

Prevalence of burnout among nurses in sub-Saharan Africa: a systematic review

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ABSTRACT

Objective: The objective of this review was to determine the prevalence rates for burnout among nurses working in countries within the sub-Saharan Africa region.

Introduction: Burnout is a response to chronic work-related stress. While there is ample information on its prevalence and risk factors in well-resourced settings in high-income countries, it remains poorly studied in the low- and middle-income countries of sub-Saharan Africa, which bear the larger share of the global burden of disease.

Inclusion criteria: This review considered studies from sub-Saharan Africa that identified the prevalence of burnout among nurses using standard measurement tools.

Methods: A three-step search strategy was utilized to identify both published and unpublished studies in English. Databases (MEDLINE, Embase, CINAHL, and others) were searched from inception to January 2019. Study selection, critical appraisal, data extraction, and data synthesis were conducted according to JBI methodology.

Results: A total of 12 studies (n = 2543 nurses) from seven African countries were included in this review. Eight of these studies were cross-sectional by design while the others were either exploratory, longitudinal, surveys, or descriptive. Ten studies were deemed to be at low risk of bias. According to the Maslach Burnout Inventory (seven studies, n = 1923), the prevalence of emotional exhaustion was 66% (95% confidence interval [CI], 37% to 89%), 60% (95% CI, 31% to 85%) for depersonalization, and 49% (95% CI, 19% to 80%) for low personal achievement. The overall prevalence of burnout among studies that utilized the Professional Quality of Life Scale (three studies, n = 337) was 87% (95% CI, 54% to 100%). One study reported a prevalence of 51% (95% CI, 44% to 57%) using the Copenhagen Burnout Inventory (n = 237), and the final study reported a prevalence of 33% (95% CI, 21% to 47%) using an unspecified measuring tool (n = 46).

Conclusions: Regardless of the measuring tool used, nurses in sub-Saharan Africa experience high levels of burnout in all its dimensions.

Keywords Burnout; nursing; sub-Saharan Africa

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Introduction

Burnout is a response to chronic stress that comprises three dimensions: emotional exhaustion, depersonalization, and personal accomplishment.¹ In the context of health care, emotional exhaustion involves the physical and emotional overload resulting from interaction with co-workers

and other health care users, while depersonalization refers to the development of cynical attitudes and responses towards fellow workers and the beneficiaries of the services that one provides.¹ Reduced personal accomplishment is the tendency to develop a negative self-concept as a consequence of exposure to unrewarding situations.¹ Burnout impacts negatively on the performance of an individual, and it leads to diminished job productivity.² Over the past decade, the prevalence of burnout has been noted to have increased substantially, and in modern working environments, it is becoming a significant problem

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with potential effects on various sectors of a country's economy (including health care).³

Owing to the nature of their work, nurses are often exposed to more stressful situations compared to other health care workers. They spend more time with patients and are constantly exposed to the emotional strains of caring for the sick and dying. In such situations, environmental demands often exceed individual resources and stress is likely to be perceived.⁴ Other sources of stress in the nursing profession include role ambiguity, role conflict, work overload, poor interrelationships in the work place, shortage of nurses, lack of opportunities for advancement, lack of support, and poor compensation for overtime.⁵ Working in such complex settings and facing multiple stressors over time can result in burnout.⁶ Indeed, it has been shown that compared to the general population and other health care professionals, nurses have higher levels of stress and burnout.^{7,8}

The impact of burnout can be felt in its effects on health care professionals and clinical outcomes, both of which are negatively affected.⁹ Among physicians and nurses, its relation to high levels of emotional exhaustion leads to an increase in morbidity associated with any related psychiatric disorders these health care workers may have.¹⁰ However, nurses are especially vulnerable to work-related mental disorders since their work (patient care, education, management, research, and political participation) consists of actions that depend on intense interpersonal relationships that occur in dynamic and overloaded work contexts.¹¹ Also, burnout in nurses negatively affects the quality of nursing care delivered to patients and family members at a time when humanization in health care is a priority. Further, burnout is not only detrimental to the individual worker, but also to the organization, as it reduces productivity and affects the quality of services provided.²

There have been several attempts at quantifying the burden of burnout. Sirsawy and colleagues¹² found the prevalence of burnout among the general working population to be 18%, and this increases to 28% among care-giving professionals such as nurses and doctors. Lorenz and colleagues¹¹ investigated the existence of burnout in a university tertiary hospital using the Maslach Burnout Inventory (MBI). They found the presence of burnout in 7.3% of nurses.¹¹ In another study, Quattrin and

colleagues¹³ found that 35% of nurses had a high level of emotional exhaustion, 17% had a high level of depersonalization, and only 11% had a high level of personal achievement. They also found significantly higher levels of emotional exhaustion among nurses older than 40 years with a working seniority of more than 15 years, those who had chosen to work on an oncology ward, and those who wanted another work assignment. In Singapore, one study identified 39% of nurses to have high emotional exhaustion, 40% to have high depersonalization, 59% to have a low sense of personal accomplishment, and the overall prevalence of burnout was 33.3%, with higher levels of burnout among nurses who worked in rehabilitation wards.⁹ In Japan, approximately 36% of human services professionals, such as nurses, were burned out compared to 18% of civil servants, and 12% of company employees pointing to the high risk of burnout among nurses.¹⁴

Although there is adequate information on the prevalence and risk factors for burnout, the majority of studies have been conducted in well-resourced settings in high-income countries. However, considering that the largest share of the global burden of disease is found in low- and middle-income countries, there is a paucity of data concerning burnout among health care professionals working in such areas, particularly in sub-Saharan Africa where health care systems remain underdeveloped and the impact of burnout on the health care system is un-quantified. This systematic review seeks to close this informational gap by attempting to synthesize the best available evidence on the prevalence of burnout among nurses in sub-Saharan Africa. This evidence will help guide nurses, researchers, and policy-makers in devising ways to counteract its effects and optimize nurse well-being and patient outcomes. A search for similar reviews in MEDLINE, Embase, Cochrane Library, *JBIR Database of Systematic Reviews and Implementation Reports*, and PROSPERO did not yield any results.

Review question

What are the prevalence rates for burnout among nurses working in countries within the sub-Saharan Africa region?

Inclusion criteria

Participants

This review considered studies that included all levels of nurses directly involved in patient care; midwives were also included in two studies. Studies that assessed burnout in a combined cohort of health care workers (i.e. doctors, nurses, and other allied health practitioners) but had separate data on nurses alone were also considered for inclusion.

Concept

This review primarily considered studies that assessed and reported on the prevalence of burnout among nursing staff as determined by the MBI. Studies that reported only the individual components of the MBI (i.e. emotional exhaustion, depersonalization, and personal accomplishment)¹⁵ were considered for inclusion as were studies that utilized other validated tools to determine the presence/absence of burnout, and studies that measured/reported burnout using non-validated/unspecified tools. The rationale for this was that such studies still provide a picture of the prevalence of burnout in Africa and omitting them would contribute to a biased outlook.

Context

This review considered both community and hospital-based studies that assessed and reported the prevalence of burnout among nursing staff. Only studies from countries in sub-Saharan Africa were considered.

Types of sources

This review considered observational study designs including prospective and retrospective cohort studies, case-control studies, and cross-sectional studies for inclusion.

Reviews, case series/reports, editorials, studies published as abstracts only or conference proceedings, and letters to the editor were excluded.

Methods

This systematic review was conducted in accordance with the JBI methodology for systematic reviews of prevalence¹⁶ utilizing an *a priori* protocol registered in PROSPERO (CRD42018105450).¹⁷

Search strategy

The search strategy aimed to find both published and unpublished studies. A three-step search strategy was utilized in this review. An initial limited search of MEDLINE and Embase was undertaken followed by analysis of the text words contained in the title and abstract, and of the index terms used to describe the article. A second search using all identified keywords and index terms was then undertaken across all included databases. Thirdly, the reference lists of all identified articles that were subsequently included in the review were searched for additional studies.

Information sources

The primary databases that were searched were MEDLINE, African Journals Online, CINAHL, and Embase. The search for unpublished studies and gray literature also included WHO Library and MedNar. In addition, the authors contacted experts in the field for any additional information concerning the review question, although this did not yield any more information.

Initial keywords used were “burnout,” “nurses,” and “Africa.” Only studies published in English were considered for inclusion in this review. Databases were searched from inception to January 2019. The search strategy for all searched databases is shown in Appendix I.

Study selection

Following the search, all identified citations were collated and uploaded into EndNote X7 (Clarivate Analytics, PA, USA) and duplicates removed. Titles and abstracts were screened by two independent reviewers, and those that did not fit the inclusion criteria for the review were excluded. Studies that seemed to meet the inclusion criteria were retrieved for full-text review and further evaluated by two independent reviewers. Among these studies, those that did not meet the inclusion criteria were excluded and reasons for exclusion noted. Any disagreements that arose between reviewers were resolved through discussion.

