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REVIEW ARTICLE

Instruments for assessing health workers' burnout during the COVID-19 pandemic: a scoping review

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ABSTRACT

Background: During the COVID-19 pandemic, health workers' workload is increasing, with the risk of burnout. Several instruments for assessing burnout have been developed since the concept was coined in the 1970s. It is important to map and describe the application of burnout instruments for health workers in the current COVID-19 pandemic situation.
Aims: This article aimed to map and describe what instruments are used and variations of their application to research burnout in health workers during the COVID-19 pandemic.
Methods: This scoping review searched articles systematically through 7 databases (PubMed, Clinical Key, Scopus, EBSCOhost, APA PsycINFO, Science Direct, and Wiley Online Library). Articles were screened and analyzed following the Arksey and O'Malley framework.
Results: From 507 results, 31 peer-reviewed articles were selected. These studies involved 33,879 participants from various health professions. Generally, the research instrument is still dominated by Maslach Burnout Inventory. Applications of burnout measurements vary widely because there is no consensus on the concept of burnout assessment.
Conclusion: Inconsistency in burnout-measuring tools can be seen as providing flexibility and alternatives, but at the same time, it is a gap that challenges researchers to develop more comprehensive instruments, especially for the burnout phenomenon in health workers during the COVID-19 pandemic.

Introduction

The COVID-19 pandemic has become a deadly phenomenon since the World Health Organization (WHO) declared it a Public Health Emergency of International Concern in early 2020. Globally, COVID-19 is spreading widely and infecting humans rapidly. A significant increase in the number of patients is occurring in hospitals worldwide. This of course also has an impact on the workload, especially for health workers at the forefront of services in hospitals. We found many surveys that reported an increase in the workload of various health care professionals in hospitals since the pandemic occurred. This has the potential to increase the risk of burnout for health workers in hospitals. One study reported that the potential for burnout in nurses increased by up to 23% (Hu et al., 2020).

Burnout is not yet classified as a disease or medical condition, as described in the International Statistical Classification of Diseases and Related Health Problems-10th revision (ICD-10) and the Diagnostic and Statistical Manual of Mental Disorders-5th revision (DSM-5). Herbert J. Freudenberger, who is credited with popularizing the term 'burnout' in 1974, explains that this is a psychological syndrome indicated by symptoms of emotional disturbances, such as irritability or crying easily accompanied by physical complaints such as fatigue, dizziness, etc. In 1980, Edelwich and Brodsky added that burnout can result in turnover in the form of enthusiasm, stagnation, frustration, apathy and finally become an intervention, namely workers choose to leave work. In a recent development, Schaufeli et al. (2020) define burnout as a work-related state of exhaustion that occurs among employees, which is characterized by extreme tiredness, reduced ability to regulate cognitive and emotional processes, and mental distancing. In conclusion, the key that distinguishes burnout from other psychological syndromes is its relationship with occupation and work environment.

Although burnout is not a medical condition, its symptoms cannot be ignored. The pressure felt by health workers causes symptoms of disturbing feelings such as fear for the safety of themselves and those closest to them, changes in sleeping and eating patterns, difficulty concentrating, various psychosomatic disorders, feelings of irritability, reduced productivity, interpersonal conflicts, and feelings of failure to handle a poor prognosis(Chen et al., 2021; Elbay et al., 2020; Gemine et al., 2021; Morgantini et al., 2020; Tan

et al., 2020). In addition to the increased workload since the COVID-19 pandemic, working hours that exceed the standard, the use of Personal Protective Equipment (PPE) for a long time, the lack of social support, and negative perceptions about COVID-19 can cause physical and mental fatigue (burnout) which has an impact on decreased immunity of health workers (Radhakrishnan et al., 2021).

In 'normal' situations, health workers are prone to burnout due to enormous psychological pressure (Elhadi et al., 2020). The condition of the COVID-19 pandemic worsens the situation because it affects not only the health of the community itself but also its health workers. The problem of the increasing number of patients is causing changes in staff availability. At the same time, many health workers are absent due to being infected with COVID-19 which contributes to the increasing burnout in health workers (Doherty et al., 2022). Health workers should be more attentive at work because of the availability of PPE, fear of exposure to viruses in the workplace, and concerns over being a virus carrier in their family contacts at home (Chen et al., 2021). The long-lasting nature of this pandemic and the challenging epidemiological characteristics of this novel infectious disease have caused many standard operating procedures (SOPs) (including PPE) in patient care to change for the safety of health workers and their patients (Jose et al., 2020).

The COVID-19 pandemic has opened up opportunities for researchers to focus on essential areas concerning burnout issues that have not been well-explored. Further study is necessary for the health workers' psychological well-being and good quality of life (Chalhub et al., 2021; Doherty et al., 2022). Burnout in health workers needs attention because burnout is associated with a high rate of medical errors and a decrease in the level of patient care (Elhadi et al., 2020).

Since the concept of burnout was coined in the 1970s, many burnout instruments have been developed by experts with different approaches and conceptualizations. Generally, these instruments are developed based on certain settings or specific situations. This is because differences in cultural, gender, and socio-economic backgrounds cannot be ignored in the preparation and application of a psychological instrument (Kristensen et al., 2005). As in socio-economic settings in developing countries, forcing health workers to work in reasonably complex work situations and with limited or low resources may lead to different definitions or symptoms of burnout (Morgantini et al., 2020).

The various problems in applying the burnout concept ultimately raised research questions: what instruments were used by researchers to assess burnout for health workers? and how were the variations in their application during the COVID-19 pandemic? This scoping review article aimed to answer those questions by mapping and describing the variation of burnout instruments for health workers during the COVID-19 pandemic.

Methods

This scoping review was prepared using the methodological framework developed by Arksey and O'Malley, namely

through the following stages: (1) identifying research questions; (2) identifying relevant articles; (3) selecting the identified articles; (4) mapping; and (5) compiling, summarizing, and reporting results (Arksey & O'Malley, 2005). Then it was reported using the guidance of PRISMA extension for Scoping Review (PRISMA-ScR) (Tricco et al., 2018) in order to increase its relevance for decision making, especially for readers who are interested in using the burnout instruments in their research.

Protocol and registration

This study protocol was not registered with PROSPERO, because PROSPERO did not accept scoping reviews.

Eligibility

The inclusion criteria that must be met for scientific articles to be reviewed in this study were: (1) research was conducted during the COVID-19 pandemic; (2) using a quantitative research design: (3) using a specific burnout instrument; (4) number of research participants >100; and (5) research participants were health workers involved in handling COVID-19 patients. 'Specific burnout instrument' refers to instruments that assess the burnout construct only, with no other constructs or the context of burnout as one of the dimensions in the other constructs. Since the main objective of this review was to identify burnout instruments rather than to synthesize research findings, a variety of research questions and heterogenous outcome report formats were eligible. Research that aimed to analyze the relationship between burnout and other variables using more than one instrument was allowed. Research that used an instrument that does not explicitly measure burnout as a single construct was not included. Research using an instrument developed by the author of the article themselves without psychometric information was not included. Articles that are research protocols were also excluded.

