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A systematic review of the risks and protective factors related to teacher resilience

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1 Abstract

Background: Resilience is a crucial aspect of well-being for primary and secondary school teachers (PSETs) as it allows them to manage the demands and challenges of their profession. However, there is limited knowledge about the key risks and protective factors that influence PSETs' resilience.

Purpose: This systematic review explores the key risks and protective factors of PSETs' resilience as recorded in literature between 2015 and 2022.

Research Questions:

1. What are the main protective factors that strengthen the resilience of PSETs?
2. What are the main risk factors that weaken the resilience of PSETs?

Methods: This systematic literature review employed a comprehensive search strategy that involved searching for relevant articles in multiple databases, including *Web of Science, ERIC, Ebscohost,* and *Scopus*. Following the application of exclusion criteria, a total of 28 peer-reviewed articles were selected for the final analysis. The quality of the articles was evaluated using the GRADE tool. The articles were categorized and tabulated to synthesize the evidence and address the research questions.

Results: The results of the systematic review indicate that support from management, self-care activities, and a positive school culture are key protective factors for PSETs' resilience. Conversely, exosystemic factors such as changes to the education system and high-stakes accountability frameworks, as well as high workload and job demands, were identified as key risk factors for PSETs' resilience. Overall, the study highlights the significance of addressing both internal and external factors that affect PSETs' resilience.

2 Introduction

High rates of teacher attrition in primary and secondary education are a cause for concern. According to the Dutch Ministry of Education, 9% of beginning teachers in primary education leave within their first year, while in secondary education, the figure rises to 20% (Ministry of Education, Culture and Science, 2021). This trend negatively impacts students and schools, as turnover is associated with lower test scores and decreased high school graduation rates, likely due to the presence of inexperienced teachers and disruptions in education (Ingersoll & Strong, 2013; Darling-Hammond, 2010). Furthermore, teacher attrition can lead to a shortage of qualified educators, resulting in negative impacts on education quality and workforce development, as well as increased inequality within the education system (Ingersoll & Strong, 2013; Darling-Hammond, 2010).

Teacher retention is of critical importance in education, as high turnover rates can negatively impact the overall quality of education. As Christopher Day suggests : *"Research on teacher retention tends to focus on factors affecting teachers' decision to leave the teaching profession. Instead, what is required is a better understanding of the factors that have enabled the majority of teachers to sustain their motivation, commitment and, therefore, effectiveness in the profession" (Day, 2008, p. 256).*

Research has shown that burnout is a significant factor in teacher attrition. Burnout is defined as a state of emotional, physical, and mental exhaustion caused by excessive and prolonged stress (Schaufeli & Buunk, 2003; Schaufeli, et al. 2009). High levels of burnout lead to lower job satisfaction, reduced effectiveness, and disengagement (Schaufeli & Buunk, 2003; Schaufeli, et al. 2009). Burnout is prevalent in many countries, including the United States, China, Australia, and England (Hong, 2010), and contributes to the teacher shortage in the Netherlands (Ministry of Education, Culture and Science, 2021).

2.1 A conceptual approach of teacher resilience

Burnout causes dissatisfaction and lack of motivation and has become an ever-present problem among teachers (Candeias et al., 2021). Therefore, academics have begun studying resilience as an intrapersonal attribute that can help teachers deal with workplace stressors and thrive in schools (Richards et al., 2016). Over the past twenty years, researchers have focused on teacher resilience to better understand career decision-making (e.g., Bobek, 2002; Brunetti, 2006; Gu & Day, 2007) and its influence on teachers' identity development (Kirk & Wall, 2010), quality of work life and motivation (Kitching et al., 2009), burnout levels (Howard & Johnson, 2004) and teaching productivity (Gu & Day, 2007).

The concept of resilience originates from the fields of psychiatry, psychology, and sociology. Resilience is a dynamic process of positive adaptation to conditions characterized by adversity or dangerous situations (Masten, 2001). It refers to an individual's ability to "well" adapt to challenges and return to a previous state (Benard, 2004). Resilience is a multidimensional construct that emerges from the interaction between risk and protective elements, not just a personal trait (Beltman et al., 2011). The multidimensional nature of resilience is crucial to the understanding its involvement in teachers' burnout.

Resilience in the teaching profession can be defined further as a cultivable practice influenced by a range of individual, relational, environmental, and organizational factors (Greenfield, 2015). While some scholars view resilience as an inherent personality trait (Brunetti, 2006), this perspective fails to acknowledge the systemic influences that shape resilience (Stones & Glazzard, 2020). According to Greenfield (2015, p. 58), teacher resilience is dependent on the beliefs that teachers have internalized about themselves and their job, which can either challenge or safeguard their resilience.

Research indicates that higher levels of resilience in teachers are associated with lower burnout rates (Richards et al., 2016), higher job satisfaction, and increased job commitment (Kitching et al., 2009). There is strong evidence linking teacher resilience to

motivation, engagement, and self-efficacy (Beltman et al., 2011; Liu & Chu, 2022; Peters & Pearce, 2012; Mansfield et al., 2016). For example, Howard and Johnson (2004) found that resilient teachers are less likely to experience stress and have a more positive perception of their work. Similarly, Gu and Day (2007) discovered that resilient teachers have better teaching productivity and are less likely to leave the profession.

The teaching profession is known to be challenging due to the high level of responsibilities and cognitive and psychological effort required to achieve them. Workplace stressors can exacerbate these challenges, leading to negative outcomes such as burnout, demotivation, turnover, and declining performance (Wang, 2021). However, resilience can help teachers to cope with these adversities and improve their satisfaction, motivation, and performance levels (Wang, 2021; Richards et al., 2016; Beltman et al., 2011; Doney, 2012). Vance et al. (2015) found that while teachers understand the theoretical framework of resilience in relation to personal life factors, they were not effectively applying this knowledge in their teaching practice. This suggests that while resilience is important for teachers, some may not be utilizing it in a way that would allow them to effectively manage workplace adversities and derive positive outcomes.

Therefore, it is crucial to identify the key protective and risk factors that impact primary and secondary teachers' resilience in order to improve their ability to remain in their current jobs.

2.2 Defining Protective and Risk Factors

In this systematic review, protective factors are defined as personal, organizational, or environmental attributes that help teachers cope with stressors and maintain their well-being (Hakanen et al., 2006, p. 674). On the other hand, risk factors refer to personal, organizational, or environmental attributes that increase teachers' vulnerability to stressors and negatively impact their well-being" (Hakanen et al., 2006, p. 674).

2.3 Research Aim and Objectives

This thesis aims to investigate the protective and risk factors that contribute to teacher resilience through a systematic literature review. The present study provides a comprehensive examination of teacher resilience highlighting gaps in literature and suggesting areas for future research.

The main research question of this thesis is : What are the key risks and protective factors for the resilience of primary and secondary school teachers? Two specific research sub-questions have been identified:

1.What are the main protective factors that strengthen the resilience of PSETs?

2.What are the main risk factors that weaken the resilience of PSETs?

3 Methodology

3.1 Literature search

A systematic review is conducted with specific search terms to cover three areas of interest: *teachers, resilience,* and *risks/protective factors of resilience*. The search engines used for the literature search were *Web of Science*, *ERIC*, *Ebscohost*, and *Scopus*. Various databases, including *Behavioural Sciences*, *ERIC*, *PsycINFO*, *Behavioural Science Collection*, *Sociology*, *Education & Educational Research*, *Psychology*, *Academic Search Premier*, *Communication & Mass Media Complete*, *Primary Search*, *Psychology Developmental and Social*, and others, were consulted. All databases available in each engine were purposefully chosen to ensure that all relevant data was identified. Only peer-reviewed journal articles written in English and published between 2015 and 2022 were systematically searched for.

First, a preliminary search was conducted through all databases to become acquainted with all features and decide which terms to use in order to be consistent and most relevant to my topic. The search string was created using Boolean operators. As long as Boolean search items are constrained by review questions and teacher resilience contains multiple search

terms, Boolean operators are an excellent way to connect disparate data to find exactly what is being searched for (see Table 1).

Table 1. *Search string*

Terms connected by OR	AND	Terms connected by OR	AND	Terms connected by OR
"Teachers" OR "Educators" OR "Primary School" OR "Elementary School" OR "Secondary School" OR "High School" OR "Secondary education" OR "Primary education"		"Resilien*"		"Risks" OR "Stressors" OR "Protective factors" OR "Coping factors" OR "Indicators" OR "Predictors"

3.2 Inclusion / Exclusion Criteria

The screening process involved two stages to identify relevant studies that examine risk and protective factors related to the resilience of PSETs, while also excluding studies that did not meet the established criteria (as outlined in Table 2).