Selected studies were assessed for methodological quality by two independent reviewers using the standardized critical appraisal instrument for studies reporting prevalence data available from JBI.¹⁶ Any

disagreements that arose between reviewers were resolved through discussion. All results were included in the review regardless of the outcome of methodological quality assessment.

Data extraction

Data were extracted from included papers using a standardized data extraction tool for prevalence data available from JBI.¹⁶ Two independent reviewers were involved in the process. The data extracted included author names, year of publication and study setting, number and demographic characteristics of study participants, work experience in years, type of tool used to measure burnout, and proportion of participants determined to have burnout in general according to any subscales in a particular tool. Any disagreements that arose between reviewers were resolved through discussion. Where necessary, study authors were contacted to request missing or additional data, but this did not yield additional results.

Data synthesis

For each included study, the prevalence of burnout or an aspect of it (as determined by subscales within the measuring tool) was expressed as the proportion/percentage of study participants with burnout as determined by the measuring tool. The 95% confidence intervals (CIs) around these estimates were then determined. Meta-analysis was performed using a random effects model after Freeman-Tukey double arcsine transformation to stabilize variances. All statistical analyses were performed on STATA v.13 (Stata Corp LLC, Texas, USA) using the *metaprop* command as described by Nyaga *et al.*¹⁸ Heterogeneity was assessed visually and statistically using the standard I^2 statistic. Owing to varied socio-economic, geopolitical and other factors, the authors anticipated wide variation in effect estimates. However, because the main objective of this review was to provide an overall picture of the prevalence of burnout in sub-Saharan Africa, the authors did not let high levels of heterogeneity hinder meta-analysis. Although initially planned, subgroup and sensitivity analyses could not be performed for two reasons. First, included studies did not uniformly report variables that could have helped in creating subgroups for further analysis. Secondly, included studies had to be

categorized according to the tool used to measure burnout, and this created groups with small numbers of studies thus precluding meaningful subgroup or sensitivity analyses.

Results

Study inclusion

A total of 874 potentially relevant studies were identified from the database searches. After correction for duplicates, 702 remained. Of these, 663 were excluded after screening titles and abstracts. The remaining 39 articles were retrieved for full-text review. Of these, 27 articles were excluded and reasons for exclusion noted (Appendix II). The remaining 12 articles met the inclusion criteria and were thus included in this review. Six of the included studies were from South Africa,¹⁹⁻²⁴ two from Nigeria,^{25,26} and one each from Ethiopia,²⁷ Senegal,²⁸ and Uganda.²⁹ One study enrolled nurses from Kenya, Uganda, and Tanzania.³⁰ Eleven of these studies utilized a cross-sectional survey study design while one study utilized a longitudinal design to survey participants. Using the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA)³¹ format, the study selection process is presented in Figure 1.

Methodological quality

All included studies underwent critical appraisal. No study was excluded on the basis of the quality assessment. The reviewers assessed that all studies employed a sample representative of the target population and recruited participants appropriately. The majority of included studies described their subjects and study settings in adequate detail. However, one study did not provide demographic characteristics of included nurses.²¹ Data analysis was done appropriately in all included studies, and the authors attempted to identify relevant subgroups and employ relevant statistical controls to account for differences. The majority of the included studies employed objective and standard criteria to measure burnout. The tools employed have proven reliability, and some studies even went as far as measuring reliability using Cronbach's alpha. One study was not explicit on the tool used to determine burnout among study participants.²³ Ten out of 12 studies answered "Yes" for each critical appraisal question, meaning that the risk of bias across included studies was low. Table 1

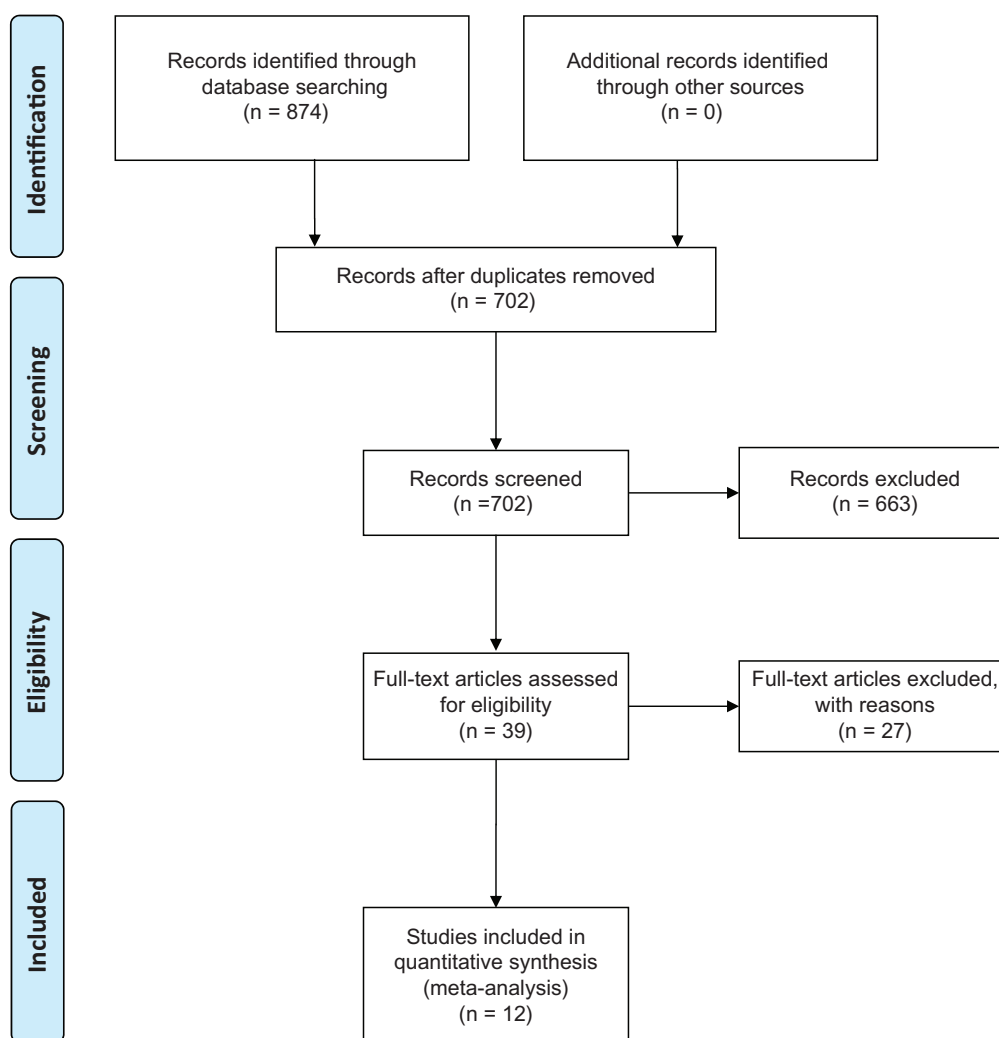


Figure 1: Search results and study selection and inclusion process³¹

gives a summary of the methodological quality of included studies.

Characteristics of included studies

Study participants and setting

A total of 2543 nurses from 12 studies were considered in this review. A cross-sectional study design was used in eight studies.^{19,21,22,25-27,29,30} Elkonin *et al.*²⁰ reported using a quantitative exploratory descriptive study design, Rouleau *et al.*²⁸ used a longitudinal study design, van Wijk *et al.*²³ used a pilot survey, and Wentzel *et al.*²⁴ utilized a descriptive survey.

Sample sizes ranged from 30 to 542 participants. Mean ages ranged from 28.6 years to 40.3 years.

Seven studies reported the mean duration of work experience among recruited participants. In six of these, mean work experience ranged from four years to 18.16 years.^{19,20,26-29} The remaining study reported that nearly two-thirds of participants had more than five years' experience working as nurses.²⁴

A total of five studies enrolled a specific cadre of nurses.^{28,29} Two studies exclusively enrolled midwives,^{28,29} one study focused on intensive care unit nurses,²⁰ another enrolled military nurses,²³ while another enrolled oncology nurses.²⁴ The remaining studies stated that nurses from across various hospital units were recruited.^{19,21,24-27,30} A summary of included studies is presented in Table 2.

Table 1: Critical appraisal of included studies

Study	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	%
Biksegn, <i>et al.</i> (2016) ²⁷	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
Davhana-Maselesele, <i>et al.</i> (2008) ¹⁹	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
Elkonin, <i>et al.</i> (2011) ²⁰	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
Engelbrecht, <i>et al.</i> (2008) ²¹	Y	Y	Y	N	Y	Y	Y	Y	Y	88
Okwaraji, <i>et al.</i> (2014) ²⁶	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
Lasebikan, <i>et al.</i> (2012) ²⁵	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
Makhado, <i>et al.</i> (2016) ²²	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
Muliira, <i>et al.</i> (2016) ²⁹	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
Rouleau, <i>et al.</i> (2012) ²⁸	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
Van der Doef, <i>et al.</i> (2012) ³⁰	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
Van Wijk, <i>et al.</i> (1997) ²³	Y	Y	Y	Y	Y	U	U	Y	Y	77
Wentzel, <i>et al.</i> (2018) ²⁴	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
Total (%) Yes	100	100	100	92	100	92	92	100	100	

Y, yes; U, unclear; N, no
 Critical appraisal questions:
 Q1. Was the frame appropriate to address the target population?
 Q2. Were study participants sampled in an appropriate way?
 Q3. Was the sample size adequate?
 Q4. Were the study subjects and the setting described in detail?
 Q5. Was data analysis conducted with sufficient coverage of the identified sample?
 Q6. Were valid methods used for identification of the condition?
 Q7. Was the condition measured in a standard, reliable way for all participants?
 Q8. Was there appropriate statistical analysis?
 Q9. Was the response rate adequate, and if not, was the low response rate managed appropriately?

