

Prevalence of Occupational Related Shoulder and Neck Pain Among Working Population in Ethiopia: Systematic Review and Meta-Analysis

Dechasa Adare Mengistu (✉ Dechasa.Adare@haramaya.edu.et)
Haramaya University

Research Article

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Abstract

Background

Currently, work-related musculoskeletal disorders are a significant public health concern and are a leading cause of disability-adjusted life years and reducing the quality of life worldwide. In developing countries including Ethiopia, there is no adequate evidence on the overall prevalence of work-related musculoskeletal disorders and it remains less prioritized and unrepresented. Thus, the current study aimed to provide the country wide prevalence of work-related musculoskeletal disorders particularly shoulder and neck pain in Ethiopia.

Methods

This study considered the studies conducted in Ethiopia, written in English language and published from 2017–2020. The studies were searched using various electronic databases such as PubMed/MEDLINE, Web of Science, Google Scholar, CINAHL, Cochrane Library, SCOPUS, Embase, African Index Medicus, and African Journals Online database from 16 July 2020 to 22 August 2020. The articles were searched using a Boolean logic operator (“AND”, “OR”, “NOT”) in combination with Medical Subject Heading (MeSH), terms, and keywords. Quality assessment of the studies was done using Joanna Briggs Institute (JBI) Critical Appraisal tools to determine the relevance of each included article to the study.

Results

The current study found the pooled prevalence of work-related shoulder and neck pain in the previous one year accounted 37.9% [95% CI:26.5, 50.8%; P-value < 0.001] and 29.9% [95% CI:20.1, 41.9%; P-value = 0.002] respectively. Based on the subgroup analysis, the pooled prevalence of work-related shoulder pain in the last one year based on the study population, publication year, and study region was 47.6% [95% CI: 45.8, 49.4%], 49.8% [95% CI: 45.7, 53.9%] and 44.6% [95% CI: 41.4, 47.8%] respectively while the pooled prevalence of neck pain in the last one year based on study population, publication year, and study area was 39.1% (95% CI: 37.5, 40.7%), 25.1% [95% CI: 20.8, 29.9%] and 32.6% [95% CI: 29.8, 35.5%] respectively.

Conclusion

This study found that at least one-third of the study participants were experienced occupational-related shoulder and/or neck pain in the previous last one year. The study suggests that there is a need to improve and implement occupational health and safety in the working environments to reduce work-related musculoskeletal disorders such as shoulder and neck pain, and other, occupational hazards.

1. Introduction

Musculoskeletal disorders (MSDs) are a major public health problems that affect various body's regions such as shoulder, elbow, low back, hips, knees, wrist, neck, hands, upper back, ankle, and feet [1–3] and characterized by symptoms such as pain, ache, and discomfort [4, 5]. Workers working in different working environments such as health care, driving, manufacturing industry, general labor, maintenance or repairing, and cleaning are potentially at risk of musculoskeletal disorders [6].

According to Global Burden of Disease report in 2016, MSDs were among the leading causes of disability-adjusted life years [7] with a double burden of economic costs, healthcare service utilization, and social problems [8, 9]. Occupational-related health problems such as shoulder and neck pain are among the most common causes of morbidity and absenteeism from work and reduced productivity in many countries [10–13] and have multifactorial biopsychological origin and socio-economic costs [9, 13, 14–16].

Two-thirds of all populations experience neck pain at some point in their lives [17]. From 1990 to 2010, the effect of neck pain disability adjusted life years increased from 23.9 million to 33.6 million [18]. According to the Global Burden of diseases reported in 2015, neck pain was among the leading causes of disability in most parts of the country [19].

In developing countries, occupational health and safety practices implementations are often disregarded and preventive measures are poor [20]. As a result of lack of adequate training, poor awareness, and underreporting of problems, the work-related MSDs have been increased in developing countries [21] and remain less prioritized [22]. In Ethiopia, there are several studies conducted on work-related MSDs such as neck and shoulder in various occupational settings [23–33].

However, there is no study that provides adequate evidence on the overall pooled prevalence of work-related MSDs such as neck and shoulder MSDs that can be crucial for policymakers or/and ministry of health in designing prevention and control programs and for the better understanding of the current evidence on the prevalence of shoulder and neck pain. Thus, this study aimed to determine the pooled prevalence of work-related shoulder and neck musculoskeletal disorders in Ethiopia.

2. Methods

This study aimed to determine the overall prevalence of shoulder and neck musculoskeletal disorders in the previous one year. The study was conducted under the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines [34].

2.1 Eligibility Criteria.

The articles that met the following predetermined inclusion criteria were included in the systematic review and meta-analysis.

- i. Population: Working population of Ethiopia regardless of their occupation.
- ii. Outcome: Articles conducted on the prevalence of MSDs and reported one-year prevalence of shoulder and/or neck pain.
- iii. Study design: A cross-sectional study that provides quantitative outcomes (magnitude, frequency, or prevalence or rate).
- iv. Study location: Full text articles conducted in Ethiopia
- v. Publication issue: Articles published in peer-reviewed journals from 2017 to 2020
- vi. Language: Full-text articles written in English language.

2.2 Data/Information Sources and Search Strategies.

The searches of the literatures were done using keywords of the systematic review and meta-analysis through search strategies such as SCOPUS, PubMed/ MEDLINE, Embase, Cochrane Library, African Index Medicus, Google Scholar, CINAHL, and African Journals Online databases.

The articles were searched using a combination of Boolean logic operators ("AND, OR, and NOT"), Medical Subject Headings (MeSH), and keywords. The following are among the search terms the author (DA. Mengistu) used in the initial searching of literatures from included databases: "Prevalence" OR "Magnitude" AND "Occupational" OR, "Occupational related" OR "Work related" OR "Ergonomic related" AND "Musculoskeletal" OR "Shoulder" OR "Neck" AND "Disorders" OR "Disease" OR "Problems" OR "Pain" OR "Injury" AND "Working group" OR "Working population" OR "Workers" AND "Ethiopia".

Furthermore, the manual searching of the literatures was made to cover those articles difficult to locate and missed from the included electronic databases. Finally, all identified keywords and index terms were checked across the electronic databases. The last search was done on 22 August 2020.

2.3 Outcomes Measure

The primary outcome of interest was the prevalence of occupational-related shoulder and neck disorders/pain that was estimated or reported by dividing those experienced disorder/s by the total population at a given time. Furthermore, the

prevalence of shoulder and neck pain was estimated by dividing the number of people who experienced shoulder or neck pain by the sample size of each study for articles not reported the prevalence or rate.

2.4 Study Selection.

Duplicated articles were removed using the ENDNOTE software version X5 (Thomson Reuters, USA). The author (DA. Mengistu) screened the titles and abstracts of the identified articles by applying the inclusion and exclusion criteria. Study selection process was made using PRISMA flowchart showing the articles included in the study and articles excluded from the study with the reasons. Finally, the systematic review and meta-analysis included studies conducted in Ethiopia and published from 2017 to 2020 that reported the last one-year prevalence of shoulder and neck musculoskeletal disorders.

2.5 Data Extraction and Quality Assessment

The author extracted the required data from the eligible articles. The relevant data required for the study under the following headings: author/s; year of publication; sample size, study region; study design and primary outcomes were extracted using a Microsoft Excel, 2016 format. The selected articles were subjected to a rigorous appraisal using standardized critical appraisal tools, Joanna Briggs Institute (JBI) Critical Appraisal tools [35] to determine the quality and relevance of each article. Then the score was taken across the articles and graded as high (85% and above score), moderate (60–85% score), and low (< 60% score) quality. The included articles were subjected to the evaluation (appraisal) at least two times at different time periods to check the accuracy of the work and to reduce the error.

2.6 Data Analysis and Statistical Procedures.

The pooled prevalence of work-related shoulder and neck MSDs in the previous one year was done using Comprehensive Meta-Analysis (CMA) version 3.0 statistical software. Furthermore, the forest plot and random-effects model were used to determine the pooled prevalence of shoulder and neck pain in the previous last one year.