Search strategy

Seven scientific databases were searched for related scientific articles (PubMed, Clinical Key, Scopus, EBSCOhost, APA PsycINFO, Science Direct, and Wiley Online Library). The article search focused on the burnout construct in the population of health workers in the setting of the COVID-19 pandemic. We used keywords based on MeSH with a Boolean system so that the coverage of scientific article searches could be maximized. The keywords used in searching the databases are *((instrument*) OR (scale*) OR (tool*)) AND ((assess*) OR (measure)) AND (health*) AND ((worker*) OR (professional *) OR (personnel*) OR (provider*)) AND (burnout) AND ((pandemic) OR (outbreak) OR (COVID-19))*. Filters were applied to get more accurate search results and minimize extraneous articles because they do not meet the criteria, including the period of article publication dating from the time COVID-19 was declared a pandemic/global emergency until the time the research was

conducted (January 2020-November 2021), and only including articles with original research that have been peer-reviewed, with full-text accessible, and published in English.

Selection of sources of evidence & data charting

Figure 1 shows the flow of the research strategy and the article screening process, as referenced by the PRISMA-ScR guidance by Tricco et al. (2018). The stages of scoping research, as referenced by the framework of Arksey and O'Malley (2005), were described in the following steps. First, identification research questions (SA and AHS). Second, identification relevant articles through seven scientific databases (MAS). Third, selection of the identified articles relevant to the research questions, based on the title, keywords and abstract (NUL). Then, the full text was read to assess the articles that met the inclusion criteria independently by two authors (SMP and AD). The differences in the results of the assessments were discussed together, and if consideration was needed, two other authors (SA and AHS) were included in the discussion. Next, the eligible articles were extracted with data-charting forms (MAS and NUL). The data-charting form was developed by two authors (SA and AHS) who collaborated in determining the extraction items, adapted from the extraction table template

for Scoping Review by the Joanna Briggs Institute (JBI), based on research questions. The data-charting form includes the source (author's name, article title, and year of publication), study location, study design, participants of the study (number and type of profession), burnout instrument used and its description (name, version, number of items, and number of dimensions) and the main findings of the study (prevalence/distribution of burnout scores among participants, and information on the psychometric properties of the instrument in the study population). Then, data on the burnout instrument and main findings were abstracted. Fourth, mapping of burnout instruments narratively by grouping studies drawn from the findings which have similar characteristics (SMP). Fifth, compiling, summarizing, and reporting results (SMP and AD).

Results

Selection of sources of evidence

After removing duplicates, searches of electronic databases and review article references yielded a total of 70 citations. Thirteen papers were eliminated based on the title and abstract, leaving 57 full text articles to be obtained and evaluated for eligibility. Twenty-six of these articles were
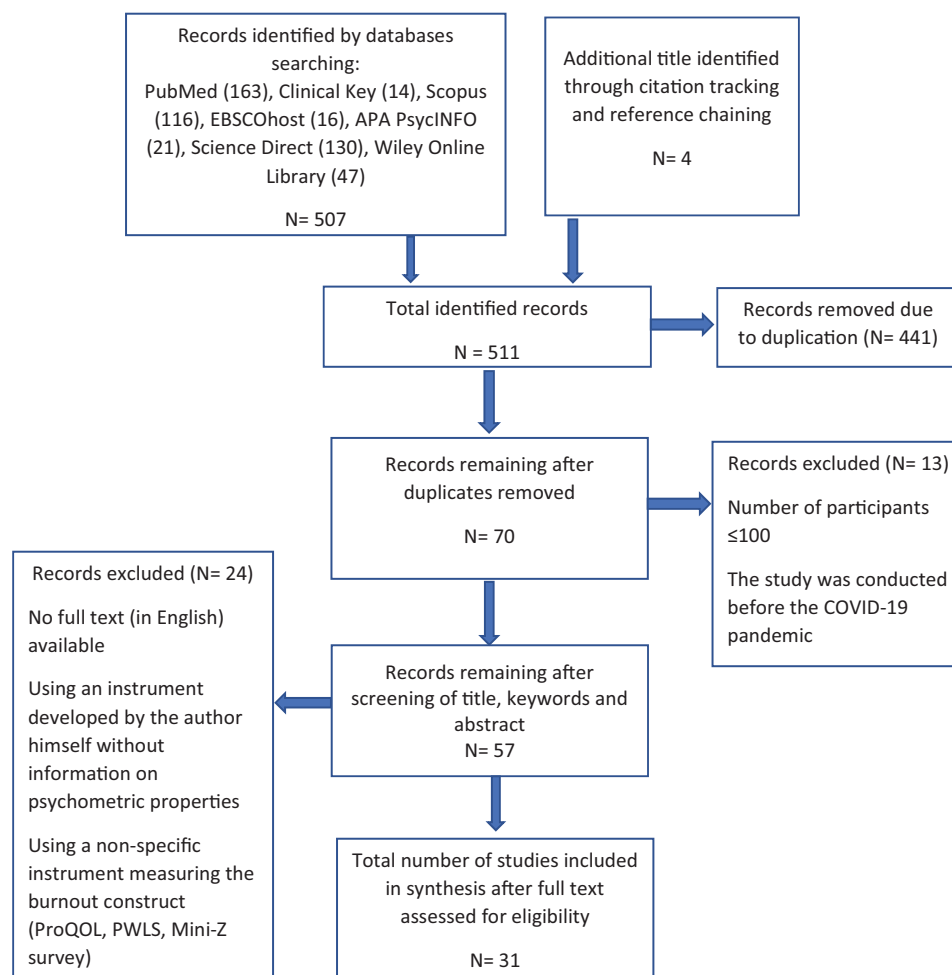

Figure 1. Flow chart of eligible articles selection following PRISMA-ScR guidance.

Table 1. Overview of eligible studies measuring health workers' burnout.