Table 2. *Inclusion and Exclusion Criteria*

Inclusion Criteria	Exclusion Criteria
Quantitative and Qualitative primary research studies in peer-reviewed journals	Secondary research studies, individual opinions, news articles, editorials, guidelines, reports, dissertations, and studies making recommendations without any concrete evidence
Research studies referring to factors contributing to the resilience of teachers in primary and secondary education	Referring to factors contributing to the resilience of teachers in higher education, special education, vocational education, student resilience, pre-service teachers (less than 5 years' experience), youth adolescences, school principals, early years education, adult education, art teachers etc.
Research studies only in English language	Research studies in any other language except English
Research studies published in the last seven years (since 2015).[1]	Research studies published before 2015 and after 2022

[1]The 2015 cut-off point was chosen to include more recent studies that examine recent resilience factors, as a gap identified in the proposed research was the need to provide a more recent perspective on the research topic. Furthermore, due to the time constraints of this student research, I believe that a time frame of seven years is more feasible.

A total of 6,903 results were obtained from the four search engines, namely *Ebscohost* (2,098), *Scopus* (70), *Web of Science* (3,056), and *ERIC* (1,679). The results were exported to Endnote to identify and remove duplicates. A total of 611 duplicates were identified and removed. The remaining 6,292 results were imported into Rayyan software, which was recommended by UMCG librarians. Another 511 duplicates were identified and removed.

Out of 5,781 articles, 5,659 were excluded after title and abstract screening using Rayyan, leaving 116 for full-text screening, with the exception of 6 articles that were not available online. The remaining articles were screened based on the exclusion criteria outlined in Table 2. 88 articles were excluded for various reasons (refer to Figure 1), leaving 28 articles for inclusion in the study analysis. The systematic review ultimately included 28 finalized articles after a careful review and strict application of the inclusion and exclusion criteria (see Figure 1).

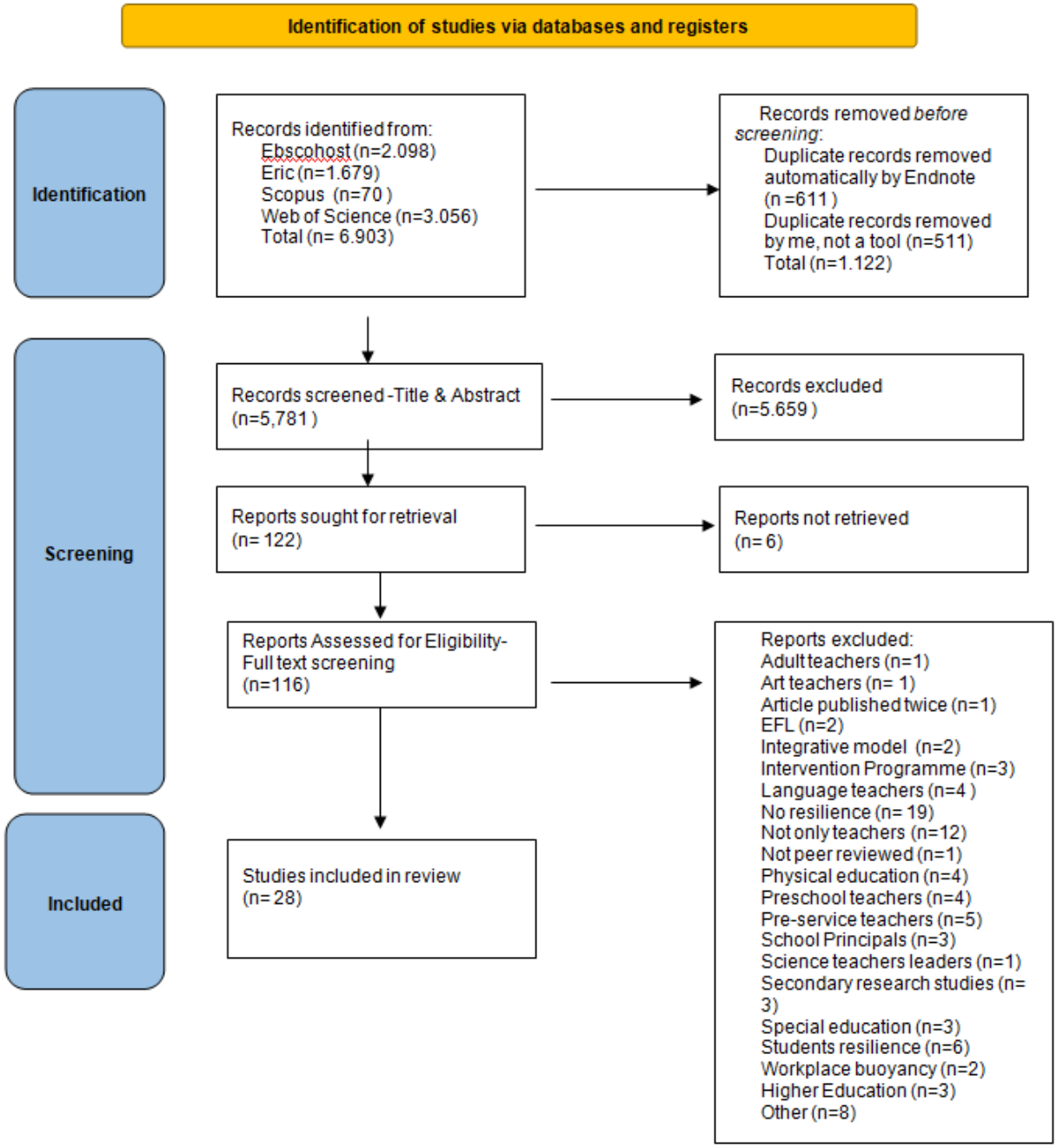

Figure 1: PRISMA Flow Diagram of study selection process

3.3 Analysis method

The quality of the 28 articles included in the systematic review examining the protective and risk factors of teacher resilience will be assessed using the GRADE (Grading of Recommendations Assessment, Development and Evaluation) tool (Schünemann et al., 2013). This tool is a widely accepted and well-established method for evaluating the quality of evidence and has been recommended by several organizations, including the Cochrane Collaboration, the World Health Organization, and the National Institute for Health and Care Excellence. The articles will be divided into low, medium, or high-quality categories based on various criteria such as the risk of bias, consistency of results, directness of evidence, and precision of effect estimates. Firstly, we will assess the risk of bias of each study, considering factors such as study design, randomization, blinding, and completeness of outcome data. Studies with a low risk of bias will be assigned a higher quality rating. Next, we will consider the consistency of the results across studies. A higher quality rating will be assigned to studies with consistent results across a range of different populations, interventions, and outcomes. The directness of the evidence will also be considered. Studies that directly examine the protective and risk factors of teacher resilience will be rated higher in quality than those that only indirectly address the topic. Finally, the precision of the estimates of effect will also be considered. Studies with larger sample sizes and narrower confidence intervals will be rated higher in quality than those with smaller sample sizes and wider confidence intervals.

To extract data from the 28 articles, the study characteristics such as details, publication year, and country of origin were recorded, followed by the participant characteristics, data collection methods, study focus, resilience measurement tool, and resilience conceptualization. Data were analyzed and overarching themes identified using Braun and Clarke's (2006) method of thematic analysis, with a focus on identifying both risk and protective factors of teacher resilience. Data extracts were organized into two tables, one

for studies prior to the pandemic and the other for studies conducted during the pandemic, to compare and analyze patterns in teacher resilience and to determine if any changes existed. The aim was to evaluate if the risk and protective factors were different during the pandemic compared to other periods.

4 Results

4.1 The GRADE system results

According to the GRADE system, most of the studies (22 out of the 28 articles) received high and medium quality ratings. Out of the 22 articles, 14 were rated as high quality, while 8 were rated as medium quality. However, the remaining six were considered low quality due to their scores in certain dimensions, such as a serious risk of bias. Despite this, the low-quality studies were not excluded from the systematic review, as the aim of the quality appraisal was to inform readers about the quality and relevance of each study rather than to determine their eligibility for inclusion. The quality assessment results are presented in Appendix 1.

4.2 Analysis of results

The analysis process began by dividing the selected papers into those published before and after the pandemic, and creating a summary table for each paper. The table included information such as the study and country, participant characteristics, data collection method, focus of the study, resilience measurement tool, and conceptualization of resilience, themes identified, and main findings. The identified factors were categorized as either challenges (risk factors) or support (protective factors). See Tables 4 and 5.

