



SYSTEMATIC REVIEW

REVISED Prevalence and factors associated with burnout among frontline primary health care providers in low- and middle-income countries: A systematic review [version 2; peer review: 1 approved, 1 approved with reservations]

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Abstract

Background: Primary health care (PHC) systems require motivated and well-trained frontline providers, but are increasingly challenged by the growing global shortage of health care workers. Burnout, defined as emotional exhaustion, depersonalization, and low personal achievement, negatively impacts motivation and may further decrease productivity of already limited workforces. The objective of this review was to analyze the prevalence of and factors associated with provider burnout in low and middle-income countries (LMICs).

Methods: We performed a systematic review of articles on outpatient provider burnout in LMICs published up to 2016 in three electronic databases (EMBASE, MEDLINE, and CAB). Articles were reviewed to identify prevalence of factors associated with provider burnout.

Results: A total of 6,182 articles were identified, with 20 meeting eligibility criteria. We found heterogeneity in definition and prevalence

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of burnout. Most studies assessed burnout using the Maslach Burnout Inventory. All three dimensions of burnout were seen across multiple cadres (physicians, nurses, community health workers, midwives, and pharmacists). Frontline nurses in South Africa had the highest prevalence of high emotional exhaustion and depersonalization, while PHC providers in Lebanon had the highest reported prevalence of low personal achievement. Higher provider burnout (for example, among nurses, pharmacists, and rural health workers) was associated with high job stress, high time pressure and workload, and lack of organizational support.

Conclusions: Our comprehensive review of published literature showed that provider burnout is prevalent across various health care providers in LMICs. Further studies are required to better measure the causes and consequences of burnout and guide the development of effective interventions to reduce or prevent burnout.


Keywords

primary health care; burnout;

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REVISED Amendments from Version 1

We have made minor revisions to the manuscript, based on the positive feedback received from reviewers. These revisions include the addition of a PRISMA flow chart as [Supplementary File 3](#), and clarification of search methods; additions to the discussion regarding limitations of the literature reviewed; further discussion of key factors for consideration when designing future studies on burnout; and additional minor revisions to improve clarity.

See referee reports

Introduction

Primary health care (PHC) includes provision of services for the prevention, treatment, management, rehabilitation, and palliation of disease, and is integral to achieving global health security, universal health coverage and the Sustainable Development Goals¹⁻⁷. A robust PHC system requires an adequate number of trained and motivated health care providers^{6,8,9}. Alarming, the World Health Organization (WHO) has estimated that the global shortage of providers will increase by 80% to 12.9 million over the next 20 years and has called for the development of an expanded, high-quality workforce¹⁰. Given the projected shortages, there is great interest in strategies to retain existing providers and improve provider efficiency and productivity. Further, a positive work environment will reduce workforce turnover, and improve quality of life and care. The reasons for lower efficiency and productivity are unclear, and may be linked to extrinsic motivational factors including financial and non-financial, organizational, and environmental incentives¹¹ or to incompletely described intrinsic motivational factors such as achievement, recognition, responsibility, and growth¹², which may be negatively impacted by provider burnout.

Burnout, as described by Freudenberg¹³ and expanded by Maslach, is comprised of three dimensions: emotional exhaustion ('emotionally overextended and exhausted by [...] work'), depersonalization ('unfeeling and impersonal response towards recipients of one's care or service'), and low personal achievement ('feelings of competence and successful achievement [...] with people'), and results in negative work experiences¹⁴⁻¹⁶. There are a number of surveys used to assess burnout^{17,18}; however, the Maslach Burnout Inventory (MBI) has emerged as perhaps the most widely used survey to assess burnout across a wide variety of work and cultural settings¹⁹. Studies using the MBI in the United States, Canada, and mostly high-income countries in Europe have found that up to half of outpatient providers report high levels of emotional exhaustion, depersonalization, and a sense of low personal achievement²⁰⁻²²). These findings are supported by a systematic review which documented high levels of burnout in both outpatient and inpatient providers in high-income countries²³. In these studies, high burnout was associated with feeling undervalued and unsupported, having too much paperwork, and the existence of long waits for specialists and tests, among other factors²⁰⁻²².

Identifying and characterizing burnout is important as it can have a negative impact on providers and patient care. Studies from predominantly high-income countries have shown that provider

burnout is associated with adverse events including medical errors, unexplained work absenteeism, reduction in quality of care^{24,25}, higher number of negative rapport-building statements (physician or patient offers a statement 'characterized as criticism or disagreement')²⁶, job dissatisfaction²⁷, and poor patient satisfaction^{28,29}. A large study of 11,530 health professionals in Spain and Latin America showed that higher emotional exhaustion was associated with higher absenteeism, intention to exit the profession, and low quality of personal and family life³⁰.

Despite the growing recognition of the need to retain trained providers and improve the quality of care they provide, there is no comprehensive analysis of the burden of provider burnout in low and middle-income countries (LMICs). In addition to the paucity of such syntheses, current data are cross-sectional without an evaluation of potential change over time and most studies have not characterized institutional (e.g., institutional management, quality, or supervision), individual, socioeconomic, or geopolitical factors that could potentially contribute to provider burnout. To address this gap, we conducted a systematic review to describe the prevalence of and factors associated with outpatient provider burnout in LMICs. These findings may help managers and policymakers develop and implement effective interventions to prevent burnout and improve work productivity, efficiency, quality and retention.

Methods

Data sources and search strategy

We performed a systematic literature search to identify articles on burnout among outpatient health care providers in LMICs. The review protocol was not registered on an online portal. We focused on outpatient care settings as this is where the majority of primary health care services are provided. Our initial search was based on articles published in EMBASE (from 1947), MEDLINE (from 1966), and Commonwealth Agricultural Bureau (CAB) Abstracts (from 1973) up to December 1, 2014. We developed a broad search strategy for each key term: 'burnout', 'healthcare providers', and 'LMICs', through a combination of text words, words in the abstract or title, and Medical Subject Headings (MeSH). For burnout, we included "motivation" and "achievement". For healthcare providers, we included "physician", "nurse", and "community health worker"; and for LMICs, we included "developing countries", "resource constrained", and "resource poor". We used the World Bank system to classify countries as low or middle-income based on gross national income per capita³¹. The search terms were combined using 'AND' to identify articles that included all three concepts, as outlined in the [S1 Supplementary Material](#). The search was updated using the same methodology to include articles from December 1, 2014 through January 23, 2016.

Study selection

The titles and abstracts were reviewed independently by two authors. Research articles written in English were included if the study was based in an LMIC and explicitly investigated *burnout* and not solely work-related depression, anxiety, or stress, in outpatient healthcare workers. Articles were excluded if they were conference abstracts, case reports, case series, simulations, review articles, editorials, commentaries, perspectives, personal

narratives, or qualitative studies; if the full-length article was not available; if the study had fewer than 50 subjects; or if the study focused on trainees (for example, students, residents, or fellows), inpatient providers, or on veterinary care providers. Discrepancies between the authors in abstracting data were resolved by discussion or through consultation with other authors. The detailed selection strategy is outlined in [Supplementary File 3](#).

Data extraction and analysis

We collected information on the study location and design, participant demographics, cadre, and duration in practice. For burnout, we collected information on the type of burnout inventory used, and estimates of overall burnout and its subcomponents (depersonalization, emotional exhaustion, and level of personal achievement).

Results

Study characteristics

Our initial search (on December 1, 2014) generated 5,412 articles (2,046 from EMBASE, 847 from CAB Abstracts, and 2,519 from MEDLINE), of which 735 were duplicates. Using eligibility criteria described above, 11 articles were included in final data extraction and analysis ([Supplementary File 3](#)). We updated the search on January 23, 2016 and identified 9 additional articles that met our eligibility criteria ([S2 Supplementary Material](#)). The 20 studies included in the final analysis spanned all global regions, and focused on various providers including physicians, pharmacists, nurses, community health workers, and midwives. Only two studies were based in low income countries while the rest were based in middle-income countries.

