Depression and Insomnia among health care professionals during COVID-19 pandemic in Ethiopia: a systematic review and meta-analysis (#78597)

First submission

Guidance from your Editor

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- Is the topic of the study relevant and meaningful?
- Are the results robust and believable?

Structure and Criteria

2

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2. **EXPERIMENTAL DESIGN**
3. **VALIDITY OF THE FINDINGS**
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BASIC REPORTING

- Clear, unambiguous, professional English language used throughout.
- Intro & background to show context. Literature well referenced & relevant.
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- Raw data supplied (see PeerJ policy).

EXPERIMENTAL DESIGN

- Original primary research within Scope of the journal.
- Research question well defined, relevant & meaningful. It is stated how the research fills an identified knowledge gap.
- Rigorous investigation performed to a high technical & ethical standard.
- Methods described with sufficient detail & information to replicate.

VALIDITY OF THE FINDINGS

- Impact and novelty not assessed. *Meaningful* replication encouraged where rationale & benefit to literature is clearly stated.
- All underlying data have been provided; they are robust, statistically sound, & controlled.
- Conclusions are well stated, linked to original research question & limited to supporting results.

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3

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Please provide constructive criticism, and avoid personal opinions	*I thank you for providing the raw data, however your supplemental files need more descriptive metadata identifiers to be useful to future readers. Although your results are compelling, the data analysis should be improved in the following ways: AA, BB, CC*
Comment on strengths (as well as weaknesses) of the manuscript	*I commend the authors for their extensive data set, compiled over many years of detailed fieldwork. In addition, the manuscript is clearly written in professional, unambiguous language. If there is a weakness, it is in the statistical analysis (as I have noted above) which should be improved upon before Acceptance.*

Depression and Insomnia among health care professionals during COVID-19 pandemic in Ethiopia: a systematic review and meta-analysis

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Introduction. Healthcare professionals play a great role on struggle against COVID-19. They are highly susceptible to COVID-19 due to their responsibilities. This susceptibility directly affects their mental health status. Comprehensive evidence on prevalence of depression and insomnia during this pandemic is vital. Thus, this study aims to provide the pooled prevalence of depression and insomnia, and their associated factors during the COVID-19 pandemic. Materials and methods. This systematic review and meta-analysis follow the PRISMA guidelines. Studies were searched from PubMed, Cochrane Library, CrossRef, African Journals Online and Google Scholar databases from the occurence of the pandemic to date. Study selection, data extraction and methodological quality assessment of study were done by two reviewers independently. The I^2 statistics was used for testing heterogeneity. A random effect model was used. Stata 16.0 was used for statistical analysis . Results. Eight studies were incorporated for this systematic review and meta-analysis. From 7 studies the pooled prevalence of the depression was 40% (95% CI (0.23-0.57); I^2 = 99.00%; P=0.00). From 3 studies the pooled prevalence of the insomnia was 35% (95% CI (0.13-0.58); I^2= 98.20; P=0.00). Associated factors of depression on HCWs were being female pooled AOR: 2.09; 95% CI (1.41-2.76); working at COVID-19 isolation center (pooled AOR =2.13; 95%CI (0.94, 3.31)); being married (pooled AOR=2.95; 95% CI (1.83, 4.07)); underline medical illness (pooled AOR= 4.11; 95% CI (-1.66, 9.87)). Conclusion. COVID-19 is highly associated with the prevalence of depression and insomnia among healthcare professionals in Ethiopia. The pooled prevalence of depression and insomnia were significantly higher among healthcare professionals. Appropriate psychological counseling package should be realized for HCWs in order to recover the general mental health problems.

Trial registration. This review was registered PROSPERO with registration number; CRD4202231486 5.

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ABSTRACT

Introduction. Healthcare professionals plays a great role on struggle against COVID-19. They are highly susceptible to COVID-19 due to their responsibilities. This susceptibility directly affects their mental health status. Comprehensive evidence on prevalence of depression and insomnia during this pandemic is vital. Thus, this study aims to provide the pooled prevalence of depression and insomnia, and their associated factors during the COVID-19 pandemic.

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Trial registration. This review was registered PROSPERO with registration number; CRD42022314865.

Keywords. COVID-19, mental health, depression, insomnia, systematic review, Ethiopia

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……healthcare workers (HCWs)……..

INTRODUCTION

The pandemic disease caused by severe acute respiratory syndrome coronavirus 2 (SARS CoV-2), first reported by officials in Wuhan City, China, in December 2019, which has spread to worldwide [1]. Healthcare professionals are forefront in the struggle against coronavirus disease 2019 (COVID-19). They are particularly susceptible to this disease due to their clinical task in the healthcare settings. This affects their mental health status. Studies have started researching the mental health condition of under the COVID-19 pandemic. Study findings on Spanish healthcare workers imply that COVID-19 has impact on the mental health of HCWs [2]. In Iran, more than half of the nurses had depression in response to the COVID-19 outbreak.[3]. In Africa, the prevalence of depression is higher compared to those reported elsewhere [4]. Situation report of UNICEF points Ethiopia had 96,169 confirmed cases of COVID-19 on 31 October, 2020 about 1,876 health care workers had tested positive and 77 had died [5]. Results of studies in Ethiopia the prevalence of depression was reported as 66.4% [6] 21.5%,[7] 25.8% [8] 58.2%.[9] Being female [6] age, family size [7] with medical illness [7] ; [9] being married, being pharmacist, contact with COVID-19 patients [9] are factors associated with depressive symptom of health care professionals during the pandemic. Also studies showed the prevalence of insomnia was 15.9% [10] 50.20% [11] and 40.8% [12]. Being female, being married and working in emergency unit are factors associated with insomnia of health care workers during the pandemic [11]. Furthermore, a worldwide meta-analysis during the pandemic result showed that the pooled prevalence of depression 34.31%. Mental health problems require early detection and initiation of intervention during the COVID-19 pandemic [13]. Study findings in Ethiopia on mental health problems (depression and insomnia) during the COVID-19 pandemic were varied. A comprehensive evidence on these findings helps policy makers, practitioners and researchers' in numerous ways. This study aims to provide the pooled prevalence of depression and insomnia, and their associated factors among health care professionals during the COVID-19 pandemic in Ethiopia.