Table 4: Summary of main characteristics of included studies pre-pandemic

Study Country	Participant characteristics	Method of data collection	Focus of study	Resilience measurement tool	Resilience conceptualized	Theme identified	Main findings
Arnup et.al. (2016) Australia	Primary & secondary teachers (n=160)	Quantitative: Online survey TJSQ	Predictors of Intention to leave teaching: Resilience, Job satisfaction, Demographic factors	RSA: 33-items Measures: Personal Strength Social competence Structured style Family cohesion Social resources	Ability to successfully coping with adversity through utilizing personal and/or external resources.	Risk factors: Resilience Intention to leave Protective factors: Job satisfaction Demographic variables	Resilience is related to teachers' intentions to leave Teachers with lower levels of resilience have higher intention to leave Lower resilience & job satisfaction are strong predictors of intention to leave Income satisfaction does not support teacher's desire to leave
Richards et.al.(2016) United States	Total: 415 Elementary School Teachers (n=174) Secondary School Teachers (n=241) 71% Female	Quantitative Survey: 66-items (25-items on demographic questionnaire) TRSS: 9 items MBI-ES: 22 items	Impact of resilience on: Role stressors: role conflict, role ambiguity role overload Burnout	CD-RISC: 10 items		Risk factors: Role stressors Burnout Restrictive environment Protective factor: Supportive climate Job satisfaction Peer interactions (School connectedness)	Resilience is strongly associated with burnout: Low burnout improved resilience, time management & organizational skills and work-life balance Resilience is positive correlated with organizational commitment& climate and job satisfaction Lowest resilience was in secondary school teacher Gender or age& teaching experience had no significant impact on resilience levels Supportive environment & interaction with peers promoted low burnout Restrictive environments & lack of community promoted high burnout
Polat et.al. (2018) Turkey	Total: 581 Kindergarten teachers (n=234) Elementary	Quantitative survey: 84-items (4-items on personal	The relationship of teachers' resilience levels with burnout, job	RSA: 33 items	The ability to withstand adversity through personal and	Risk factors: Resilience Burnout Restrictive	Significant negative relationship between teachers' resilience levels and burnout Significant positive relationship between teachers' resilience and organizational

	school teachers (n=156) Secondary school teachers (n=162)	information form) JSS: 14 items BM-SV: 10 items OCST: 17 items OCDQ: 39 items	satisfaction, perception of organizational climate and organizational commitment.		external factors	environment Protective factors: Job satisfaction Organizational commitment	commitment Significant positive relationship between teachers' resilience levels and job satisfaction Significant positive relationship between teachers' resilience and perception of organizational climate Teachers' resilience level working at high schools differ significantly from those working at secondary schools.
Richards et al. (2018) United States	Total: 28 Male (n=11) Female (n=17)	Quantitative: 7-point Likert Scale Qualitative: Semi-structured interview	Gain understanding of how low and high burnout teachers experience teaching	MBI-ES: 7-Point Likert scale	Resilience is perceived as positive adaptation regardless of diversity or ability to recover and bounce back from stressful situations.	Risk factors: Resilience Burnout Role stress Protective factors: Nurturing teaching environment Optimal teaching environment	Low-burnout teachers perceived nurturing teaching environment High-burnout teachers perceived constraining and combative teaching environment All teachers must manage workplace stress Optimal working environment affects teacher burnout
Schussler et al. (2018) United States	Total: 21 Elementary school teachers	Qualitative	Impact of a mindfulness-based intervention, on the stress levels and resilience of school teachers, and to understand the changes in stress and resilience related to this intervention.	CARE	Ability of the teachers to exercise mindful awareness and tolerate distress	Risk factors: Resilience Stress Protective factors: Healthy distress tolerance Mindful awareness Self-care practices	The way teachers cope with stress is more significant than the amount of stress they experience Teachers with resilience strategies, such as mindfulness were able to respond more positively to their students
Maksimović&Osmanović (2019) Serbia	Total: 442	Quantitative:	The relationship between teachers' perceptions of burnout and various factors such as work experience, pay satisfaction &job-related	TELTS	Ability to cope with adversity through internal and external factors	Risk factors: Burnout Protective factors: Pay satisfaction Work experience Job-related satisfaction	Teachers' perceptions of burnout were related to their work experience and pay satisfaction Teachers' self-satisfaction and job-related satisfaction were dependent on their work experience and pay satisfaction Work experience and pay satisfaction did not significantly influence teachers' evaluations of

			satisfaction				their efficiency, skills and personal worth, but did affect their willingness to change and take initiative in their teaching
Akin (2019) Turkey	Total: 490 Male (n=241) Female (n=249)	Quantitative: MBI scale Qualitative: Semi-structured	To examine the relationship between teachers' burnout and various demographic factors.	MBI: 22 items	Ability to overcome adversity based on gender, task type and marital status.	Risk factors: Burnout Emotional exhaustion Reduced personal accomplishment Depersonalization Protective factors: Type o school Marital status Job role Gender	Perceptions of the sub-dimensions of burnout to gender variable are negative Sometimes teachers and managers have more burnout then the other. Perception of burnout differed based on marital status Participants' perception of burnout differed according to school type Perception of burnout differed based on whether they have children or not.
García&Gambarte (2019) Spain	Total: 334 Primary school teachers Women (n=188) Men (n=146)	Quantitative: MBI-GS: 15 items CD-RISC: 25 Items	Determine the relationship between perceptions of burnout levels and resilience of primary school teachers	CD-RISC	Ability to develop better mental health conditions and overcome adversity	Risk factors: Resilience Burnout Protective factors: Personal competence Tenacity Tolerance to negative effects Spiritual influence Positive acceptance of change	Women have greater resilience levels than men Resilient teachers can handle difficult situation without feeling burnout Resilience reduce vulnerability to burnout

Abbreviations: RSA: Resilience Scale for Adults; CD-RISC: Connor-Davidson Resilience Scale; MBI-ES: Maslach Burnout Inventory-Educators Survey; TISQ: Teacher Job Satisfaction Questionnaire; TRSS: Teacher Role Stressors Survey; RSA: Resilience scale for adults; JSS: Jobs Satisfaction Scale; BM-SV: Burnout Measure Short Version; OCST: Organizational Commitment Scale for Teachers; OCDQ; Organizational Climate Description Questionnaire; MBI-ES: Maslach Burnout Inventory- Educators Survey; CARE: Cultivating Awareness and Resilience; TELTS: Emotional Labour of Teaching Scale;

Table 5. Summary of main characteristics of included studies during pandemic

Study Country	Participant character-istics	Method of data collection	Focus of study	Resilience measurement tool	Resilience conceptualized	Theme identified	Main findings
Baker et al. (2021) United States	Total: 454 (Public school) 81% Females	Quantitative & Qualitative	Mental health Coping abilities Teaching performance Race disparities	EPII: 24-items (18 stressors & 6 protective factors)	Ability to develop coping strategies for stressful conditions	Risk factors: Stressors -Increased workload -Emotional distress -Transition to home teaching -Separation from family -Acute awareness of student stressors -Lack of engagement with activities Protective factors: -Student connectedness -Peer support -Family support -Availability of technology resources	Seven stressors & four protective factors were reported Stressors correlated with worse mental health Protective factors correlated with improved coping & mental health Black teachers reported improved mental health, more protective factors and less stressors compared to White teachers Barrier: lack of connection and difficulties with online teaching Facilitator: support from peers & management
Walter et al. (2021) United States	Total: 49 Primary school teachers	Qualitative & Qualitative	Individual and contextual factors hindering well being Ways of alleviating job-related stress and enhancing wellbeing		Ability to adapt and thrive regardless of the adversity	Risk factors: Lack of boundaries Low self-efficacy Disconnection from purpose Decline in emotional and physical wellbeing Uncertainty Lack of autonomy Unrealistic expectations Protective factors: Self-care Wellbeing disposition Support from others	At the individual level, wellbeing can be improved through self-care, wellbeing disposition and support from others. At the contextual level, promoting well-being can involve empathetic leadership, a supportive team, and increased resources for teachers.
Candeias et al (2021) Portugal	Total: 7528 Regular teachers (n=7085) Specialist (n=442)	Quantitative	Burnout levels Stress levels Impact of personal variables	MBI: 22 items	The ability to cope with stress and lower vulnerability to stress	Risk factors: Burnout Vulnerability to stress Protective factors: Professional experience	Non-specialist teachers have higher levels burnout than specialist teachers High levels of burnout correlate with vulnerability to stress in both group of teachers Teachers with higher level of training were less