Source	Study location	Study design	Participants of study	Burnout instrument	Key finding(s)
A large-scale survey on trauma, burnout, and posttraumatic growth among nurses during the COVID-19 pandemic (Chen et al., 2021)	China & Taiwan	Cross-sectional survey	12.596 nurses	22 items of Maslach Burnout Inventory-Human Service Survey (MBI-HSS)	Overall, the instrument had good internal consistency reliability for each burnout subscales, i.e. 0.90 for emotional exhaustion, 0.79 for depersonalization, and 0.71 for lack of personal accomplishment. The average scores of participants' burnout was in the low-to-moderate range. The details mean and standard deviation for each subscale were as follows: emotional exhaustion was 19.1 ± 10.0 (moderate), depersonalization was 5.5 ± 4.6 (moderate), lack of personal accomplishment was 19.0 ± 8.4 (low).
A pilot study of burnout and long-covid in senior specialist physicians (Doherty et al., 2022)	Ireland	Cross-sectional survey	144 physicians	2 items modified version of MBI-HSS	Measurements were carried out using a modified MBI-2 item by adding questions related to the experience of long covid syndrome. MBI-2 is a shortened version of MBI-HSS and has been validated by previous studies. While this instrument has not reported the results of the validity and reliability tests specifically on population in this study. The response format is a 7-item Likert scale from 0 to 6 (never to daily). Participants were considered burnout if they have a score of 3 or more. The results showed that 77% ($N = 88$) of respondents experienced burnout with an average score of 5.6.
A questionnaire study effect of COVID-19 pandemic on anxiety and burnout levels in emergency healthcare workers (Sahin et al., 2020)	Turkey	Cross-sectional survey	249 physicians, 301 nurses, 190 laboratory assistants, 180 paramedics/technicians	22-items of Maslach Burnout Inventory (MBI)	The results showed that participants generally experienced burnout at a low level in terms of the median value. The details of the minimum and maximum scores, as well as the median for each subscale are as follows: EE (9–45; median 10), DP (5–25; median 5.8), PA (8–40; median 6.7). This study adopted MBI and didn't give any information about the psychometric properties of the instrument to their study population.
Anxiety, health-related quality of life, and symptoms of burnout in frontline physicians during the COVID-19 pandemic (Chalhub et al., 2021)	Brazil	Cross-sectional survey	251 physicians	22-items of MBI	The internal consistency of the instrument is indicated by Cronbach's alpha of each sub-scale as follows: EE and PA were ideal (0.88 and 0.82, respectively) and DP was satisfactory (0.69). The results showed that in general, participants experienced burnout at a moderate level, seen from the average score and standard deviation of the three subscales as follows: EE (27.53 ± 11.59), DP (6.44 ± 5.45) and PA (35.62 ± 7.87).
Burnout and associated factors among health care workers in Singapore during COVID-19 pandemic (Tan et al., 2020)	Singapore	Cross-sectional survey	458 physicians, 1394 nurses, 483 paramedics, 491 support staff, 249 administrative staff	16 items of Oldenburg Burnout Inventory (OLBI)	The Cronbach's alpha for each subscale was good to excellent: OLBI - Exhaustion (0.80) and Disengagement (0.83). Confirmatory factor analysis was also performed to assess the goodness of fit of the data on the instruments used. Root mean square error of approximation (RMSEA < 0.06), Comparative Fit Indices (CFI 0.90) and Standardized Root Mean Square Residual (SRMSR < 0.08). Participants who met the burnout threshold were 79.7% for Disengagement and 75.3% for Exhaustion.

Table 1. Continued.

Source	Study location	Study design	Participants of study	Burnout instrument	Key finding(s)
Burnout and its influencing factors between frontliner nurses and nurses from other wards during the outbreak of Coronavirus Disease (COVID-19) in Iran (Hoseinabadi et al., 2020)	Iran	Cross-sectional survey	245 nurses	Oldenburg Burnout Inventory (OLBI), Persian version	The psychometric properties of the instrument was 0.77 Cronbach's alpha. The mean value of burnout scores for participants was 2.57 out of 5, with a slight difference in the mean of exposed and unexposed nurses in the COVID-19 treatment room, 2.61 ± 0.27 and 2.51 ± 0.23, respectively.
Burnout and resilience among frontline nurses during COVID-19 pandemic: a cross-sectional study in the Emergency Department of a Tertiary Care Center, North India (Jose et al., 2020)	India	Cross sectional (survey)	120 nurses	22-items of MBI-HSS	Nurses working in the frontline (emergency unit) experienced moderate to severe levels of emotional exhaustion (29.13 ± 10.30) and depersonalization (12.90 ± 4.67). However, it was noted that mild to moderate in personal achievement (37.68 ± 5.17). In this study, the instrument's reliability coefficient of Cronbach alpha for EE, DP and PA were 0.88; 0.83 and 0.82, respectively.
Burnout syndrome among hospital healthcare workers during the COVID-19 pandemic and civil war (Elhadi et al., 2020)	Libya	Cross sectional-survey	532 health workers (no specific profession was mentioned, only the department in the hospital)	9-items of the Abbreviated-MBI (aMBI)	67.1% of the participants experienced emotional exhaustion (score ≥ 10), 47.4% experienced depersonalization (score ≥ 10), and 22.7% reported a lower sense of personal accomplishment (score ≤ 10). A re-validity test was conducted with lower results than previous study (0.76 for emotional exhaustion, 0.66 for depersonalization, and 0.71 for personal accomplishment). However, in general, the score obtained was still appropriate.
Burnout, depersonalization, and anxiety contribute to post-traumatic stress in frontline health workers at COVID-19 patient care: a follow-up study (Miguel-Puga et al., 2021)	Mexico	Longitudinal survey	120 physicians, 8 nurses, 76 supported staff.	Burnout Measure, short version (Malach-Pines, 2005)	This instrument consisted of 10 items with 7 points Likert Scale (1 = never to 7 = always). Burnout level was determined by an average score with the following details: ≤ 4 is very low burnout; 2.5–3.4 is a low burnout; 3.5–4.4 is a high burnout; 4.4–5.4 is a very high burnout; and ≥ 5.5 is a very high burnout and needs help. The results showed that there was no significant change in the frequency of burnout among participants in the 3 assessments (before, during and after the change in patient management in handling COVID-19). The frequency of burnout (score ≥ 3.5) among participants was 15.1% in the first evaluation, 19.6% in the second evaluation, and 18.6% in the third evaluation. No information about the instrument's psychometric properties in this article.
Coronavirus anxiety and exhaustion among Polish frontline healthcare workers: The mediation effect of insomnia (Baka, 2021)	Poland	Cross sectional (survey)	177 nurses and midwives, 112 physicians, 45 paramedics, 61 support staff	8-items exhaustion subscale of Oldenburg Burnout Inventory (OLBI), Polish version	The internal consistency of this instrument is quite good with the value of $\alpha = 0.77$ and $\omega = 0.79$ for exhaustion, likewise for the value of construct validity which shows $P < 0.001$. CFA results with modification show X^2 (51.74), df (12), P (<0.001), RMSEA (0.02), Pclose (0.196), SRMR (0.02), CFI (0.99), AIC (12 663.74). There was no information about determining the burnout status of participants and the results of the assessment. The article only showed the mean score on the exhaustion dimension was 2.2 SD 0.2.

Table 1. Continued.