Research questions

The following research questions were answered:

1. What is the pooled prevalence of depression and insomnia during COVID-19 pandemic among HCWs in Ethiopia?

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.....healthcare workers (HCWs).....

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2. What is the pooled effect size of associated factors of depression and insomnia during COVID-19 among HCWs in Ethiopia?

Objectives

General Objective

- This study aimed to assess the impact of COVID-19 on depression and insomnia among healthcare professionals in Ethiopia.

Specific objectives

- To estimate the pooled prevalence of depression and insomnia during COVID-19 pandemic among HCWs in Ethiopia.
- To estimate the pooled effect size and summary of associated factors of depression and insomnia during COVID-19 pandemic among HCWs in Ethiopia.

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MATERIALS AND METHODS

Protocol Registration

To understanding of impacts of COVID-19 on depression and insomnia among health care professionals in Ethiopia, we conducted a systematic review and meta-analysis in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement and registered in the International Prospective Register of Systematic Reviews with PROSPERO registration number: CRD42022314865. ~~The PRISMA flow chart for reporting of systematic review and meta-analysis is presented **(Fig.1)**.~~

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Search strategy

PubMed, Cochrane Library Database, CrossRef and Google Scholar databases were searched to get literatures and articles published to date were included. To assess the mental health impact of COVID-19 among healthcare professionals, observational studies were considered. Systematic searches were conducted by combining every possible combination of MeSH terms and keywords. Reference lists of key full text articles included in the review were checked to recognize any potentially eligible studies. The systematic procedure verifies that the literature search comprises all published studies on the impact of COVID-19 among healthcare professionals in Ethiopia. The search results were exported to Mendeley and duplicates were removed. Two reviewers (AAH and AAS) independently screened titles and abstracts of the

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studies, and any disagreement between the reviewers was resolved by discussin with third reviewer (AAM). The search strategy of PubMed database is presented (**Table 1)**. The search strategy is considered as adequate to reduce the risk of selection and detection bias

Inclusion criteria

For this study only observational studies (cohort, case-control and cross-sectional) focus the impacts of COVID-19 on depression and insomnia among healthcare professionals during the pandemic in Ethiopia were included.

Setting/context*:* Studies conducted in Ethiopia was the main concern of this review.
Population*:* The review will include studies involving healthcare professionals as a whole.
Study design*:* Observational studies (cohort, case-control and cross-sectional studies) that reported the impacts of mental disorders and its associated factors during the pandemic.
Language: English language reported studies were considered.

Exclusion criteria

The following types of studies were excluded:

1. Studies on whole population;
2. Studies with very small sample size;
3. Studies that did not have enough statistical information to be extracted and
4. Descriptive reviews, randomized controlled trials, systematic review, meta-analysis, editorials, comments, conference abstracts and expert opinions, not precisely measured the prevalence and the determinants of mental illness of healthcare professionals were excluded.

Outcome measures

There are two main outcomes in this systematic review and meta-analysis. The first outcome was the prevalence of depression and insomnia on healthcare professionals during the COVID-19 pandemic. The second outcome of the study is to identify factors related to the prevalence of depression and insomnia among health care professionals during the COVID-19 pandemic in Ethiopia.

Selection of studies

Two reviewers (AAH and AAS) assessed the studies based on inclusion and exclusion criteria. Firstly, the reviewers assessed both the titles and abstracts of the studies identified from the

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searched databases. Then full-text screening was done to screen the full texts selected in the previous stage. Moreover, we have a rationale for inclusion and exclusion of studies in the PRISMA flow diagram. Lastly, the final list of articles for data extraction for systematic review and meta- analysis was prepared.

Data extraction

The data extraction was done by two reviewers independently. There was pretest the data extraction to ensure effective, facilitates the collection of all necessary data required for the valuable systematic review and meta-analysis. Disagreements were resolved by deep argument. For the included studies, we extracted the author's last name, year of publication, where the study was conducted, study design, cases, sample size, instrument used, outcome measures and main findings.

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For example:
The following data were extracted from each article by two reviewers independently: study type, total number of participants……

Methodological quality assessment

Two reviewers (AAH and AAS) separately assessed the risk of bias of the included studies using the Newcastle-Ottawa Scale (NOS) [14]. NOS scale rates observational studies based on 3 parameters: selection, compared between the exposed and unexposed groups, and exposure/outcome assessment. Studies with less than 5 stars were considered low quality, 5-7 stars of moderate quality, and more than 7 stars of high quality [15]. Only studies with moderate and above quality score were included in this systematic review and meta-analysis.

Data synthesis

The extracted data was entered into a Microsoft Excel and then imported in to STATA version 16.0 software for the analyses. We calculated pooled prevalence and pooled adjusted odds ratios (AOR) with 95% confidence interval (CI) by the generic inverse variance method. Heterogeneity among included studies was assessed using the I^2 test. If $I^2 > 0.5$ or $P < 0.1$ it is considered that there is a significant heterogeneity among the included studies,[16] and random-effect model with the inverse variance method was used. To determine the source of heterogeneity subgroup analyses was performed by regions and instruments used in individual studies. Publication bias across studies examined using the funnel plot method, Egger's test and Begg's test [17]. The funnel plot is symmetrical and the P value of Egger's, and Begg's tests is >0.05, no significant publication bias is considered to exist in the meta-analysis [18]. If publication bias is found, a trim and fill analysis used to evaluate the number of missing studies

and recalculate the pooled prevalence and adjusted odds ratio with the addition of these missing hypothetical studies.

RESULTS

A PRISMA flow diagram illustrating the steps of data search and refining process for the study on depression and insomnia among health care professionals during the COVID-19 pandemic period (**Fig.1)**. We have got 30 papers from the searched databases. 8 studies duplicated were removed, we examined the titles and abstracts and 3 papers removed. By examining the full text, we removed 4 that did not meet inclusion criteria. 7 Studies removed due to not reporting about depression and insomnia. Finally, 8 studies were relevant to the systematic review and meta-analysis.