Table 2: Characteristics of included studies

Study	Type	Characteristics	Measure	Results
Biksegn/ Ethiopia ²⁷	Cross sectional	237 general nurses working in a university teaching hospital. Mean age 28.6 ± 7.65 years and mean work experience of 4.57 ± 6.61 years.	Copenhagen Burnout Inventory. The mean score was the cut-off value. Those above the mean had burnout.	50.6% (n = 120) of nurses had burnout.
Davhana/South Africa ¹⁹	Cross-sectional	174 nurses caring for people with HIV/AIDS in provincial hospitals. Mean age 37 ± 9.2 years and mean work experience of 7 ± 7 years.	MBI. Mean values used to determine proportion with high scores (for emotional exhaustion and depersonalization) and low scores (for personal achievement).	33% of nurses had emotional exhaustion, 29% had depersonalization, and 52% had low personal achievement.
Elkonin/South Africa ²⁰	Quantitative exploratory descriptive design	30 nurses working in intensive care units in private facilities. Mean age 38.7 years (range: 26–57 years) and mean work experience of 18 years. General nurses 16 years (range 6–30 years) and intensive care unit nurses 8.28 years (0.5–20 years).	ProQOL Scale. Burnout categorized as low risk (below 19), moderate risk (19–28) and high risk (above 28). Moderate and high risk combined for further dichotomization.	86.7% (n = 26) of nurses had moderate to high risk of burnout.

Table 2: (Continued)

Study	Type	Characteristics	Measure	Results
Engelbrecht/ South Africa ²¹	Cross-sectional	542 professional nurses working in primary health care facilities. No demographic parameters reported.	MBI. Cut-off levels for low, moderate, and high levels for each subscale based on MBI manual.	99.8% (n = 541) of nurses had moderate to high levels of emotional exhaustion, 98.1% (n = 532) had moderate to high levels of depersonalization, and 99.2% (n = 538) had moderate to high levels of low personal achievement.
Okwaraji/ Nigeria ²⁶	Cross-sectional	210 nurses working in a university teaching hospital. Mean age 35.5 ± 8.34 years and mean work experience of 5.6 ± 2.6 years.	MBI. Subscales categorized as Yes or No. Cut-off values likely based on MBI manual.	42.9% of nurses (n = 90) had emotional exhaustion, 47.6% (n = 100) had depersonalization, and 53.8% (n = 113) had low personal achievement.
Lasebikan/ Nigeria ²⁵	Cross-sectional	270 nurses working in a general hospital. Mean age 38.3 ± 19.9 years.	MBI. Emotional exhaustion categorized as low (18 or less), average (19–26) or high (27 and above). Depersonalization categorized as low (5 or less), average (6–9), or high (10 and above). Personal achievement categorized as low (40 and above), average (39–34) or high (33 and below). Participants with average and high scores combined.	39.1% (n = 106) of nurses had high level emotional exhaustion, 29.2% (n = 79) had depersonalization, and 40% (n = 108) had low personal achievement.
Makhado/ South Africa ²²	Cross-sectional	233 nurses; 109 professional nurses, 58 enrolled nurses, and 66 nurse auxiliaries all working in provincial hospitals and caring for people with HIV/AIDS.	MBI. No explicit mention of how cut-off values were determined but likely as per MBI manual.	53.2% of nurses had emotional exhaustion, 83.7% had depersonalization, and 25.3% had low personal achievement.
Muliira/ Uganda ²⁹	Cross-sectional	224 midwives in rural district hospitals. Mean age 34 ± 6.3 years and mean work experience of 4 ± 2.1 years.	ProQOL Scale. Burnout categorized as low, average, or high based on the ProQOL manual.	A total of 220 (98%) nurses had average (n = 197) or high (n = 23) levels of burnout.
Rouleau/ Senegal ²⁸	Longitudinal	185 midwives working in the public sector. Mean age 40.3 ± 9.2 years and mean work experience of 8.1 ± 5.9 years.	MBI. Each subscale categorized as low, average, or high based on cut-off values reported in the MBI manual.	80% of nurses had emotional exhaustion, 57.5% had depersonalization, and 12.4% had low personal achievement.
van der Doef/ East Africa ³⁰	Cross-sectional	309 nurses from both public and private hospitals. Mean age 33.7 ± 8.7 years.	MBI. High emotional exhaustion and depersonalization were determined as the proportion above the 75 th percentile of scores, while high personal achievement was determined as the proportion below the 75 th percentile.	65.5% of nurses had emotional exhaustion, 31.2% had depersonalization, and 12.8% low personal achievement.
van Wijk/South Africa ²³	Pilot survey	46 military nurses with majority (n = 25) of age range 26–35 years.	Burnout Questionnaire. It is not specified how presence/absence of burnout was determined.	33% of nurses (n = 15) had burnout.
Wentzel/South Africa ²⁴	Descriptive survey	83 oncology nurses of mean age 38.9 years (range 23–65 years). 64% had more than five years of work experience.	ProQOL Scale. Cut-off values for low, average, and high burnout determined from the ProQOL manual.	61% of nurses (n = 51) had burnout.

MBI, Maslach Burnout Inventory; ProQOL, Professional Quality of Life

Measurement instruments

Included studies assessed burnout using three main scales. The MBI was used to assess burnout in seven studies ($n = 1,923$),^{19,21,22,25,26,28,30} the Professional Quality of Life (ProQOL) Scale was used in three studies ($n = 337$),^{20,24,29} and the Copenhagen Burnout Inventory (CBI) was used in one study ($n = 237$).²⁷ The final study utilized an unspecified burnout questionnaire ($n = 46$).²³

The MBI is a 22-item tool that measures burnout under three dimensions (emotional exhaustion, depersonalization, and personal achievement). For both emotional exhaustion and depersonalization, higher scores correspond to greater experience of burnout while for personal achievement, lower scores correspond to greater experienced burnout. Only three studies explicitly reported Cronbach's alpha as a measure of internal consistency/reliability of the MBI as applied in the study.^{19,21,25} The rest either did not report it or assumed it from previous surveys. Only two studies reported the mean values for each of the subscales of the MBI.^{21,28} While these seven studies reported discrete levels for the presence of each subscale of the MBI (low, moderate, high), the cut-off levels used to determine each level were often not clearly defined. One study²¹ based its cut-off levels on a study done in the Netherlands,³⁰ and another stated that cut-off values were based on the original report by Maslach and Jackson.³² In five studies, the manual by Maslach and Jackson was the likely basis for the reported cut-off values as it was cited in the methods section of these articles.

ProQOL Scale is a 30-item tool with three subscales (i.e. compassion satisfaction, compassion fatigue, and burnout). Scores for each subscale range from 0 to 50 with higher scores showing higher compassion satisfaction, higher compassion fatigue, and higher burnout. Two studies reported Cronbach's alpha as a measure of internal consistency/reliability.^{20,29} All studies reported the mean values for the three subscales, but one did not describe the cut-off values used.²⁹ In one study,²⁰ it was unclear how the cut-off values utilized in each subscale were derived, while another study²⁴ stated that cut-off values were employed based on the original study on ProQOL by Stamm *et al.*³³

The CBI is a 19-item tool with three dimensions of burnout (personal burnout, work burnout, and

client burnout). It assesses physical and emotional disturbances in terms of their severity and frequency. In the one study²⁷ that utilized this tool, the presence of burnout was determined by calculating the mean CBI score and using this number as a cut-off value for burnout. Participants with scores above the mean were deemed to have burnout. One study utilized an un-named questionnaire and provided no details of how burnout was measured.²³ Further details on the measuring tools identified in this review are presented in Table 2.

Review findings

Because included studies utilized different tools to measure burnout among nurses, pooling all of them was deemed inappropriate. However, findings from studies utilizing the same tools were pooled separately. Irrespective of the cut-off values used, studies categorized presence of burnout or its subscales as either low or high. The prevalence reported in the following section, therefore, is for high levels of burnout or its subscales.

