et al., 2015b). Besides, the schools may have the potential to incorporate the program into their curriculum, thereby resulting in enhanced personal resilience and professional growth for teachers.
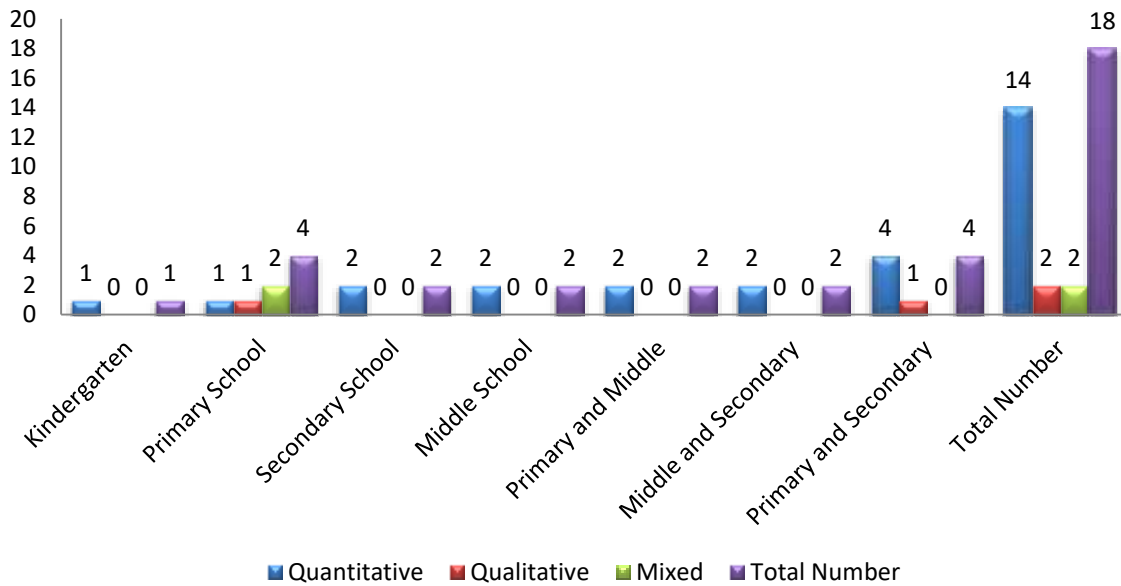
Figure 4. Research methods and participants of the studies included on the review

Conclusion and Implication

The job of teaching is widely acknowledged as both very demanding and stressful, while also being highly rewarding. There is a substantial body of evidence indicating that teacher work stress is prevalent on a worldwide scale (e.g., Bottiani et al., 2019). With regards to the severity of teacher stress, Van Droogenbroeck & Spruyt, (2015) conducted a literature analysis on the topic of teacher stress and found that most of the existing studies had methodological and statistical limitations, such as a lack of specificity surrounding educator type (e.g., primary teacher, secondary teacher, leadership team). With this notion, the present study conducted a systematic analysis of 18 previously published articles related to teachers' work stress at the K–12 education level. Based on the analysis made in these articles, the basic contents related to stress copying strategies or stress reduction interventions such as value stream mapping, mindfulness-based stress reduction interventions, and other specific techniques like relaxation exercises and time management were explored. Additionally, contents related to the effects of work stress on teachers' personal factors such as psychological capital, turnover intention, self-efficacy, occupational commitment, work-related well-being, physical health, absenteeism, and presenteeism were also discussed in detail. On the other hand, the analysis revealed that the USA has the highest number of relevant publications in relation to teacher work stress in primary and secondary schools. This might be due to the heightened stress levels brought on by the complex bureaucratic structures involved, as well as the social and political obligations connected with the duty of educating the next generation (Goldstein, 2014).

Moreover, as per the understanding obtained from the systematic review conducted on the recruited articles, the findings of the studies may have theoretical and practical implications. From a theoretical point of view, in the investigation of stress among teachers, self-reports serve as a key instrument for data collection (Wettstein et al., 2020). These are appropriate for measuring the subjective psychological stress of teachers, but they are susceptible to bias due to memory problems, subjective impressions, and reporting biases (Prado-Gascó et al., 2019). Moreover, self-reports do not provide reliable data on biological stress responses. The accurate interpretation of biological processes may often present challenges (Campbell & Ehlert, 2012), and there is always no congruence between biological stress measurement and subjective perceptions of stress (Ehlert, 2016). Additionally, the combination of subjective and biological stress measurements using ambulatory assessment methods including observational and biological/physiological/behavioural measures, would facilitate the investigation of stress in authentic educational settings, thereby enhancing ecological validity (Prado-Gascó et al., 2019). From a practical perspective, the use of value stream mapping would enable teachers to find the possible sources of stress through screening inefficiencies and areas of resource wastage or underutilization, including various resources like time, supplies, and personnel. Through the strategic delineation of procedures and the removal of activities that do not provide value, teachers' may minimize stressors and optimize the allocation and use of resources in areas of utmost need. Additionally, the use of mindfulness-based stress reduction intervention (MBSR) would provide teachers with a catalogue of strategies to effectively cope with stress, enhance their level of self-awareness, and foster practices of self-care. This phenomenon has the potential to manage their work stress and enhance their overall well-being, work satisfaction, and resilience.

Moreover, the analysis showed that a substantial number of published papers examining the work stress of teachers used quantitative research methodologies, followed by qualitative and mixed methods. Furthermore, the majority of participants involved in the research were from primary schools and from both primary and secondary schools. However, few studies were conducted in kindergartens, which could be related to methodological challenges, a lack of researcher's focus, and perceptions of stressors—that is, teachers in kindergarten have stresses that are either less severe or unique compared to teachers in other school levels. Besides, certain limitations were also observed in the published articles. For instance;

1) The studies were focused on the specific countries or regions, excluding African countries, so limiting the extent to which the results may be applied to a broader context.

2) Majority of the studies have used self-report measures, which had the potential to be influenced by bias or the tendency to present oneself in a socially desirable manner.

3) Inadequate emphasis on interventions or coping strategies

4) Limited number of longitudinal studies; majority of the studies did not investigate at the long-term impacts of teacher work stress or recorded changes in stress levels.

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