Study characteristics

In this systematic review and meta-analysis, we included 8 studies [[19]; [7]; [10]; [6]; [8]; [9] ;[11]; [12]] focusing on the impact of COVID-19 on depression and insomnia among health care professionals in Ethiopia. Regarding the regional distribution 1 study [8] is from SNNP, 3 studies [19]; [7]; [6] are from Oromiya, 1 study [9] is from Amhara, 1 study [10] is from Addis Ababa and Oromiya, 1 study [12] is from Addis Ababa. Furthermore, the key characteristics of the included papers was summarized and showed in table (**Table 2).**

Quality of included studies

The methodological quality score of the 8 included studies using the modified Newcastle Ottawa scale for correctional studies quality assessment tool was presented (**Table 2).** Accordingly, 2 studies were rated as moderate quality [9]; [11] and 6 studies were rated as high quality [19]; [10]; [6]; [8]; [12]; [7] and were considered for final systematic review and meta analysis.

Publication bias

As a rule of thumb, tests for funnel plot asymmetry should not be used when there are fewer than 10 studies in the meta-analysis because test power is usually too low to distinguish chance from real asymmetry [20]. Accordingly, the number of included studies for depression and insomnia are less than ten we do not apply the asymmetry test.

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Pooled Prevalence of depression

A total of 7 studies reported the prevalence of depression, and the pooled prevalence of the depression was 40% (95% CI [0.23-0.57]; I^2 = 99.00%; p=0.00) (**Fig.2)**. From the heterogeneity test, there is significant heterogeneity is observed among individual studies on the prevalence of depression among healthcare professionals during the pandemic in Ethiopia.

Subgroup analysis of depression by region

To handle this variability in studies the subgroup analysis by region is done. From the forest plot (**Fig.3),** the pooled prevalence of depression in Addis Ababa & Oromiya, Oromiya, SNNP, Addis Ababa and Amhara is 60%, 35%, 26%, 27% and 63% respectively. The heterogeneity test indicates that there is significant variability among regions. The prevalence of depression is higher in Amhara region compared to the others.

Subgroup analysis of depression by instrument

Based on the instrument used in individual included studies, subgroup analysis is done. From the forest plot (**Fig.4),** the pooled prevalence of depression by DASS-21 and PHQ-9 is 48%, and 34% respectively. The heterogeneity test indicates that there is significant variability on a study finding between measurements. The prevalence of depression measured in DASS-21 is higher than that measured by PHQ-9 among health care workers during the pandemic. This might be due to the difference in sensitivity and specificity of the assessment instruments.

Pooled Prevalence of Insomnia

Three studies reported the prevalence of insomnia, and the pooled prevalence of the insomnia was 35% (95% CI [0.13-0.58]; I^2 = 98.20%; p=0.00) (**Fig.5)**. In the test of heterogeneity, we have seen that there is considerable variation among individual included studies on the prevalence of insomnia among health care professionals during the pandemic in Ethiopia.

Subgroup analysis of Insomnia by region

Subgroup analysis by region is done. From the forest plot (**Fig.6),** the pooled prevalence of insomnia in Oromiya and Addis Ababa is 24% and 41% respectively. The heterogeneity test indicates that there is significant variation in the prevalence of insomnia between regions. The prevalence of insomnia is higher in Addis Ababa than Oromiya.

Subgroup analysis of insomnia by instrument

Based on the instrument used in individual included studies, subgroup analysis is done. From the forest plot in (**Fig.7),** the pooled prevalence of depression measured by ISI and PSQI is 24% and 41% respectively. The heterogeneity test indicates that there is significant variation on a study finding between measurements. The prevalence of depression measured in PHQI is higher than that measured by ISI among health care workers during the pandemic.

Pooled adjusted odds ratio of associated factors of depression and insomnia

The pooled adjusted odds ratio of the factors associated with prevalence of depression among health care professionals during COVID-19 in Ethiopia presented (**Table 3)**. We looked at the association between sex and depression in this meta-analysis. Accordingly, female healthcare workers were two times more likely to de depression than male (Pooled AOR: 2.09; 95% CI: (1.41, 2.76)). The test statistics revealed no heterogeneity among the included studies (I^2 = 0.00% and p =0.837). We saw at the association between working units of healthcare workers and depression in this meta-analysis. Accordingly, working at COVID-19 isolation center were two times more likely to develop depression than their counterparts (pooled AOR: 2.13; 95%: (0.94, 3.31)). The test statistics revealed no heterogeneity among the included studies (I^2 = 0.00% and p =0.980). Married HCWs were nearly three times more likely to develop depression than single (pooled AOR: 2.95; 95% CI: (1.83, 4.07)). The test statistics revealed no heterogeneity among the included studies (I^2 = 0.00% and p =0.539). We have seen association of healthcare workers with medical illness and depression. HCWs with medical illness were four times more likely to develop depression than not have medical illness (pooled AOR: 4.11, 95% CI: (-1.66, 9.87)). The test statistics revealed no heterogeneity among the included studies (I^2 = 40.4% and p =0.195). Since the findings on the factors associated with the prevalence of depression and insomnia were hetrogenious and impossible to pooling. We explor these factors systematically summarized (**Table 4)**.

DISCUSSIONS

Due to COVID-19 pandemic health care professionals faces a variety of mental health problems. There are studies at the single level, but to our knowledge, this systematic review and meta-analysis study was the first of its kind that assessed the pooled prevalence of depression and insomnia and their associated factors. The study included 8 studies [[19]; [7]; [10]; [6]; [8]; [9]

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The authors should explain/mention the strength of their study.

