

Prevalence of musculoskeletal disorders among healthcare professionals in Africa: A systematic review and meta-analysis

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Research Article

Keywords: Prevalence, work-related musculoskeletal disorders, healthcare professionals, systematic review, Africa

Posted Date: October 24th, 2023

DOI: <https://doi.org/10.21203/rs.3.rs-3465239/v1>

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Additional Declarations: No competing interests reported.

Abstract

Background

Musculoskeletal disorders (MSDs) decrease productivity. The objective of this systematic review was to estimate the regional prevalence of MSD among healthcare professionals in Africa.

Methods

After prospective registration (PROSPERO CRD42023455517), a literature search was conducted in PubMed, Science Direct and Google Scholar in August 2023. Observational studies that reported the prevalence of MSDs among healthcare professionals were included. Studies were assessed for risk of bias in duplicate. The data were pooled using random effects models to estimate the prevalence of MSD with 95% confidence interval (CI) and I^2 statistic captured heterogeneity.

Results

From 17,322 citations, 18 studies (4486 participants) were included. Of these, 8 (44%) were high-quality studies and 10 (56%) medium-quality. The overall pooled prevalence of MSDs was 70.8% (95% CI 61.9–78.961.9–78.9, I^2 97.5%). The regional prevalence of MSDs in East Africa was 68.7% (95% CI 58.4–78.1, I^2 94.9%; 7 studies, 1885 participants); West Africa 72.0% (95% CI 53.2–87.4, I^2 95.8%; 4 studies, 604 participants); South Africa 61.6% (95% CI 53.0–70.0, I^2 77.5%; 3 studies, 681 participants); and, North Africa 79.6% (95% CI 50.6–97.5, I^2 99.2%; 4 studies, 1316 participants). The prevalence of MSDs among different professional groupings was: Physiotherapists 89.8% (95% CI 74.3–98.6, I^2 97.4%; 4 studies, 1061 participants); Nurses 65.3% (95% CI 55.2–74.8, I^2 65.3%; 8 studies, 2239 participants); Dentists 67.8% (95% CI 58.2–76.7, I^2 87.5%; 4 studies, 827 participants); and, Medical laboratory staff 52.8% (95% CI 43.6–61.9, I^2 52.8%; 2 studies, 359 participants).

Conclusion

Pooling studies of mixed quality revealed a high prevalence of MSD among healthcare professionals in Africa. This meta-analysis will help in regional occupational healthcare policy and prevention programs among various healthcare professions.

Introduction

Musculoskeletal disorders (MSDs) are medical conditions or injuries that affect any component of the musculoskeletal system, including muscles, tendons, ligaments, joints, cartilage, bones, nerves, and spinal discs [1]. It has been documented that MSDs are the second most prevalent cause of years lost to injury in the global burden of diseases including Africa [2, 3, 4]. Healthcare professionals are no exception to the risk of MSDs as they harbor greater exposure to occupational risk factors [5, 6]. Work-related MSDs are health concerns in many professions and have profound and detrimental effects [7]. MSD hinder productivity and predisposes professionals to the risk of permanent disability.

Studies among different healthcare professionals have reported that the lower back is a highly exposed area in physiotherapists [8], nurses [9], and surgeons [10]. Additionally, the neck and shoulder have also been reported to be exposed areas for healthcare professionals [11–14]. Despite the concern about MSDs in healthcare workers, these data have not been summarised using meta-analysis among healthcare professionals in Africa. A previous review published on MSDs among healthcare professionals focused mainly on other countries as only a few studies from Africa were included [11]. Given the above background, we pooled the prevalence data of MSDs among healthcare professionals by geographical regions, professional groupings and body areas of pain, meta-analysing the available studies from Africa.

Methods

The protocol for this review was registered in the PROSPERO database (CRD42023455517). This study was reported according to Preferred Reporting Systematic Review and Meta-Analysis (PRISMA) standards [15]