Across the reported studies, the mean age of healthcare providers ranged from 26.4 years to 47.4 years ([Table 1](#)). Studies included a range of provider types including HIV service providers (3 studies), PHC and general practitioners (five studies) and community-based workers (six studies). Cadres included physicians, nurses and midwives, dentists, pharmacists, community health workers and health volunteers. The range of education varied based on cadre, with lower rates among community health workers and volunteers compared to providers with a formal degree. For example, among AIDS volunteers in South Africa, 93.7% had completed secondary or high school education while only 2.4% had 'higher education'³², whereas among HIV caregivers in Brazil, 52.9% of volunteers had a university level education³³.

Maslach Burnout Inventory (MBI) to measure provider burnout

The MBI is the most widely used inventory to assess burnout, and consists of 22 questions across three dimensions: emotional exhaustion (nine questions), depersonalization (five questions), and personal achievement (eight questions). Each question is scored on a scale from 0 (never) to 6 (everyday). The points from each dimension are added to provide a total score for that dimension.

The score for each dimension can be categorized as low, moderate, or high: emotional exhaustion (low ≤ 13 ; moderate 14 to 26; high ≥ 27); depersonalization (low ≤ 5 ; moderate 6 to 9; high ≥ 10); and personal achievement (high ≤ 33 ; moderate 34 to 39; low ≥ 40)²². Higher scores on emotional exhaustion and depersonalization, and a lower score on personal achievement, are associated with higher provider burnout. The development, reliability, and validity of the MBI have been previously described¹⁵. Of the 20 studies, 15 used the MBI^{33–47}, one³² used a modified version of MBI, and four^{48–51} used other assessment tools ([Table 2](#)).

Emotional Exhaustion was evaluated in 15 studies, and the average score ranged from 2.3³⁸ to 31.3³⁷. The lowest prevalence of moderate or high emotional exhaustion (score ≥ 14) was seen among rural health workers in Iran (27.4%)⁴⁰ and the highest was among nurses in South Africa (99.6%)³⁷. Eight studies reported the proportion of people with different levels of emotional exhaustion; of these, six studies showed moderate to high levels of emotional exhaustion were reported in more than one-third of healthcare providers studied.

Depersonalization was reported in 16 studies. Similar to emotional exhaustion, a high level was reported, with the average score ranging from 0.7³⁸ to 17.8³⁷. The lowest prevalence of 'moderate or high' depersonalization (score ≥ 6) was seen among rural health workers in Iran (13.3%)⁴⁰ and the highest among nurses in South Africa (98.0%)³⁷. Nine studies reported the proportion of people with different levels of depersonalization; of these, six studies showed moderate to high levels of depersonalization in more than one-third of healthcare providers.

Personal Achievement was reported in 16 studies, and the average score ranged from 3.9⁴³ to 39.6³³. The lowest prevalence of 'moderate or high' personal achievement (score ≤ 29) was seen among primary health care providers (25.1%) in Lebanon⁴², whereas the highest (99.3%) was seen among nurses in South Africa³⁷.

Non-MBI measures of provider burnout

Four studies used non-MBI tools to measure burnout among providers. A study based in Serbia used a self-assessment test (15 questions assessed on a Freudenberg scale) and reported that 44.4% of community pharmacists had high levels of burnout⁵¹. A study based in Zimbabwe used a single question to assess burnout and reported that 27.8% of HIV healthcare providers had burnout that was severe or not improving with time⁵⁰. In Uganda, Mullira and colleagues⁴⁸ used the Professional Quality of Life Scale, which classifies provider burnout levels into three categories: high, average, and low, and reported that 89.3% and 10.1% of female midwives had average and high levels of burnout, respectively, while 82.6% and 10.8% of male midwives had average and high levels of burnout, respectively. Pandey and colleagues used a modified Copenhagen Burnout Inventory (scale 1–7, with higher scores reflecting higher

Table 1. Characteristics of outpatient healthcare providers. All studies used the Maslach Burnout Inventory, except as follows: Kruse⁵⁰ (single question validated against a full occupational burnout scale); Akintola³² (modified MBI score); Jovic⁵¹ (Self-assessment test with 15 questions assessed on a Freudenberg scale); Muliira⁴⁸ (Professional Quality of Life Scale); Pandey⁴⁹ (Copenhagen Burnout Inventory).

Author, year	Country (World Bank Region)	Type of Healthcare Provider	Sample Size	Sex, % participants	Age, years ^a	Position/Type of work, % participants	Number of years in present position or occupational tenure, % participants ^b
Benevides-Pereira, 2007	Brazil (Latin America and the Caribbean)	HIV Healthcare Providers	87	Male, 18.4% Female, 79.3% Not Reported, 2.3%	36.4 ± 9.5	Voluntary, 63.2% Not voluntary, 36.8%	≤5, 73.5% >5, 25.3% Not Reported, 1.2%
da Silva, 2008	Brazil (Latin America and the Caribbean)	Community-based health agents	141	Male, 7.8% Female, 92.2%	38.9 ± 11.4	Not Reported	≤3.5, 51.1% >3.5, 48.9%
Engelbrecht, 2008	South Africa (Sub-Saharan Africa)	Nurses	543	Not Reported	Not Reported	Not Reported	Not Reported
Kruse, 2009	Zambia (Sub-Saharan Africa)	HIV Healthcare Providers	483	Female, 86.6% Not Reported, 13.4%	Median, 37 (31–45)	Physicians, 1.5% Clinical officers, 10.8% Nurses, 50.5% Midwives, 27.9% Pharmacy technicians, 4.1% Others, 5.2%	Median (IQR) ^d 10 (4–17)
Putnik, 2011	Serbia (Europe and Central Asia)	Primary Healthcare Physicians	373	Male, 16.0% Female, 84.0%	Male, 47.4 ± 10.2 Female, 47.4 ± 8.5	Not Reported	Mean Male, 19.8% Female, 19.6%
Ge, 2011	China (East Asia and Pacific)	Community Health Workers	1694	<i>City of Shenyang</i> : Male, 22.2% Female, 77.8% <i>City of Benxi</i> : Male, 15.8% Female, 84.2%	Median ≥ 40	<i>City of Shenyang</i> : Physicians, 56.6% Nurses, 40.4% <i>City of Benxi</i> : Physicians, 35.4% Nurses, 46.6% Others, 7.9% Others, 13.0%	Not Reported
Malakouti, 2011	Iran (Middle East and North Africa)	Rural Health Workers	227	Male, 29.9% Female, 70.1%	35.1 ± 7.2	Not Reported	Mean ± SD 12.0 ± 7.6
Calgan, 2011	Turkey (Europe and Central Asia)	Community Pharmacists	251	Male, 41.4% Female, 58.6%	42.1 ± 11.2	Not Reported	<10, 43.4% 10–19, 25.7% 20–29, 21.2% ≥ 30, 9.6%
Alameddine, 2012	Lebanon (Middle East and North Africa)	Primary Healthcare Providers	755	Male, 49.6% Female, 50.3% Not Reported, 0.1%	Median, 36–45	Generalists (including dentists), 23% Medical Specialists, 21.7% Nurses, 32.7% Allied health professionals, 15.1% Other health professionals, 7.4%	≤5, 61.8% 6–10, 19.2% >10, 16.1% Not Reported, 2.9%
Akintola, 2013	South Africa (Sub-Saharan Africa)	AIDS Volunteer Caregivers	126	Male, 100%	35.0 ± 7.1	Care of HIV/AIDS patients, 36.8% Care of orphans, 14.4% Care of both groups, 48.8%	Mean ± SD 6.8 ± 2.1