;[11]; [12]] articles focus on the impact of COVID-19 on depression and insomnia status of health care professionals in Ethiopia. Studies are conducted with the ethical guideline. The pooled prevalence of depression and insomnia, and their associated factors were discussed. The pooled prevalence of depression among HCWs during the COVID-19 pandemic was 40%. This is higher than meta-analysis result 36% [21] and lower than the study results in Africa 45% [4] higher than a meta analysis results 31.8% [22] and 26.2% [23]. Among regions, there is heterogeneity on the prevalence of depression. The prevalence of depression in Amhara regions is 63%, is higher compared to the others. Subgroup analysis by instrument, the pooled prevalence of depression by DASS-21 and PHQ-9 is 48% and 34% respectively. The pooled adjusted odds ratio on female HCWs is 2.05, 95%CI (1.46, 2.64) implies that female HCWs are two times more likely to develop the depressive symptom than males during the pandemic. Similarly, working at COVID-19 isolation center pooled adjusted odds ratio is 2.22, 95%CI (1.06,3.37) meaning that working at COVID-19 isolation center two times more likely to develop depression than working pharmacy. Been married pooled adjusted odds ratio is 2.95, 95%CI (1.83, 4.07) indicate married HCWs are nearly 3 times more likely to develop depression than not married. The pooled prevalence of insomnia on HCWs during the COVID-19 pandemic was 35%. This was inline with the poled prevalence of insomnia among HCWs 34% [23], higher than a meta analysis results 28% [4], 32% [23] and 27.8 % [22]. Subgroup analysis by region the heterogeneity test indicates that there is significant variation in the prevalence of insomnia between regions. The prevalence of insomnia in Addis Ababa is 41% higher than Oromiya. We have summarized the factors associated with insomnia due to small number of study obtained. This study is with strengths and some limitations. Data extraction and risk of bias assessment were performed by two reviewer independently. Newcastle-Ottawa Scale used to assess the risk of bias of the included studies were the strengths. The absence of sufficient studies on the impact of COVID-19 on the mental health of health care professionals in Ethiopia and heterogeneity among studies were the limitations of this systematic review and meta-analysis.

CONCLUSION

The COVID-19 pandemic caused a variety of mental health impacts among health care professionals in Ethiopia. Due to this pandemic, the prevalence of depression and insomnia among health care professionals became high in Ethiopia. The prevalence varied among regions

as well as instruments used. The suitable programs that offer awareness on the COVID-19 virus, psychological counseling and intervention should be implemented for HCWs in order to improve the general mental health problems including depression and insomnia.

Abbreviations

AOR Adjusted Odds Ratio

CI Confidence Interval

HCWs Health Care Workers

MeSH Medical Subject Headings

NOS Newcastle Ottawa Quality Assessment Scale

PRISMA Preferred Reporting Items for Systematic Review and Meta-Analysis

SNNP Southern Nations, Nationalities and People

WHO World Health Organization

ACKNOWLEDGEMENTS

We acknowledged the authors of studies included in this systematic review and meta-analysis.

Funding

The author received no funding for this work.

Competing Interests

The authors declare there are no competing interests.

Author's contributions

- All authors have made significant contributions to this study.
- AAH developed the research question, wrote the first draft, designed the search strategy, and edited and approved the final version of the manuscript.

- AAS revised the search strategy of databases, developed the data extraction form, and edited and approved the final version of the manuscript.
- AAM revised the data extraction form and edited and approved the final version of the manuscript.

Data Availability

The data are included with in the article.

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Table 1 (on next page)

PubMed search strategy.

1

Search number	Search detail
	"COVID-19"[MeSH Terms]
#2	"depression"[Mesh Terms]
#3	"insomnia"[Mesh Terms]
#4	"COVID-19"[Title/Abstract] OR "2019 novel coronavirus disease"[Title/Abstract] OR "2019 novel coronavirus infection"[Title/Abstract] OR "2019 ncov disease"[Title/Abstract] OR "2019 ncov infection"[Title/Abstract] OR "covid 19 pandemic"[Title/Abstract] OR "covid 19 pandemics"[Title/Abstract] OR "covid 19 virus disease"[Title/Abstract] OR "covid 19 virus infection"[Title/Abstract] OR "COVID19"[Title/Abstract] OR "coronavirus disease 2019"[Title/Abstract] OR "coronavirus disease 19"[Title/Abstract] OR "sars coronavirus 2 infection"[Title/Abstract] OR "sars cov 2 infection"[Title/Abstract] OR "severe acute respiratory syndrome coronavirus 2 infection""[Title/Abstract] OR "SARS-CoV-2"[Title/Abstract] OR "2019 novel coronavirus"[Title/Abstract] OR "2019 novel coronavirus"[Title/Abstract] OR "2019- nCoV"[Title/Abstract] OR "covid 19 virus"[Title/Abstract] OR "covid19 virus"[Title/Abstract] OR "Coronavirus disease 2019 virus"[Title/Abstract] OR "SARS coronavirus 2"[Title/Abstract] OR "SARS cov 2 virus"[Title/Abstract] OR "severe acute respiratory syndrome coronavirus 2"[Title/Abstract] OR "Wuhan coronavirus"[Title/Abstract] OR "Wuhan seafood market pneumonia virus"[Title/Abstract]
#5	"Mental illness" [Title/Abstract] OR "Psychiatric problem" [Title/Abstract] AND "insomnia" [Title/Abstract] OR "depression" [Title/Abstract] OR "psychology problem" [Title/Abstract] OR "mental health effect" [Title/Abstract] OR "psychological disturbance" [Title/Abstract] "Mental Disorder" [Title/Abstract] OR "Psychiatric Illness" [Title/Abstract] OR "Psychiatric Diseases" [Title/Abstract] OR "Psychiatric Disorders" [Title/Abstract] OR Behavior Disorders" [Title/Abstract] OR "Severe Mental Disorder" [Title/Abstract]
#6	"health care professionals"[Title/Abstract] OR "health care workers"[Title/Abstract] AND "Ethiopia"[Title/Abstract] OR "Addis Ababa"[Title/Abstract] OR "Amhara"[Title/Abstract] OR "Afar"[Title/Abstract] OR "Oromia"[Title/Abstract] OR "SNNP"[Title/Abstract] OR "Somali" [Title/Abstract] OR "Gambella" [Title/Abstract] OR " Benishangul-Gumuz" [Title/Abstract] OR "Tigrai" [Title/Abstract] OR " Harari" [Title/Abstract] OR "Dire Dawa" [Title/Abstract]
#7	#1 OR #4
#8	#2 OR #3 OR #5
#9	#6 AND #7 AND #8
#10	Limit to "observational studies" OR "cohort" OR "case-control" OR "cross-sectional"

Table 2(on next page)

Key characteristics of the included studies for depression and insomnia of HCWs during the COVID-19 pandemic in Ethiopia.