The publication bias of the included studies was evaluated using funnel plots and P-value of < 0.05 was considered as the evidence for publication bias. Furthermore, the subgroup analysis was done based on the year of publication, study population/occupation categories, and study region to minimize the random variations between the included studies. Finally, the results were presented using texts, tables, and graphs/figures.

2.7 Heterogeneity

Cochran's Q test, (Q) and (I Squared test) I^2 statistics were used to evaluate the heterogeneity among the included articles. I^2 statistics is the proportion of the variation in the estimates of prevalence due to genuine variation in prevalence [36, 37]. Furthermore, subgroup analysis based on the years of publication, occupation, and study areas were done to determine the heterogeneity in the prevalence of shoulder and neck pain.

3. Results

3.1 Study Selection

About 921 articles, and reports were searched through electronic databases such as Web of Science, SCOPUS, PubMed/MEDLINE, Embase, Google Scholar, CINAHL, Cochrane Library, African Index Medicus, African Journals Online databases and Science Direct from 16 July to 22 August 2020. Following the searching of articles, 222 articles duplicated articles were excluded. Furthermore, 443 articles excluded after initial screening and 66 articles excluded after full-text articles were assessed for eligibility. Finally, a total of 11 articles were included in the systematic review and meta-analysis (Fig. 1).

3.2 Characteristics of Included Articles

In this study, a total of 4,713 participants were included in 11 articles conducted in Ethiopia and published from 2017 to 2020 [23–33]. Regarding the region of the country where the studies were conducted, 3 (27.27%) articles [28, 30, 33] conducted in Oromia, 3 (27.27%) articles [25, 27, 29] in Amhara, 2 (18.2%) articles [24, 31] in Tigray, 2 (18.2%) in SNNP [23, 26] and one

(9.1%) article in Addis Ababa city administration [32]. The included studies were cross-sectional studies with a sample size ranging from 264 [31] to 755[32] study participants.

Based on JBI Critical Appraisal tool [35], all of the included articles had a low risk of bias. The work-related prevalence of shoulder and neck pain in the previous one year ranged from 10.5% [28] to 72.1% [29] and 7.6% [28] to 68.3% [29] respectively.

Among the studies included in this work, 10(90.1%) [23–25, 27–33] were reported the prevalence of both shoulder and neck pain, while only one article [26] reported the prevalence of shoulder pain alone. Furthermore, 6(54.54%) of included articles were published in 2020 [23, 24, 29–32] while 3(27.27%) articles [25, 27, 28] were published in 2019. (Table 1).

Table 1
Overall characteristics of included articles in the systematic review and meta-analysis, 2020.

Author	Publication year	Study period	Sample size	Study design	Prevalence of MSDs		Population	Region	Reference
					Shoulder	Neck			
Tamene et al	2020	2019	344	Cross-sectional	61	15.2	Vehicle Repair Workers	SNNP	[23]
Kibret et al	2020	2018	307	Cross-sectional	29.6	35.2	Bank workers	Tigray	[24]
Wami et al	2019	2017	422	Cross-sectional	54	50.7	Hotel house keepers	Amhara	[25]
Henok	2017	2016	422	Cross-sectional	68.2	NA	Pedestrian BL women	SNNP	[26]
Mekonnen et al(a)	2019	2018	417	Cross-sectional	27.1	29.3	Barbers	Amhara	[27]
Lette, et al	2019	2017	410	Cross-sectional	10.5	7.6	Construction workers	Oromia	[28]
Mekonnen et al(b)	2020	2019	419	Cross-sectional	72.1	68.3	Tailors	Amhara	[29]
Mekonnen et al©	2020	2019	652	Cross-sectional	53.7	53.4	Hairdressers	Oromia	[30]
Melese et al	2020	2019	264	Cross-sectional	14	9.5	Cleaners	Tigray	[31]
Dagne et al	2020	2016/17	755	Cross-sectional	40.9	38	Bank workers	Addis Ababa	[32]
Regassa et al	2018	2015	301	Cross-sectional	14.1	24	Nurses	Oromia	[33]

Keys: MSDs: Musculoskeletal Disorders; NA: Not Applicable; SNNP: Southern Nations, Nationalities, and Peoples.

3.3 Prevalence of Musculoskeletal Disorders

The meta-analysis was conducted using the Comprehensive Meta-Analysis (CMA) Version 3 statistical package (software) to determine the pooled prevalence of work-related shoulder and neck musculoskeletal disorders in Ethiopia.

3.3.1 Prevalence of Occupational Related Shoulder Pain

3.3.1.1 Overall Pooled Prevalence of Shoulder Pain

The pooled prevalence of occupational-related shoulder pain in the previous one year was found to be 37.9% with 95% CI of 26.5 to 50.8%; $I^2 = 98.51\%$ with p-value < 0.001 (Fig. 2).

3.3.1.2 Subgroup Analysis of Prevalence of Shoulder Pain Based on Study Population

Based on the subgroup analysis by the study population, the lowest prevalence [10.5% (95% CI: 7.9, 13.9%) with a p-value < 0.001] of occupational-related shoulder pain in the previous one year was reported among construction workers whereas the highest prevalence [72.1% (95% CI: 67.6, 76.2%) with a p-value of < 0.001] was reported among tailors.

After the subgroup analysis of the prevalence of work-related shoulder pain was done based on the study population or participants, the overall pooled prevalence of shoulder pain in the previous one year was 47.6% (95% CI: 45.8, 49.4% with P-value of = 0.009] (Fig. 3).

3.3.1.3 Prevalence of Shoulder Pain by Publication Year

Based on a subgroup analysis of the prevalence by year of publication, the lowest [14.7% (95% CI: 10.6, 18.5%) with a p-value of < 0.001] prevalence of work-related shoulder pain in the previous one year was reported in the study published in 2018 whereas the highest prevalence [68.2%, (95% CI: 63.6, 72.5%) with a p-value of < 0.001] was observed in the study published in 2017.

After subgroup analysis was done based on the year of publication, the overall pooled prevalence of occupational related shoulder pain in the previous one year was 49.8 % with 95% CI: 45.7, 53.9%) and a p value of > 0.05] (Fig. 4).

3.3.1.4 Prevalence of Shoulder Pain Based on Study Region of the Country

Based on the subgroup analysis of pooled prevalence of work-related shoulder pain by study region, the lowest pooled prevalence [20.9% (95% CI: 9.4%, 40.1%) with a p-value = 0.005] of shoulder pain in the previous one-year was reported among the study conducted in Tigray regional state where as the highest prevalence [64.7%, (95% CI: 57.4, 71.4%) with a p-value of < 0.001] was reported by the study conducted in Southern Nations, Nationalities, and Peoples.

Furthermore, after the subgroup analysis of the prevalence of shoulder pain was done by the study region, the overall pooled prevalence of occupational related shoulder pain was 44.6 % with 95% CI: 41.4, 47.8%) and a P-value of = 0.001] (Fig. 5).

3.3.2 Prevalence of Occupational Related Neck Pain.

3.3.2.1 Overall Prevalence of Neck Pain

The pooled prevalence of occupational related neck pain in the previous one year was 29.9% with 95% CI of 20.1, 41.9% with p-value of 0.002 and $I^2 = 98.29\%$ with P-value < 0.001 (Fig. 6).

3.3.2.2. Prevalence of Neck Pain Based on Study Population

After the subgroup analysis of the work-related neck pain in the previous one year based on the study population, the lowest prevalence [7.6% (95% CI: 5.4, 10.6%) with a p-value < 0.001] was reported among construction workers whereas the highest prevalence [68.3% (95% CI: 63.7, 72.6%) with a p-value of < 0.001] was reported among tailors.

Furthermore, after subgroup analysis was done based on study population or participants, the overall pooled prevalence of occupational-related neck pain in the previous one year was 39.1% (95% CI: 37.5, 40.7% with P-value of < 0.001] (Fig. 7).