Source	Study location	Study design	Participants of study	Burnout instrument	Key finding(s)
Frontline nurses' burnout, anxiety, depression and fear statuses and their associated factors during the COVID-19 outbreak in Wuhan, China: a large scale cross-sectional study (Hu et al., 2020)	China	Cross sectional -survey	2014 nurses	22-items of MBI-Human Service Survey (HSS) for Medical Personnel	The instrument's psychometric properties in this article were only represented by one information on the Cronbach alpha value (0.86). Overall the participants had burnout with indication as follows: 60.5% nurses reported moderate to high EE, 42.3% nurses indicated moderate to high DP, and 60.5% had no or low PA.
Prevalence of health care worker burnout during the Coronavirus Disease 2019 (COVID-19) pandemic in Japan (Matsuo et al., 2020)	Japan	Cross sectional (survey)	82 physicians, 126 nurses, 19 pharmacists, 85 health laboratory personnel)	16 items of MBI-General Survey (MBI-GS), Japanese version	Burnout status was expressed by high scores of exhaustions (>3.5), cynicism (>3.5) and low professional efficacy (<2.5). 31% of the participants were indicated burnout. No information about instrument's psychometric properties in this population of study.
Psychosocial burden of healthcare professionals in times of COVID-19: a survey conducted at the University Hospital Augsburg (Zerbini et al., 2020)	Germany	Cross sectional survey	75 nurses and 35 physicians	22 items of Maslach Burnout Inventory (MBI), German version	No reports of specific burnout conditions in participants, but the authors reported correlations of burnout symptoms with other mental conditions (fear, anxiety, stress and depression due to the COVID-19 situation). There was no information about the instrument's psychometric properties in this population of study.
COVID-19 pandemic related anxiety distress and burnout prevalence and associated factors in healthcare workers of North-west Italy (Naldi et al., 2021)	Italy	Cross-sectional survey	328 physicians and 469 nurses	22-items of Maslach Burnout Inventory	The results showed that 40.7% of participants had high emotional exhaustion, 30.2% had high depersonalization and 36.4% had low personal accomplishment. There was no information about the re-test of validity and reliability in this study.
Determinants of burnout and other aspects of psychological well-being in healthcare workers during the COVID-19 pandemic: a multinational cross-sectional study (Denning et al., 2021)	United Kingdom, Poland, and Singapore	Cross-sectional study	684 physicians, 1590 nurses, 517 paramedics, 746 support staff	16 items of OLBI	The participants were considered to be at 'high risk of burnout' if they had score of 2.1–2.25 for both exhaustion and disengagement subscales. The result showed 67% of participants were at high level of burnout. The value of Cronbach alpha in this study were ideal (0.88).
Determination of stress, and burnout levels of front-line nurses during the COVID-19 pandemic (Murat et al., 2021)	Turkey	Cross-sectional and descriptive design.	705 nurses	22 item-MBI (Turkish version)	The Turkish version of the MBI differs from the original instrument, in that it uses a 5-point Likert scale response format (0 = never and 4 = always). The mean score of the each MBI dimensions were follows: 11.4 ± 5.0 for personal achievement, 7.3 ± 4.5 for depersonalization, and 18.9 ± 8.5 for emotional exhaustion. Generally, the participants had high levels of burnout. The Cronbach alpha coefficient for each dimension are as follows: 0.90 for Personal Achievement: 0.76 for depersonalization and 0.89 for emotional exhaustion.
Evaluation of stress, burnout and hair cortisol levels in health workers at a University Hospital during COVID-19 pandemic (Ibar et al., 2021)	Argentina	Transversal observational design	69 physicians, 25 nurses, 39 paramedics, 63 administrative staff, 38 support staff	22 items-MBI-HSS	The participants were indicated burnout if they required high EE (score > 26), high DP (score > 9) and low PA (score <34). The result showed 12% of the participants were burnout. The reliability analysis of the instrument yielded a Cronbach alpha of 0.805.

Table 1. Continued.

Source	Study location	Study design	Participants of study	Burnout instrument	Key finding(s)
Factor contributing to healthcare professional burnout during the COVID-19 pandemic: A rapid turnaround global survey (Morgantini et al., 2020)	Global (60 countries)	Cross-sectional survey	719 physicians, 855 nurses, 1133 paramedics and support staff	A single-item adapted from EE-MBI	The instrument contains the statement "I am burned out from my job," with a 7-point Likert scale (1: strongly disagree to 7: strongly agree). Participants who choose point 5 or greater were considered burnout. The result showed 51.4% participants were burnout. No information on the instrument's psychometric properties in this study population was available.
Factors associated with work-related burnout in NHS staff during COVID-19: a cross-sectional mixed methods study (Gemine et al., 2021)	UK	Cross-sectional survey	257 participants: 18 physicians, 75 nurses, 15 paramedics, 149 others	7-items of Work-related subscales of Copenhagen Burnout Inventory (CBI)	Scores on the work-related burnout subscale ranged from 1 to 100, and high burnout was defined as ≥50. While the results showed that the participants' scores ranged from 3.6 to 96.4 with mean of 45.7 and SD 15.7. Information of the instrument's psychometric properties was not available in this study population.
Healthcare professionals' work-related stress in palliative care: a cross-sectional survey (Dijxhoorn et al., 2021)	Netherlands	Cross-sectional	179 participants consisting of 85 nurses, 69 physicians, 23 staff other health	Burnout Assessment Tool	No information on psychometric properties of the instrument in this article. The burnout level was determined by Cut-off scores for low (1.00–1.55), median (1.56–2.79), high (2.80–3.64) and very high (3.65–5.00) Most participants showed median levels on the four core dimensions: exhaustion (55%), mental distance (49%), emotional impairment (78%), and cognitive impairment (70%). Most respondents (74%) had a median level of secondary symptoms.
How organisational commitment influences nurses' intention to stay in nursing throughout their career (Bell & Sheridan, 2020)	Ireland	Cross-sectional	754 nurses	14-items of Shirom Melamed Burnout Measure (SMBM)	The instrument's internal consistency was represented by alpha Cronbach of 0.94. Burnout level was determined based on the score, as follows: ≤ 2 as no burnout; 2.1–3.74 as moderate; and ≥3.75 as high burnout. The result reported almost 97% of the participants experienced burnout, with mean 4.4 and SD = 1.8.
Impact on mental health of the COVID-19 outbreak among community pharmacists during the sanitary lockdown period (Lange et al., 2020)	French	Cross sectional (survey)	135 Pharmacists	MBI	There was no information about the MBI version and the number of items used. Neither information on psychometric properties of the instrument in this population of study. High burnout symptoms were defined by scores ≥ 30 for EE, ≥ 12 for DP and ≤ 33 for PA. The result showed the mean scores of the each subscale were 23 (SD = 11.4) for EE (moderate) , 10.9 (SD = 5.5) for DP (moderate) and 48.1 (SD = 7.2) for PA (low).
Impacts and challenges of the COVID-19 pandemic on emergency medicine physicians in the United States (Nguyen et al., 2021)	USA	Cross sectional (survey)	166 physicians	Single-item burnout adapted from MBI-HSS (MP)	The instrument used response format of a 5-point Likert scale (never, rarely, sometimes, often, always), where if the respondent answers "sometimes/often/always" it was considered burnout. The result showed 74.7% of participants were indicated burnout. The survey was internally validated through a small pilot study (to test for face validity, assess survey questions clarity, and improve content and quality), then submitted to the committee for review and approval before distribution to the participants. but no information about statistical test or result to validate the survey.

(continued)

Table 1. Continued.