Generally, the prevalence of burnout among nurses in included studies was high. In the seven studies using the MBI, the prevalence of emotional exhaustion ranged from 33% to 100%. The pooled prevalence was 66% with a 95% CI of 37% to 89% (Figure 2). The prevalence of depersonalization ranged from 29% to 98%. The pooled prevalence was 60% with a 95% CI of 31% to 85% (Figure 3). Low personal achievement had a prevalence ranging from 13% to 99%, with a pooled estimate of 49% with a 95% CI of 19% to 80% (Figure 4). Heterogeneity was determined using the I^2 statistic and was found to be very high (>97%) across these analyses. The number of included studies was not sufficient to help in investigating this level of heterogeneity. However, given that the seven studies in this analysis utilized similar definitions for burnout and its components, the observed heterogeneity may be due to a number of reasons. First, studies in this analysis may have used different cut-off levels to define the various sub-categories of burnout. Nonetheless, the impact of this is likely to be small. Second and more importantly, it is possible that the observed heterogeneity may be due to the different contexts in which burnout was measured. Studies included in this analysis were performed in different countries across Africa that have different work environments, which

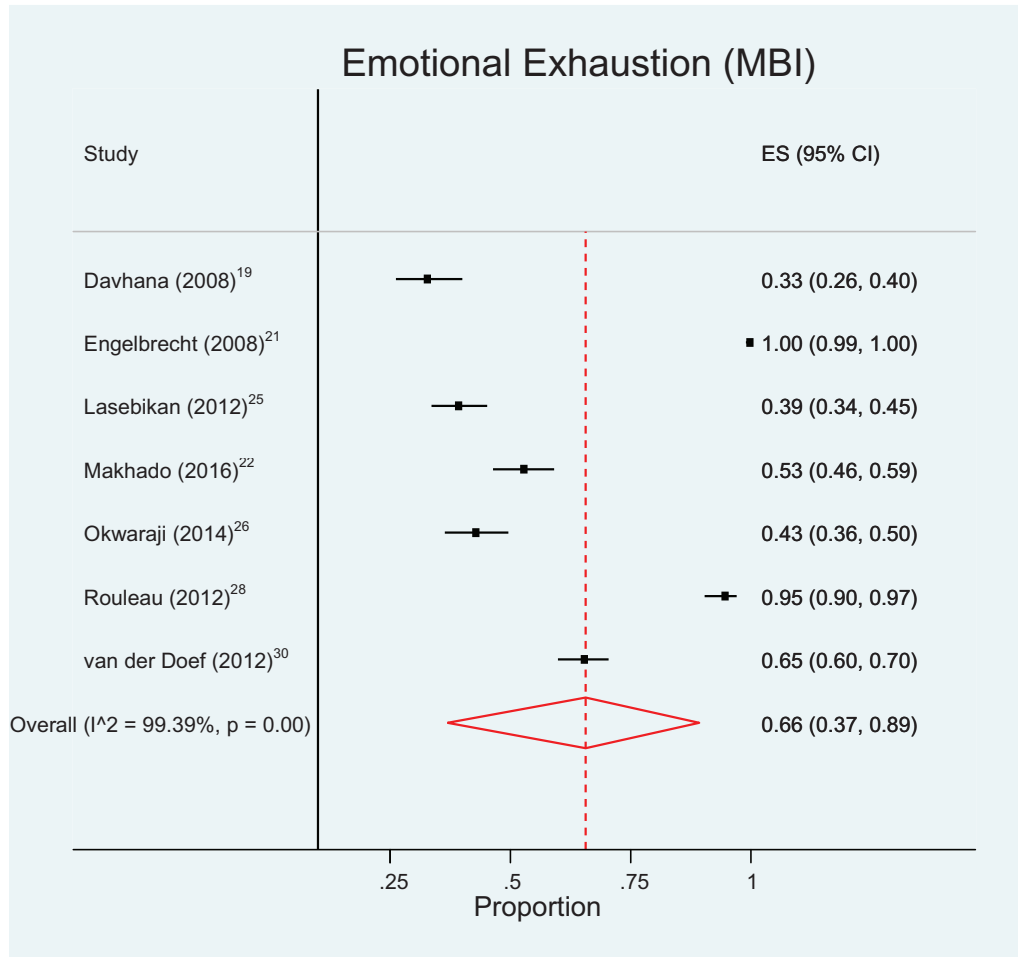


Figure 2: Forest plot showing point estimates with 95% confidence intervals for prevalence of emotional exhaustion among nurses in sub-Saharan Africa according to the Maslach Burnout Inventory (MBI)

in turn may impact the observed levels of burnout among nurses.

The prevalence of burnout among studies that utilized ProQOL Scale ranged from 61% to 98%. The pooled estimate using this tool was 87% with a 95% CI of 54% to 100% (Figure 5). As with the MBI, heterogeneity as measured by the I² statistic was very high (>97%) in this analysis. Only three studies assessed burnout using this tool and, therefore, it was not possible to investigate it further or even perform subgroup analysis. As with previous analysis, the high heterogeneity observed here may be due to differences in the context in which burnout was measured.

The prevalence of burnout according to the CBI was 51% with a 95% CI of 44% to 57%, while

according to the unspecified questionnaire, it was 33% with a 95% CI of 21% to 47%. Overall, more than a third of the nurses in these studies from sub-Saharan Africa have experienced burnout regardless of the tool used to measure it or the context in which it was measured.

Discussion

To the best of our knowledge, this is the first attempt at assessing the burden of burnout among nurses in sub-Saharan Africa. Compared to other regions in the world, sub-Saharan Africa bears the largest burden of disease, while at the same time being the least resourced and, therefore, least capable of handling this overwhelming burden. One of the many keys to

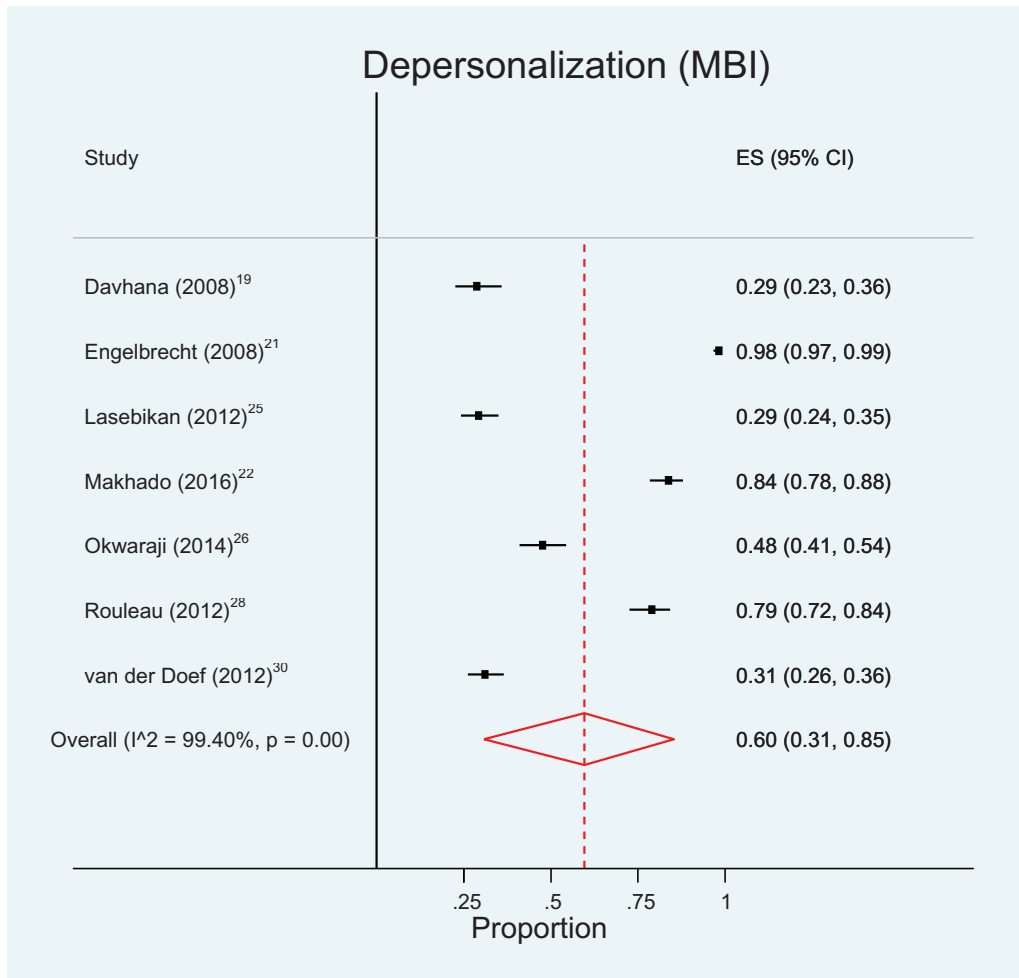


Figure 3: Forest plot showing point estimates with 95% confidence intervals for prevalence of depersonalization among nurses in sub-Saharan Africa according to the Maslach Burnout Inventory (MBI)

reversing this trend is having an adequately trained and motivated health care workforce. Burnout is an indicator of an overwhelmed and demotivated workforce, leading to absenteeism, medical errors, and decreased patient safety. These factors are detrimental to the goal of reversing Africa’s health care problems as envisioned in sustainable development goal number 3.³⁴

Overall, we report high levels of burnout and its subscales among nurses in sub-Saharan Africa. Up to two-thirds of nurses had emotional exhaustion as determined by the MBI. This is much higher than what is reported in similar reviews. Manslave-Reyes *et al.*³⁵ reported a prevalence of 28% among primary

care nurses from Europe and Latin America, Pradas-Hernández *et al.*³⁶ reported a prevalence of 31% among pediatric nurses mostly from North America, while Cañadas-De la Fuente *et al.*³⁷ reported a prevalence of 30% among oncology nurses from Europe, America, and Australasia.