1

2

No	Authors /year	Region	Study design	Gender (male %)	Cases	Sample size (n)	Mental disorders (Outcomes)	Instrument	Prevalence (%)	Quality
1	Jemal et al.(2021) A	AA and Oromiya	CS	540(66.17)	492	816	Depression	DASS-21	60.3	8
2	Jemal et al. (2021) B	Oromiya	CS	279(66.90)	66	417	Insomnia	ISI	15.9	8
					68	417	Depression	PHQ-9	16.3	
3	Yitayih et al.(2021)	Oromiya	CS	118(47.38)	125	249	Insomnia	ISI	50.2	7
4	GebreEyesus et al.(2021)	SNNP	CS	167(51.86)	83	322	Depression	PHQ-9	25.8	9
5	Habtamu et al. (2021)	AA	CS	101(42.43)	65	238	Depression	PHQ-9	27.3	9
					97	238	Insomnia	PSQI	40.8	
6	Wayessa et al. (2021)	Oromiya	CS	173(62.90)	59	275	Depression	DASS-21	21.5	8
7	Yadeta et al.(2021)	Oromiya	CS	133(50.18)	176	265	Depression	PHQ-9	66.4	8
8	Asnakew et al.(2021)	Amhara	CS	292(69.7)	244	419	Depression	DASS-21	58.2	7

3

Table 3(on next page)

Pooled adjusted odds ratio of associated factors of depression.

1

Studies	Mental illness	No of studies	Variables	Reference category	Pooled AOR (95% CI)	Heterogeneity	
						I^2 (%)	p-value
[10][19][6][12]	Depression	4	Sex(female)	Male	2.09 (1.41, 2.76)	0.00	0.837
[10][19]	Depression	2	Working unit (COVID-19 isolation center)	Pharmacy	2.13 (0.94, 3.31)	0.00	0.980
[10][8][12]	Depression	3	Marital status (married)	Single	2.95(1.83, 4.07)	0.00	0.743
[7][9]	Depression	2	With medical illness	Not	4.11(-1.66, 9.87)	40.4	0.195

Table 4(on next page)

A summarized review of study findings on factors of depression and insomnia with their magnitude among healthcare professionals during the COVID-19 pandemic in Ethiopia.

1

No	Authors (	Mental Disorders	Variables	Category	AOR(95% CI)
1	et Al.(2021) A	Depression	Hcws in the Oromiya special zone Medical laboratory professionals	Centeral Oromiya Pharmacy	3.94 (1.94, 8.09) 4.69 (2.81, 9.17)
2	et al. (2021)	Depression	Married participants unit of years Poor behavioral responses Poor perception to COVID-19	Single Outpatient >=10 years Good response Good	2.87 (2.03, 4.30) 2.11 (1.27, 4.61) 2.07 (1.89, 4.84) 2.13 (1.18, 3.57) 1.47 (1.88, 2.64)
3	Gebreeyesus et al.(2021)	Depression	Masters and above Whose educational status, degrees Live with their husband/wife Live with their families	Deploma Deploma Alone Alone	10.844 (1.131,4.551) 2.269 (3.314,35.482) 5.824 (1.896,17.88) 3.938 (1.380,11.242)
5	Wayessa et al. (2021)	Depression	Age 25-29 Family size>=4 members Alcohol use Having training on COVID-19 Poor knowledge on COVID-19	Age >=35 1 person Not Not Good	2.35 (1.126,3.95) 3.56 (1.09,11.62) 4.31 (1.76, 10.55) 0.37 (0.17–0.81) 15.34 (6.32–37.21)
6	Yadeta et al.(2021)	Depression	Perceived susceptibility to COVID-19	Not	4.05 (1.12-14.53)
7	Asnakew et al.(2021)	Depression	With Mental illness Contact confirmed COVID-19 patients Poor social support	Not Not contct Good	2.72(1.05,7.01) 2.59 (1.37,4.89) 1.87(1.08,3.22)
8	Jemal et al. (2021) B	Insomnia	Female HCWs Married participants Working in the emergency units Working experience of <5 years Poor behavioral responses to COVID-19 Have poor perception COVID-19	Male Single Outpatient >=10 years Good Good	2.16 (1.58, 4.38) 3.31 (1.56, 6.68) 2.74 (1.85, 6.45) 2.45 (1.28, 4.90) 1.69 (1.02, 3.17) 1.98 (1.56, 3.95)

2 AOR=Adjusted Odds Ratio, CI=Confidence Interval, HCWs= Health Care Workers

Figure 1

Preferred reporting items for systematic reviews and meta-analyses (PRISMA) flow chart