3.3.2.3 Prevalence of Neck Pain Based on Year of Publication

After a subgroup analysis based on the year of publication, the lowest pooled prevalence [24.0% (95% CI: 19.5%, 29.1%) with p-value of < 0.001] of work-related neck pain in the previous one year was reported in the study published in 2018 whereas the highest pooled prevalence [33.6%, (95% CI: 20.3, 50.2%) with a p-value of = 0.05] was observed among studies published in 2020.

Furthermore, after the subgroup analysis was done based on the year of publication, the overall pooled prevalence of neck pain in the previous one year was 25.1 % with 95% CI: 20.8, 29.9%) and a P- value < 0.001] (Fig. 8).

3.3.2.4 Prevalence of Neck Pain by Study Areas (Region)

Based on the subgroup analysis of pooled prevalence of work-related neck pain by study regions of the country, the lowest pooled prevalence [15.2% (95% CI: 11.8, 19.4%)] in the previous one year was reported by studies conducted in Southern Nations, Nationalities, and Peoples whereas the highest prevalence [49.3%, (95% CI: 28.2, 70.7%)] was reported among the studies conducted in Amhara regional state.

Furthermore, after the subgroup analysis was done based on the study region, the overall pooled prevalence of work-related neck pain was 32.6 % with 95% CI: 29.8, 35.5%) and a p value of < 0.001] (Fig. 9).

4. Discussion

This study was aimed to determine the pooled prevalence of occupational-related shoulder and neck pain in the previous one year in Ethiopia based on the previously published articles. In the current study, a total of 4713 of the study participants were included in 11 articles conducted in Ethiopia [23–33].

Musculoskeletal disorders such as neck and shoulder pain are the leading causes for the loss of productivity, employee absenteeism and affect quality of life. The current study found the pooled prevalence of occupational-related shoulder pain in the previous one year account 37.9% [95% CI:26.5, 50.8%; P-value < 0.001]. However, the pooled prevalence of shoulder pain was increased to 47.6%, 49.8%, and 44.6% after the subgroup analysis of the prevalence based on the study population, publication year, and study region respectively.

Furthermore, the study found the highest prevalence of shoulder pain (72.1%) among tailors [29] followed by the prevalence among pedestrian back-loading women (68.2%) [26], vehicle repair workers (61.0%) [23], hotel housekeepers (54.0%) [25] and hairdressers (53.7%) [30] respectively while the lowest prevalence of shoulder pain or disorders (10.5%) [28] was reported among construction workers. There is a variation in the prevalence of occupational-related shoulder pain among the included working populations with various occupations. The difference may be due to the variation in activities or nature of the work, availability of occupational health services, and implementation of occupational health and safety practices.

On the other hand, the current study found the pooled prevalence of work-related neck pain in the previous one year account 29.9% [95% CI:20.1, 41.9%; P-value = 0.002]. However, the pooled prevalence of neck pain among various working populations was increased to 39.1%, and 32.6% based on the subgroup analysis by the study population and study region, respectively. However, reduced to 25.1% based on the subgroup analysis of prevalence of neck pain by publication year. Furthermore, the study found the highest prevalence of neck pain (68.3%) among tailors [29], followed by the prevalence among hairdressers (53.4%) [30], and hotel housekeepers (50.7%) [25] respectively while the lowest prevalence of neck pain (7.6%) [28] was reported among construction workers. The variation may be due to the difference in activities, work load or nature of the work, and implementation of occupational health safety practices.

In general, the current study found that at least two participants out of seven study participants were experienced occupational-related shoulder pain, while three participants out of eight study participants were experienced occupational-related neck pain regardless of the occupation categories. This indicates that occupational-related MSDs continue to have

potential health and economic impacts. Thus, the implementation of occupational health and safety practices such as engineering control, administrative control, and use of personal protectives in the working environment play an important role in reducing these problems [38, 39].

Limitations

There was an unequal distribution of the occupations among the included articles. On the other hand, the prevalence of MSDs such as shoulder and neck pain in some regions of Ethiopia was not covered because of the lack of studies in those regions. Furthermore, cross-sectional studies were included and causal relationships between MSDs and risk factors cannot be established.

Conclusion

Occupational related musculoskeletal disorders continue to have a potential impact on worker's health, productivity and quality of life worldwide. Similarly, the current study found that at least one-third of the study participants were experienced occupational-related shoulder and/or neck pain in the previous last one year. Thus, this study suggests that there is a need to improve and implement occupational health and safety to reduce MSDs and other occupational hazards.

Abbreviations

CDC: Centers for Disease Control and Prevention; CMA:Comprehensive Meta-Analysis; JBI:Joanna Briggs Institute; MSDs:Musculoskeletal Disorders; PRISMA:Preferred Reporting Items for Systematic Review and Meta-Analysis; SNNP:Southern Nations, Nationalities, and Peoples

Declarations

Ethics Approval and Consent to Participate.

Not applicable.

Consent for Publication

Not applicable.

Availability of Data and Materials.

Almost all data are included in this study. However, additional data will be available from the corresponding author on reasonable request.

Competing Interests.

The author declares that there is no competing interest in this work.

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Not Applicable.

Author Contributions

DA. Mengistu conducted this systematic review and meta-analysis independently. All activities in this work such as generating the idea, extracting and analyzing the data, writing, editing, revising, and approving the final version to be published were done by DA. Mengistu.

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References

1. Roquelaure Y, Bodin J, Descatha A, Petit A. Musculoskeletal disorders: how to recognize them as occupational diseases. *La Revue du praticien*. 2018 Dec 1;68(10):1132-4.
2. M. Stanley, D. W. Rebecca, and I. Kunaba, "Prevalence and patterns of work-related musculoskeletal disorders among bankers in maiduguri, northeast Nigeria," *Occupational Medicine & Health Affairs*, vol. 2, pp. 1–6, 2014.
3. S. K. Kotwani, N. Sinha, V. Panhale, "Prevalence of musculoskeletal discomfort in bank employees," *International Journal of Innovative Research in Medical Science*, vol. 4, no. 1, 2019.
4. Al-Hourani Z, Nazzal M, Khader Y, Almhdawi K, Bibars AR. Work-related musculoskeletal disorders among Jordanian dental technicians: Prevalence and associated factors. *Work*. 2017 Jan 1;56(4):617-23.
5. Bethge M. Work-Related Medical Rehabilitation. *Rehabilitation (Stuttg)*. 2017 Feb;56(1):14–21.
6. European Agency for Safety and Health at Work, "OSH in figures Work-Related Musculoskeletal Disorders in the EU Euroean Risk Observatory Report," *European Agency for Safety and Health at Work*, vol. 82, no. 6, p. 14, Bilbao, Spain, 2013.
7. Briggs AM, Woolf AD, Dreinhöfer K, Homb N, Hoy DG, Kopansky-Giles D, Åkesson K, March L. Reducing the global burden of musculoskeletal conditions. *Bull World Health Organ*. 2018;96(5):366–8.
8. Chang JH, Wu JD, Liu CY, et al. Prevalence of musculoskeletal disorders and ergonomic assessments of cleaners. *Am J Ind Med*. 2012;55(7):593–604. doi:10.1002/ajim.22064
9. Coyte PC, Asche CV, Croxford R, Chan B. The economic cost of musculoskeletal disorders in Canada. *Arthritis Rheum*. 1998;11:315–25.
10. Sadeghian F, Raei M, Ntani G, Coggon D. Predictors of incident and persistent neck / shoulder pain in Iranian Workers: a cohort study. *PLoS One*. 2013;8(2):e57544.
11. Larsson B, Søgaaard K, Rosendal L. Work related neck – shoulder pain: a review on magnitude , risk factors , biochemical characteristics , clinical picture and preventive interventions. *Best Pract Res Clin Rheumatol*. 2007; 21(3):447–63.
12. Erick PN, Smith DR. a systematic review of musculoskeletal disorders among school teachers. *BMC Musculoskelet Disord*. 2011;12(260):13–7.
13. Melaku Hailu Temesgen, Gashaw Jember Belay, Asmare Yitayeh Gelaw, Balamurugan Janakiraman and Yaregal Animut. Burden of shoulder and/neck pain among school teachers in Ethiopia *BMC Musculoskeletal Disorders* (2019) 20:18 <https://doi.org/10.1186/s12891-019-2397-3>
14. P.M. Bongers, S Ijmker, S. van den Heuvel BMB. Epidemiology of work related neck and upper limb problems : psychosocial and personal risk factors (part I) and effective interventions from a bio behavioural perspective (part II). *J Occup Rehabil* 2006;16:279–302.
15. Kraatz S, Lang J, Kraus T, Mu E. The incremental effect of psychosocial workplace factors on the development of neck and shoulder disorders: a systematic review of longitudinal studies. *Int Arch Occup Env Heal*. 2013; 86:375–95.
16. Erick PN, Smith DR. Musculoskeletal disorders in the teaching profession: an emerging workplace hazard with significant repercussions for developing countries. *Ind Health*. 2015; 53:385–6.
17. Binder AI. Cervical spondylosis and neck pain. *Bmj* 2007;334(7592):527e31.
18. Hoy D, et al. The global burden of neck pain: estimates from the global burden of disease 2010 study. *Ann Rheum Disease* 2014;73(7):1309e15.