In this review, the prevalence of depersonalization ranged from 29% to 98% with a pooled estimate of 60%. Similar reviews report prevalence ranging from 15% to 21%.^{35,37} Low personal achievement had an overall prevalence of 49%, which is higher compared to similar reviews that report a prevalence of low personal achievement ranging from 31% to 39%.^{35,36} The higher burden of burnout noted in

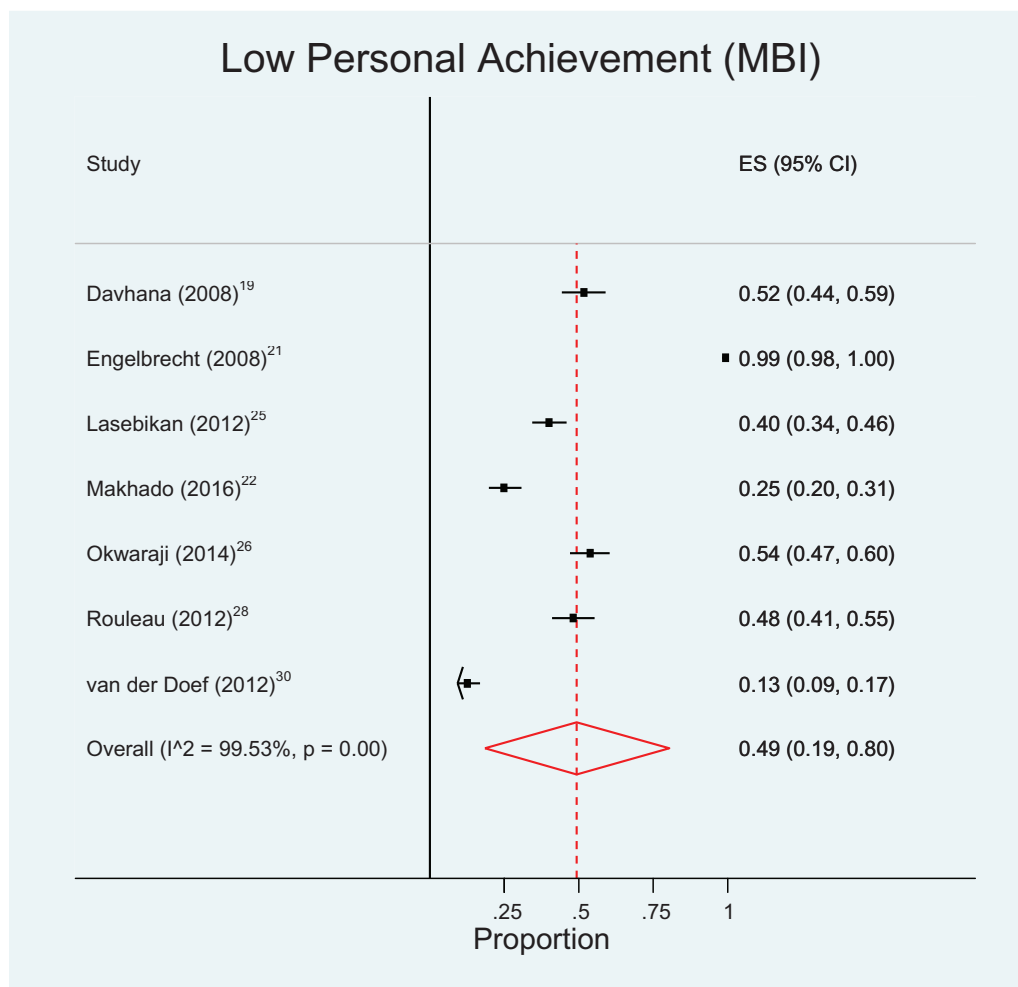


Figure 4: Forest plot showing point estimates with 95% confidence intervals for prevalence of low personal achievement among nurses in sub-Saharan Africa according to the Maslach Burnout Inventory (MBI)

this review may be because moderate and high levels of the three components of burnout were combined when determining their prevalence. Primary studies reported results in this way, and it was often not possible to further break down the results. In this review, the prevalence of burnout according to Pro-QOL was high at 87%. We did not find similar reviews using this tool among nursing populations. Similarly, at 51%, the CBI also indicated a high level of burnout with no opportunity for comparison with similar reviews.

There may be a number of explanations for the high levels of burnout among African nurses. The most obvious one is nursing workforce shortages. Out of the 58 countries in the world with

health care staff shortages, 36 are in Africa.³⁸ Nursing as a cadre is particularly affected by this shortage. Worse still, while more nurses are needed throughout the continent, increasing numbers of existing nurses are leaving for better-paying opportunities abroad, thus compounding the problem further. In Kenya, for instance, emigration of highly trained nurses to other countries has contributed to a significant shortage of health workers that almost cripples health care delivery.³⁹ The Ministry of Health in Kenya approximates that there are only 17,000 nurses in the public sector against a need of 35,000.⁴⁰ In addition to staff shortages, nurses in Africa often work in unsupportive environments. They work longer hours

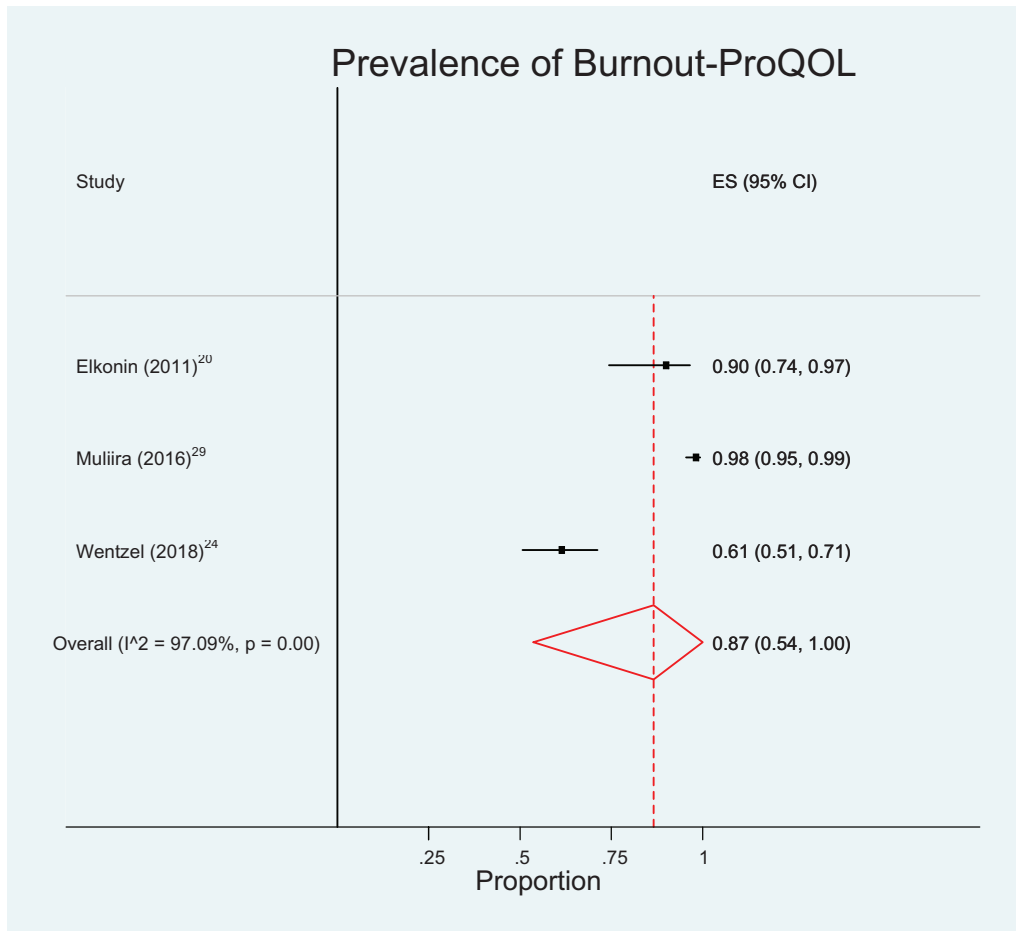


Figure 5: Forest plot showing point estimates with 95% confidence intervals for prevalence of burnout among nurses in sub-Saharan Africa according to the Professional Quality of Life (ProQOL) Scale

with insufficient supplies and for little pay.⁴¹ Such environments are more likely to result in higher levels of burnout, as has been shown in South Africa.⁴² Further still, elements such as nurse involvement in decision-making⁴³ and autonomy⁴⁴ (which have been shown to reduce burnout levels) are almost non-existent in most African health care settings.