Author, year	Country (World Bank Region)	Type of Healthcare Provider	Sample Size	Sex, % participants	Age, years ^a	Position/Type of work, % participants	Number of years in present position or occupational tenure, % participants ^b
Jocic, 2014	Serbia (Europe and Central Asia)	Community Pharmacists	647	Male, 24.9% Female, 75.1%	Median, 41–50	Not Reported	≤5, 16.7% 6–10, 27.0% >10, 56.3%
Karakose, 2014	Turkey (Europe and Central Asia)	General practitioners	71	Male, 87.3% Female, 12.7%	<30 years, 29.6% 31–45 years, 54.9% ≥46 years, 15.5%	Not Reported	Not Reported
Ding, 2014	China (East Asia and Pacific)	Community Health Center providers	1243	Not reported	Not reported	Not reported	≤10, 28.7% 11–20, 31.4% 21–30, 26.4% >30, 13.5%
Cagan, 2015	Turkey (Europe and Central Asia)	Primary Healthcare Providers	418	Male, 33.3% Female, 66.7%	36.6 ± 6.3	Physicians, 44.4% Nurses, 25.4% Midwives, 30.1%	Not Reported
Cao, 2015	China (East Asia and Pacific)	Community Health Nurses	485	Female, 100%	26.4 ± 3.8	Staff nurses, 94.2% Head nurses, 5.8%	≤5, 57.9% 6–10, 29.1% >10, 13.0%
Silva, 2015	Brazil (Latin America and the Caribbean)	Primary Healthcare Providers	194	Male, 16.5% Female, 83.5%	44.9 ± 10.5	Physicians, 27.8% Nurses, 37.1% Dentists, 20.1% Social assistants, 14.9%	Not Reported
Muliira, 2015	Uganda (Sub-Saharan Africa)	Midwives	224	Male, 20.5% Female, 79.5%	34 ± 6.3	Antenatal clinic, 43.3% Delivery ward or labour room, 33.0% Postnatal ward, 23.7% Health Center Level II 49.1% Health Center Level III 33.5% Health Center Level IV 17.4%	3 ± 1.3
Hu, 2015	China (East Asia and Pacific)	Nurses	420	Female, 100%	≤30 years, 48.3% 31–40 years, 34.5% ≥41 years, 17.2%	Nurse, 41.4% Senior Nurse, 24.8% Chief Nurse or higher, 33.8%	≤3 years, 29.3% 4–10 years, 22.4% ≥11 years, 48.3%
Pandey, 2015	India (South Asia)	Accredited Social Health Activists	177	Female, 100%	31.9 ± 6.7	Accredited Social Health Activists, 100%	Not reported
Cao, 2016	China (East Asia and Pacific)	Community Health Nurses	456	Male, 4.7% Female, 95.4%	34.1 ± 7.1	Community health nurses, 100%	1–5, 5.5% 6–10, 24.6% 11–15, 38.3% 16–20, 26.8% >20, 4.8%

Key:

^a Age (in years) is reported as mean ± standard deviation, except where noted^b Number of years in service (in %) except where noted^c Shenyang, Benxi are two cities in Liaoning Province in northeast China. Shenyang has 7.2 million inhabitants, and Benxi has 3.1 million inhabitants^d IQR : interquartile range

Table 2. Prevalence of burnout among outpatient healthcare providers.

Author, year	Emotional Exhaustion (%) ^a (Mean Score \pm SD)	Depersonalization (%) ^a (Mean Score \pm SD)	Personal Achievement (%) ^a (Mean Score \pm SD)	Other Results
Benevides-Pereira, 2007	Low, 40.2% Moderate, 33.3% High, 26.4% (19.1 \pm 10.3)	Low, 56.3% Moderate, 26.4% High, 17.2% (4.2 \pm 5.4)	Low, 40.2% Moderate, 40.2% High, 19.5% (39.6 \pm 7.2)	-
da Silva, 2008	Moderate or High, 70.9%	Moderate or High, 34.0%	Moderate or High, 47.5%	Report of aspects related to burnout, 84.4% Burnout by MBI criteria, 24.1%
Engelbrecht, 2008	Low, 0.2% Moderate, 30.9% High, 68.7% (31.3 \pm 9.3)	Low, 1.8% Moderate, 12.9% High, 85.1% (17.8 \pm 5.0)	Low, 0.7% Moderate, 91.0% High, 8.3% (20.3 \pm 6.8)	-
Kruse, 2009	Not Reported	Not Reported	Not Reported	No Burnout, 6.9% Stress without Burnout, 42.0% Occasional Burnout, 23.3% Burnout not improving, 4.3% Severe Burnout, 23.5%
Putnik, 2011	Male Low: 22.4% Moderate: 36.2% High: 41.4% (2.3 \pm 1.3) Female Low: 17.0% Moderate: 33.7% High: 49.4% (2.5 \pm 1.3)	Male Low: 48.3% Moderate: 46.6% High: 5.2% (0.7 \pm 0.7) Female Low: 55.4% Moderate: 30.1% High: 14.4% (0.8 \pm 0.9)	Male Low: 10.3% Moderate: 15.5% High: 74.1% (5.1 \pm 1.1) Female Low: 4.2% Moderate: 17.3% High: 78.5% (5.1 \pm 5.2)	-
Ge, 2011	<i>City of Shenyang</i> (7.2 \pm 5.5) <i>City of Benxi</i> (6.9 \pm 5.8)	<i>City of Shenyang</i> (3.6 \pm 4.3) <i>City of Benxi</i> (3.3 \pm 4.4)	<i>City of Shenyang</i> (24.4 \pm 10.8) <i>City of Benxi</i> (25.4 \pm 10.5)	-
Malakouti, 2011	Low, 72.6% Moderate, 15.1% High, 12.3% (14.5 \pm 9.9)	Low, 86.7% Moderate, 8.0% High, 5.3% (2.2 \pm 3.4)	Low, 43.7% Moderate, 19.0% High, 37.4% (33.8 \pm 10.4)	-
Calgan ^b , 2011	Moderate, 27.1% ^c High, 1.2% (16.8 \pm 6.3)	Moderate, 13.9% ^c High, 0.8% (Mean 4.0, Range 0–14)	Moderate, 24.7% ^c High, 71.3% (Mean 22.0, Range 9–32)	-
Alameddine, 2012	Low, 59.1% Moderate, 17.7% High, 23.2%	Low, 70.7% Moderate, 15.5% High, 13.8%	Low, 64.9% Moderate, 16.4% High, 8.7%	-
Akintola, 2013	Not Reported	High, 50% (8.5 \pm 1.6)	High, 60% (8.9 \pm 1.2)	-
Jocic, 2014	Not Reported	Not Reported	Not Reported	No Burnout, 37.1% Risk for Burnout, 9.0% Before Burnout, 9.6% Burnout, 29.7% Combustion, 14.7%
Karakose, 2014	Male (mean 2.8 \pm 1.2) Female (mean 3.4 \pm 1.1)	Male (mean 2.5 \pm 1.0) Female (mean 2.5 \pm 1.1)	Male (mean 4.0 \pm 1.0) Female (mean 3.9 \pm 0.8)	-
Ding, 2014	Mean (10.1 \pm 6.5)	Mean (5.7 \pm 5.2)	Mean (24.1 \pm 9.3)	-

Author, year	Emotional Exhaustion (%) ^a (Mean Score \pm SD)	Depersonalization (%) ^a (Mean Score \pm SD)	Personal Achievement (%) ^a (Mean Score \pm SD)	Other Results
Cagan, 2015	Male (median 14.0) Female (median 24.0)	Male (median 4.0) Female (median 3.0)	Male (median 15.0) Female (median 23.0)	-
Cao, 2015	Mean (27.0 \pm 10.6)	Mean (8.4 \pm 7.0)	Mean (25.7 \pm 9.3)	-
Silva, 2015	Low, 36% Average, 21% High, 43%	Low 51% Average, 33% High, 17%	Low, 32% Average, 43% High, 25%	Burnout risk: High 27.8% Medium 26.3% Low 45.9%
Muliira, 2015	Not reported	Not reported	Not reported	Low level of burnout, 0% (male), 1.8% (female) Average level of burnout 17.0% (male), 71.0% (female) High level of burnout 2.2% (male), 8.0% (female)
Hu, 2015	≤ 30 years, mean (12.1 \pm 5.3) 31–40 years, mean (14.2 \pm 5.6) ≥ 41 years, mean (13.6 \pm 6.3)	≤ 30 years, mean (16.1 \pm 7.3) 31–40 years, mean (15.3 \pm 6.7) ≥ 41 years, mean (14.6 \pm 5.7)	≤ 30 years, mean (22.1 \pm 7.5) 31–40 years, mean (20.9 \pm 7.2) ≥ 41 years, mean (20.1 \pm 6.5)	-
Pandey, 2015	Not reported	Not reported	Not reported	Mean burnout (4.0 \pm 1.4)
Cao, 2016	26.5 \pm 10.5	8.6 \pm 6.5	24.7 \pm 9.4	-

Key:

^a Prevalence reported as percentage of participants with scores. Higher Emotional Exhaustion and Depersonalization, and lower Personal Accomplishment, are associated with higher burnout Low refers to low score, Moderate refers to moderate score, and High refers to high score

^b values are relative to Hungarian national norms⁴¹

burnout)¹⁷ and showed that accredited social health activists (ASHA) in India had a mean burnout score of 4.0 \pm 1.4⁴⁹. Further, one study in South Africa used a modified version of MBI, in which the emotional exhaustion domain was excluded. Using this modified version, Akintola and colleagues reported a high level of depersonalization and personal achievement among AIDS care volunteers³².