19. Vos T, et al. Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990e2015: a systematic analysis for the global burden of disease study 2015. *The Lancet* 2016;388(10053):1545e602.
20. Lucchini RG, London L. Global occupational health: current challenges and the need for urgent action. *Annals Global Health*. 2014;80(4):251–6.
21. Abraha TH, Demoz AT, Moges HG, Ahmmed AN. Predictors of back disorder among Almeda textile factory workers, North Ethiopia. *BMC research notes*. 2018 Dec 1;11(1):304. <https://doi.org/10.1186/s13104-018-3440-4>
22. Woolf AD, Brooks P, Åkesson K, Mody GM. Prevention of musculoskeletal conditions in the developing world. *Best Pract Res Clin Rheumatol*. 2008; 22(4):759–72.
23. Tamene A, Mulugeta H, Ashenafi T, Thygerson SM. Musculoskeletal Disorders and Associated Factors among Vehicle Repair Workers in Hawassa City, Southern Ethiopia. *Journal of Environmental and Public Health*. 2020 May 7;2020. <https://doi.org/10.1155/2020/9472357>
24. Kasaw Kibret A, Fisseha Gebremeskel B, Embaye Gezae K, Solomon Tsegay G. Work-Related Musculoskeletal Disorders and Associated Factors Among Bankers in Ethiopia, 2018. *Pain Research and Management*. 2020 Sep 8;2020., <https://doi.org/10.1155/2020/8735169>
25. Wami SD, Dessie A, Chercos DH. The impact of work-related risk factors on the development of neck and upper limb pain among low wage hotel housekeepers in Gondar town, Northwest Ethiopia: institution-based cross-sectional study. *Environmental health and preventive medicine*. 2019 Dec 1;24(1):27.
26. Henok A, Bekele T. Prevalence of musculoskeletal pain and factors associated with kyphosis among pedestrian back-loading women in selected towns of Bench Maji zone, Southwest Ethiopia. *Ethiopian Journal of Health Development*. 2017;31(2):103-9.
27. Mekonnen TH, Abere G, Olkeba SW. Risk factors associated with upper extremity musculoskeletal disorders among barbers in Gondar town, Northwest Ethiopia, 2018: a Cross-sectional study. *Pain Research and Management*. 2019 Apr 3;2019. <https://doi.org/10.1155/2019/6984719>
28. Lette A, Hussien A, Kumbi M, Nuriye S, Lamore Y. Musculoskeletal Pain and Associated Factors among Building Construction Workers in Southeastern Ethiopia. *Ergonomics Int J* 2019, 3(5): 000214.
29. TH.Mekonnen, DG.Yenealem and DM.Geberu. Physical environmental and occupational factors inducing work-related neck and shoulder pains among self-employed tailors of informal sectors in Ethiopia, 2019. Results from a community based cross-sectional study. *BMC Public Health* (2020) 20:1265. <https://doi.org/10.1186/s12889-020-09351-8>
30. Mekonnen TH, Kekeba GG, Azanaw J, Kabito GG. Prevalence and healthcare seeking practice of work-related musculoskeletal disorders among informal sectors of hairdressers in Ethiopia, 2019: findings from a cross-sectional study. *BMC Public Health*. 2020 Dec; 20:1-0. <https://doi.org/10.1186/s12889-020-08888-y>
31. Melese H, Gebreyesus T, Alamer A, Berhe A. Prevalence and associated factors of musculoskeletal disorders among cleaners working at Mekelle University, Ethiopia. *Journal of Pain Research*. 2020; 13:2239-2246.
32. Dagne D, Abebe SM, Getachew A. Work-related musculoskeletal disorders and associated factors among bank workers in Addis Ababa, Ethiopia: a cross-sectional study. *Environmental health and preventive medicine*. 2020 Dec;25(1):1-8. <https://doi.org/10.1186/s12199-020-00866-5>
33. Regassa TM, Lema TB, Garmomsa GN (2018) Work Related Musculoskeletal Disorders and Associated Factors among Nurses Working in Jimma Zone Public Hospitals, South West Ethiopia. *Occup Med Health Aff* 6: 279. DOI: 10.4172/2329-6879.1000279.
34. PRISMA-P Group, D. Moher, L. Shamseer et al., “Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement,” *Systematic Reviews*, vol. 4, no. 1, 2015.
35. The Joanna Briggs Institute. Critical appraisal tools for use in the JBI systematic reviews checklist for prevalence studies: The University of Adelaide. Available from: https://joannabriggs.org/sites/default/files/2019-05/JBI_Critical_Appraisal_Checklist_for_Prevalence_Studies2017_0.pdf.

36. Higgins JP, Thompson SG. Quantifying heterogeneity in a meta-analysis. *Stat Med.* 2002;21(11):1539–58.
37. Stroup DF, Berlin JA, Morton SC, Olkin I, Williamson GD, Rennie D, et al. Meta-analysis of observational studies in epidemiology: a proposal for reporting. *JAMA.* 2000;283(15):2008–12.
38. Azizpour Y, Delpisheh A, Montazeri Z, Sayehmiri K. Prevalence of low back pain in Iranian nurses: a systematic review and meta-analysis. *BMC nursing.* 2017 Dec 1;16(1):50. DOI 10.1186/s12912-017-0243-1
39. CDC, work place health promotion, Work-Related Musculoskeletal Disorders & Ergonomics. <https://www.cdc.gov/workplacehealthpromotion/health-strategies/musculoskeletal-disorders/index.html>. Last accessed on December, 16,2020.