Source	Study location	Study design	Participants of study	Burnout instrument	Key finding(s)
Physician burnout in primary care during the COVID-19 pandemic: a cross-sectional study in Portugal (Baptista et al., 2021)	Portugal	Cross-sectional study	214 physicians	19 items of Copenhagen Burnout Inventory (CBI), Portuguese version	The internal consistency (alpha Cronbach) for each subscale as follows: 0.91 for personal burnout, 0.89 for work-related burnout and 0.89 for patient-related burnout. Those value were higher than the original Portuguese version of CBI. The instrument used 5 points Likert scale with score ranging 1–100. The participants were considered high burnout if they had a score ≥50. The result showed that most of the participants experienced burnout in high level for the 3 dimensions (65.9% for personal burnout, 68.7% for work-related burnout and 54.7% for patient-related burnout).
Prevalence of burnout risk and factors associated with burnout risk among ICU nurses during the COVID-19 outbreak in French speaking Belgium (Bruyneel et al., 2021)	Belgium	Cross-sectional survey	1135 nurses	22 items MBI- French version	No information about psychometric performance of the instrument in this population of study. An individual with a high score in at least one of the three dimensions (EE, DP, PA) can be considered to be at risk of burnout. 68% of participants indicated burnout, with the details of each MBI dimension categorized as high: 38% for EE, 29% for DP, and 31% for decreased in PA.
Psychological and physiological stress and burnout among maternity providers in a rural county in Kenya: individual and situational predictors (Afulani et al., 2021)	Kenya	Cross-sectional survey	62 midwives, 16 physicians, 23 support staff.	14-items of Shirom-Melamed Burnout Scale	The instrument's internal reliability was represented by Cronbach alpha of 0.87. Burnout level was determined based on the score, as follows: ≤ 2 as no burnout; 2.1–3.74 as moderate; and ≥3.75 as high burnout. The result showed 65% of the participants were classified as low burnout, 15.4% were moderate and 19.6% were high.
Psychological impact of the COVID-19 pandemic on hospital workers over time: Relationship to occupational role, living with children and elders, and modifiable factors (Maunder et al., 2021)	Canada	Longitudinal Survey	134 nurses, 247 other medical staff, 158 support (non-medical) staff	9-items of Emotional Exhaustion dimension of MBI	Burnout was defined categorically with a cut-off of ≥27 to indicate severe emotional exhaustion. At T_1 41.1% participants indicated severe emotional exhaustion and increased at T_2 by 49.8% with the highest proportion of the prevalence of severe EE occurring in nurses. No information about the psychometric properties of instrument in this population of study.
Results from the national taskforce for humanity in healthcare's integrated, organizational pilot program to improve well-being (Pierce et al., 2021)	USA	Experimental study	206 healthcare workers. No specific profession was described.	5 items-Emotional Exhaustion adapted from MBI	The national pilot program intervention to improve the well-being of health workers (one indicator of which was a reduction in emotional exhaustion scores) was showing promising results. Participants' EE scores decreased from 48.1% before the intervention to 34.5% after the intervention. No information about the instrument's psychometric properties in this population of study.
Secondary traumatic stress and burnout in healthcare workers during COVID-19 outbreak (Orrù et al., 2021)	45 countries and 5 continents	Cross sectional survey	141 physicians, 10 nurses, 33 support staff	22 items- MBI-HSS	No information about the instrument's psychometric properties in this population of study. Burnout scores on each subscale were as follows: 56.0% of participants reported moderate to high level of EE, 48.9% reported moderate to high level of DP, and 76% reported low to moderate of PA.

(*continued*)

Table 1. Continued.

Source	Study location	Study design	Participants of study	Burnout instrument	Key finding(s)
Sensory processing sensitivity and compassion satisfaction as risk or protective factors from burnout and compassion fatigue in healthcare and education professionals (Pérez-Chacón et al., 2021)	Spanish-speaking countries	Cross-sectional survey	694 healthcare workers and 872 education professionals	22 items- MBI (Spanish version)	The criteria for classifying the burnout level applied to the Spanish population sample. EE (low: <15; medium: 15–24; high: >24), DP (low:<4; medium: 4–9; high: >9), and PA (low: <33; medium: 33–39; high: >39). The reliability indices for this sample, according to the Cronbach's alpha coefficients, were 0.90 (EE), 0.79 (DP), and 0.71 (PA). The mean score of each subscale as follows: 26.92 for EE (high), 5.97 for DP (moderate) and 39.93 for PA (high).
The immediate impact of the coronavirus disease 2019 (COVID-19) pandemic on burnout, work-engagement, and surgical training in the Netherlands (Poelmann et al., 2021)	Netherlands	Cross-sectional survey	317 physicians	16 items of Utrecht Burnout Scale (MBI-GS, Dutch version)	The participants could be considered as burnout when they had high scores on emotional exhaustion combined with one/two other dimensions with high score too. The result showed prevalence of burnout on participant deployment after the COVID-19 pandemic had 2 times bigger than those who were not deployed in the COVID ward (16.0% vs. 7.6%, P .06) No information about the instrument's psychometric properties in this population of study.

eliminated for the following reasons: there are fewer than 100 participants, the study was conducted prior to the COVID-19 epidemic, using an instrument created by the author without any knowledge of its psychometric qualities, and the burnout construct was measured with a non-specific instrument (ProQOL, PWLS, Mini-Z survey). The remaining 31 eligible articles were included in synthesis.

Characteristics of sources of evidence

We reviewed 31 articles that came from various countries on 4 continents. As an illustration of mapping the locations of these various studies, there are articles including 13 articles from Europe (Netherlands, Italy, Belgium, Portugal, Ireland, England, Poland, Germany, France, and Spain), 7 articles from Asia (Iran, China, Turkey, Singapore, Taiwan, India, Japan), 6 articles from America (Brazil, Canada, Argentina, Mexico, and America), 2 articles from Africa (Libya and Kenya), and 3 articles from cross-continental studies. The total number of health workers who participated in the study was 33,879, consisting of 4,192 doctors (general and specialist), 22,818 nurses, 154 pharmacists, 239 midwives, and 5,044 support staff (laboratory technicians, administration, and other non-medical personnel). There were 1,432 participants whose type of profession was not specifically mentioned in the article. As many as 28 articles (90%) were cross-sectional survey research, 2 articles were longitudinal studies, and 1 other article was transversal-observational studies. Data-charting of all eligible articles including the author's name, article title, year of publication, study location, study design, participants, burnout instrument used and the key findings of the study, are provided in Table 1.

Synthesis of result: overview of burnout instruments used

Health workers who work on the front lines (emergency healthcare) or in the treatment room for COVID-19 patients have the potential to experience greater burnout than health workers who do not have direct clinical contact with COVID-19 patients (Baka, 2021; Chalhub et al., 2021; Hoseinabadi et al., 2020; Hu et al., 2020; Jose et al., 2020; Miguel-Puga et al., 2021; Murat et al., 2021; Nguyen et al., 2021; Sahin et al., 2020). In general, the health professionals who are prone to burnout during a pandemic are nurses more than other professions (doctors, pharmacists, midwives, and other health support staff). This opinion was concluded by several studies that compared the prevalence of burnout in several health care professions (Baka, 2021; Denning et al., 2021; Dijxhoorn et al., 2021; Gemine et al., 2021; Ibar et al., 2021; Matsuo et al., 2020; Maunder et al., 2021; Miguel-Puga et al., 2021; Morgantini et al., 2020; Naldi et al., 2021; Sahin et al., 2020; Tan et al., 2020; Zerbini et al., 2020). However, this conclusion is only based on the eligible articles in this review, where the proportion of nurses is the largest compared to the total number of participants (51%). In addition, the number of participants

Table 2. Burnout instruments' description.