Variables associated with provider burnout

Seven studies investigated variables associated with overall burnout (Table 3). Among HIV healthcare providers in Zambia, Kruse and colleagues⁵⁰ observed that the 36–45 year age group had a higher relative risk (1.5 [1.1–1.9], at 95% confidence interval) of burnout compared with those 45 years or older. In Serbia, Jovic and colleagues³¹ found that burnout was more common among older community pharmacists (51–60 years) compared with their younger colleagues. In addition, Kruse and colleagues⁵⁰ showed that females (relative risk 2.0 [1.1–2.7]), providers who worked other jobs (relative risk 1.4 [1.1–1.6]) and providers who knew a co-worker who had quit work (relative risk 1.6 [1.2–2.0]) reported higher levels of burnout. Among rural health workers in Iran, provider burnout was associated with longer work experience, high job stress (70.1% in those with burnout versus 37.7% in those without burnout; $p=0.001$), and having a higher General Health Questionnaire score, a measure of higher psychological distress⁴⁰.

Twelve studies in our analysis reported on factors associated with specific dimensions of burnout. Higher rates of *emotional exhaustion* were associated with higher time pressure of workload and excessive workload^{37,41}. In Turkey, among pharmacists who reported having “excessive” time pressure, the mean emotional exhaustion score was higher (19.2 \pm 5.9) compared to those with low time pressure (10.7 \pm 5.6, $p<0.001$)⁴¹. Higher emotional exhaustion scores were also seen in pharmacists who had less work experience (10 years or less [17.6 \pm 5.7]) compared to those who had worked longer in the field (30 years or more [13.8 \pm 6.9]; $p=0.007$)⁴¹. In community health workers in China, emotional exhaustion was associated with lower intrinsic and extrinsic job satisfaction (Table 3)³⁹. Intrinsic satisfaction evaluates job-related tasks (e.g. professional development opportunities) while extrinsic satisfaction evaluates aspects external to the job (e.g. wages, benefits and bonuses)³⁹. In general, inverse associations were seen with emotional exhaustion and perceived organizational support, leadership, and staff relationships.

Variables associated with *depersonalization* were evaluated in 12 studies. As seen with emotional exhaustion, higher levels of depersonalization were associated with excessive time pressure and lack of support^{32,37,41}. Amongst pharmacists in Turkey with excessive time pressure, the median depersonalization score was higher compared to those with low time pressure (4 versus 1, $p=0.004$)⁴¹. Similar findings were seen among nurses providing HIV care in South

Table 3. Variables associated with provider burnout among studies using the Maslach Burnout Inventory and reporting these variables (15/20).

Author, year	Overall Burnout	Emotional Exhaustion	Depersonalization	Personal Achievement
Benevides-Pereira, 2007	Not Reported		Positive association: male sex	Positive association: younger age
da Silva, 2008		No significant associations identified	Positive association: being black; those absent from work once in the 30 days prior to the interview Inverse association: female sex; age 41 years or higher; monthly family income between 4 and 5, and above 7 minimum salaries; working where 20% or more users are of private medical care systems	Positive association: age =41 years
Engelbrecht, 2008		Positive association: availability of resources; time pressure of workload; conflict and social relations	Positive association: availability of resources; time pressure of workload	
Kruse, 2009	Positive association: female sex; age (36 to 45 years); working other jobs; knowing a co-worker who left	Not reported		
Putnik, 2011	None reported			
Ge, 2011		<i>Inverse association: intrinsic and extrinsic job satisfaction</i>	Positive association: intrinsic job satisfaction	
Malakouti, 2011*	Positive association: longer work experience; higher GHQ scores; higher job stress	Not Reported		
Calganb, 2011		Positive association: lower age; lower work contentment; lower satisfaction with customers; excessive workload; excessive time pressure; higher frequency of work stress; fewer years in practice	Positive association: lower age; being unmarried; lower satisfaction with customers; excessive time pressure; higher frequency of work stress; fewer years in practice	Positive association: lower age; higher work contentment; higher satisfaction with customers; lower time pressure; lower frequency of work stress; more years in practice
Alameddine, 2012		Positive association: likelihood to quit job	Positive association: likelihood to quit job	<i>Inverse association: likelihood to quit job</i>
Akintola, 2013		Not Reported	Positive association: Type of volunteer and lack of support	Positive association: total stress; lack of support; overwhelming nature of the disease; difficulty dealing with distress and dying
Jocic, 2014	Positive association: higher age	Not Reported		
Karakose, 2014		<i>Inverse association: intrinsic job satisfaction.</i> No association with extrinsic job satisfaction, and general job satisfaction	No association with intrinsic job satisfaction, extrinsic job satisfaction, or general job satisfaction	Positive association: intrinsic job satisfaction, extrinsic job satisfaction, and general job satisfaction

Author, year	Overall Burnout	Emotional Exhaustion	Depersonalization	Personal Achievement
Ding, 2014		Positive association: effort-reward ratio, over commitment, and anxiety symptoms <i>Inverse association: length of employment</i>	Positive association: effort-reward ratio, over commitment, and anxiety symptoms <i>Inverse association: length of employment</i>	Positive association: length of employment, and over commitment <i>Inverse association: effort-reward ratio, and anxiety symptoms</i>
Cagan, 2015	No relationship with gender, marital status, or profession. Personal accomplishment positively associated with working in districts. Emotional exhaustion positively associated with low perceived economic status and not personally choosing working department. Emotional exhaustion and depersonalization negatively associated with job happiness.			
Cao, 2015		<i>Inverse association: general self-concept, leadership, communication, knowledge, staff relationship, caring, affective commitment, normative commitment, continuance commitment</i>		
Silva, 2015	Positive association with risk of burnout ⁸ : age >30 years, work week >40 hours, professional dissatisfaction, desire to abandon the profession, feeling of discomfort, reporting that work was not a source of realization, mental disorder diagnosed by a psychiatrist, emotional tension, and limited/average future expectations			
Muliira, 2015	Positive association: associate degree (compared to Bachelor's or Masters' degree), being married, and involvement in non-midwifery health care activities at work			
Hu, 2015	Positive association: constant term, unmarried status, junior college-level education, difficulties between doctor and nurse, difficulties between nurse and patient, and difficulties between nurse and nurse <i>Inverse association: job satisfaction</i>	Positive association: age >30 years, non-single marital status, associate/bachelor degree/higher, being senior nurse/charge nurse/higher, employment status (formal establishment), >3 years employment, job dissatisfaction, unfair/inappropriate content of continuing education opportunities, difficulty with interpersonal relationships, income = 1000 RMB	Positive association: job dissatisfaction, unfair/inappropriate content of continuing education opportunities, difficulty with interpersonal relationships,	Positive association: single marital status, job dissatisfaction, unfair/inappropriate content of continuing education opportunities, difficulty with interpersonal relationships
Pandey, 2015	Positive association with "deep emotional labor", or altering felt emotions to match expectations <i>Inverse association: job satisfaction and "surface emotional labor", or altering expressed (but not felt) emotions to match expectations</i>			

Author, year	Overall Burnout	Emotional Exhaustion	Depersonalization	Personal Achievement
Cao, 2016		<i>Inverse association: perceived organization support, general self-concept, leadership, communication, knowledge, staff relationship, and caring</i>		

Higher Emotional Exhaustion and Depersonalization, and lower Personal Accomplishment, are associated with higher burnout

Key:

*GHQ: General Health Questionnaire; higher scores indicate higher psychological distress; Job stress based on Steinmetz test⁴⁰

[§]High risk of burnout: (high emotional exhaustion + high depersonalization + high professional realization) OR (high emotional exhaustion + low depersonalization + low professional realization) OR (low emotional exhaustion + high depersonalization + low professional realization); moderate risk of burnout: high emotional exhaustion OR high depersonalization OR low professional realization; low risk of burnout: (low emotional exhaustion + low depersonalization + high professional realization)

RMB: Renminbi or Yuan (currency of China)

Emotional labor: "the process of regulating both feelings and expressions for the organizational goals". Surface-level emotional labor is showing fake emotions and deep-level emotional labor is done when providers "alter their felt emotions genuinely to match the ones desired by the organization."