						Age Academic degree Specialization Training	vulnerable to stress Vulnerability to stress play a significant role as predictor of burnout for group of teachers.
Herman et al. (2021) United States	Total: 639 Teachers Female (79%) Male (21%) White (87%) Latino (3%) Black (7%)	Quantitative	Wellbeing before and after Covid-19 Student attendance/engagement Predictors of stress and wellbeing	Not specified	Ability to cope with stress and improve wellbeing	Risk factors: Stress Protective factors: Improved coping Wellbeing Supportive principal Job satisfaction Good school environment	Teachers lower levels of work-related stress after the pandemic onset compared to pre-pandemic levels Predictor of teachers wellbeing included their confidence to manage student behaviors.
Mulaudzi et al. (2021) South Africa	Total: 6 Teachers	Qualitative	Coping strategies of stressed teachers Effectiveness of the strategies in improving teaching performance	Not Specified	Ability to withstand, adapt, recover and flourish during adversity	Risk factors: Stress Lack of resources Poor infrastructure Protective factors: Personal resilience Problem-focused Avoidance	Teachers in rural secondary schools used personal resilience, avoidance and problem-focused stress as coping strategies for dealing with stress Effective teacher stress management do not automatically lead to better performance Stressful nature of teaching should be communicated to prospective teachers
Fitchett et al. (2021) United States	Total: 180 secondary school teacher	Quantitative	Connection between occupational commitment and teachers' perception of classroom control, out of field teaching, stress risk and workplace fatigue. The extent to which the factors are associated with each other	Not specified	Ability to cope with stress based on appraisal of workplace environment	Risk factors: Risk of stress Workplace fatigue Protective factors: Occupational commitment Job satisfaction Occupational health Classroom control	Teachers who perceived greater classroom control were less vulnerable to stress and other vocational concerns Teachers working out of their subject area were susceptible to workplace fatigue Secondary schools with high concentration of stress-vulnerable teachers were linked to high levels of workplace fatigue and lower levels of occupational commitment
Kamboj et al. (2021) India	Total: 200 teachers from private and public schools Female (61.5%) Male (38.5%)	Quantitative: RPWS WYRS SSEIT	Emotional intelligence Resilience Psychological wellbeing	WYRS: 16 items using 7-point scale	Character trait of an individual to fight back when facing trauma and adversities while maintaining healthy	Risk factors: Resilience Protective factors: Perseverance Psychological wellbeing Acceptance of own limitation and abilities Emotional intelligence	Perseverance significantly mediate and predict psychological wellbeing Self-reliance significantly mediate the relationship between emotional intelligence and wellbeing of teachers Female school teachers have higher emotional intelligence and resilience compared to male

					functioning		school teachers.
Hascher et al. (2021) Switzerland	Total: 21 Primary school teacher Women (19) Men (2)	Qualitative	Impact of pandemic on primary school teachers Wellbeing Challenges and resources affecting wellbeing	Not specified	Personal resource for coping with adversities	Risk factors: Lack of resources Changes in teaching profession Increased stress Lack of self-efficacy Protective factors: Positive experience Feeling competent Job satisfaction Stress coping strategies Positive attitude Support from colleagues and leadership Emotional stability Self-care	Social distancing, high workload, feeling of lack of self-efficacy and competence were associated with deteriorating wellbeing Factors such as collegial support or leadership support, school resources, clear work structure, coping strategies and resilience were associated improved wellbeing Teachers' wellbeing were nourished with positive experience given the new form of distance teaching and feelings of professional mastery
Phillips, R. (2021) Austria	Total: 16 teachers	Qualitative	Teachers' resilience Personal faith Wellbeing	Not specified	The capacity to adjust to adversity	Risk factors: Resilience Protective factors: Self-esteem Self-efficacy Christian virtues or faith	Religious interpretations shielded teachers from threats during distress Christian coping strategies help teachers develop resilience Teachers may use personal faith to cope with conflicts and view teaching as a way to grow in Christian virtues
Baker et al. (2021 United States	Total: 454 Teachers from public schools Female (81%) Male (19%)	Quantitative & Qualitative	Teachers' stressors Mental health Coping abilities Teaching performance	EPII	The ability to cope with stressful situations	Risk factors: Increase workload Medical treatment Separated from family Emotional distress Death within families Hard times Protective factors : Quality time Finding greater meaning Appreciative Attention to personal health Volunteering Connection made with supportive people	Teachers experiencing mores stressors had worse mental health and found it hard to teach and cope Experiencing more protective factors are linked with easier coping and teaching Black teachers reported better mental health, less negative impact of stressors, more protective factors and more positive impact of protective factors than white teachers
Ozoemena et al.	Total: 235 Teachers	Quantitative	Coping strategies Managing stress	MBI-GS: 12 items	The capacity to develop	Risk factors: Psychological distress	Significant number of teachers experienced burnout and psychological distress leading to

(2021) Nigeria			Factors associated with psychological burnout and distress		psychological strength for dealing with distress	Burnout Poor school climate Excessive workloads Lack of instructional resources Lack of support Exposure to adverse events Protective factors: Problem-focused coping strategies Monthly income Marital status Academic qualification	severe mental symptoms The risk factors or challenges contributed to distress Majority of the teachers used dysfunctional coping strategies Factors such as age, marital status, monthly income affected psychological distress High income teachers experienced more burnout but had increased personal accomplishment scores than low income teachers
Werang et al. (2021) Indonesia	Total: 157 Catholic primary school teacher	Quantitative	Emotional Exhaustion Organizational commitment	Not specified	The mental capacity to cope with adversity and stressful events	Risk factors: Emotional exhaustion Burnout Protective factors: Organizational commitment	Significant negative correlation between emotional exhaustion and organizational commitment Teachers with more mental drain are less committed Teachers experiencing less mental drain are more committed to the organization
Lacomba-Trejo et al. (2022) Chile	Total: 614 Teachers Female (94.6%) Male (5.4%)	Quantitative	Risk and protective factors for depression, stress and anxiety	DASS-21	Ability to cope with stress during adversities	Risk factors: Emotional symptoms Lower life satisfaction Less resilience Protective factors: Emotional balance Resilience	Teachers with prior health issues experienced lower life satisfaction, emotional symptoms, less resilience compared to those without health issues Female teachers experienced low resilience and higher levels of anxiety than male teachers Teachers in secondary and elementary experienced more stress and anxiety than high school teachers Teachers with better resilience and emotional balance reported fewer mental health issues
López-Angulo et al. (2022) Chile	Total: 1329 teachers Men (n=269) Women (n=1060)	Quantitative	Teachers' resilience Emotional intelligence Gender and teaching capacity	WLEIS: 16 item s	As a protective factors for stress in teachers	Risk factors: Obstacles Challenges Protective factors: Emotional intelligence	Positive, significant and high relationship between emotional intelligence Great disparity in both emotional intelligence and emotional regulation with regards to specialty and sex

						Resilience Teaching capacity Gender	
Heffernan et al. (2022) Australia	Total: 2444 Primary and secondary school teacher	Quantitative and Qualitative	Teachers' reasons for leaving the profession Factors and strategies that can be used by teachers to overcome challenges and remain in the profession	Not specified	Ability to cope and thrive in challenging situations	Risk factors: Heavy workload Status of profession Health concern Wellbeing concern Protective factors: Meaningful reductions in workload Raising status of profession	Majority of the teachers expresses intention to leave profession due to factors such as excess workload that affected their health and wellbeing Solutions such as providing more autonomy and reducing workload and increasing recognition of the profession could reduce intention to leave.
Carroll et al. (2022) Australia	Total: 749 teachers Female (n=625) Male (n=124)	Quantitative	Predictors of burnout and tress in Australian teachers Importance of workload, emotional regulation and subjective wellbeing	PSS: 10 items CBI: 6 items	Individual capacity to deal with stress and thrive	Risk factors: Stress Burnout Workload Protective factors: Subjective Wellbeing Emotional regulation	Majority of the teachers reported being extremely stress and considered leaving the profession Workload, emotional regulation and subjective wellbeing are in important in developing teachers' stress and burnout
Keim et al. (2022) Italy	Total: 3251 teachers	Quantitative	Emotional distress among teachers during pandemic Factors contributing to emotional distress	BRCS: 4 items	Ability to deal with distress during difficult times	Risk factors: Emotional distress Mistrust Pandemic anxiety Coping style Chronic disease Protective factors: Resilience Team atmosphere	Teachers experienced a higher level of emotional distress, such as depression, anxiety, and stress, during the pandemic compared to the general population Factors such as life satisfaction, resilience, and team atmosphere were negatively related to the emotional distress experienced by teachers General coping styles did not have a significant impact on emotional distress during the pandemic
Padmanabhanunni et al. (2022) South Africa	Total: 355 Primary school teacher Women (76.6%) Men (23.4%)	Quantitative	Teacher resilience as a personal resource in preventing teacher burnout Relationship between fear of COVID-19 and burnout	MBI: 22 items	The mental capacity to cope with adversity and stressful events	Risk factors: Burnout Lack of resources Emotional exhaustion Depersonalization Lack of support Low salaries Lack of time with family Protective factors: Resilience Personal accomplishment	Higher levels of fear of COVID-19 were related to increased emotional exhaustion and depersonalization Factors such as feeling pressured or uncomfortable in the workplace, lack of support from administrators, low salaries, lack of time with family, and feelings of guilt and self-reproach were found to contribute to vulnerability to depersonalization Resilience fully mediates the relationship