Figures

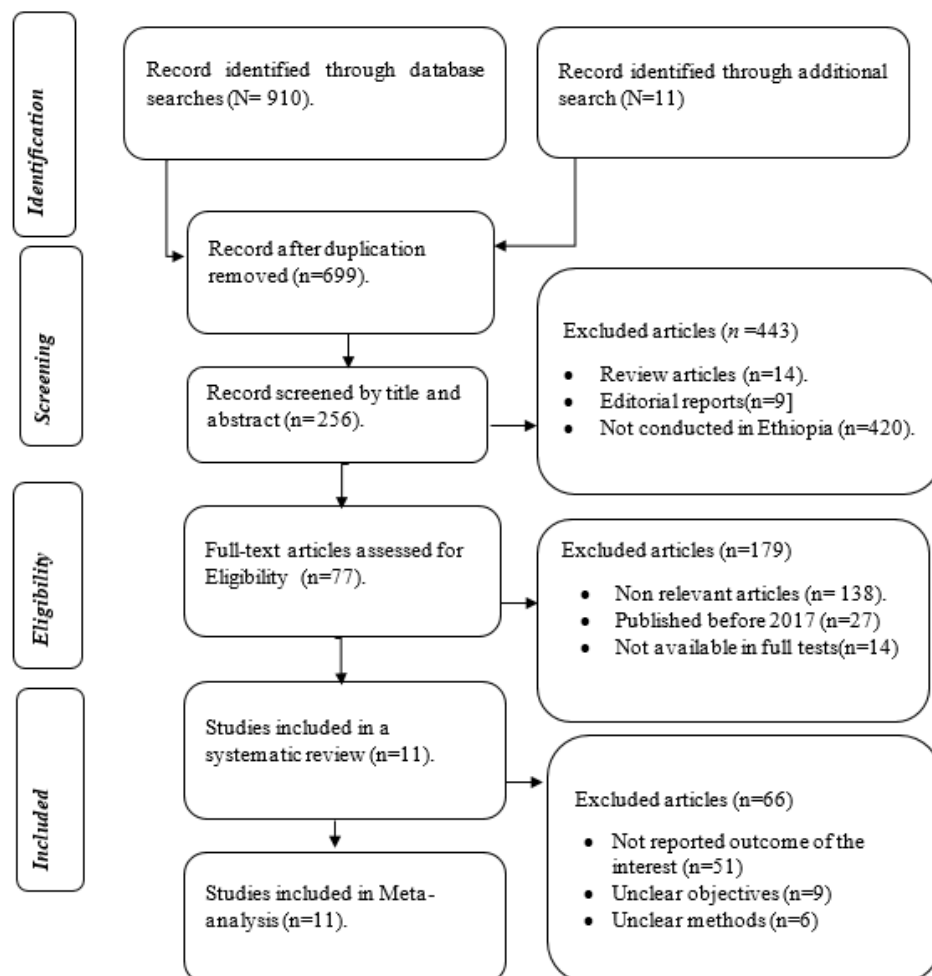


Figure 1

Study selection process of included articles for a systematic review and Meta-analysis, 2020.

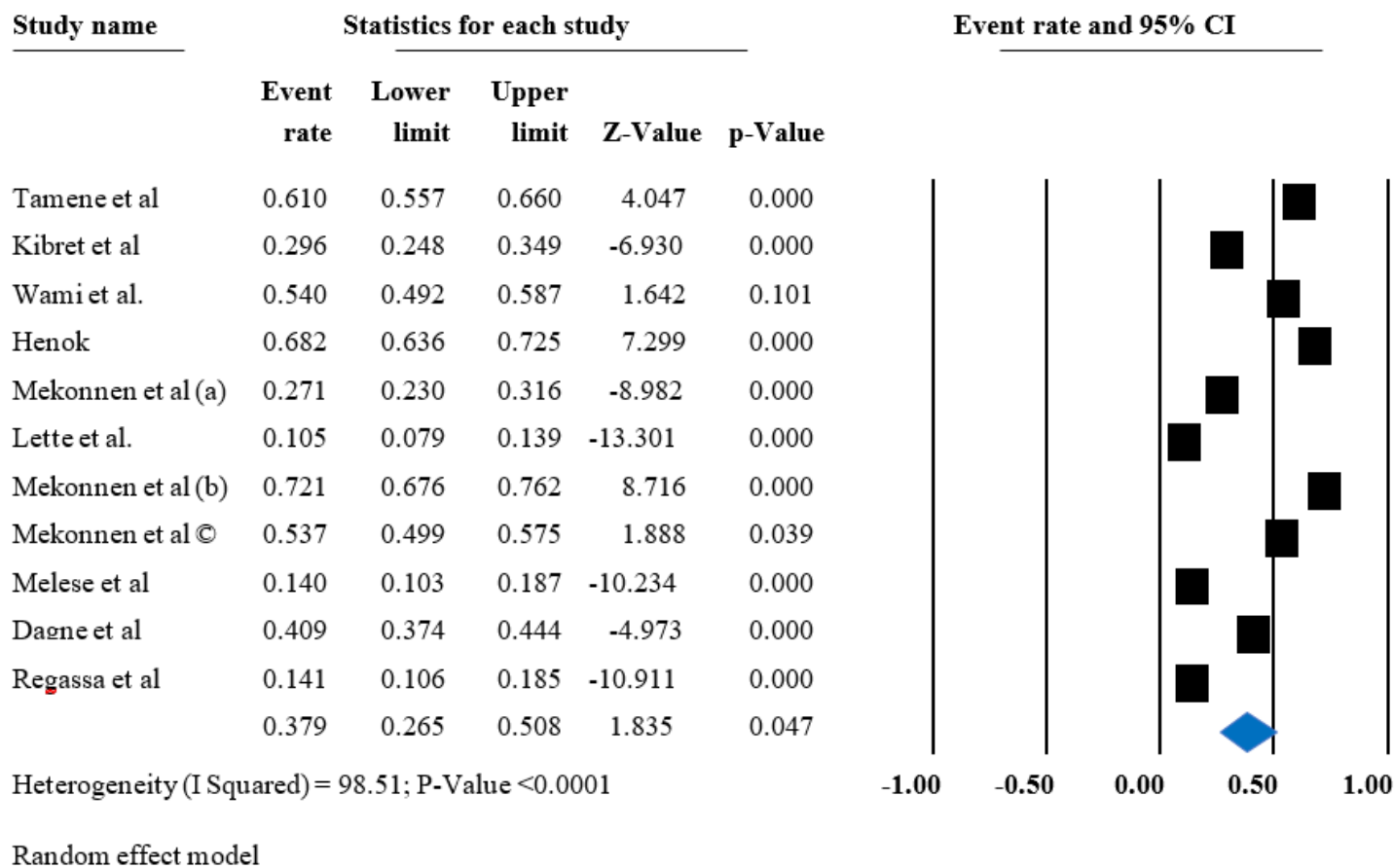
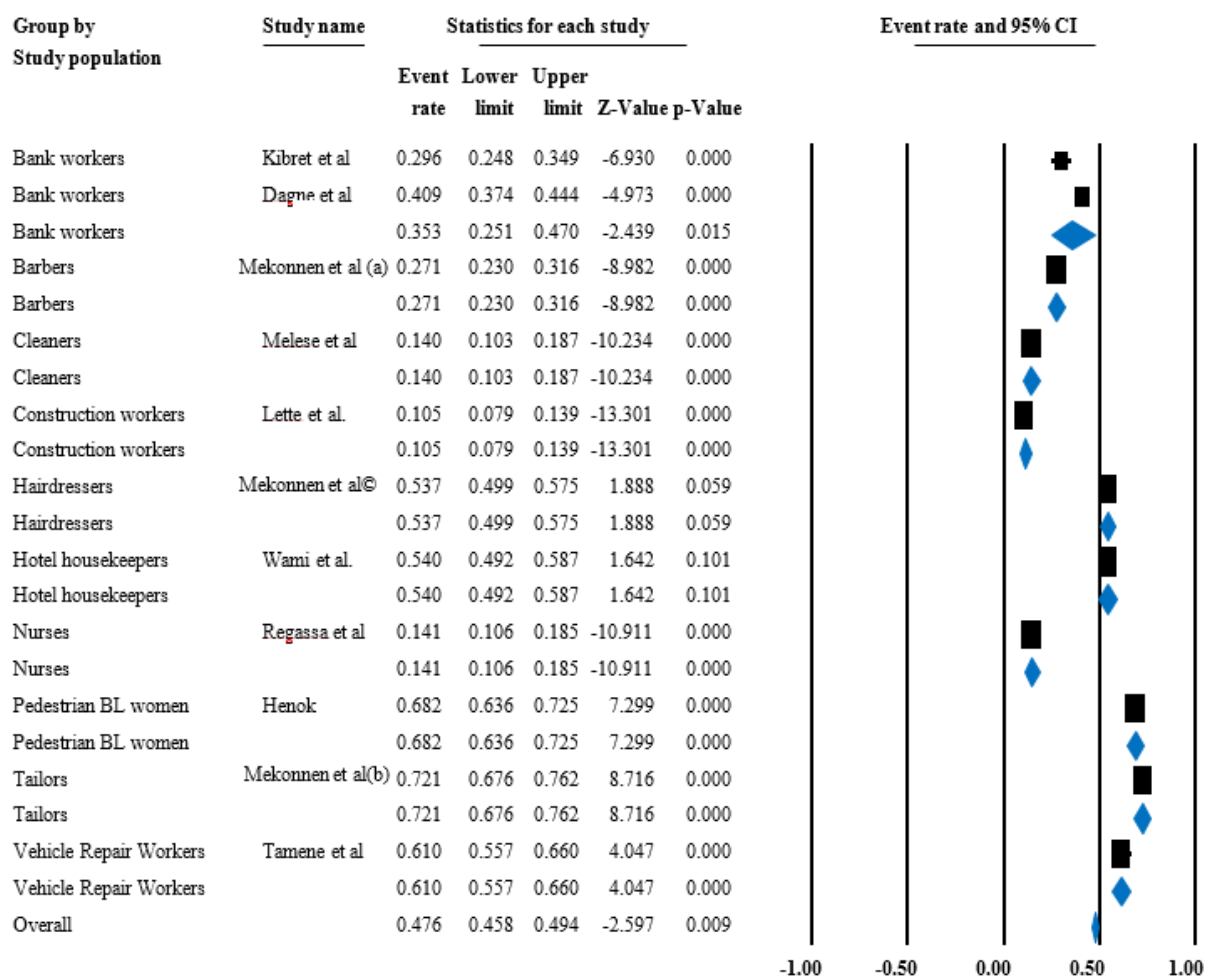