Africa³⁷. Among AIDS care volunteers in South Africa, higher depersonalization was seen among those who perceived a 'lack of support' ($p=0.025$)³². In other studies, higher depersonalization was seen among men compared with women and was associated with higher rates of recent absenteeism (odds ratio 3.0 [1.2–7.8], $p=0.02$)^{33,36}. Lower rates of depersonalization were associated with overall higher intrinsic and extrinsic job satisfaction among community health workers in China³⁹.

Consistent with trends observed for emotional exhaustion and depersonalization, higher personal achievement was associated with lower time pressure, lower stress, and higher availability of resources and intrinsic job satisfaction^{32,37,39,41}. For example, among nurses in South Africa, higher personal achievement was significantly associated with lower time pressure³⁷, and among AIDS care volunteers in South Africa, lower personal achievement was associated with higher rating of 'lack of support' ($p=0.03$), 'professional uncertainty' ($p=0.008$), and overwhelming nature of their patients' disease ($p=0.04$). One study showed that higher emotional exhaustion was associated with increased likelihood of quitting the job (odds ratio 3.46 [2.00–5.99], $p<0.001$) while higher personal achievement lowered that risk (odds ratio 3.05 [1.67–5.56], $p<0.001$)⁴².

Discussion

In this systematic literature review, we observed that burnout is prevalent across a range of frontline PHC service delivery providers including physicians, nurses, pharmacists, and community health workers in various outpatient health care settings including HIV care clinics in a number of LMICs. To our knowledge, this is the first systematic review to describe provider burnout in LMICs, and provides insight into factors that could influence worker productivity, efficiency, quality, and retention through their influence on burnout. The level of burnout across each MBI dimension is comparable to rates observed among outpatient general internists in the US, family doctors in Canada, and family doctors across 12 countries in Europe^{20–22}. These studies, which include several high-income countries, found rates of high emotional exhaustion (range 43.0% to 48.1%), high depersonalization (32.7% to 46.3%), and low personal achievement (20.3% to 47.9%).

We were able to identify several consistent factors associated with different dimensions of burnout. Possibly modifiable factors

included levels of organizational support, time pressure and workload, as well as the availability of accessible opportunities for professional growth, though the association of these factors with burnout is likely to depend on the cadre in question, their training level, degree of autonomy, and relationship with communities and patients. These results are generally supported by the other studies that showed positive association with longer work hours and inverse association with job satisfaction^{34,35,48,49}. Absence of supportive supervision (managers helping health workers to do their job better) appears to also be related to the presence of burnout. Supportive supervision can provide health care workers with opportunities for new skills development as well as improving effectiveness and efficiency of their care delivery. While higher disease burden of patients is less amenable to simple solutions, service delivery changes such as multidisciplinary teams may provide approaches to reducing provider burnout. These reported findings were generally similar to findings seen in high-income countries^{20,22}.

Additionally, there were also factors which were not modifiable through workplace interventions including age, gender, and level of education, which is also similar to results seen in high-income countries^{20,22}. Further research is required to understand why burnout is higher among these groups in order to ensure that effective support and coping strategies are provided for health care workers.

Improving PHC will be critical for achieving universal health coverage and the Sustainable Development Goals by 2030. In LMICs, this will require an available, accessible, and acceptable workforce that can deliver efficient, high-quality patient care⁵². While increasing the number of providers in some regions is clearly necessary, health systems will also have to focus on ways to retain existing staff by reducing burnout, providing a supportive environment, creating opportunities for personal achievement and growth, reducing stress and maintaining motivation. Interventions focused on improving interpersonal relationships, supportive work environments, supportive supervision including mentorship, coaching incentives and training on self-awareness and mindfulness, may help to reduce burnout, however evidence from LMICs is often lacking and the generalizability of many of these interventions done in high income settings is not certain^{53–59}. For example a pre-post study of 84 mental health professionals in the United States found that a one-day retreat and training focused on increasing

knowledge of and strategies to prevent burnout was associated at six weeks with significant decreases in emotional exhaustion and depersonalization⁵⁵. While larger studies on effectiveness of interventions are generally lacking, a few ongoing studies in high-income countries on interventions to reduce burnout and improve patient outcomes may shed light on promising approaches, although these are generally limited to specific cadres or settings^{55,60}.

Our paper has a number of important limitations. We included articles from three widely used electronic databases, and different cadres of health care providers across LMICs from many regions. However, we did not include articles that were not in English or articles that were published outside of the three search engines, including in non-peer reviewed literature. Only 15 of the 20 included studies used the MBI, and among them, differences in study population and design precluded analyses across different cadres of health providers.

We included a wide variety of primary care providers ranging in training from physicians to community health workers and volunteer caregivers. Because of high prevalence of HIV in some of the countries, we included providers of HIV services as they are a significant source of critical first contact care for people living with HIV/AIDS. The comparability of findings across these widely different health workers who operate within the primary health care sector in LMICs may not be complete. Finally, the quality of evidence available in the included studies was often low. Many studies relied on non-validated measures or used thresholds for defining burnout which were established for high-income countries but applied to LMIC. More work is needed to ensure high-quality measurement and the use of contextually appropriate diagnosis criteria. Additionally, further studies should ensure higher response rates among responders, describe the characteristics of non-responders, and clarify the level of anonymity responders have while participating in studies. Further, as many studies are cross-sectional, it will be challenging to generalize these findings to different contexts and situations. However, despite these limitations, we were able to observe consistent trends in burnout across these different health providers and in different countries.

Our understanding of factors related to high rates of burnout and low provider motivation in LMICs is still in its infancy. This review is based on 20 cross-sectional studies of diverse health providers in different countries. To better describe burnout and reduce its impact on provider retention and quality, further research should focus on more comprehensive investigation of the i) burden of provider burnout from diverse health care providers at different levels in the health care system, ii) demographic,

socioeconomic, institutional, and geopolitical factors that influence or mitigate provider burnout, iii) longitudinal changes in burnout in response to extrinsic (i.e. monetary or training) and intrinsic motivational factors, iv) association between burnout, depression, lack of motivation, and other psychological stressors, and v) interventions likely to reduce the burden of burnout. These studies can guide health and policy makers on strategies to improve provider efficiency, productivity, quality, and possibly retention in the workforce.

Conclusions

The delivery of high quality care in low and middle-income countries requires a workforce that is competent, effective, and motivated. Our results show that provider burnout is prevalent across different cadres of providers in various countries with different health care systems. As we move beyond the Health Workforce Decade (2006–2015)⁶¹, towards achieving universal health coverage and the Sustainable Development Goals, populations and countries will require a robust primary health care system to deliver efficient care. Furthermore, the Global Health Workforce Alliance, which was passed at World Health Assembly 2016, specifically highlights a vision in which: “all people everywhere will have access to a skilled, motivated and supported health worker, within a robust health system”⁶². However, projections show that the global health workforce shortage is only expected to increase over the coming years. In this context, our results suggesting high rates of provider burnout in a number of low and middle income countries underscore the urgent need for health and policy makers to characterize specific risk factors and develop evidence-based interventions to reduce provider burnout, slow down the ongoing attrition of providers from the global workforce, and ensure all patients everywhere receive quality care from motivated and hopeful frontline providers.