Search strategy and study selection

All primary studies that investigated the regional prevalence of work-related MSDs among healthcare professionals in Africa were identified by thorough searches in the following databases; PubMed, Scopus, Science Direct, AJOL, and was done by ABA, IBA and OAO in August 2023 using specific terms. The following concept was captured by keywords, word variants and free text words: "Musculoskeletal disorders" AND "Prevalence" AND "Health professional" AND "Africa region". The electronic search was limited to covering two decades starting January 2002. The study selection focused exclusively on English language peer-reviewed works that quantified the prevalence of MSDs by anatomical body regions in healthcare professionals. Reviews, systematic reviews, commentaries, case studies, and case series were excluded. Articles included in this study were original research that studied the prevalence of work-related MSDs among healthcare professionals and included the following nine anatomical body areas for MSDs: neck, shoulder, upper back, lower back, elbow/arm, wrist/thumb, hips/buttocks, knee and ankle. The studies were excluded if they: were not published in English, were not from African regions, were not about healthcare professionals, had mixed healthcare workers without the possibility of distinguishing between them, provided with insufficient details on work-

related MSDs, provided insufficient data about sampling and focused on only a limited number of body areas. A thorough review of the title, abstract, and full paper was done by three reviewers (ABA, IBA, and OAO). A full-text analysis of qualifying studies, including the identification of duplicate records, was conducted by ABA, IBA, and OAO. Any form of disagreement was settled by consensus between three reviewers during the weekly evaluation meetings. The consistency of the selection process and quality assessment across the three reviewers were ensured by calculating the level of inter-rater agreement [16].

Data extraction and study quality assessment

The following data was extracted by ABA, IBA, and OAO from the screened articles eligible for inclusion in the meta-analysis; First author, year of publication, age, country, region, healthcare profession, general body prevalence of MSDs, anatomical body region prevalence, sample size, gender, occupational risk factors. According to information provided by the United Nations' statistics division, the following countries were included in Africa regions: Eastern Africa (Burundi, Comoros, Uganda, Kenya, Rwanda, Seychelles, Somalia, Somaliland, Tanzania, Reunion, Mozambique, Mauritius, Madagascar, Malawi, Eritria, and Ethiopia.); Western Africa (Benin, Burkina Faso, Cape Verde, Cote D'Ivoire, Gambia, Ghana, Togo, Sierra Leone, Senegal, Nigeria, Niger, Mauritania, Mali, Liberia, Guinea Bissau and Guinea); Southern Africa (Botswana, Lesotho, Namibia, South Africa, and Swaziland); Northern Africa (Algeria, Western Sahara, Egypt, Sudan, Tunisia, Morocco, and Libya); and, Central Africa (Angola, Cameroon, Central African Republic, Chad, Congo Republic-Brazzaville, Sao Tome and Principe, Equatorial Guinea, Gabon and Democratic Republic of Congo) [38]. A critical appraisal tool was used to assess the quality of the studies included in this systematic review [17]. The study quality was assessed using the score range of 0–6 with the following classification: 5–6 (over 80%) high quality, a score of 4 – 3 (79%-50%) medium quality, and below 3 (under 50%) low quality. The overall methodological quality assessment was done by ABA, IBA, OAO and SS. Each reviewer assessed the quality of the articles independently and any disagreements were resolved by consensus.

Statistical analysis

The rates representing the prevalence of work-related MSDs in individual studies were pooled using random-effects models and 95% confidence intervals (CI) estimated. The heterogeneity was assessed graphically using forest plots, and statistically through I^2 statistics which gives percentages of variation across the studies [17]. The Egger's test ($p < 0.05$) was explored for publication and related biases in funnel plot analysis. The sub-group analysis was performed to examine the source of heterogeneity attributed to geographical regions, professional groupings and body areas of pain. Analyses were performed using the statistical software MedCalc version 19.13 [18].

Results

The exploration of electronic databases identified 17,322 citations (Fig. 1). Of these, 103 were selected based on their title/abstract for full-text evaluation. After eligibility assessment, 85 articles were excluded. Finally, 18 articles were included in the meta-analysis.

Study characteristics and quality appraisal

The detailed study characteristics are provided in Table 1. Among the 18 included studies, four types of healthcare professional groupings were identified: Physiotherapists, nurses, dentists and, medical laboratory staff. The study participants were generally male or female aged between 30 to 40 years and they came from public or private hospitals. The quality appraisal of 18 studies revealed that 8 (44%) were high-quality studies and 10 (56%) medium-quality (Table 2).