Figure 2

Forest plot shows the pooled prevalence of occupational-related shoulder pain in the previous one year in Ethiopia, 2020.



Key: BL: Back Loading

Figure 3

Forest plot shows the subgroup analysis of the prevalence of occupational-related shoulder pain in the previous one year based on the study population/occupation, 2020.

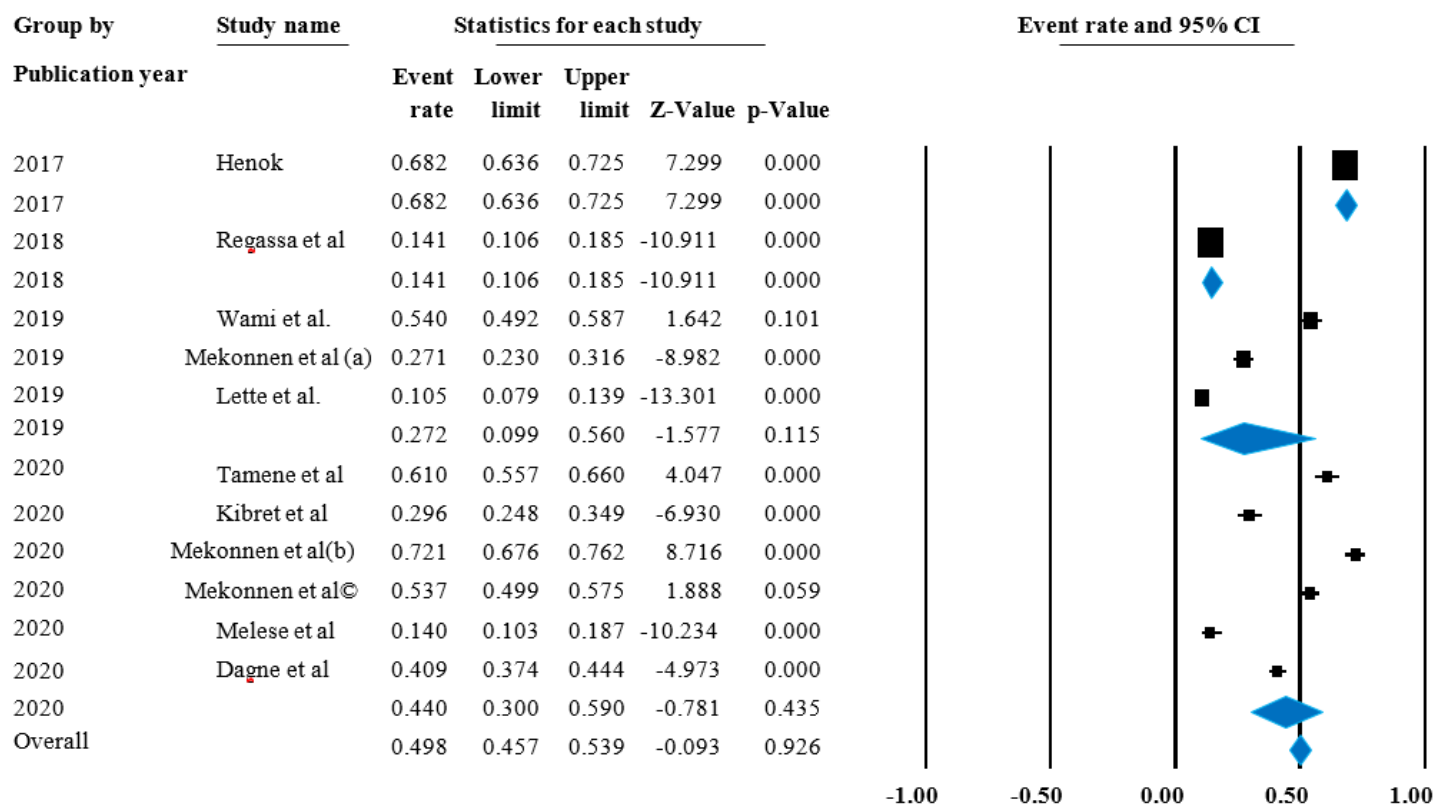


Figure 4

Forest plot shows the subgroup analysis of pooled prevalence of occupational related shoulder pain in the previous one year based on publication year, 2020.