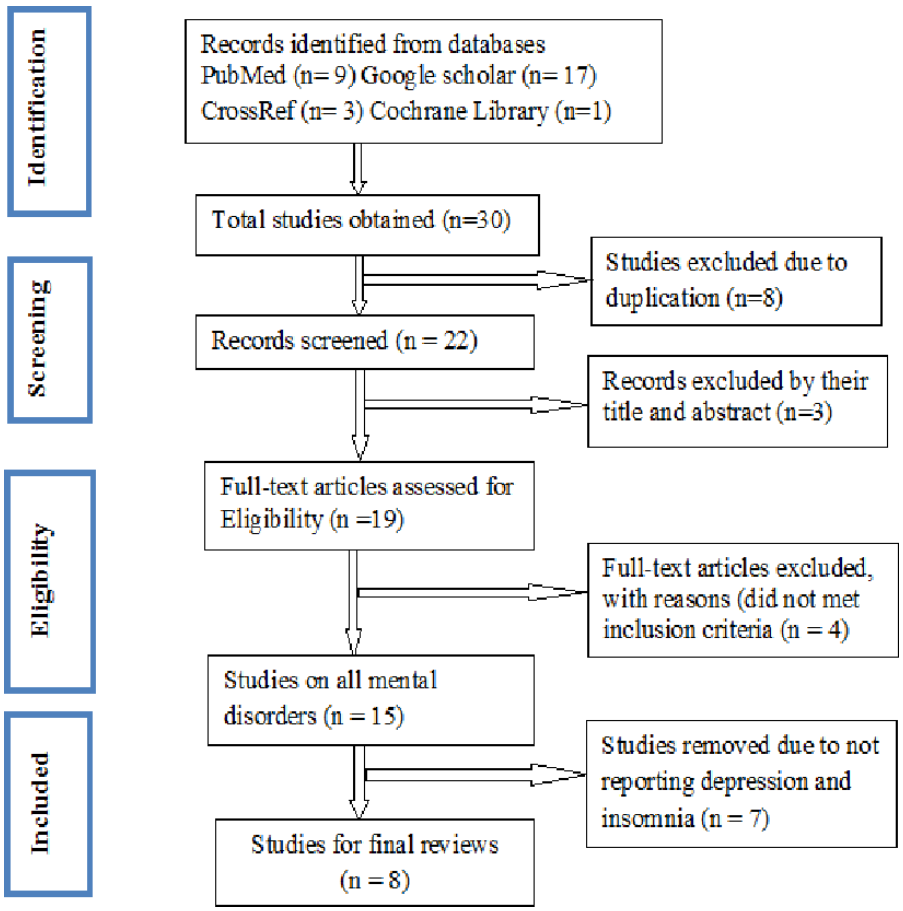

Figure 2

A forest plot for the prevalence of depression among the health care professionals during the COVID-19 pandemic. ES, effect size; CI, confidence interval; Weight, weight of each included study (degree of impact on pooled results).

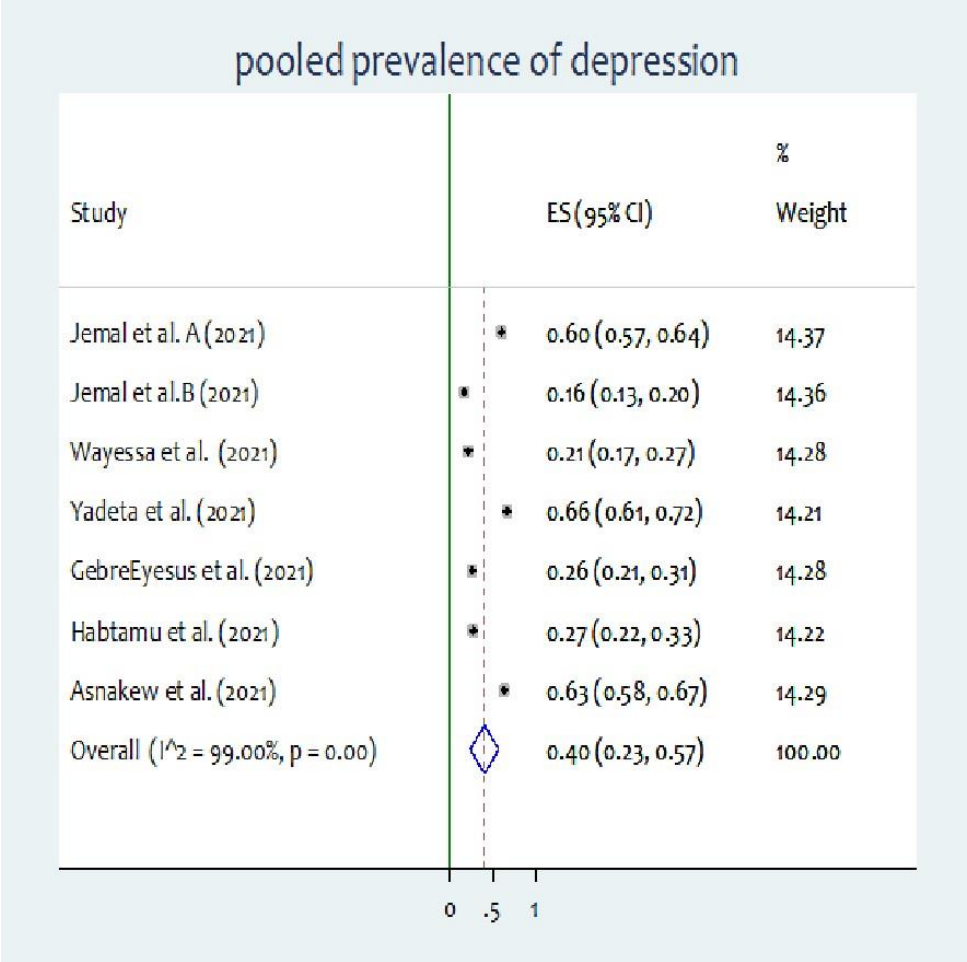

Figure 3

A sub-group analysis of prevalence of depression among health care workers during the COVID-19 pandemic by region. SNNP, Southern nation9s nationalities and people; ES, effect size; CI, confidence interval; Weight, weight of each included study (degree of