Competing interests

No competing interests were disclosed.

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Supplementary material

Supplementary Materials S1 and S2: Search terms used in electronic database search.

[Click here to access the data.](#)

Supplementary File 2: PRISMA checklist.

[Click here to access the data.](#)

Supplementary File 3: PRISMA flowchart, showing the number of records identified, included and excluded.

[Click here to access the data.](#)

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Charlotte Hanlon 

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Medhin Selamu 

Addis Ababa University, Addis Ababa, Ethiopia

Original review major comments, point 1: PRISMA flow chart: requires revision

Comment 1:

The numbers are inconsistent between the abstract and the PRISMA flow chart.

The reason for excluding studies (and the numbers in each category have not been given.

Original review major comments, point 2: There is almost no consideration of the quality of the studies included in the review.

Comment 2:

The authors have not adequately addressed this comment. The limitation of researchers applying non-validated cut-offs across diverse cultures and settings is not considered at all, even though this threatens the validity of the findings (and is the major problem with the research to date).

The authors have not conducted any standardised evaluation of the quality of the studies. It if was not done then it needs to be acknowledged as a limitation of this review.

Original review major comments, point 3: The authors excluded studies that only focused on healthcare provider mental health without considering burnout, but one criticism of the burnout concept is that it may represent undetected depression (there is a high level of overlap with depression symptoms). There is, therefore, a need for studies that measure both burnout and depression in order to understand the extent to which these constructs are separate. The lack of studies to do this is worth mentioning.

Comment 3: This has not been commented upon in the article.

Original review major comments, point 6: Given that all studies were cross-sectional, please speak about ‘associated factors’ rather than risk factors (as we do not know the temporal relationship). There is some inconsistency in the terminology used.

Comment 4: This has been addressed adequately.

Original review major comments, point 8: The range of health worker cadres included are very diverse in their training level, their role in primary health care, their level of control over their job as well as community's attitude and respect towards them. Aggregating these heterogeneous groups need to be done with caution. Please can you give more emphasis to the differences among these types of primary healthcare worker. This is also relevant to the discussion, where you talk about modifiable risk factors, but the cadre of health worker to which this pertains is not clear.

Comment 5: This has been addressed to some extent.

Original review minor comments, point 10: Please align the conclusion in the abstract and the main paper.

Comment 6: This has been addressed adequately.

Original review minor comments, point 8: Please could you make the aim of the review more focused, e.g. to describe the prevalence of, and factors associated with, outpatient provider burnout in LMICs. Then you can comment that you hope that this will then “help managers and policymakers develop and implement effective interventions to prevent burnout and improve work productivity, efficiency, quality and retention.”, but this latter goal seems to be beyond the scope of the review.

Comment 7: this has been addressed adequately.

References

1. Dugani S, Afari H, Hirschhorn L, Ratcliffe H, et al.: Prevalence and factors associated with burnout among frontline primary health care providers in low- and middle-income countries: A systematic review. *Gates Open Research*. 2018; **2**. [Publisher Full Text](#)

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Cultural adaptation of mental health measures, mental health epidemiology

We confirm that we have read this submission and believe that we have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however we have significant reservations, as outlined above.

Author Response 04 Jun 2018

Hannah Ratcliffe, Brigham and Women's Hospital and Harvard T.H. Chan School of Public Health, Boston, USA

We are grateful for the thoughtful feedback. We have addressed your specific points and have revised the manuscript accordingly. Additional details are provided comment-by-comment, below.

Comment 1: *The numbers are inconsistent between the abstract and the PRISMA flow chart. The reason for excluding studies (and the numbers in each category have not been given.*

The literature search was initially done on December 1, 2014. At that time, 5412 unique articles were identified. The search was repeated on January 23, 2016, and 770 articles were identified. This gives a total of 6,182 articles, which is included in the abstract. In the results section, we have modified the sentence as follows: "...we identified 770 articles (total of 6,182 articles when combined with search on December 1, 2014)"

In many published articles, reasons for excluding articles are listed in the secondary screening stage and not necessarily at the primary screening stage. Accordingly, we have provided reasons (and number of articles in each case) for excluding articles.

Comment 2: *The authors have not adequately addressed this comment. The limitation of researchers applying non-validated cut-offs across diverse cultures and settings is not considered at all, even though this threatens the validity of the findings (and is the major problem with the research to date). The authors have not conducted any standardised evaluation of the quality of the studies. It if was not done then it needs to be acknowledged as a limitation of this review.*

The 'Discussion' section has been revised to reflect our evaluation of the quality of the studies.

Original review major comments, point 3: *The authors excluded studies that only focused on healthcare provider mental health without considering burnout, but one criticism of the burnout concept is that it may represent undetected depression (there is a high level of overlap with depression symptoms). There is, therefore, a need for studies that measure both burnout and depression in order to understand the extent to which these constructs are separate. The lack of studies to do this is worth mentioning.*

Comment 3: *This has not been commented upon in the article.*

We have modified the Discussion section with the following sentence "Further, provider depression may be a cause or consequence of provider burnout, and studies will be required to explore if they are separate or linked constructs"

Original review major comments, point 8: *The range of health worker cadres included are very diverse in their training level, their role in primary health care, their level of control over their job as well as community's attitude and respect towards them. Aggregating these heterogeneous groups need to be done with caution. Please can you give more emphasis to the differences among these types of primary healthcare worker. This is also relevant to the discussion, where you talk about modifiable risk factors, but the cadre of health worker to which this pertains is not clear.*

Comment 5: *This has been addressed to some extent.*

We have modified the Discussion section with the following sentence "The roles and responsibilities of different cadres of health workers depends on the study, and therefore should be interpreted carefully".

Competing Interests: No competing interests were disclosed.

Reviewer Report 08 May 2018

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Eliudi Eliakimu 

Health Quality Assurance Division, Ministry of Health, Community Development, Gender, Elderly and Children, Dar es Salaam, Tanzania

The authors have done good job in addressing all the comments raised in my previous report.¹ Only a minor error has remained in page 4 of 23 in which they have not changed the study area for reference number 50 (in the version 2)² to be Zambia instead of Zimbabwe as shown in the quote below:

"Non-MBI measures of provider burnout

Four studies used non-MBI tools to measure burnout among providers. A study based in Serbia used a self-assessment test (15 questions assessed on a Freudenberg scale) and reported that 44.4% of community pharmacists had high levels of burnout⁵¹. A study based in Zimbabwe used a single question to assess burnout and reported that 27.8% of HIV healthcare providers had burnout that was severe or not improving with time⁵⁰. In Uganda,....."

Apart from the minor error above, I do not have further comments.

References

1. Eliakimu E.: Referee Report For: Prevalence and factors associated with burnout among frontline primary health care providers in low- and middle-income countries: A systematic review [version 2; referees: 1 approved, 1 approved with reservations]. *Gates Open Res.* 2018; **2** (4). [Publisher Full Text](#)
2. Dugani S, Afari H, Hirschhorn LR et al: Prevalence and factors associated with burnout among frontline primary health care providers in low- and middle-income countries: A systematic review [version 2; referees: 1 approved, 1 approved with reservations]. *Gates Open Research.* 2018; **2** (4). [Publisher Full Text](#)

Competing Interests: No competing interests were disclosed.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Author Response 04 Jun 2018

Hannah Ratcliffe, Brigham and Women's Hospital and Harvard T.H. Chan School of Public Health, Boston, USA

Thank you for catching this error--we have updated the revised manuscript accordingly.

Competing Interests: No competing interests were disclosed.

Version 1

Reviewer Report 21 February 2018

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Charlotte Hanlon

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This review is timely in view of the increasing focus on the wellbeing of health workers worldwide and the implications for health systems. We have some suggestions to improve the quality of the paper.