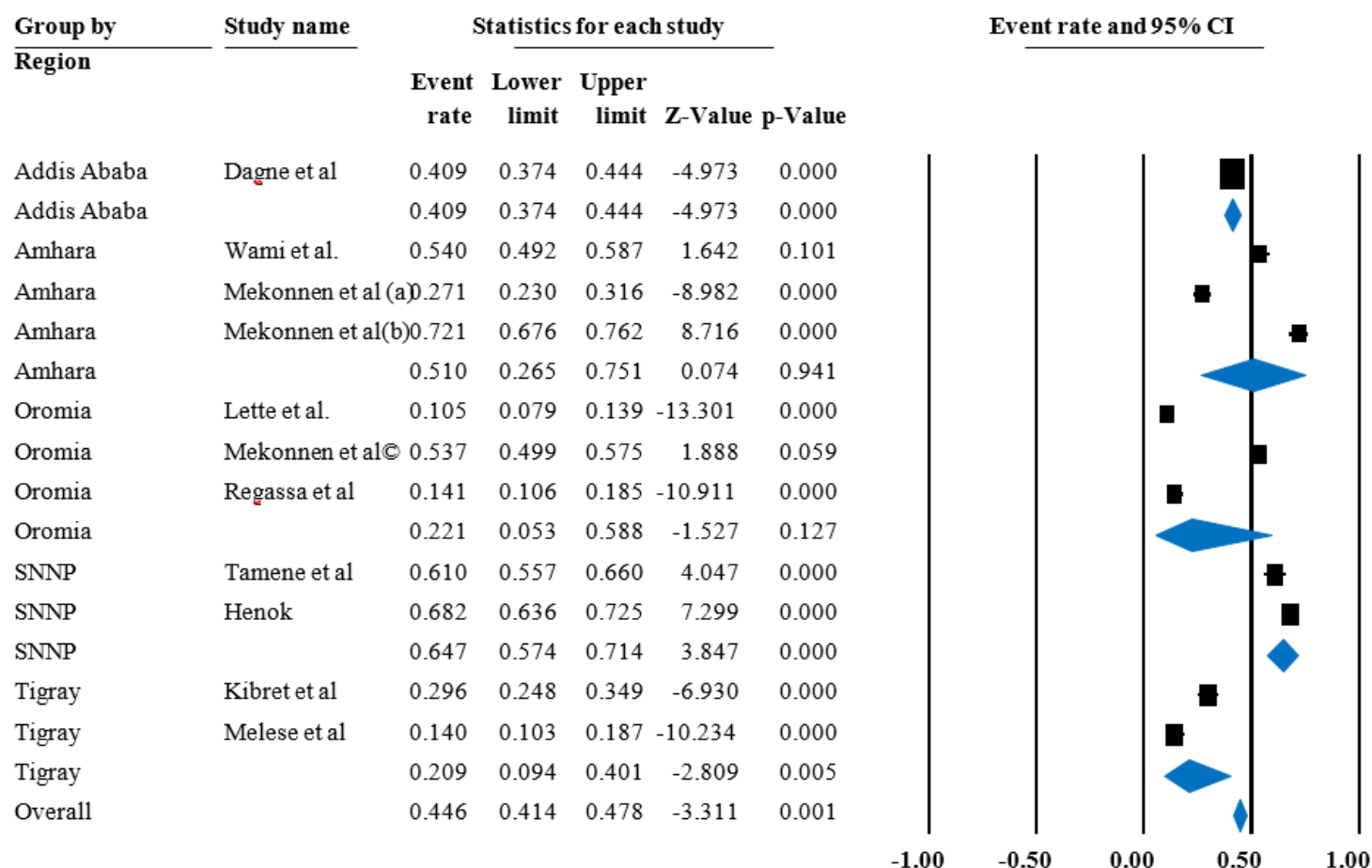


Figure 5

Forest plot shows the subgroup analysis of pooled prevalence of occupational related shoulder pain in the previous one year based on study region, 2020.

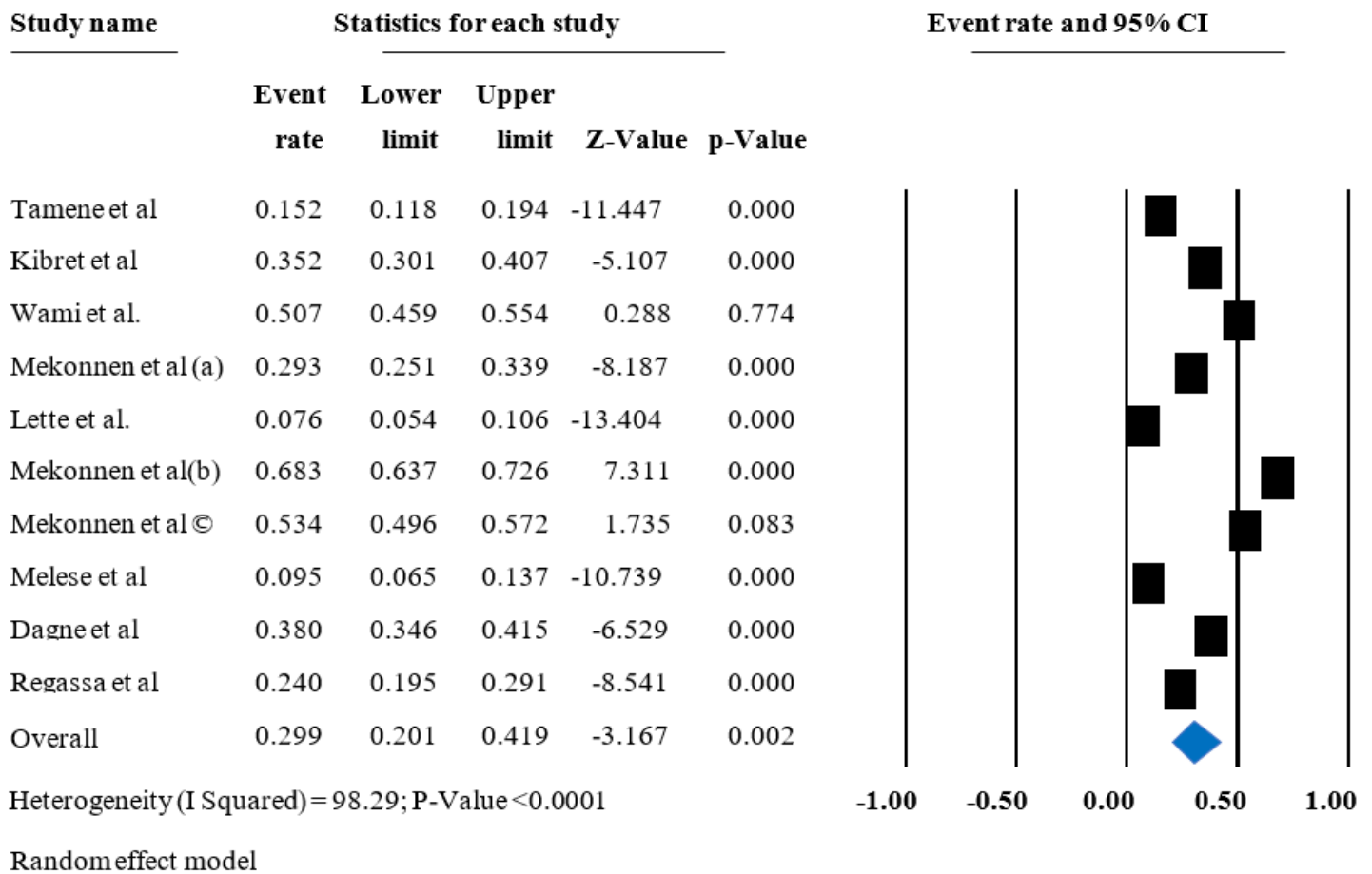


Figure 6

Forest plot shows the pooled prevalence of occupational-related neck pain in the previous one year in Ethiopia, 2020.