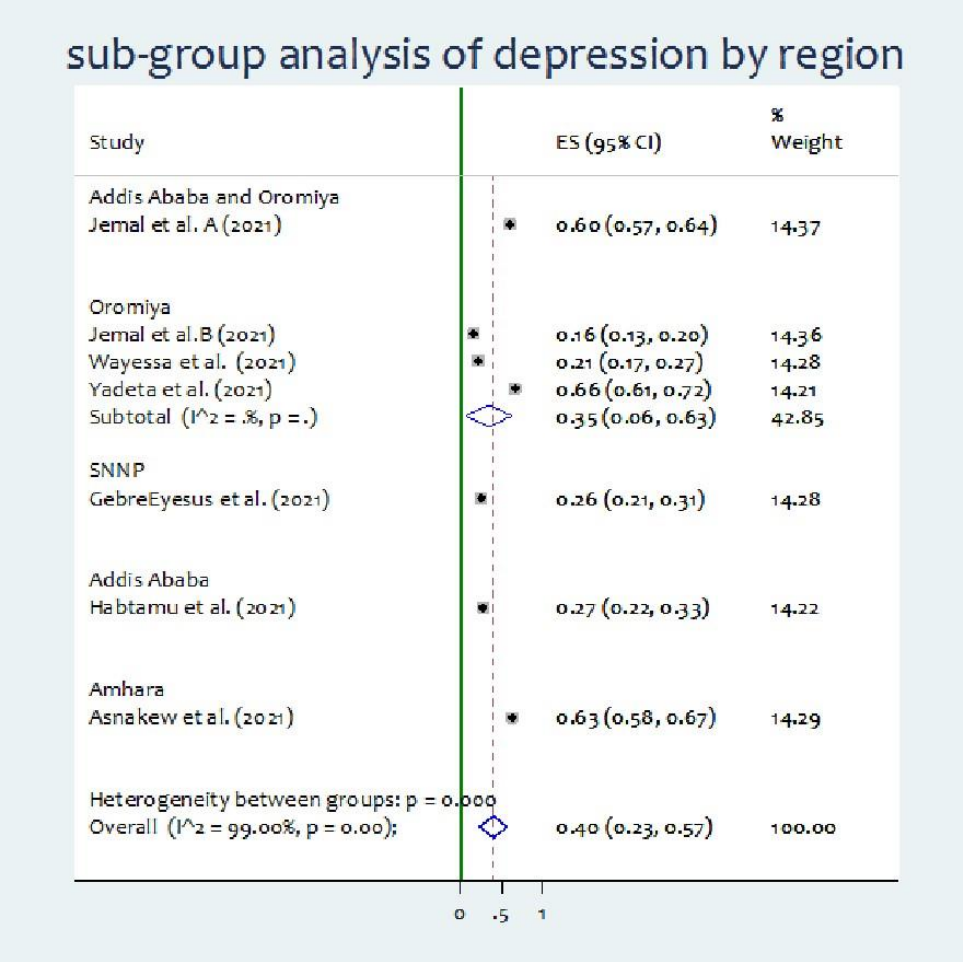

Figure 4

A sub-group analysis for prevalence of depression among health care professionals during the COVID-19 pandemic in Ethiopia by instrument. DASS-21, Depression, Anxiety, Stress Scale -21; PHQ-9, the 9-item Patient Health Questionnaire.

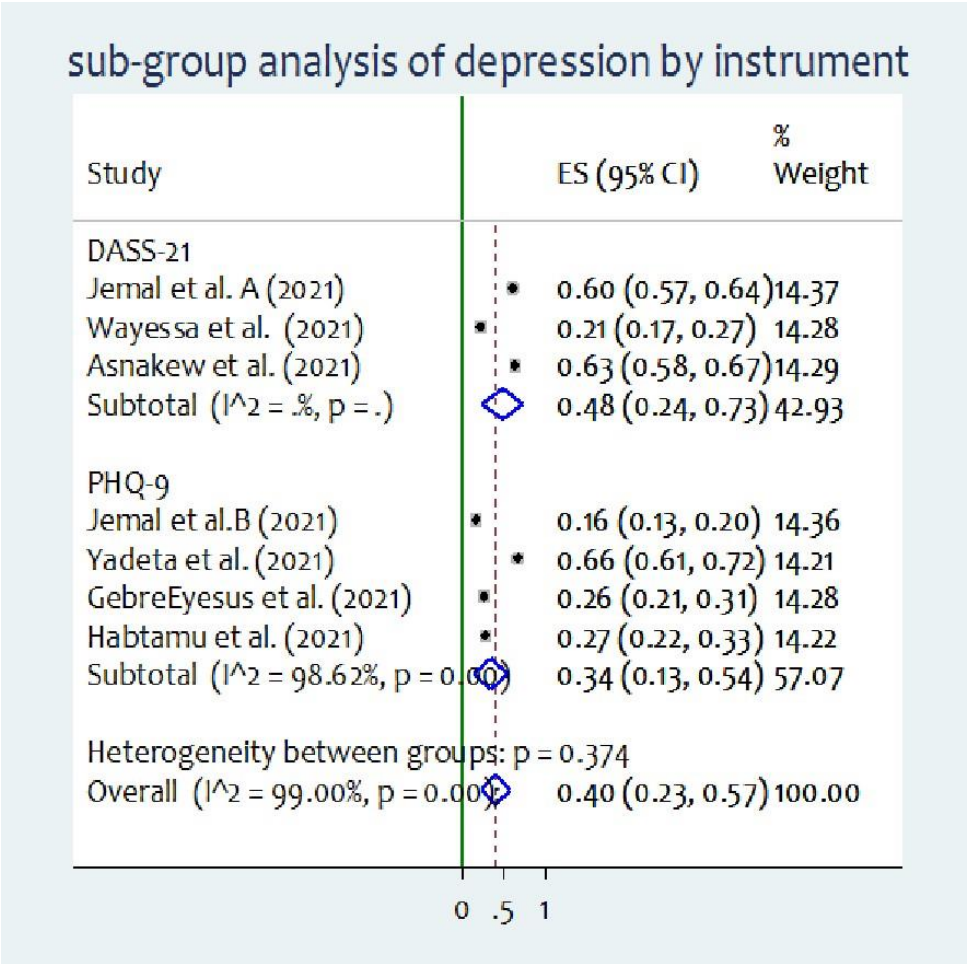

Figure 5

A forest plot for the prevalence of insomnia among the health care professionals during the COVID-19 pandemic. The pooled prevalence of Insomnia ES, effect size; CI, confidence interval; Weight, weight of each included study (degree of impact on pooled re