Table 1
 Characteristics of studies included in the meta-analysis of prevalence of musculoskeletal disorders among healthcare profession

Authors	Study Details				prevalence	main body Areas					
						Neck	Upper back	Lower back	Shoulder	Elbow/forearm	Wrists /Hands /Fingers
Sagahutu, & Nuhu, (2019) [18]	Study Population	Physiotherapy	male/female	33/16	12 months	13	22	29	10	2	12
	n-participant	49	age (year, mean SD))	30.89 + 5.7							
	Response Rate	91.20%	country	Rwanda							
Mutanda et al, (2017) [19]	Study Population	Nurses	male/female	23/203	12 months	48	48	117	41	22	50
	n-participant	266	age (year, mean SD))	41							
	Response Rate	91.70%	country	Uganda							
Abu-Taleb, et al, (2021) [20]	Study Population	Physiotherapy	male/female	177/208	12 months	252	141	265	183	25	277
	n-participant	385	age (year, mean SD))	N/A							
	Response Rate	96.00%	country	egypt							
Ouni, et al, (2020) [21]	Study Population	Nurses	male/female	151/159	12 months	42	55	102	32	30	27
	n-participant	310	age (year, mean SD))	41.2/5.7							
	Response Rate	95.00%	country	Tunisia							
Cheikh Y et al, (2020) [22]	Study Population	Dentist	male/female	22/98	12 months	61	45	54	46	16	40
	n-participant	120	age (year, mean SD))	33.79							
	Response Rate	81.08%	country	Morocco							
Haile et al, (2012) [33]	Study Population	Medical Lab	male/female	83/73	12 months	27	32	27	32	14	12
	n-participant	156	age (year, mean SD))	33.96/8.48							
	Response Rate		country	Ethiopia							
Enone, et al, [24]	Study Population	Dentist	male/female	199/97	12 months	28	23	26	22	1	13
	n-participant	199	age (year, mean SD))	28.65							
	Response Rate	82.90%	country	Nigeria							
khairy, et al, [25]	Study Population	Physiotherapist	male/female	267/234	12 months	151	125	285	169	33	120
	n-participant	501	age (year, mean SD))	29.9/6.4							

Authors	Study Details				prevalence	main body Areas					
						Neck	Upper back	Lower back	Shoulder	Elbow/forearm	Wrists/Hands/Fingers
	Response Rate	88.90%	country	Egypt							
Nalunga, et al [12]	Study Population	Medical Lab	male/female	108/95	12 months	-	-	-	-	-	52
	n-participant	203	age (year, mean SD))	29							
	Response Rate	95.7	country	Uganda							
Nkhata, et al, [26]	Study Population	Nurses	male/female	48/219	12 months	31	35	98	55	19	36
	n-participant	267	age (year, mean SD))	36.5/9.39							
	Response Rate	98.80%	country	Zambia							
Adegboke, et al, [34]	Study Population	Physiotherapist	male/female	80/46	12 months	43	18	88	28	7	26
	n-participant	126	age (year, mean SD))	33.7/6.8							
	Response Rate	58.10%	country	Nigeria							
Regassa et al, [27]	Study Population	Nurses	male/female	159/142	12 months	44	28	124	26	5	13
	n-participant	301	age (year, mean SD))	26.1							
	Response Rate	90.40%	country	Ethiopia							
Gothey & Lembariti, [29]	Study Population	Dentist	male/female	117/38	12 months	81	66	84	60	16	47
	n-participant	155	age (year, mean SD))	37.94/8.96							
	Response Rate		country	Tanzania							
Munabi et al, [23]	Study Population	Nurses	male/female	108/647	12 months	257	256	445	231	109	206
	n-participant	755	age (year, mean SD))	35.4/10.7							
	Response Rate	85.40%	country	Uganda							
Tinubu, et al, [29]	Study Population	Nurses	male/female	3/125	12 months	33	20	52	15	8	19
	n-participant	128	age (year, mean SD))	36.4/7.8							
	Response Rate	80.00%	country	Nigeria							
Boakye et al, [30]	Study Population	Nurses	male/female	12/137	12 months	37	35	67	24	4	21
	n-participant	151	age (year, mean SD))	33.03/9.65							
	Response Rate	75.50%	country	Ghana							

Authors	Study Details				prevalence	main body Areas					
						Neck	Upper back	Lower back	Shoulder	Elbow/forearm	Wrists /Hands /Fingers
K. Brein et al, [31]	Study Population	Nurses	male/female	10/51	12 months	3	8	25	14	1	6
	n-participant	61	age (year, mean SD))	36.7/9.33							
	Response Rate	70.90%	country	SouthAfrica							
Moodley, et al, [32]	Study Population	Dentist	male/female	150/203	12 months	70	-	-	55.8	-	56.8
	n-participant	353	age (year, mean SD))								
	Response Rate	55.70%	country	SouthAfrica							

Table 2

Quality appraisal of included studies in the meta-analysis of prevalence of musculoskeletal disorders among healthcare professionals in Africa.