							between fear of COVID-19 and personal accomplishment, but only partially mediates the relationship between fear of COVID-19 and emotional exhaustion and depersonalization
Baguri et al. (2022) Malaysia	Total: 248 secondary school teacher Female (77%) Men (23%)	Quantitative	Self-esteem Dispositional hope Teacher resilience Crisis self-efficacy and gender differences	BRCS: 6 items	The ability to adapt to extreme conditions and thrive	Risk factors: Protective factors: Self-esteem Dispositional Hope Resilience Mattering Gender Differences Crisis Self-efficacy	To improve the resilience of teachers during the COVID-19 pandemic, it is necessary to focus on enhancing their self-esteem, hope, and sense of mattering Crisis self-efficacy plays a influencing role in the teacher resilience Significant role of gender in teacher resilience, with male teachers having higher levels of dispositional hope and female teachers having higher levels of self-esteem
Oldfield &Ainsworth(2022) United Kingdom	Total: 28 primary and secondary teacher	Qualitative	Find factors that impact a teacher's resilience, and how they interact with one another How individual and environmental factors influence a teacher's ability to adapt and cope	Not specified	The capacity to adapt to extreme and stressful conditions	Risk factors: Diminished morale Workload Exosystemic factors Protective factors: Resilience Support from management School culture Nurturing relationships Self-esteem	Exosystemic factors have a major impact on the resilience process of teachers, often mediated through an increase in workload and diminished morale Support from management was a key protective factor for teachers, with positive effects on resilience mediated through positive impacts on school culture, the nurturing of relationships within school, and self-esteem
Falk et al. (2022) South Africa	Total: 42 Teachers	Qualitative	Impact of conflict and forced displacement on the well-being and role fulfillment of teachers	Not specified	Ability of an individual to deal with adversities while maintaining healthy functioning	Risk factors: Conflict Displacement Low self-efficacy Difficulty in fulfilling roles Frustration Stress Protective factors: Wellbeing	When teachers are working in settings affected by conflict and displacement, they experience difficulty in fulfilling their roles and this leads to low levels of self-efficacy, resulting in negative emotions such as frustration, stress, and sadness, which negatively impact their well-being.

Abbreviations. EPII: Epidemic–Pandemic Impacts Inventory; SSEIT: Schutte self-report emotional intelligence test; RPWS: Ryff's psychological well-being Scale; WYRS: Wagnild and Young resilience scale; DASS-21: Depression Anxiety and Stress Scale 21; WLEIS: Wong Law Emotional Intelligence Scale; CBI: Copenhagen Burnout Inventory; PSS: Perceived Stress Scale; BRCS: Brief Resilient Coping Scale

4.3 General characteristics

The review covers studies from around the world (see Figure 2) with most conducted in 2021 (Figure 3). Ten of the 28 studies focused on teacher resilience during COVID-19. Quantitative research was used in the majority of the studies (18), while two used both quantitative and qualitative methods, and eight used qualitative methods, often employing semi-structured interviews. Lastly, the diagram (Figure 4) represents clusters of risk factors and protective factors identified in the studies. The figure also indicates how many studies refer to each cluster.

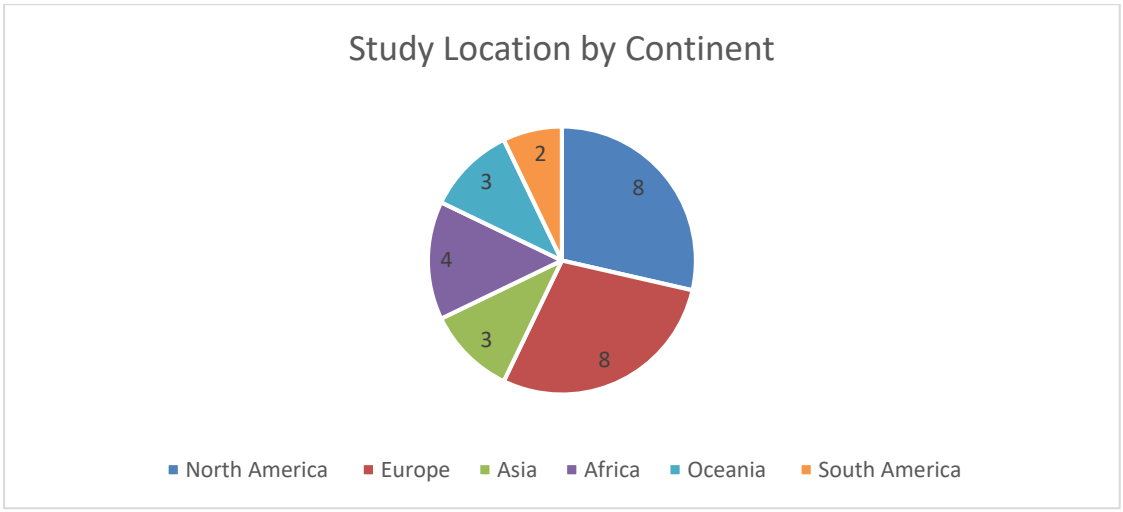

Figure 2: Pie chart representing study locations by continent

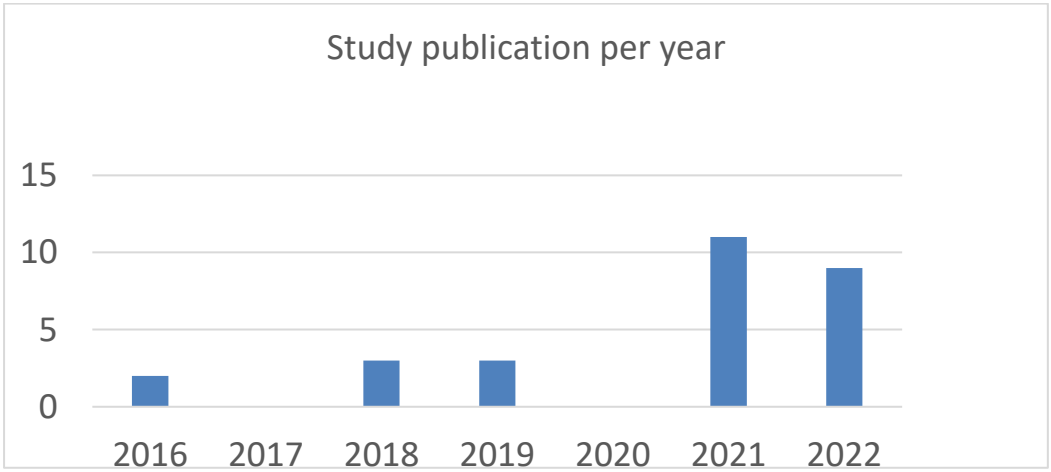

Figure 3: Chart presenting most frequently study publication per year.