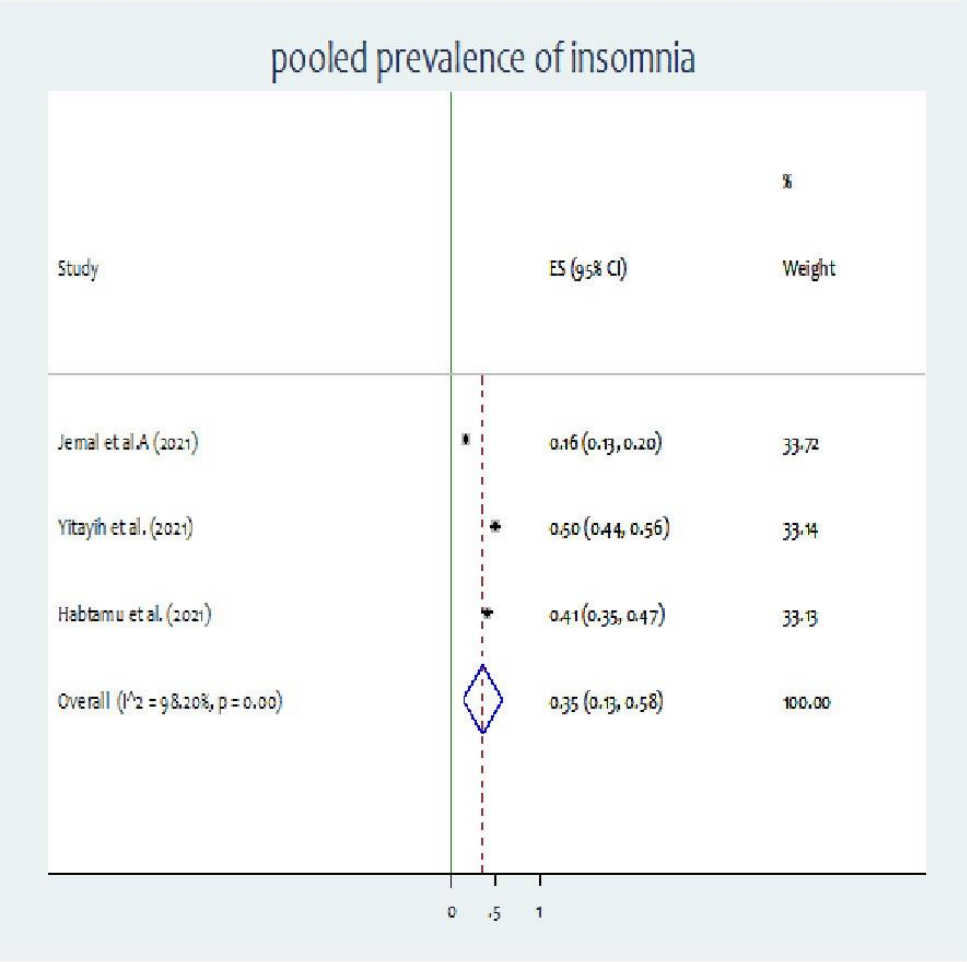
pooled prevalence of insomnia
Study
ES (95% CI)
%
Weight
Jemal et al.A (2021)
0.16 (0.13, 0.20)
33.72
Yitayih et al. (2021)
0.50 (0.44, 0.56)
33.14
Habtamu et al. (2021)
0.41 (0.35, 0.47)
33.13
Overall (I^2 = 98.20%, p = 0.00)
0.35 (0.13, 0.58)
100.00
0
.5
1

Figure 6

A sub-group analysis of prevalence of insomnia among health care workers during the COVID-19 pandemic by region.

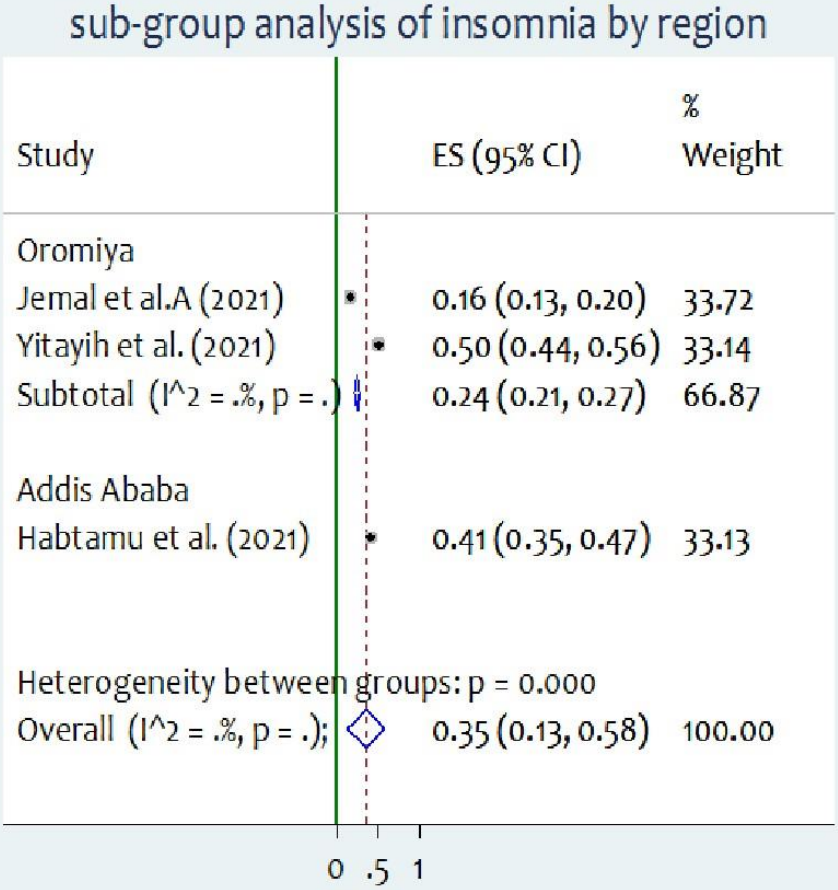

Figure 7

A sub-group analysis of prevalence of insomnia among the health care professionals during the COVID-19 pandemic in Ethiopia by instrument. ISI, Insomnia Severity Index; PSQI, Pittsburgh Sleep Quality Index.