Burnout instrument	MBI	OLBI	BMS	CBI	SMBM	BAT
First author	C. Maslach	E. Demerouti	A. Maslach-Pines	T.S Kristensen	A. Shirom	W. B. Schaufeli
Year of publication	1981	1999	2005	2005	2006	2020
Population	Human service sector	General	General	Human service sector	General	General
Sub-scale(s) and number of items	Emotional Exhaustion (9 items), Depersonalization (5 items), and Personal Accomplishment (8 items)	Exhaustion (7 items) and Disengagement (8 items)	Unidimensional in 3 domains (physical, emotional and mental) of Exhaustion (10 items)	Personal burnout (6 items), Work-related burnout (7 items) and Client-related burnout (6 items)	Physical fatigue (6 items), Cognitive weariness (5 items), and Emotional exhaustion (3 items)	23-items of core dimensions/ BAT-C (exhaustion, mental distance, impaired emotional, and cognitive control) and 10-items of secondary dimension/ BAT-S (psychological and psychosomatic complaints)
Psychometric properties	Cronbach's Alpha of EE (0.89); Dp (0.77); and PA (0.74). Cronbach's Alpha of all item generally was 0.83 (Maslach & Jackson, 1981)	Cronbach's α of Exhaustion (0.87) and Disengagement (0.81)	Cronbach's Alpha of 0.86 (Malach-Pines, 2005)	Cronbach's Alpha of Personal burnout (0.87), Work-related burnout (0.87) and Client-related burnout (0.85) (Kristensen et al., 2005)	Cronbach's alpha of 0.94 (Shirom & Melamed, 2006)	Cronbach's Alpha for the total BAT-C was 0.95 and for the total BAT-S was 0.90 (Schaufeli et al., 2020)
Adopted by*	Sahin et al. (2020), Chalhub et al. (2021), Pérez-Chacon et al. (2021), Orrù et al. (2021), Lange et al. (2020), Ibar et al. (2021), Jose et al. (2020), Hu et al. (2020), Naldi et al. (2021), Chen et al. (2021)	Tan et al. (2020), Denning et al. (2021)	Miguel-Puga et al. (2021)	Gemine et al. (2021)	Afulani et al. (2021), Bell and Sheridan (2020)	Dijxhoorn et al. (2021)
Variation (after being adapted or modified) *	Single-item of EE by Morgantini et al. (2020) 2-items (EE and DP) by Doherty et al. (2022) and Nguyen et al. (2021) 5 items of EE by Pierce et al. (2021) 9 items of EE (Maunder et al. (2021) French version by Bruyneel et al. (2021) Turkish version (Murat et al., 2021) 9-items of the Abbreviated-MBI (Elhadi et al., 2020) German version (Zerbini et al., 2020) Dutch version by Poelmann et al. (2021) Japanese version (Matsuo et al., 2020)	Persian version (Hoseinabadi et al., 2020), 8-items exhaustion subscale of OLBI, Polish version (Baka, 2021)	N/A	Portuguese version (Baptista et al., 2021)	N/A	N/A
	N/A		N/A	N/A	N/A	N/A

(continued)

Table 2. Continued.

Burnout instrument	MBI	OLBI	BMS	CBI	SMBM	BAT
Result of retesting validity and reliability*	Cronbach's Alpha of 0.90 for EE, 0.79 for DP, and 0.71 for PA (Chen et al., 2021) Cronbach's Alpha of 0.88 for EE and 0.82 for PA and 0.69 for DP (Chalhub et al., 2021) Cronbach's alpha of 0.90 for EE, 0.79 for DP, and 0.71 for PA (Pérez-Chacón et al., 2021). Cronbach's alpha of 0.805 (Ibar et al., 2021) Cronbach's alpha of 0.90 for PA; 0.76 for DP and 0.89 for EE (Murat et al., 2021) Cronbach's alpha for EE, DP and PA were 0.88; 0.83 and 0.82, respectively (Jose et al., 2020) Cronbach's alpha of 0.76 for EE, 0.66 for DP, and 0.71 for PA (Elhadi et al., 2020)	Cronbach's Alpha of Exhaustion (0.80) and Disengagement (0.83); RMSEA < 0.06; CFI (0.90) and SRMSR < 0.08 (Tan et al., 2020) Cronbach's Alpha 0.77 (Hoseinabadi et al., 2020) Internal consistency $\alpha = 0.77$ and $\omega = 0.79$ for exhaustion (Baka, 2021) Cronbach's Alpha 0.88 (Denning et al., 2021)				

MBI: Maslach Burnout Inventory; OLBI: Oldenburg Burnout Inventory; BMS: Burnout Measure-Short version; CBI: Copenhagen Burnout Inventory; SMBM: Shirom-Melamed Burnout Measure; BAT: Burnout Assessment Tool.
Note: *Data from eligible studies.

in each profession was also not balanced in the articles reviewed during this time.

From all of the articles reviewed, only 10 articles focused on researching the prevalence of burnout in health workers and its determinants (Baptista et al., 2021; Bruyneel et al., 2021; Doherty et al., 2022; Elhadi et al., 2020; Gemine et al., 2021; Hoseinabadi et al., 2020; Matsuo et al., 2020; Morgantini et al., 2020; Tan et al., 2020). The other articles have the aim of investigating the potential correlation of burnout with stress (Afulani et al., 2021; Dijxhoorn et al., 2021; Ibar et al., 2021; Murat et al., 2021; Orrù et al., 2021), anxiety (Baka, 2021; Chalhub et al., 2021; Hu et al., 2020; Miguel-Puga et al., 2021; Naldi et al., 2021; Sahin et al., 2020), trauma (Chen et al., 2021; Miguel-Puga et al., 2021; Orrù et al., 2021), depression (Chen et al., 2021; Hu et al., 2020; Murat et al., 2021) and other topics, so that in their research they use more than 1 instrument. However, this review was only focused on the instruments used to assess burnout syndrome.

From the 31 selected articles, 67% of the research or 21 articles used the Maslach Burnout Inventory (MBI), with various derived versions. In addition, we also identified 4 articles using the Oldenburg Burnout Inventory (OLBI), 1 article using the Burnout Measure-Short version (BMS), 2 articles using the Copenhagen Burnout Inventory (CBI), 2 articles using the Shirom-Melamed Burnout Scale (SMBM), and 1 article using the Burnout Assessment Tool (BAT). A description of the characteristics and variations in the use of each instrument based on the results of a review of the 31 eligible articles is available in Table 2.

Synthesis of result: burnout instrument mapping according on its characteristics

Burnout instruments for health workers during the COVID-19 pandemic can be described according to several characteristics. The first characteristic, based on the target population, of the burnout instruments, was divided into two groups. The first group is an instrument developed specifically for workers in human services, including Health Professionals (MBI-HSS and CBI). The second group includes the instruments developed for workers in general (MBI-GS, OLBI, BMS, SMBM, and BAT).