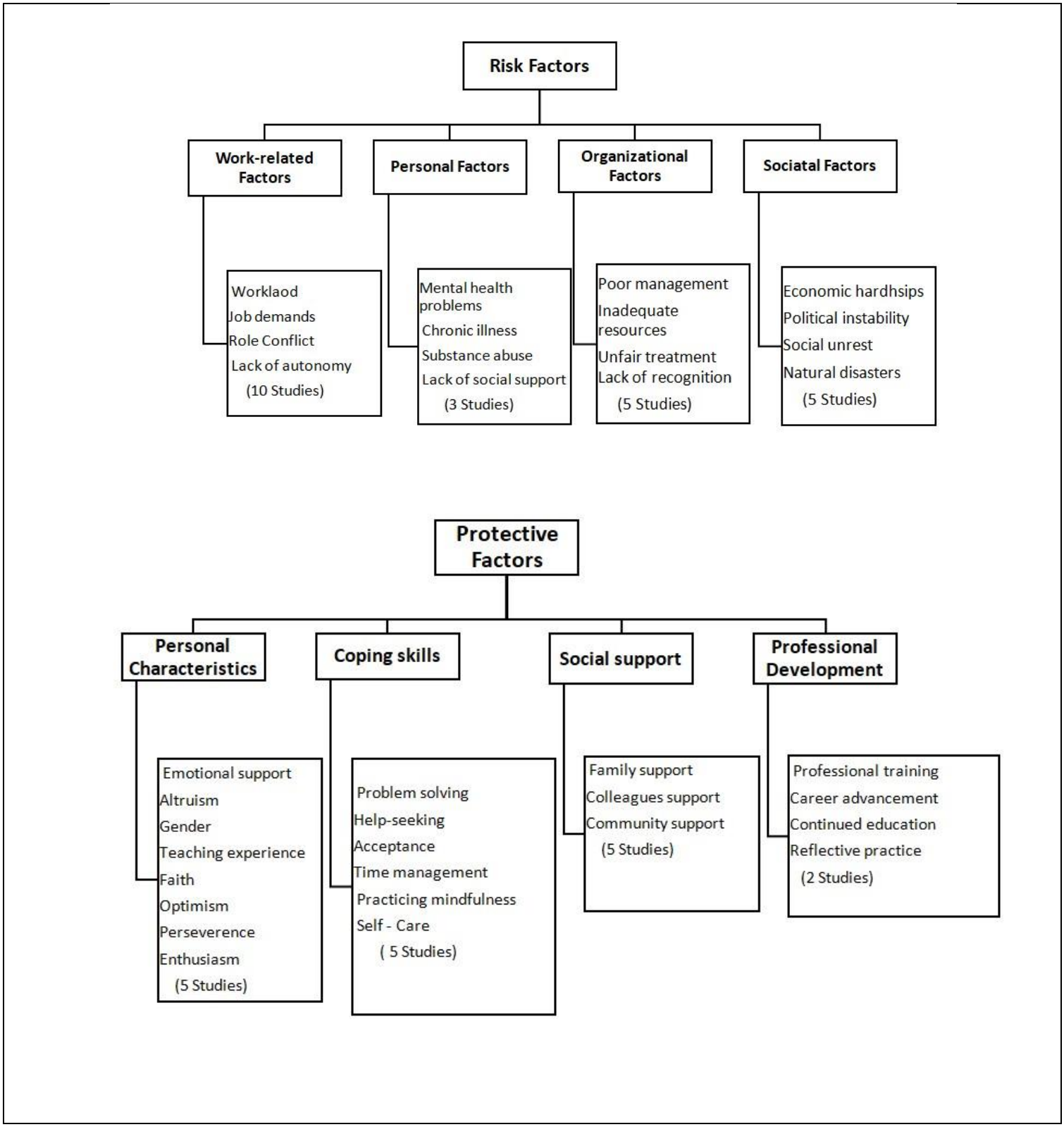

Figure 4. Risk and protective factors adopted from the articles

4.4 Protective factors that strengthen the resilience of PSETs

4.4.1 Personal attributes and PSETs resilience

Five studies have revealed that personal attributes such as altruism, emotional intelligence, faith, optimism, perseverance, and enthusiasm strengthen resilience among PSETs. For instance, Herman et al. (2021) study found that self-reported confidence in managing student behavior and "contextual leadership" were significant positive predictors of teachers' job satisfaction and positive well-being. Another study by Maksimović and Osmanović (2019) found that experienced teachers who have a positive self-concept and are satisfied with their job and pay tend to exhibit higher levels of resilience.

The findings also revealed that gender plays a significant role in PSETs' resilience. For instance, García & Gambarte (2019) discovered women generally exhibiting higher levels of resilience compared to men. Kamboj et al. (2021) supports this finding and revealed that female teachers have higher resilience levels than male teachers. This could be due to cultural norms in India that emphasize these qualities in women, as female teachers tend to have higher levels of emotional intelligence and resilience than male teachers.

The role of faith in PSETs resilience was demonstrated in Phillips' (2021) study, which found that teachers' faith and identity processes can contribute to their resilience. Identity processes refer to the psychological processes that individuals undergo in order to develop, maintain, and modify their sense of self. These processes can include exploring and integrating personal experiences, forming and maintaining meaningful relationships, and defining one's values, beliefs, and goals. In the context of Phillips' (2021) study, identity processes that contribute to teachers' resilience may include their ability to maintain a strong sense of self and purpose in their teaching role, even in the face of stress and burnout risk factors. These processes may involve developing a positive self-image, building a supportive network of colleagues and family members, and finding meaning and fulfilment in their work.

Additionally, Kamboj et al. (2021) found that the main protective factors of resilience among teachers from private and public schools in India are emotional intelligence and empathy. The findings also revealed that emotional intelligence has a direct impact on psychological well-being, with teachers who have good psychological well-being being better equipped to create positive interactions and relationships with their students, effectively manage their classrooms, and guide students towards their academic goals. The study also found that perseverance is a significant factor in mediating the relationship between resilient traits and psychological well-being among teachers (Kamboj et al. 2021).

4.4.2 Coping skills and PSETs resilience

Findings from four studies suggest that coping skills such as help-seeking, problem-solving, time management, and acceptance can strengthen resilience. For instance, Schussler et al. (2018) research found that practicing mindfulness, utilizing healthy stress management strategies, possessing a strong sense of efficacy, participating in self-care activities, and consistently employing emotional regulation techniques can help maintain resilience.

Similarly, Oldfield & Ainsworth (2022) found that self-care activities such as yoga and physical activities can enhance teacher's resilience by promoting autonomy and competence. The authors suggest that engaging in yoga can help improve mindfulness, reduce stress and anxiety, and promote a sense of control over one's thoughts and emotions, all important attributes of autonomy and competence.

However, the study by Kamboj et al. (2021) established that teachers who have a high acceptance of their own abilities and limitations may have lower levels of well-being, despite high levels of emotional intelligence, due to the demanding nature of teaching as a profession.

Mulaudzi et al. (2021) investigated the coping strategies adopted by stressed teachers in rural secondary schools in South Africa and found that stress coping strategies primarily comprised avoidance strategies, personal resilience, and problem-focused coping strategies.

However, the study found that the utilization of these strategies did not significantly enhance teaching performance, due to factors such as a lack of resources, high student absenteeism, poor infrastructure, and poverty. The authors recommended that prospective teachers be made aware of the high stress levels associated with teaching and that rural teachers be trained to utilize stress coping strategies as protective factors for resilience, to enhance their personal resources and improve their effectiveness in the teaching profession.

4.4.3 Social support and PSETs resilience

The findings from five studies have demonstrated the importance of social support factors, such as family, community, and colleagues, in promoting teacher resilience. For example, Schussler et al. (2018) found that social networks provide a protective factor for PSETs resilience. Similarly, Arnup and Bowles (2016) support that a sense of belonging and connectedness to the school community promotes resilience among primary and secondary school teachers, and Oldfield and Ainsworth (2021) emphasized the importance of interactions between individuals and their social ecologies in promoting resilience. Maksimović and Osmanović (2019) found that experienced teachers who recognize the importance of teamwork and cooperation exhibit higher levels of resilience.

In contrast, the study by Richards et al. (2018) revealed an inverse relationship between teacher resilience and burnout, and a positive correlation between teacher resilience and job satisfaction, organizational commitment, and perceived organizational climate. The study found that supportive work environments and positive relationships with colleagues can augment teacher resilience, whereas restrictive work environments and a lack of community can contribute to burnout. The study also highlighted the importance of promoting teacher resilience through the creation of supportive work environments and fostering collaboration among teachers and stakeholders, as this can decrease the risk of burnout and improve job satisfaction. Additionally, the study found that teachers working in supportive environments

exhibit better coping mechanisms and improved well-being, which, in turn, improve their resilience.

Overall, the findings suggest that promoting resilience among PSETs requires a multi-faceted approach that involves addressing individual factors, such as coping skills and identity processes, as well as social and organizational factors, such as social support, work environment, and collaborative relationships.

4.4.4 Professional development and PSETs resilience

The findings from two studies have also shown that professional development factors, such as career advancement, professional training, continuing education, and reflective practice, strengthen PSETs' resilience. For instance, Candeias et al. (2021) found that vulnerability to stress is one of the key factors that weakens teachers' resilience. However, the results of the study suggest that a training program in stress management for teachers, based on an analysis of their specific needs, could help teachers improve their coping skills and increase their resilience. This could lead to improved well-being, physical and mental health, and professional performance, particularly in the context of working with students with disabilities in inclusive schools. Overall, the study highlights the importance of addressing the factors that weaken teachers' resilience in order to support their well-being and professional performance.

Similarly, the study findings by Richards et al. (2018) provide evidence of the significance of teacher resilience in the field of education. The results of this study reveal a positive relationship between resilience, job satisfaction, organizational commitment, and perception of organizational climate derived from practices such as professional training, career advancement opportunities, and good pay. In other words, the study suggests that providing supportive work environments and opportunities for professional growth can help to promote the resilience of teachers, leading to increased job satisfaction, commitment to their organization, and a more positive perception of the overall organizational climate.

4.5 Risk factors that weaken the resilience PSETs

4.5.1 Work-related factors and PSETs resilience

Work-related factors such as workload, job demands, role conflict, and lack of autonomy were found to be negatively associated with PSETs' resilience. For example, Arnup et al. (2016) study revealed that multiple factors, referred to as risk factors, can contribute to burnout or a decrease in resilience among teachers. The classroom environment plays a crucial role in a teacher's risk for burnout. When a teacher perceives a chaotic or subjugated atmosphere within the classroom or administration, it increases the likelihood of burnout. Falk et al. (2022) findings support that negative emotions such as frustration, stress, and sadness arising from difficulties in carrying out their duties can weaken teacher resilience.