Major comments

1. Please include the PRISMA flow chart of studies in the main paper (also, the quality of chart is not good in the supplementary file and it is difficult to read). There is inconsistency between the text in the main paper describing inclusion/exclusion criteria and the flow chart e.g. qualitative studies, the time period of consideration.
2. There is almost no consideration of the quality of the studies included within the review. A key limitation of the research in the area of burnout has been the use of non-validated questionnaires and uncritical application of cut-offs from Western settings to define burnout. At present this review propagates this problem. We appreciate that the authors can only present the data presented in the original papers, but there needs to be critical reflection on the limitation of using cut-offs from non-validated measures. Other aspects of

research quality are also crucial. How was social desirability minimised? (to what extent did studies ensure anonymity of responses to allow primary care workers to honestly disclose their feelings?). How representative were the samples? (did they only include health workers who were at work and selectively under-sample health workers who were absent/off sick?). Please expand your discussion of these important methodological issues and the implications for future studies.

3. The authors excluded studies that only focused on healthcare provider mental health without considering burnout, but one criticism of the burnout concept is that it may represent undetected depression (there is a high level of overlap with depression symptoms). There is, therefore, a need for studies that measure both burnout and depression in order to understand the extent to which these constructs are separate. The lack of studies to do this is worth mentioning.
4. Was the review protocol registered (e.g. in Prospero)? If not, this is an important limitation and needs to be acknowledged.
5. It seems surprising that a meta-analysis was not considered, given the high number of studies that used the same assessment measure for burnout. Given our concerns about the quality of the studies, that is probably a good decision, but it needs better justification within the paper.
6. Given that all studies were cross-sectional, please speak about 'associated factors' rather than risk factors (as we do not know the temporal relationship). There is some inconsistency in the terminology used.
7. Only two of the studies appear to have been conducted in low-income countries (the rest are middle-income). This is a relevant discussion point.
8. The range of health worker cadres included are very diverse in their training level, their role in primary health care, their level of control over their job as well as community's attitude and respect towards them. Aggregating these heterogeneous groups need to be done with caution. Please can you give more emphasis to the differences among these types of primary healthcare worker. This is also relevant to the discussion, where you talk about modifiable risk factors, but the cadre of health worker to which this pertains is not clear.

Minor comments

1. In the abstract background (and the introduction), we think that it is also relevant to highlight that staff turnover, quality of care and quality of life are key considerations (not just about efficiency and productivity).
2. In the abstract, it might be helpful to add midwives to the list of providers included.
3. In the last three lines of the abstract results you state that "Higher provider burnout was associated with high job stress, high time pressure and workload, and lack of organizational support." Please relate this to the specific health worker type where the evidence is present.
4. In the introduction (line 11) it would be helpful if you indicated whether the 50-80%

spending on staff remuneration is for low or high income countries.

5. Please add a title for the Methods.
6. Was data extraction done by more than one person independently?
7. At the end of the introduction you have a comment on the paucity of high quality studies on burnout in LMICs, emphasising the cross-sectional nature of studies etc. This is really the finding of your review and doesn't fit well in the introduction.
8. Please could you make the aim of the review more focused, e.g. to describe the prevalence of, and factors associated with, outpatient provider burnout in LMICs. Then you can comment that you hope that this will then "help managers and policymakers develop and implement effective interventions to prevent burnout and improve work productivity, efficiency, quality and retention.", but this latter goal seems to be beyond the scope of the review.
9. At the beginning of the results there is some repetition of the cadres of health worker (but inconsistent with one another and different from the tables). Please ensure consistency. Where are the studies including dentists?
10. Please align the conclusion in the abstract and the main paper.

Are the rationale for, and objectives of, the Systematic Review clearly stated?

Yes

Are sufficient details of the methods and analysis provided to allow replication by others?

Partly

Is the statistical analysis and its interpretation appropriate?

Not applicable

Are the conclusions drawn adequately supported by the results presented in the review?

Partly

Competing Interests: No competing interests were disclosed.

We confirm that we have read this submission and believe that we have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however we have significant reservations, as outlined above.

Author Response 25 Apr 2018

Hannah Ratcliffe, Brigham and Women's Hospital and Harvard T.H. Chan School of Public Health, Boston, USA

Thank you for your insightful comments and questions. Please see below a detailed

explanation of how each of your comments was addressed.

Major comments

1) Please include the PRISMA flow chart of studies in the main paper (also, the quality of chart is not good in the supplementary file and it is difficult to read). There is inconsistency between the text in the main paper describing inclusion/exclusion criteria and the flow chart e.g. qualitative studies, the time period of consideration.

Based on the journal's preferred format, the protocol has been added to the supplementary appendix. The literature search was done twice (December 1, 2014, and January 23, 2016), as explained in the "Data sources and search strategy" section. We have amended the methods section to clarify that qualitative studies were also excluded. We apologize for the inconsistency.

2) There is almost no consideration of the quality of the studies included within the review. A key limitation of the research in the area of burnout has been the use of non-validated questionnaires and uncritical application of cut-offs from Western settings to define burnout. At present this review propagates this problem. We appreciate that the authors can only present the data presented in the original papers, but there needs to be critical reflection on the limitation of using cut-offs from non-validated measures. Other aspects of research quality are also crucial. How was social desirability minimised? (to what extent did studies ensure anonymity of responses to allow primary care workers to honestly disclose their feelings?). How representative were the samples? (did they only include health workers who were at work and selectively under-sample health workers who were absent/off sick?). Please expand your discussion of these important methodological issues and the implications for future studies.

The reviewer raises several excellent points as under-sampling, purposeful sampling, and characteristics of non-responders will dictate the validity of the results. These are important points that should be taken into consideration for future studies. We have added the following to the discussion on Page 14: "Further studies should ensure higher response rates among responders, describe the characteristics of non-responders, and clarify the level of anonymity responders have while participating in studies. Further, as many studies are cross-sectional, it will be challenging to generalize these findings to different contexts and situations."

3) The authors excluded studies that only focused on healthcare provider mental health without considering burnout, but one criticism of the burnout concept is that it may represent undetected depression (there is a high level of overlap with depression symptoms). There is, therefore, a need for studies that measure both burnout and depression in order to understand the extent to which these constructs are separate. The lack of studies to do this is worth mentioning.

We agree that burnout may represent undetected depression. Further, burnout may be a precursor to depression, result from it, or be worsened by it. Separating burnout, lack of motivation, depression, and other psychologic stressors is important as they may point to different interventional strategies. We agree that further studies should focus on this.

4) Was the review protocol registered (e.g. in Prospero)? If not, this is an important limitation and

needs to be acknowledged.

The protocol was not registered, and we have added this on Page 5 under “Data sources and search strategy”

5) It seems surprising that a meta-analysis was not considered, given the high number of studies that used the same assessment measure for burnout. Given our concerns about the quality of the studies, that is probably a good decision, but it needs better justification within the paper.

In the discussion section, we address reasons for not considering a meta-analysis. We noted that “only 15 of the 20 included studies used the MBI, and among them, differences in study population and design precluded analyses across different cadres of health providers”.

6) Given that all studies were cross-sectional, please speak about ‘associated factors’ rather than risk factors (as we do not know the temporal relationship). There is some inconsistency in the terminology used.

Many studies discuss the risk associated with burnout. We agree that this is association and not causation. In these cross-sectional studies, it is likely that some of the observations result from burnout and may not be a risk associated with developing burnout.

7) Only two of the studies appear to have been conducted in low-income countries (the rest are middle-income). This is a relevant discussion point.

We agree and have added the following to the Results section “Two studies were based in low income countries while the rest were based in middle-income countries”.

8) The range of health worker cadres included are very diverse in their training level, their role in primary health care, their level of control over their job as well as community’s attitude and respect towards them. Aggregating these heterogeneous groups need to be done with caution. Please can you give more emphasis to the differences among these types of primary healthcare worker. This is also relevant to the discussion, where you talk about modifiable risk factors, but the cadre of health worker to which this pertains is not clear.

We noted a variety of cadres, and included this in the discussion as a factor that precluded doing a meta-analysis. The educational background and qualifications of each cadre vary resulting in different healthcare responsibilities. From the studies, we could not determine these factors.