The second characteristic is based on its dimensions or subscales. The instrument with the highest number of subscales is BAT (6 subscales). However, in this review, several articles used only one subscale to assess burnout. The only subscale that occurs frequently, even referred to as the core of burnout according to theoretical studies and statistical evidence is exhaustion. So, the articles can be mapped into two groups. The first group is instruments that only use a single subscale/dimension: exhaustion. The second group includes the instruments that use more than one subscale (MBI, OLBI, SMBM, and BAT).

The third characteristic is the variety of use. The articles were grouped into 2, namely those who fully adopt and those who modify the instruments. In this review, the instruments fully adopted by users are BMS, CBI, SMBM,

and BAT. Meanwhile, MBI and OLBI are used in various ways depending on the dimensions and number of items. As with the largest number of users, MBI is also the instrument with the most variety of uses. In addition to the original 22-item version of the MBI, an article mentions the abbreviated-MBI, which is a short version consisting of 9 items (Elhadi et al., 2020). Apart from the multidimensional concept of burnout, some studies assess burnout from only one dimension using a 5-item (Pierce et al., 2021) and 9-item adapted from the Emotional Exhaustion (EE) dimension (Maunder et al., 2021). In addition, two studies using 2-item MBI adapted from the dimensions of EE and Depersonalization (DP) (Doherty et al., 2022; Nguyen et al., 2021) and 1 study using only single-item adapted from EE (Morgantini et al., 2020). These short instruments make the burnout construct dichotomous ("burnout if it has a score of 3" and "no burnout if the score is <3") instead of a continuum construct like the 'original' MBI concept. Agreeing with Pierce et al. (2021) and Maunder et al. (2021), Baka's Baka (2021) preference adapts the 8-item exhaustion only, instead of all items from the OLBI. These short versions of the instruments have been validated and have a strong correlation with the measurement results of the longer versions of the instruments.

The fourth characteristic relates to the instrument's psychometric properties applied to the research population. The articles were separated between those who reported retesting of psychometrics and those who did not. In the first group, only 11 studies reported psychometric properties, most of which were represented by reliability coefficients (Cronbach's). Compared to the original version of MBI, 6 studies showed better results when retesting the validity and reliability of MBI in their study population (Chalhub et al., 2021; Chen et al., 2021; Elhadi et al., 2020; Jose et al., 2020; Murat et al., 2021; Pérez-Chacón et al., 2021). Only one study shows that Cronbach's coefficient is slightly lower than the general coefficient for all MBI items (Ibar et al., 2021). Among OLBI users, only one article showed better psychometric results (Denning et al., 2021), while 3 other OLBI users reported lower results than the original version (Baka, 2021; Hoseinabadi et al., 2020; Tan et al., 2020). Users of the BMS, CBI, SMBM, and BAT instruments were included in the second group (20 articles) that did not report the results of retesting the psychometric instruments to the study population. The author's preference was based on testing the validity and reliability of the instrument in previous studies.

Discussion

Summary of evidence

This scoping review has identified six instruments for burnout assessment for health workers during the COVID-19 pandemic. Several other instruments that have been identified but have been eliminated in the article screening process are the Mini-Z survey, the Stanford Professional Fulfillment Index, the Professional Quality of Life, and the Physicians Work-life Study. Elimination is done because

these instruments do not specifically assess the burnout construct, or the burnout context is only one dimension in another construct. In addition to the six identified instruments, it is known that there are several other specific instruments for assessing burnout (Hamburg Burnout Inventory, Bergen Burnout Inventory, Granada Burnout Questionnaire, and others), but these were not included in the review because they were not found in eligible research.

Among the six instruments identified, MBI still dominates burnout research on health workers during the COVID-19 pandemic. Based on the analysis in this review, it is known that several factors are the advantages of MBI. First, MBI has many variations, one of which is very specific to the population of health workers, namely the MBI-Human Service Survey for Medical Personnel (22-item). However, not all studies used this version. Second, in this review, the number of studies reporting better scores on the psychometric retest compared to the original was greater than those with lower scores (6:1). Third, MBI has many versions of languages, so it is more applicable to use in various populations in many countries.

For eligible articles, the authors do not provide specific reasons or explicit preferences to justify the choice of instrument. Instruments developed for workers and humans, in general, are still widely used, although there are already instruments specifically developed for health workers. At the same time, burnout tends to be more about workplace conditions and the relationship between the organization and its workers, instead of about the internal conditions of the worker (Maslach & Jackson, 1981). Accordingly, the specificity of the target population should also be considered as a preference. Moreover, health workers are a profession that has a high burnout tendency due to various stressors, such as high workload, time pressure, skill demands, uncertainty regarding patient care, low social support at work, and emotional attachment when serving patients who suffer (Portoghese et al., 2014).

The description of the burnout assessment results reported by eligible articles in the key-findings column in Table 1 varies widely. It cannot be separated from preferences based on the conceptual assumption that burnout is a multidimensional or unidimensional construct, a methodological approach that sees burnout as a continuous or dichotomous variable, and burnout assessment or data analysis. Although there is already a consensus on the definition of burnout that has been agreed upon by experts from 29 countries (Guseva Canu et al., 2021), there is no consensus yet on formulating a standard burnout research methodology.

The multidimensional approach has emerged since its initial definition that burnout is a psychological syndrome as a response to chronic stress at work that is not only physically visible (in the form of feeling very tired for a long time, often suffering from headaches, digestive disorders and difficulty sleeping), but also from behavior (irritability, unresponsiveness and withdrawal) (Guseva Canu et al., 2021). Several instruments were developed from this approach, including the MBI, OLBI, and BAT. MBI consists

of dimensions of emotional exhaustion as a key aspect associated with negative behavior or depersonalization and resulting in a decrease in self-achievement or professional efficacy (Maslach & Jackson, 1981). In contrast to MBI, OLBI does not agree on professional efficacy as a burnout dimension and simplifies it into 2 dimensions, namely exhaustion and disengagement (Demerouti & Bakker, 2008). In comparison, the BAT is more complex by separating the core dimensions (exhaustion, mental distance, impaired emotional, and cognitive control) and secondary dimensions (psychological and psychosomatic complaints), which can be analyzed separately or together in a composite score (Schaufeli et al., 2020). This approach is suitable to see that burnout conditions in each person can be different from one another. Consequently, the results of the analysis can only show a relative burnout score and not an absolute score.

The unidimensional approach emerged based on various theoretical perspectives that mention exhaustion as a key dimension of burnout. Through testing various theoretical models, statistical evidence has also concluded exhaustion is a core dimension of burnout (Cartwright & Cooper, 2009). As a result, an alternative thought emerged to simplify the burnout dimensions only by exhaustion. In the CBI instrument, exhaustion is the core dimension but is developed with attributes into personal, work, and 'client' sub-domains (Kristensen et al., 2005). Whereas in BMS, exhaustion is more specifically described with three dimensions: physical, emotional, and mental exhaustion (Malach-Pines, 2005). Somewhat similar but with differences, SMBM describes the dimensions of exhaustion divided into physical, emotional, and cognitive exhaustion(Shirom & Melamed, 2006). The advantage of the unidimensional approach is that it can simplify the results to provide a better understanding, especially if the study looks at the effects of an intervention. Although exhaustion is the main criterion for burnout, it is not enough. If one exhaustion dimension is sufficient, there should be no need for the term 'burnout' to denote a new construct (Cartwright & Cooper, 2009).