Besides staff shortages, the complexity of working conditions as seen in sub-specialty practice may also influence burnout levels among nurses. For instance, working in the emergency department may lead to substantial anxiety and burnout,⁴⁵ while pediatric nurses have been reported to have moderate to high levels of emotional exhaustion and depersonalization.^{36,46} These findings are similar for oncology nurses.³ There are also unique stressors among

nurses in military settings. They often work in outlying hospitals with logistical challenges, reduced emotional support, and shortages – factors that have been postulated to increase burnout.^{23,47}

While the MBI is the most commonly employed tool for determining burnout, the authors identified studies that utilized other tools. These studies did not explicitly mention the reason for not using the MBI; however, it is likely related to a longstanding critique of the MBI. The cut-off values used to dichotomize presence/absence of burnout have been criticized for being arbitrary. They were derived from models that split a normative population into thirds and determined that individuals with “high” burnout were those in the upper third percentile. This approach has been deemed inaccurate. Nonetheless, a closer look at the other tools (i.e. CBI and the ProQOL

Scale) still presents this problem, and perhaps more research in this area is warranted.

Inadequate staffing numbers, poor pay, lack of continuing educational opportunities, and poor job satisfaction are some of the issues suggested as underlying factors contributing to burnout among nurses in studies from other parts of the world.⁴⁸ These factors are similar to those identified in African studies in which the following factors stand out: job insecurity, interpersonal conflicts (with managers and other health care professionals), lack of resources, time pressure/workloads, and poor wages.^{20,21,25,30} Regardless of the underlying problems with the measurement tools, burnout continues to be a significant issue among nurses in sub-Saharan Africa.

Conclusions

The authors acknowledge that this review exhibits some strengths and weaknesses. This review investigated an issue that is relevant and useful for policy makers, clinicians, and researchers alike. Further, an explicit methodology was employed, which reduces the risk of bias in the review findings.

Conversely, only English-language studies were considered for inclusion, which introduces bias in the effect estimates, and resulted in the exclusion of two studies^{49,50} (one in French and another in Afrikaans). Additionally, there was a high level of heterogeneity observed during meta-analysis. While it was not possible to investigate this further, it is likely that it represents underlying individual, socio-economic, and geopolitical factors in the populations included in the review. Another limitation of this review is that while studies included in meta-analysis reported the proportion of participants with the different facets of burnout, the exact scores used to determine prevalence was not explicitly stated in a number of studies. Nonetheless, the impact of this issue on the overall findings is likely to be small. A final weakness is that of the 12 studies included in this review, half represent one country. This affects the external validity of the findings of this review in terms of their applicability within the African continent.

In conclusion, irrespective of the measuring tool used, nurses in sub-Saharan Africa experience high levels of burnout. They have high rates of emotional

exhaustion, high rates of depersonalization, and a low sense of personal achievement.

Recommendations for research

This review contributes useful data on the prevalence of burnout among nurses in sub-Saharan Africa. However, in order to understand this problem further, it is necessary to pursue studies seeking to establish factors that increase nurses' risk for burnout and strategies that enhance coping. It is also important to note that burnout among nurses in sub-Saharan Africa is measured using tools designed in completely different environments. Future work in this area should look at designing a tool that measures burnout while considering the peculiarities of health care provision in Africa. Finally, it may also be beneficial to have studies that compare levels of burnout among the various cadres of health care professionals working in sub-Saharan Africa.

Recommendations for practice

The findings of this review draw the attention of health care administrators and practitioners to the existence of burnout among nurses in sub-Saharan Africa and the need to develop appropriate measures to prevent or reduce it. Interventions should be aimed at both the individual and the environment in which the individual works (JBI Grade of Recommendation = B).¹⁶

References

1. Maslach C, Jackson S. The measurement of experienced burnout. *J Organiz Behav* 1981;2(2):99–113.
2. Maslach C, Schaufeli WB, Leiter MP. Job burnout. *Annu Rev Psychol* 2001;52:397–422.
3. Cañadas-De la Fuente GA, Vargas C, San Luis C, Garcia I, Cañadas GR, De la Fuente EI. Risk factors and prevalence of burnout syndrome in the nursing profession. *Int J Nurs Stud* 2015;52(1):240–9.
4. Coyle D, Edwards D, Hannigan B, Fothergill A, Burnard P. A systematic review of stress among mental health social workers. *Int Soc Work* 2005;48(2):201–11.
5. Levert T, Lucas M, Ortlepp K. Burnout in psychiatric nurses: contributions of the work environment and a sense of coherence. *S Afr J Psychol* 2000;30(2):36–43.
6. Queiros C, Carlotto MS, Kaiseler M, Dias S, Pereira AM. Predictors of burnout among nurses: an interactionist approach. *Psicothema* 2013;25(3):330–5.
7. Aiken LH, Clarke SP, Sloane DM, Sochalski J, Silber JH. Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction. *JAMA* 2002;288(16):1987–93.

8. Aiken LH, Clarke SP, Sloane DM, Sochalski JA, Busse R, Clarke H, et al. Nurses' reports on hospital care in five countries. *Health Aff (Millwood)* 2001;20(3):43–53.
9. Tay WY, Earnest A, Tan SY, Ng MJM. Prevalence of burnout among nurses in a community hospital in Singapore: a cross-sectional study. *Proc Singapore Healthc* 2014;23(2): 93–9.
10. Renzi C, Pietro CD, Tabolli S. Psychiatric Morbidity and emotional exhaustion among hospital physicians and nurses: association with perceived job-related factors. *Arch Environ Occup Health* 2012;67(2):117–23.
11. Lorenz VR, Benatti MC, Sabino MO. Burnout and stress among nurses in a university tertiary hospital. *Rev Lat Am Enfermagem* 2010;18(6):1084–91.
12. Sirsawy U, Steinberg W, Raubenheimer J. Levels of burnout among registrars and medical officers working at Bloemfontein public healthcare facilities in 2013. *S Afr Fam Pract* 2016;58(6):213–8.
13. Quattrin R, Zanini A, Nascig E, Annunziata M, Calligaris L, Brusafarero S. Level of burnout among nurses working in oncology in an Italian region. *Oncol Nurs Forum* 2006;33(4):815–20.
14. Kitaoka K, Masuda S. Academic report on burnout among Japanese nurses. *Jpn J Nurs Sci* 2013;10(2):273–9.
15. Schuster RC, McMahon DE, Young SL. A comprehensive review of the barriers and promoters health workers experience in delivering prevention of vertical transmission of HIV services in sub-Saharan Africa. *AIDS Care* 2016;28(6): 778–94.
16. Munn Z, Moola S, Lisy K, Riitano D, Tufanaru C. Chapter 5: Systematic reviews of prevalence and incidence. In: Aromataris E, Munn Z (Editors) *JBIR Reviewer's Manual* [Internet]. Adelaide: JBI; 2017 [cited 22 Sep 2019]. Available from: <https://reviewersmanual.joannabriggs.org/>.
17. Owuor R, Mwita C, Anyango R, Mutungi K. Prevalence of burnout among nurses in sub-Saharan Africa: a systematic review protocol [Internet]. PROSPERO 2018 CRD42018105450. Available from: http://www.crd.york.ac.uk/PROSPERO/display_record.php?ID=CRD42018105450.
18. Nyaga VN, Arbyn M, Aerts M. Metaprop: a Stata command to perform meta-analysis of binomial data. *Arch Public Health* 2014;72(1):39.
19. Davhana-Maselesele M, Igumbor JO. The impact of caring for persons living with HIV and AIDS on the mental health of nurses in the Limpopo Province. *Curationis* 2008;31(2): 67–73.
20. Elkonin D, van der Vyver L. Positive and negative emotional responses to work-related trauma of intensive care nurses in private health care facilities. *Health SA Gesondheid* 2011;16(1):1–8.
21. Engelbrecht Mc, Bester CI, Van Den Berg H, Van Rensburg Hcj. A study of predictors and levels of burnout: the case of professional nurses in primary health care facilities in the free state. *S Afr J Econ* 2008;76(s1):S15–27.
22. Makhado L, Davhana-Maselesele M. Knowledge and psychosocial wellbeing of nurses caring for people living with HIV/AIDS (PLWH). *Health SA Gesondheid* 2016;21(1):1–10.
23. Van Wijk C. Factors influencing burnout and job stress among military nurses. *Mil Med* 1997;162(10):707–10.
24. Wentzel DL, Brysiewicz P. A survey of compassion satisfaction, burnout and compassion fatigue in nurses practicing in three oncology departments in Durban, South Africa. *Int J Afr Nurs Sci* 2018;8:82–6.
25. Lasebikan VO, Oyetunde MO. Burnout among nurses in a Nigerian general hospital: prevalence and associated factors. *ISRN Nurs* 2012;2012:402157.
26. Okwaraji FE, Aguwa EN. Burnout and psychological distress among nurses in a Nigerian tertiary health institution. *Afr Health Sci* 2014;14(1):237–45.
27. Biksegn A, Kenfe T, Matiwo S, Eshetu G. Burnout status at work among health care professionals in a tertiary hospital. *Ethio J Health Sci* 2016;26(2):101–8.
28. Rouleau D, Fournier P, Philibert A, Mbengue B, Dumont A. The effects of midwives' job satisfaction on burnout, intention to quit and turnover: a longitudinal study in Senegal. *Hum Resour Health* 2012;10:9.
29. Muliira RS, Ssendikadiwa VB. Professional quality of life and associated factors among ugandan midwives working in Mubende and Mityana rural districts. *Matern Child Health J* 2016;20(3):567–76.
30. van der Doef M, Mbazzi FB, Verhoeven C. Job conditions, job satisfaction, somatic complaints and burnout among East African nurses. *J Clin Nurs* 2012;21(11–12): 1763–75.
31. Moher D, Liberati A, Tetzlaff J, Altman DG; the PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Med* 2009;6(7):e1000097.
32. Maslach C, Jackson SE. The measurement of experienced burnout. *J Organiz Behav* 1981;2(2):99–113.
33. Stamm BH. The ProQOL manual. [Internet] 2010. [cited 24 Sep 2019]. Available from: <https://proqol.org/uploads/ProQOLManual.pdf>.
34. UN General Assembly. Transforming our world: the 2030 agenda for sustainable development. 2019 [cited 24 Sep 2019]. Available from: <https://www.refworld.org/docid/57b6e3e44.html>.
35. Monsalve-Reyes CS, San Luis-Costas C, Gomez-Urquiza JL. Burnout syndrome and its prevalence in primary care nursing: a systematic review and meta-analysis. *BMC Fam Pract* 2018;19(1):59.
36. Pradas-Hernández L, Ariza T, Gómez-Urquiza JL, Albendín-García L, De la Fuente El, Cañadas-De la Fuente GA. Prevalence of burnout in paediatric nurses: a systematic review and meta-analysis. *PLoS One* 2018;13(4):e0195039.
37. Cañadas-De la Fuente GA, Gómez-Urquiza JL, Ortega-Campos EM, Cañadas GR, Albendín-García L, De la Fuente-Solana El. Prevalence of burnout syndrome in oncology