Walter et al. (2021) findings identified individual barriers to well-being such as a lack of boundaries and disconnection from purpose, and contextual barriers such as uncertainty and limited teacher input as factors weakening the resilience of PSETs. The study of Heffernan et al. (2022) also identified various factors that can weaken teacher's resilience, and one of the main factors is the heavy workload and emotional stress of managing difficult student behaviour. These factors can be a significant source of stress for teachers, leading to burnout and a lack of motivation to continue in the profession.

Furthermore, the study findings revealed that a lack of autonomy in decision making, limited opportunities for professional growth, and negative perceptions of the teaching profession can also contribute to a lack of resilience among teachers. Feeling of low status and lack of respect from the community can also contribute to a lack of motivation to continue in the profession. Finally, a sense of isolation from the teaching profession and lack of clarity and certainty in career progression and advancement opportunities are also factors that can weaken teacher's resilience (Heffernan et al., 2022).

Candeias et al. (2021) study found that vulnerability to stress is one of the key factors that weakens teachers' resilience. This means that if teachers are more susceptible to stress,

they are likely to have lower levels of resilience. The study also found that lack of social support, dramatization, perfectionism, adverse living conditions, and subjugation are other factors that contribute to a teacher's vulnerability to stress and weaken their resilience. In addition, while professional experience, age, and academic degree have a positive impact on burnout, a higher level of burnout is associated with greater vulnerability to stress. This highlights the importance of addressing burnout and providing support for teachers to strengthen their resilience and prevent burnout.

The study by Fitchett et al. (2021) established that several factors can negatively impact teacher resilience, including a lack of control in the classroom, teaching subjects outside of their area of expertise, high levels of stress in both individuals and the school environment, poor job satisfaction and occupational health issues, and workplace fatigue. In other words, certain work-related conditions and experiences can weaken the resilience of teachers, making it harder for them to cope with stress and other challenges in the workplace. These factors can have a significant impact on teachers' occupational commitment and overall well-being. The study highlights the need for school administration to prioritize supporting teacher autonomy and creating a healthy and supportive working environment. This includes taking an "upstream approach" that addresses school-wide stress levels and challenges and promotes the health and well-being of teachers. The study emphasizes the need to consider the interconnectedness of these risk factors and the importance of addressing them collectively to support teacher resilience.

In agreement with the above findings, Ozoemena et al. (2021) added that risk factors that weaken teacher's resilience include excessive workloads and lack of knowledge on handling students' misbehaviour. According to the findings, these factors were found to contribute to psychological distress and burnout.

4.5.2 Personal factors and PSETs resilience

Findings from three studies showed that personal factors like chronic illness, mental health issues, substance abuse, and lack of social support negatively impact PSERs' resilience. This is evident in the study of Heffernan et al. (2022), which found that mental health concerns are among the factors that weaken PSETs' resilience. This is because mental illness can be a significant source of stress for teachers and can lead to burnout and a lack of motivation to continue in the profession. This study further revealed that teachers often report a lack of support from colleagues and school leaders, which can further exacerbate feelings of stress and isolation and hence weaken their resilience.

Another study by Werang et al. (2021) found that emotional exhaustion is a significant risk factor that can weaken teachers' resilience. The research revealed that when teachers experience high levels of emotional exhaustion, it negatively impacts their commitment to their teaching role. Ozoemena et al. (2021) study findings add the risk factors that weaken teachers' resilience, including lack of administrative and parental support and inability to meet students' learning and social needs. These factors were found to contribute to psychological distress and burnout among Nigerian primary school teachers.

4.5.3 Organizational factors and teachers resilience

Organizational factors such as poor management, inadequate resources, unfair treatment, and lack of recognition have been found to hinder teachers' resilience. These are exemplified in Hascher et al. (2021) study, which found that objective factors such as lack of resources and changes in the teaching profession negatively impacted primary teacher well-being, as well as subjective factors such as increased stress and lack of self-efficacy. Covering poor management factor, Arnup et al. (2016) study found that a lack of support from the administration or a chaotic administration can also increase the risk of burnout. This can lead to feelings of apathy and disengagement from responsibilities, and a frequent perception of

loss of control could result in burnout. If a teacher reaches the point of wanting to leave the profession, there is a significant risk of actually leaving the profession.

In agreement with the above findings, Ozoemena et al. (2021) add the risk factors that weaken teachers' resilience include a poor school climate, lack of instructional resources, limited incentives, and lack of administrative and parental support. These factors were found to contribute to psychological distress and burnout among Nigerian primary school teachers.

The study findings by Richards et al. (2018) provide evidence of the significance of teacher resilience in the field of education. The results of this study reveal a negative correlation between teacher resilience and burnout and a positive relationship between resilience and job satisfaction, organizational commitment, and perception of organizational climate. Additionally, the findings of Polat et al. (2018) study emphasized the crucial role that the work environment plays in shaping teacher resilience. It has been found that teachers working in non-supportive and restrictive environments experience higher levels of burnout and reduced resilience.

4.5.4 Societal factors and PSETs resilience

Seven studies have revealed that economic hardships, political instability, social unrest, and natural disasters can negatively impact the resilience of post-secondary education and training (PSET) systems. Among these factors, the COVID-19 pandemic has been found to weaken the resilience of PSETs. For example, Lacomba-Trejo et al. (2022) found that the sudden shift to online classes and remote correspondence, coupled with the fear of transmission in the workplace, has added unprecedented stress to teachers' daily lives, weakening their resilience. The study also revealed that teachers with pre-existing health problems reported more emotional symptoms, lower life satisfaction, and less resilience.

Similarly, Keim et al. (2022) argue that reopening schools after the pandemic presented new challenges, with teachers having to work in an environment where the fear of transmission persists. This increased stress level has weakened the resilience of teachers and

impacted their productivity. Baguri et al. (2022) add that during the COVID-19 pandemic, female teachers showed better resilience than male teachers.

Padmanabhannuni et al. (2022) found that teachers in countries with poor infrastructure and resources, such as South Africa, reported high levels of fear of COVID-19 and burnout. This fear resulted in increased depersonalization and emotional exhaustion, further weakening their resilience. However, López-Angulo et al. (2022) found that emotional stability, resilience, and emotional intelligence were important for coping with challenges and obstacles in education during the pandemic.

Falk et al. (2022) identified various challenges to teacher resilience, including working in conflict-prone or displaced settings, which can hinder their ability to perform their roles effectively and reduce their self-efficacy. Ozoemena et al. (2021) added that exposure to adverse events, lack of instructional resources, limited incentives, lack of administrative and parental support, inability to meet students' learning and social needs, and lack of knowledge on handling students' misbehaviour were risk factors that weakened the resilience of Nigerian primary school teachers. These factors were found to contribute to psychological distress and burnout among teachers.

Overall, these studies suggest that the COVID-19 pandemic and other societal factors can weaken the resilience of PSETs and teachers, highlighting the need for strategies to support and enhance their resilience.

5 Discussion

The review identified four main protective factors that increase resilience clustered as personal attributes (such as altruism, emotional intelligence, faith, optimism, perseverance, gender, and enthusiasm), coping skills (like help-seeking, problem-solving, time management, and acceptance), social support (such as family support, community support,

and colleagues' support), and professional development (such as career advancement, professional training, continued education, and reflective practice).

On the other hand, the review identified four main risk factors that hinder teachers' resilience clustered as work-related factors (workload, job demands, role conflict, lack of autonomy), personal factors (chronic illness, mental health issues, substance abuse, lack of social support), organizational factors (poor management, inadequate resources, unfair treatment, lack of recognition), and societal factors (economic hardships, political instability, social unrest, and natural disasters.

The study's findings align with Beltman et al. (2011) systematic review, which concluded that resilience is produced in the interaction of risk and protective factors of individual and contextual nature. The findings also align with research by Richards et al. (2016), which showed that teachers with higher levels of resilience are less likely to experience burnout, more likely to be satisfied with their work, and have higher levels of job commitment.

What's more, a study by Howard and Johnson (2004) found that teachers with higher levels of resilience are less likely to experience stress and have a positive perception of their work. Similarly, research conducted by Day and Gu (2007) reinforces the idea that teacher resilience is a crucial factor in promoting job satisfaction and reducing stress and burnout among teachers. In other words, having higher levels of resilience can help teachers maintain a positive attitude towards their work, cope effectively with challenging situations, and ultimately improve their overall well-being in the demanding field of education.