The conceptual understanding of burnout as a multidimensional or unidimensional construct will then have an impact on the assessment methodology, where burnout is classified as a continuous variable (with a range of 'none,' 'mild,' to 'severe') or dichotomous variable ('burnout' or 'no burnout."). If burnout is seen as a continuous variable, then the usual analysis is to regress the burnout level on other continuous variables or structural equation models. The presentation of the results in eligible articles is generally about the average relative burnout score in a group or correlation with other variables (Bell & Sheridan, 2020; Chen et al., 2021; Gemine et al., 2021; Hoseinabadi et al., 2020; Lange et al., 2020; Murat et al., 2021; Pérez-Chacón et al., 2021). While practitioners usually see burnout as a dichotomous variable to inform medical diagnoses, it is easier to compute the incidence, proportion or percentage, prevalence, and relative risk to predict burnout with an odds ratio (Cartwright & Cooper, 2009). Dichotomous categorization usually uses a cut-off point that is determined based on

statistical or diagnostic criteria (Baptista et al., 2021; Denning et al., 2021; Doherty et al., 2022; Morgantini et al., 2020; Nguyen et al., 2021). However, for some practical reasons, some studies which view burnout as a multidimensional construct simplify the results by making burnout a dichotomous variable with criteria for high EE levels combined with either high DP or low PA (Bruyneel et al., 2021; Poelmann et al., 2021).

Aside from a conceptual understanding of burnout, another factor to consider when selecting an instrument is its psychometric quality. The better the psychometric quality, the stronger the trust in the research results obtained. The researchers chose the seven instruments in this review because they have good psychometric properties (see Table 2). However, not all studies have retested their population. Some reported instrument quality based on psychometric tests conducted in previous studies, although they were not specific to studies that had a population of health workers (Afulani et al., 2021; Bell & Sheridan, 2020; Dijxhoorn et al., 2021; Matsuo et al., 2020; Miguel-Puga et al., 2021; Poelmann et al., 2021). The coefficient indicating the psychometric quality is not constant and depends on the characteristics of the sample applied. The coefficient is considered adequate if the characteristics of the sample from the research target and the confirmed reference sample are similar (Aguayo et al., 2011).

Each instrument has its advantages and disadvantages. Here is some additional information based on this review analysis that can be considered. MBI is the most widely used instrument with various variations, and other researchers retested its validity and reliability. However, the inconsistency of using the instrument due to various modifications to the items and the response format can reduce the quality of the evidence for the validity of the content of the instrument itself (Shoman et al., 2021). Based on the conclusion of a systematic review study, OLBI is an instrument that has complete validation, has a fairly good quality of evidence for content validity, and there are no differences of opinion when checking the correctness of the interpretation of the results (Shoman et al., 2021). OLBI also has two-way (positive-negative) items that are psychometrically better than one-way items (Demerouti & Bakker, 2008). However, this procedure is considered problematic because the positive items of burnout are confused with the opposite term (work engagement) (Schaufeli et al., 2020). BMS and SMBM have the advantage of providing a single score that makes computing easier. CBI is formulated to be used for both workers and non-workers with its three-tiered sub-dimensions. However, BMS, CBI, and SMBM use a unidimensional approach that ignores the multi-faceted nature of burnout (Schaufeli et al., 2020). Answering the shortcomings of the previous instrument, BAT was developed with the most complex dimensions and items. Complex instruments are better at providing more precise results (Rohland et al., 2004). However, filling out complex questionnaires also takes a longer time, so it has an impact on the low participation of respondents (Orrù et al., 2021).

The COVID-19 pandemic situation, which directly or indirectly affects the workload of health workers, should be considered when choosing a more efficient instrument. The use of a shorter version can be understood as an effort to increase the participation of health workers in the survey, which has traditionally been low due to the busy clinical work setting. This short and simple instrument has proven to be suitable for use in large-scale research involving health workers from 60 countries worldwide (Morgantini et al., 2020). Although the results of a 'diagnosis' with a single-item measure of simplifying the burnout construct are difficult, it is hoped that it will contribute to research or practice (Cartwright & Cooper, 2009).

In this review, 17 studies adopted a valid and well-established instrument, while others adapted a derivative version or modified the instrument. Modifications were made because the existing items were difficult to investigate specific burnout attributes due to the COVID-19 pandemic (Doherty et al., 2022). It shows that the available instruments are not comprehensive enough to accommodate burnout disorders in specific situations such as the COVID-19 pandemic.

Limitations and future directions

This scoping review focuses on studies using burnout instruments with health worker participants during the COVID-19 pandemic. As part of the research on developing burnout instruments in the COVID-19 pandemic situation for health workers in Indonesia, mapping what instruments have been used by previous researchers worldwide is very important as initial research. This review did not consult with health care institutions to gather information about whether they had conducted burnout assessments on their staff and, if so, how they measured it at an individual or collective level. In addition, there is the question of whether the instruments used, which are often not designed with the specific pandemic situation in mind, are truly appropriate for health workers. Further understanding of what constructs are most important for assessing burnout in healthcare workers in a pandemic situation, with multidisciplinary input from stakeholders, is needed to develop a more comprehensive instrument. Consultation with stakeholders combined with findings from this scoping review can guide how to assess burnout to improve the mental well-being of health workers in a pandemic situation.

The purpose of this scoping review is to describe and map the burnout instrument used by studies on health workers during the COVID-19 pandemic, not to provide an in-depth analysis or methodological evaluation of these studies. The period during the COVID-19 pandemic (2 years) also limited the screening studies. A systematic review of the methodological assessment of burnout and/or the factors that most influence burnout in health workers during a pandemic is highly recommended to be investigated in subsequent meta-analyses. The occurrence of other outbreaks before COVID-19 also needs to be studied to expand the scope of the review or compare the burnout conditions experienced by health workers due to outbreaks from time to time.

Conclusions

The COVID-19 pandemic exacerbates the risk of burnout for healthcare workers. Among the burnout instruments identified in this review (MBI, OLBI, BMS, CBI, SMBM, and BAT), it is known that MBI still dominates burnout research on health workers during the COVID-19 pandemic. The researcher's preference for choosing the burnout instrument is not always clear and pragmatic. This review also underscores the fact that there are many modifications and variations in using these instruments. These modifications indicate that the existing items have not sufficiently 'captured' the burnout phenomenon in specific health workers due to the COVID-19 pandemic. The large variety of instruments shows that measurement inconsistencies are rooted in the lack of consensus on the conceptualization of burnout. The many variations of burnout instruments provide some alternatives but at the same time can be seen as a gap that challenges researchers to develop more comprehensive burnout instruments, especially during the COVID-19 pandemic.

Disclosure statement

The authors state that there is no potential conflict of interest in the research described in this paper.

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Data availability statement

As a scoping study, no data are attached to this manuscript.

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