- nursing: a meta-analytic study. *Psychooncology* 2018;27(5):1426–33.
38. World Health Organization. The world health report: working together for health Geneva, Switzerland: WHO; 2006.
 39. Chankova S, Muchiri S, Kombe G. Health workforce attrition in the public sector in Kenya: a look at the reasons. *Hum Resour Health* 2009;7:58.
 40. Ojwang BO, Ogutu EA, Matu PM. Nurses' impoliteness as an impediment to patients' rights in selected Kenyan hospitals. *Health Hum Rights* 2010;12(2):101–17.
 41. Gwaro J, Owino J. An inquiry into industrial action among nurses in Kenya: a management or a leadership failure? *BIRJ* 2017;7(Special Issue):1–5.
 42. Khamisa N, Oldenburg B, Peltzer K, Ilic D. Work related stress, burnout, job satisfaction and general health of nurses: a follow-up study. *Int J Nurs Pract* 2016;22(6):538–45.
 43. Van Bogaert P, Kowalski C, Weeks SM, Van Heusden D, Clarke SP. The relationship between nurse practice environment, nurse work characteristics, burnout and job outcome and quality of nursing care: a cross-sectional survey. *Int J Nurs Stud* 2013;50(12):1667–77.
 44. Panunto MR, Guirardello Ede B. Professional nursing practice: environment and emotional exhaustion among intensive care nurses. *Rev Lat Am Enfermagem* 2013;21(3):765–72.
 45. Wei R, Ji H, Li J, Zhang L. Active intervention can decrease burnout in ED nurses. *J Emerg Nurs* 2017;43(2):145–9.
 46. Hecktman HM. Stress in pediatric oncology nurses. *J Pediatr Oncol Nurs* 2012;29(6):356–61.
 47. Watkinson GE. Intensive stress? Caring under pressure. *J R Nav Med Serv* 1991;77(2):87–101.
 48. Hu HX, Liu LT, Zhao FJ, Yao YY, Gao YX, Wang GR. Factors related to job burnout among community nurses in Changchun, China. *J Nurs Res* 2015;23(3):172–80.
 49. Amamou B, Bannour AS, Yahia MBH, Nasr SB, Ali BBH. High prevalence of Burnout in the Tunisian units that support terminally ill patients. *Pan Afr Med J* 2014;19:16–22.
 50. Erasmus L, Poggenpoel M, Gmeiner A. Burnout among psychiatric nurses in a private, psychiatric hospital. *Curationis* 1998;21(2):9–16.
 51. Aguwa EN, Nduka I, Arinze-Onyia SU. Assessment of burnout among health workers and bankers in Aba South local government area, Abia state, South east Nigeria. *Niger J Clin Pract* 2014;17(3):296–302.
 52. Baltes A, Seleman T, Zombe O, Unkels R. Signs of burnout and coping strategies among healthcare workers in maternal and newborn care in two regions of Tanzania: a mixed methods study using the Maslach Burnout Inventory and indepth interviews. *Br J Obstet Gynecol* 2017;124(S1):20.
 53. Beer LT, Pienaar J, Rothmann S. Job burnout, work engagement and self-reported treatment for health conditions in South Africa. *Stress Health* 2016;32(1):36–46.
 54. Bhagavathula AS, Abegaz TM, Belachew SA, Gebreyohannes EA, Gebresillasie BM. Burnout syndrome among healthcare professionals working in gondar university hospital, north-west Ethiopia: a cross-sectional study. *Value Health* 2017;20(9):A884.
 55. Cilliers F. Burnout and salutogenic functioning of nurses. *Curationis* 2003;26(1):62–74.
 56. Gorgulu O, Akilli A. The determination of the levels of burnout syndrome, organizational commitment, and job satisfaction of the health workers. *Niger J Clin Pract* 2017;20(1):48–56.
 57. Hall EJ. Nursing attrition and the work environment in South African health facilities. *Curationis* 2004;27(4):28–36.
 58. Hojat M, Zeinijahromi M. The relationship between spiritual intelligence and burnout in nurses at Jahrom University of Medical Sciences-2018. *J Fundam* 2017;9(9):1419–25.
 59. Khamisa N, Oldenburg B, Peltzer K, Ilic D. Work related stress, burnout, job satisfaction and general health of nurses. *Int J Environ Res Public Health* 2015;12(1):652–66.
 60. Khamisa N, Peltzer K, Ilic D, Oldenburg B. Work related stress, burnout, job satisfaction and general health of nurses: a follow-up study. *Int J Nurs Pract* 2016;22(6):538–45.
 61. Khamisa N, Peltzer K, Ilic D, Oldenburg B. Effect of personal and work stress on burnout, job satisfaction and general health of hospital nurses in South Africa. *Health SA* 2017;22:252–8.
 62. Kim MH, Mazenga AC, Simon K, Yu X, Ahmed S, Nyasulu P, et al. Burnout and self-reported suboptimal patient care amongst health care workers providing HIV care in Malawi. *PLoS One* 2018;13(2).
 63. Klopper HC, Coetzee SK, Pretorius R, Bester P. Practice environment, job satisfaction and burnout of critical care nurses in South Africa. *J Nurs Manag* 2012;20(5):685–95.
 64. Kruse GR, Chapula BT, Ikeda S, Nkhoma M, Quitaro N, Pankratz D, et al. Burnout and use of HIV services among health care workers in Lusaka District, Zambia: a cross-sectional study. *Hum Resour Health* 2009;7:55.
 65. Ledikwe JH, Kleinman NJ, Mpho M, Mothibedi H, Mawandia S, Semo BW, et al. Associations between healthcare worker participation in workplace wellness activities and job satisfaction, occupational stress and burnout: a cross-sectional study in Botswana. *BMJ Open* 2018;8(3):e018492.
 66. Mathias CT, Wentzel DL. Descriptive study of burnout, compassion fatigue and compassion satisfaction in undergraduate nursing students at a tertiary education institution in KwaZulu-Natal. *Curationis* 2017;40(1):e1–6.
 67. McCusker P, Geel J. Low self-reported rates of burnout in Johannesburg nurses in one paediatric oncology unit. *Pediatr Blood Cancer* 2015;62:S191.
 68. Njim T, Mbanga C, Mouemba D, Makebe H, Toukam L, Kika B, et al. Determinants of burnout syndrome among nursing students in Cameroon: cross-sectional study. *BMC Res Notes* 2018;11(1):450.