Minor comments

1) In the abstract background (and the introduction), we think that it is also relevant to highlight that staff turnover, quality of care and quality of life are key considerations (not just about efficiency and productivity).

We have added the following sentence to the introduction “Further, a positive work environment will reduce workforce turnover, and improve quality of life and care”.

2) In the abstract, it might be helpful to add midwives to the list of providers included.

This change has been made

3) In the last three lines of the abstract results you state that "Higher provider burnout was associated with high job stress, high time pressure and workload, and lack of organizational support." Please relate this to the specific health worker type where the evidence is present. We have made the following change "Higher provider burnout (for example, among nurses, pharmacists, and rural health workers) was..."

4) In the introduction (line 11) it would be helpful if you indicated whether the 50-80% spending on staff remuneration is for low or high income countries.

We have focused those sentences on retention and quality of life, therefore deleted the section related to salaries.

5) Please add a title for the Methods.

This change has been made

6) Was data extraction done by more than one person independently?

Yes, as noted in the methods section, all articles were extracted independently by 2 study team members. The method for resolving conflicts is also described.

7) At the end of the introduction you have a comment on the paucity of high quality studies on burnout in LMICs, emphasising the cross-sectional nature of studies etc. This is really the finding of your review and doesn't fit well in the introduction.

We meant that paucity of synthesis of studies on burnout. We have modified this to read "In addition to the paucity of such synthesis, current data..."

8) Please could you make the aim of the review more focused, e.g. to describe the prevalence of, and factors associated with, outpatient provider burnout in LMICs. Then you can comment that you hope that this will then "help managers and policymakers develop and implement effective interventions to prevent burnout and improve work productivity, efficiency, quality and retention.", but this latter goal seems to be beyond the scope of the review.

We agree and have made this change.

9) At the beginning of the results there is some repetition of the cadres of health worker (but inconsistent with one another and different from the tables). Please ensure consistency. Where are the studies including dentists?

We have made changes to ensure consistency. We did not include dentists in our study. We strongly think this is a vital cadre and should be the subject of future studies.

10) Please align the conclusion in the abstract and the main paper.

We agree with the reviewer and have made the following changes to the conclusions in the abstract to read “Our comprehensive review of published literature showed that provider burnout is prevalent across various health care providers in LMICs. Further studies are required to better measure the causes and consequences of burnout, and guide the development of effective interventions to reduce or prevent burnout.”

Competing Interests: No competing interests were disclosed.

Reviewer Report 09 February 2018

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Eliudi Eliakimu 

Health Quality Assurance Division, Ministry of Health, Community Development, Gender, Elderly and Children, Dar es Salaam, Tanzania

This report provides a review of the paper by Dugani, et al (2018).¹ The rationale of the paper by Dugani and colleagues is to fill the knowledge gap regarding the lack of comprehensive analysis of the burden of burnout and contributing factors in low-and middle – income countries (LMICs). The authors have clearly shown their objective for the study – “.....to describe the prevalence of and factors associated with outpatient provider burnout in LMICs, to help managers and policy makers develop and implement effective interventions.....” The authors went on to give clear details of the methodologic approach (search strategy, selection of the studies, data extraction and analysis) and then they presented well their results, discussion and conclusions.

The purpose of this review report is to vet the paper in terms of whether it is scientifically sound. The report is sequenced into six parts as per the paper layout (introduction, methodology, results, discussion, conclusions, and reference list).

1. Introduction – the authors have given clear introduction with description of primary health care system and its key requirement (i.e., availability of skilled and motivated human resources, and they have included projections of human resources shortage); and then they focused the rest of it on burnout. To my expertise, I find the introductory part to be well-done and scientifically sound.

2. Methodology – it is well presented with clear details of the search process (sources and strategy) and how the studies were selected by indicating the role played by each of authors. To the best of my knowledge, I approve the methodology used and details provided on the process that they are valid and robust.

3. *Results* – the results section is well presented and of acceptable standard. However, there are some minor corrections, which the authors need to make on the following:

- On the paragraph under the subheading “Non-MBI measures of provider burnout” and the paragraph under the subheading “variables associated with provider burnout”, the authors have made an error by wrongly referring the study by Kruse, et al (2009), which is reference number 51 in the paper to be from Zimbabwe while it was done in Zambia – Lusaka District.²
- In table 1 – Kruse, et al (2009)² the same error is seen indicating it was done in Zimbabwe instead of Zambia.
- There is a need for consistency of the names of authors used in the tables 1, 2, and 3 and the way they appear in the reference list. In particular here, I refer to “da Silva (2008)” – in the reference list (number 37) it is cited as “Silva”. In this case, the authors need to find the correct name for the author of reference-37 and use both in the tables and in the reference list in order to enable readers to follow through smoothly.

In terms of how exhaustive the literature search has been, the authors have done a very comprehensive search strategy. However, there could be some literatures that have not been captured. For example, I suggest to the authors to consider inclusion of the paper by Perry, et al (2014)³ on burnout among voluntary medical male circumcision (VMMC) services providers. By nature of the VMMC services, they are usually outpatient in nature.

4. *Discussion* – it is well presented and linked to the results.

5. *Conclusions* – the authors have synthesized well the conclusions and linked it with the results and discussion.

6. *Reference list* – the authors need to ensure correctness of the references both in the text (narrative and in tables) and in the reference list.

References

1. Dugani S, Afari H, Hirschhorn L.R, Ratcliffe H, et al.: Prevalence and factors associated with burnout among frontline primary health care providers in low- and middle-income countries: A systematic review [version 1; referees: awaiting peer review]. *Gates Open Res.* 2018; **2** (4). [Publisher Full Text](#)
2. Kruse GR, Chapula BT, Ikeda S, Nkhoma M, 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 [PubMed Abstract](#) | [Publisher Full Text](#)
3. Perry L, Rech D, Mavhu W, Frade S, et al.: Work experience, job-fulfillment and burnout among VMMC providers in Kenya, South Africa, Tanzania and Zimbabwe. *PLoS One.* 2014; **9** (5): e84215 [PubMed Abstract](#) | [Publisher Full Text](#)

Are the rationale for, and objectives of, the Systematic Review clearly stated?

Yes

Are sufficient details of the methods and analysis provided to allow replication by others?

Yes

Is the statistical analysis and its interpretation appropriate?

Yes

Are the conclusions drawn adequately supported by the results presented in the review?

Yes

Competing Interests: No competing interests were disclosed.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Author Response 25 Apr 2018

Hannah Ratcliffe, Brigham and Women's Hospital and Harvard T.H. Chan School of Public Health, Boston, USA

Thank you for your insightful comments and questions. Please see below a detailed explanation of how each of your comments was addressed.

1) On the paragraph under the subheading "Non-MBI measures of provider burnout" and the paragraph under the subheading "variables associated with provider burnout", the authors have made an error by wrongly referring the study by Kruse, et al (2009), which is reference number 51 in the paper to be from Zimbabwe while it was done in Zambia – Lusaka District.²

We have corrected this error.

2) In table 1 – Kruse, et al (2009)² the same error is seen indicating it was done in Zimbabwe instead of Zambia.

We have corrected this error.

3) There is a need for consistency of the names of authors used in the tables 1, 2, and 3 and the way they appear in the reference list. In particular here, I refer to "da Silva (2008)" – in the reference list (number 37) it is cited as "Silva". In this case, the authors need to find the correct name for the author of reference-37 and use both in the tables and in the reference list in order to enable readers to follow through smoothly

We have corrected this error.

4) In terms of how exhaustive the literature search has been, the authors have done a very comprehensive search strategy. However, there could be some literatures that have not been captured. For example, I suggest to the authors to consider inclusion of the paper by Perry, et al (2014)³ on burnout among voluntary medical male circumcision (VMMC) services providers. By nature of the VMMC services, they are usually outpatient in nature. We thank the reviewer for suggesting this paper.

We had encountered this paper, but excluded it as the setting (outpatient vs. inpatient) was unclear to us. As a result we will exclude it from our manuscript.

5) Reference list – the authors need to ensure correctness of the references both in the text (narrative and in tables) and in the reference list.

We have reviewed the references.

Competing Interests: No competing interests were disclosed.