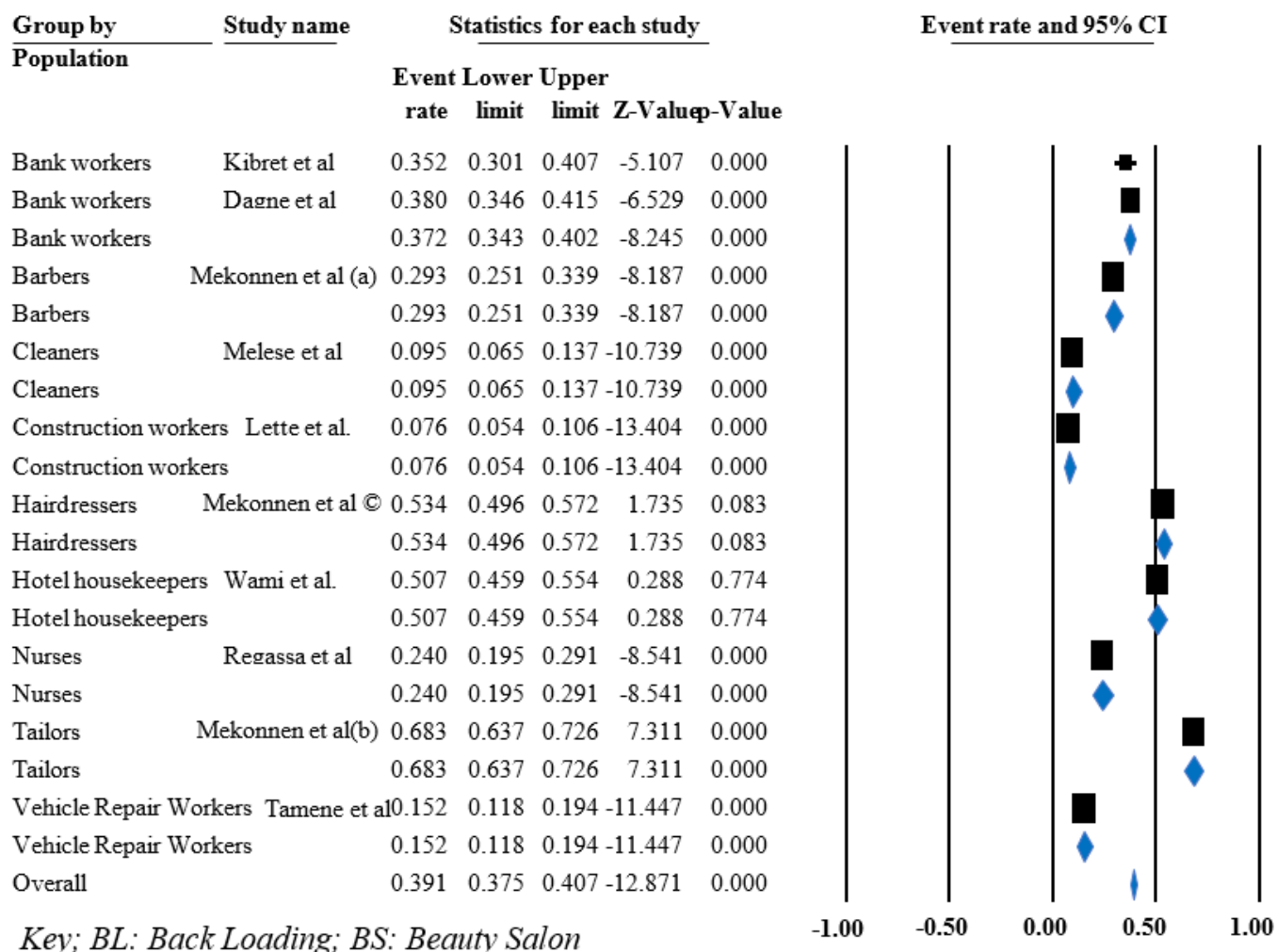


Figure 7

Forest plot shows the subgroup analysis of pooled prevalence of occupational related neck pain in the previous one year based on the study population, 2020.

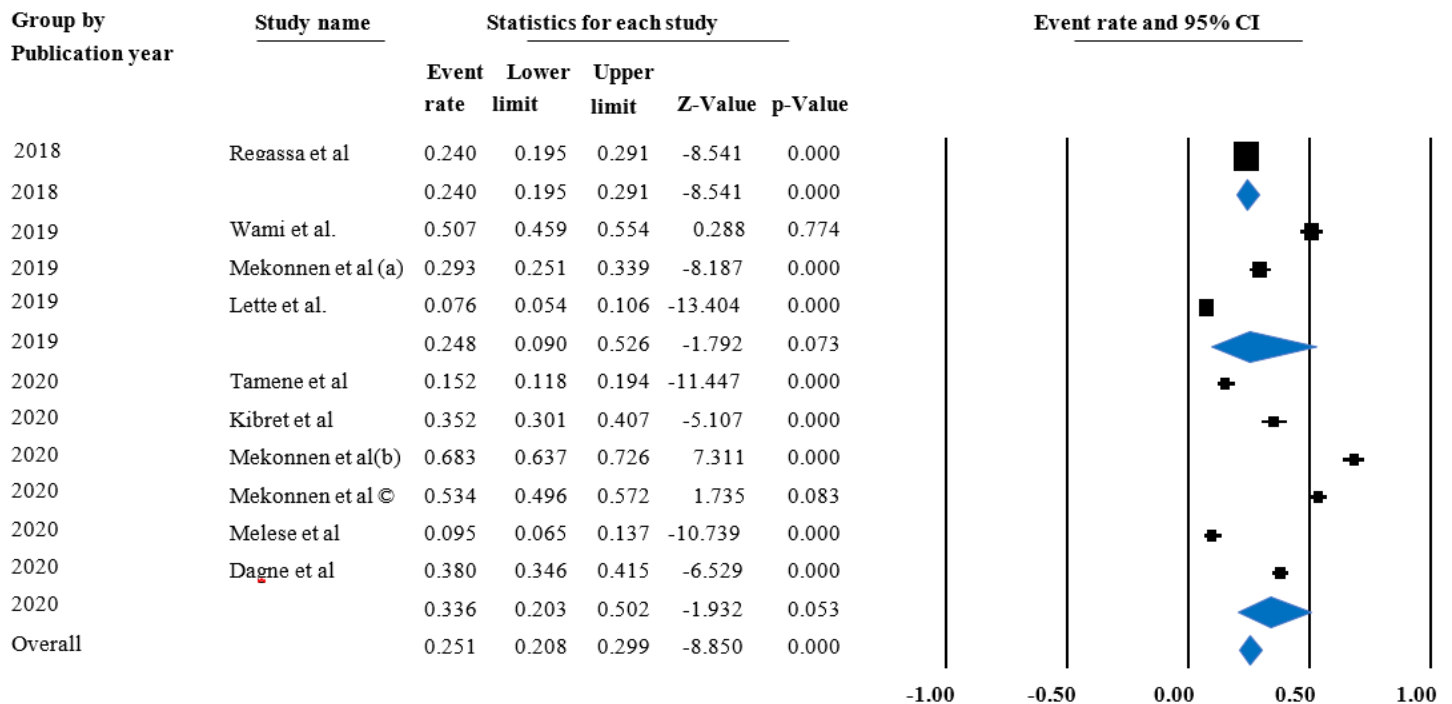


Figure 8

Forest plot shows the subgroup analysis of pooled prevalence of occupational related neck pain in the previous one year based on publication year, 2020.

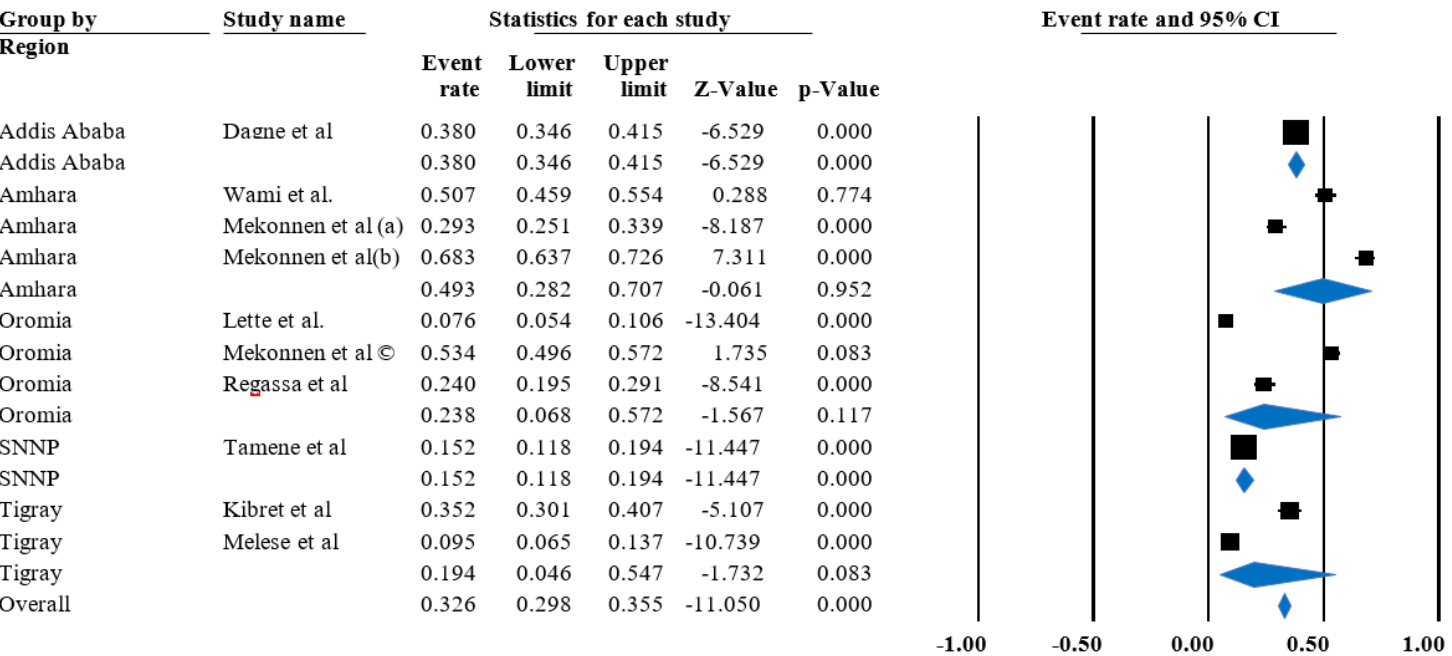


Figure 9

Forest plot shows the subgroup analysis of pooled prevalence of occupational related neck pain in the previous one year based on study region,2020.

Supplementary Files

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- [PRISMAP2015checklistBMCphdec2020.docx](#)