69. Nwafor CE, Immanuel EU, Obi-Nwosu H. Does nurses' self-concept mediate the relationship between job satisfaction and burnout among Nigerian nurses. *Int J Afr Nurs Sci* 2015;3:71–5.
70. Roomaney R, Steenkamp J, Kagee A. Predictors of burnout among HIV nurses in the Western Cape. *Curationis* 2017;40(1):1–9.
71. Teffo ME, Levin J, Rispel LC. Compassion satisfaction, burnout and secondary traumatic stress among termination of pregnancy providers in two South African provinces. *J Obstet Gynaecol Res* 2018;44(7):1202–10.
72. Thorsen VC, Tharp AL, Meguid T. High rates of burnout among maternal health staff at a referral hospital in Malawi: a cross-sectional study. *BMC Nurs* 2011;10:9.
73. Ugwu LI, Enwereuzor IK, Fimber US, Ugwu DI. Nurses' burnout and counterproductive work behavior in a Nigerian sample: the moderating role of emotional intelligence. *Int J Afr Nurs Sci* 2017;7:106–13.
74. van der Colff JJ, Rothmann S. Burnout of registered nurses in South Africa. *J Nurs Manag* 2014;22(5):630–42.
75. Wilson D, Chiwakata L. Locus of control and burnout among nurses in Zimbabwe. *Psychol Rep* 1989;65(2):426.

Appendix I: Search strategy

(from inception to January 2019; no limits set)

Database	Terms	Records retrieved
MEDLINE via PubMed (Last search January 2019)	#1 (“Africa South of the Sahara“ OR ”sub-Saharan Africa”) #2 (Angola OR Benin OR Botswana OR “Burkina Faso” OR “Upper Volta” OR Burundi OR Urundi OR Cameroon OR Cameroons OR “Cape Verde” OR “Central African Republic” OR Chad OR Comoros OR “Comoro Islands” OR Comores OR Mayotte OR Congo OR Zaire OR “Cote d’Ivoire” OR “Ivory Coast”) #3 (“Democratic Republic of the Congo“ OR Djibouti OR “French Somaliland” OR Eritrea OR Ethiopia OR Gabon OR “Gabonese Republic” OR Gambia OR Ghana OR “Gold Coast” OR Guinea OR Kenya OR Lesotho OR Basutoland OR Liberia) #4 (Madagascar OR “Malagasy Republic” OR Malawi OR Nyasaland OR Mali OR Mauritania OR Mauritius OR Mozambique OR Namibia OR Niger OR Nigeria) #5 (Rwanda OR “Sao Tome” OR Seychelles OR Senegal OR “Sierra Leone” OR Somalia OR “South Africa” OR Sudan OR Swaziland OR Tanzania OR Togo OR “Togolese Republic” OR Uganda OR Zambia OR Zimbabwe OR Rhodesia) #6 (“burnout[MeSh]”) #7 (“compassion fatigue[MeSH]”) #8 (“burnout syndrome” OR “nurse burnout” OR “stress burnout” OR “maslach burnout”) #9 (#1 OR #2 OR #3 OR #4 OR #5) #10 (#6 OR #7 OR #8) #11 (#9 AND #10)	179
Embase (Last search January 2019)	#1 ‘Africa South of the Sahara’ OR ‘sub-Saharan Africa’ #2 Angola OR Benin OR Botswana OR ‘Burkina Faso’ OR ‘Upper Volta’ OR Burundi OR Urundi OR Cameroon OR Cameroons OR ‘Cape Verde’ OR ‘Central African Republic’ OR Chad OR Comoros OR ‘Comoro Islands’ OR Comores OR Mayotte OR Congo OR Zaire OR ‘Cote d’Ivoire’ OR ‘Ivory Coast’ #3 ‘Democratic Republic of the Congo’ OR Djibouti OR ‘French Somaliland’ OR Eritrea OR Ethiopia OR Gabon OR ‘Gabonese Republic’ OR Gambia OR Ghana OR ‘Gold Coast’ OR Guinea OR Kenya OR Lesotho OR Basutoland OR Liberia #4 Madagascar OR ‘Malagasy Republic’ OR Malawi OR Nyasaland OR Mali OR Mauritania OR Mauritius OR Mozambique OR Namibia OR Niger OR Nigeria #5 Rwanda OR ‘Sao Tome’ OR Seychelles OR Senegal OR ‘Sierra Leone’ OR Somalia OR ‘South Africa’ OR Sudan OR Swaziland OR Tanzania OR Togo OR ‘Togolese Republic’ OR Uganda OR Zambia OR Zimbabwe OR Rhodesia #6 ‘burnout’/exp #7 ‘compassion fatigue’/exp #8 ‘burnout syndrome’ OR ‘nurse burnout’ OR ‘stress burnout’ OR ‘maslach burnout’ #9 (#1 OR #2 OR #3 OR #4 OR #5) #10 (#6 OR #7 OR #8) #11 (#9 AND #10)	279

<i>(Continued)</i>		
Database	Terms	Records retrieved
Cumulative Index to Nursing and Allied Health Literature (CINAHL) (Last search January 2019)	#1 ("Africa South of the Sahara" OR "sub-Saharan Africa") #2 (Angola OR Benin OR Botswana OR "Burkina Faso" OR "Upper Volta" OR Burundi OR Urundi OR Cameroon OR Camerouns OR "Cape Verde" OR "Central African Republic" OR Chad OR Comoros OR "Comoro Islands" OR Comores OR Mayotte OR Congo OR Zaire OR "Cote d'Ivoire" OR "Ivory Coast") #3 ("Democratic Republic of the Congo" OR Djibouti OR "French Somaliland" OR Eritrea OR Ethiopia OR Gabon OR "Gabonese Republic" OR Gambia OR Ghana OR "Gold Coast" OR Guinea OR Kenya OR Lesotho OR Basutoland OR Liberia) #4 (Madagascar OR "Malagasy Republic" OR Malawi OR Nyasaland OR Mali OR Mauritania OR Mauritius OR Mozambique OR Namibia OR Niger OR Nigeria) #5 (Rwanda OR "Sao Tome" OR Seychelles OR Senegal OR "Sierra Leone" OR Somalia OR "South Africa" OR Sudan OR Swaziland OR Tanzania OR Togo OR "Togolese Republic" OR Uganda OR Zambia OR Zimbabwe OR Rhodesia) #6 (MH "Burnout, Professional") #7 (MH "Compassion Fatigue") #8 ("burnout syndrome" OR "nurse burnout" OR "stress burnout" OR "maslach burnout") #9 (#1 OR #2 OR #3 OR #4 OR #5) #10 (#6 OR #7 OR #8) #11 (#9 AND #10)	89
African Journals Online (Last search January 2019)	Burnout	92
WHO Library (Last search January 2019)	Burnout Compassion fatigue	6 0
MedNar (Last search January 2019)	Burnout AND Africa	229
Total		874
Total after correction of duplicates		702

Appendix II: Studies ineligible following full-text review

Author	Reason for exclusion
Aguwa <i>et al.</i> ⁵¹	No separated data on nurses reported
Amamou <i>et al.</i> ⁴⁹	Article in French
Baltes <i>et al.</i> ⁵²	Conference proceedings
Beer <i>et al.</i> ⁵³	No separate data on nurses reported
Bhagavathula <i>et al.</i> ⁵⁴	Conference proceedings
Cilliers <i>et al.</i> ⁵⁵	No data on prevalence of burnout
Erasmus <i>et al.</i> ⁵⁰	Article in Afrikaans
Gorgulu <i>et al.</i> ⁵⁶	No separate data on nurses reported
Hall <i>et al.</i> ⁵⁷	No data on prevalence of burnout
Hojat <i>et al.</i> ⁵⁸	Setting not in sub-Saharan Africa
Khamisa <i>et al.</i> ⁵⁹	No data on prevalence of burnout
Khamisa <i>et al.</i> ⁶⁰	No data on prevalence of burnout
Khamisa <i>et al.</i> ⁶¹	No data on prevalence of burnout
Kim <i>et al.</i> ⁶²	No separate data on nurses reported
Klopper <i>et al.</i> ⁶³	No data on prevalence of burnout
Kruse <i>et al.</i> ⁶⁴	No separate data on nurses reported
Ledikwe <i>et al.</i> ⁶⁵	No separate data on nurses reported
Mathias <i>et al.</i> ⁶⁶	Focus on nursing students
McCusker <i>et al.</i> ⁶⁷	Conference proceedings
Njim <i>et al.</i> ⁶⁸	Focus on nursing students
Nwafor <i>et al.</i> ⁶⁹	No data on prevalence of burnout
Roomaney <i>et al.</i> ⁷⁰	No data on prevalence of burnout
Teffo <i>et al.</i> ⁷¹	No separate data on nurses reported
Thorsen <i>et al.</i> ⁷²	No separate data on nurses reported
Ugwu <i>et al.</i> ⁷³	No data on prevalence of burnout
Van der Colff <i>et al.</i> ⁷⁴	No data on prevalence of burnout
Wilson <i>et al.</i> ⁷⁵	Short communication/abstract only