6 Conclusion

In conclusion, resilience is a complex construct that involves an individual's ability to adapt and cope with challenging situations. In the context of teachers, resilience is critical for maintaining their motivation, job satisfaction, and overall well-being. Protective factors, such

as social support, self-efficacy, and a sense of purpose, can enhance PSTEs' resilience by providing them with the resources and tools they need to navigate difficult circumstances. On the other hand, risk factors such as high workload, low salaries, and lack of recognition can hinder PSTEs' resilience, leading to burnout and decreased job satisfaction. The current global pandemic, COVID-19, is a prime example of a risk factor that has significantly impacted teachers' resilience. The sudden shift to online teaching and the added workload, uncertainty, and fear have all contributed to increased stress and decreased resilience.

However, what stand out from this review unlike in the past studies is that resilience of teachers come from motivation when protective factors are provided or improved while teacher resilience diminishes with the risk factors such as natural disasters like Covid-19 and other epidemics. When protective factors are provided or improved, such as professional development opportunities, a positive work environment, and supportive leadership, teachers' motivation and resilience can be enhanced.

In summary, this review underscores the importance of addressing both protective and risk factors to promote PSTEs' resilience. It highlights the crucial role of motivation in promoting resilience and emphasizes the need for creating supportive work environments and implementing strategies to enhance PSTEs' well-being and job satisfaction.

7 Limitations and future research

The current systematic review has certain limitations that warrant consideration. While a comprehensive search of relevant articles was conducted across multiple databases, it is possible that some relevant studies might have been missed. Moreover, as the review was conducted by a single researcher who was a master's student, there is a risk of personal bias in the selection, analysis, and interpretation of studies, leading to potentially flawed

conclusions. As per the Cochrane handbook, such bias may result in a non-representative sample of the literature and incorrect inferences (Higgins et al., 2019).

To address this limitation and strengthen the findings of this study, future research could benefit from the involvement of multiple researchers in the systematic review process. The involvement of a team of researchers would mitigate the risk of personal bias and enhance the accountability and reliability of the study findings. Moreover, a meta-analysis could be conducted to synthesize the results of multiple systematic reviews, to analyse more specific which factors are the strongest predictors of resilience.

Secondly, the inconsistent conceptualization of resilience in research can create confusion and difficulties when comparing and synthesizing findings across different studies. For instance, in the study of Kamboj et al. (2021), resilience is defined as a character trait of individuals who are able to fight back when facing trauma and adversity while maintaining healthy functioning, while in the study of Walter et al. (2021), resilience is defined as the ability to adapt and thrive in the face of any adversity. This variation in conceptualization of resilience can have significant consequences, as it can affect the identification and interpretation of risk and protective factors associated with resilience. A standardized and comprehensive definition of resilience, along with standardized resilience measurements, would help to address these limitations and improve the reliability and validity of research on resilience.

Furthermore, the identification of low quality in two studies and very low quality in one study during the GRADE tool assessment can be considered a limitation of the systematic review study. This is because the results from low-quality studies may not be reliable and therefore, their findings should be interpreted with caution (GRADE Working Group, 2011).This highlights the need for further high-quality research in this area.

A final suggestion for future research is to create an intervention program aimed at enhancing teachers' resilience, involving the use of participatory action research (PAR) methodology (MacDonald, 2012). This approach would involve collaborating with policy makers and teachers to co-create and implement an evidence-based intervention. Such collaboration would ensure that the intervention is not only evidence-based, but also practical and feasible in the real-world setting of schools and educational institutions. Active involvement of teachers in the development and implementation of the intervention could enhance its effectiveness and sustainability in the long run.

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9 Appendix 1: Quality assessment using GRADE approach

Study	Limitation	Inconsistency	Indirectness	Imprecision	Risk of bias	Quality of grading
Arnup et.al. (2016)	Serious limitation (sample size used for analysis consisted of more female (84.3%) than males (15.5%) limiting the generalisability of the result to other population).	No serious inconsistency	No serious indirectness	No serious imprecision	None of detected	◯⊕⊕⊕ ⊕ Medium
Richards et.al. (2016)	Serious limitation (More female (70.8%) participants than male (29.2%) reducing generalisability)	No serious inconsistency	No serious indirectness	No serious Imprecision	Serious risk of bias (96.4% of the participants were white and skewed towards having more teaching experience)	◯⊕⊕⊕◯ Low
Polat et.al. (2018)	Serious limitation (more female participants (71.4%) than male participants 28.6%), thereby reducing generalisability)	No serious inconsistency	No serious indirectness	No serious imprecision	None detected	◯⊕⊕⊕⊕ Medium

Richards et al. (2018)	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	None detected	⊕⊕⊕⊕⊕ High
Schusslr et al. (2018)	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	None detected	⊕⊕⊕⊕⊕ High
Maksimović&Osmanović (2019)	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	None detected	⊕⊕⊕⊕⊕ High
Akin (2019)	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	None detected	⊕⊕⊕⊕⊕ High
García&Gambarte (2019)	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	Serious risk of bias (Sample used was from public primary representing a very specific group reducing generalisability to teachers of other levels or fields)	⊕⊕⊕⊕◯ Medium
Walter et al. (2021)	Serious limitation (sample size used consisted of 96% female and 4% male reducing generalisability to other population)	No serious inconsistency	No serious indirectness	No serious imprecision	None detected	◯⊕⊕⊕⊕ Medium

Candeis et al. (2021)	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	None detected	⨁⨁⨁⨁⨁ High
Herman et al. (2021)	Serious limitation (More female (79%) participants than male (21%) reducing generalisability)	Serious inconsistency (Aspects of the school organizational health and climate were not specified)	No serious indirectness	No serious imprecision	Serious risk of bias (87% of the participants were white)	◯◯⨁⨁◯ Very low
Mulaudzi et al. (2021)	Serious limitation (small sample size of six participants were used reducing representativeness)	No serious inconsistency	No serious indirectness	No serious imprecision	None detected	◯⨁⨁⨁⨁ Medium
Fitchett et al. (2021)	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	None detected	⨁⨁⨁⨁⨁ High
Kamboj et al. (2021)	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	None detected	⨁⨁⨁⨁⨁ High
Hascher et al. (2021)	Serious limitation (Sample size consisted of more women (19) than men (2),	No serious inconsistency	No serious indirectness	No serious imprecision	None detected	◯⨁⨁⨁⨁ Medium

	teachers memory bias and timing of data leading to reduced generalisability to other population)					
Phillips, R. (2021)	Serious limitation (relatively small sample size (16), retrospective interview, and self-declared Christian teachers reducing generalisability to other population)	No serious inconsistency	No serious indirectness	No serious imprecision	None detected	⨁⨁⨁⨁◯ Medium
Baker et al. (2021)	Serious limitation (Sample size consisted of more women (81%) than men (19%) reducing generalisability to other population)	No serious inconsistency	No serious indirectness	No serious imprecision	None detected	⨁⨁⨁⨁◯ Medium
Ozoemena et al. (2021)	Serious limitations (Participants were from public primary reducing generalisability to private and secondary schools)	Serious inconsistency (cut-off score was only used for burnout but	No serious indirectness	No serious imprecision	None detected	⨁⨁⨁◯◯ Low

		not other dimensions)				
Werang et al. (2021)	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	None detected	⨁⨁⨁⨁⨁ High
Lacomba-Trejo et al. (2022)	Serious limitation (Sample size consisted of more women (94.6%) than men (5.4%) reducing generalisability to other population)	No serious inconsistency	No serious indirectness	No serious imprecision	None detected	◯⨁⨁⨁⨁ Medium
López-Angulo et al. (2022)	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	None detected	⨁⨁⨁⨁⨁ High
Heffernan et al. (2022)	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	None detected	⨁⨁⨁⨁⨁ High
Carroll et al. (2022)	Serious limitation (Sample size consisted of more female (83%) than male (17%) reducing generalisability)	No serious inconsistency	No serious indirectness	No serious imprecision	None detected	◯⨁⨁⨁⨁ Medium
Keim et al. (2022)	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	None detected	⨁⨁⨁⨁⨁ High

Padmanabhanunni et al. (2022)	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	None detected	⨁⨁⨁⨁⨁ High
Baguri et al. (2022	Serious limitation (Sample size consisted of more female (77%) than male (23%) reducing generalisability)	No serious inconsistency	No serious indirectness	No serious imprecision	Serious risk of bias (Selection of participants skewed towards more experience)	◯⨁⨁⨁◯ Low
Oldfield &Ainsworth(2022)	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	None detected	⨁⨁⨁⨁⨁ High
Falk et al. (2022)	No serious limitation	No serious inconsistency	No serious indirectness	No serious imprecision	None detected	⨁⨁⨁⨁⨁ High