Study details	Representativeness of the sample frame	Adequate sampling methods	Sample size calculation	Valid methods for outcome measurement	study designs	Response rate > 90%	Overall quality
Sagahutu & Nuhu, [18]	0	0	1	1	1	1	4
Mutanda et al, [19]	1	0	1	1	0	1	4
Abu-Taleb, et al, [20]	1	0	1	1	1	1	5
Ouni, et al, [21]	1	0	1	1	1	0	4
Cheikh Y et al, [22]	1	0	1	1	1	0	4
Haile et al, [33]	1	1	1	1	1	1	6
Enone, et al, [24]	1	1	1	1	1	1	6
Nalunga, et al, [13]	1	1	1	1	1	0	5
Nkhata, et al, [26]	1	1	1	1	1	0	5
Adegboke, et al, [34]	1	0	1	1	1	0	4
khairy, et al, [25]	1	1	1	1	1	0	5
Boakye et al, [30]	1	0	1	1	1	0	4
K. Brein et al, [31]	1	1	1	1	1	0	5
Munabi et al, [23]	1	0	1	1	1	0	4
Tinubu, et al, [29]	1	0	1	1	1	0	4
Regassa et al, [27]	1	1	1	1	1	1	6
Goththey & Lembariti, [29]	1	0	1	1	1	0	4
Moodley, et al, [32]	1	0	1	1	1	0	4

Overall and regional prevalence of MSD

Figure 2 summarizes the overall MSDs prevalence in Africa. The overall prevalence rate was 70.8% (CI 61.9–78.9, I^2 97.5%). The regional prevalence of MSDs was: East Africa was 68.7% (95% CI 58.4–78.1, I^2 94.9%; 7 studies, 1885 participants); West Africa 72.0% (95% CI 53.2–87.4, I^2 95.8%; 4 studies, 604 participants); South Africa 61.6% (95% CI 53.0–70.0, I^2 77.5%; 3 studies, 681 participants); and, North Africa 79.6% (95% CI 50.6–97.5, I^2 99.2%; 4 studies, 1316 participants) (Fig. 3).

Prevalence of MSD by healthcare professions

The prevalence of MSDs among different professions was: Physiotherapists 89.8% (95% CI 74.3–98.6, I^2 97.4%; 4 studies, 1061 participants); Nurses 65.3% (95% CI 55.2–74.8, I^2 65.3%; 8 studies, 2239 participants); Dentist 67.8% (95% CI 58.2–76.7, I^2 87.5%; 4 studies, 827 participants); and, Medical laboratory staff 52.8% (95% CI 43.6–61.9, I^2 52.8%; 2 studies, 359 participants) (Fig. 4).

Prevalence of MSD by body areas of pain

The prevalence of MSD in different body areas among the healthcare professionals was: Neck 27.9% (95% CI 19.9–36.82, I^2 97.41%; 17 studies, 4283 participants); Shoulder 23.7% (95% CI 17.6–30.5, I^2 95.9%; 17 studies, 4283 participants); Upper-back 22.7% (95% CI 17.6–28.2, I^2 93.5%; 16 studies, 3930 participants); Lower-back 44.8% (95% CI 36.7–53.1, I^2 96.3%; 16 studies, 3930 participants); Elbow 6.5% (95% CI 4.5–8.9, I^2 86.9%; 16 studies, 3930 participants); Wrists/Hands 20.9% (95% CI 13.5–29.6, I^2 97.8%; 18 studies, 4486 participants); Hips/thighs 9.28% (95% CI 5.2–14.21, I^2 95.7%; 17 studies, 3930 participants); Knee 18.1% (95% CI 13.0–23.71, I^2 96.3%; 16 studies, 3930 participants); and, Ankles/feet's 14.6% (95% CI 8.9–21.5, I^2 96.3%; 17 studies, 3930 participants) (Table 3).

Table 3
Meta-analysis of prevalence of musculoskeletal disorders for each of the body areas among healthcare professionals in Africa.

	Neck	Upper back	Lower back	Shoulder	Elbow	Wrist	Hips	Knee	Ankle
Overall proportion (%)	27.9	22.7	44.8	23.7	6.5	20.9	9.2	18.1	14.6
95% Confidence Interval	19.9–36.8	17.6–28.2	36.7–53.1	17.6–30.5	4.5–8.9	13.5–29.6	5.2–14.2	13.0–23.7	8.9–21.5
Sample size	4283	3930	3930	4283	3930	4486	3930	3930	3930
Number of studies	17	16	16	17	16	18	17	16	17
I^2 statistics	97.4	93.5	96.3	95.9	86.9	97.8	95.8	94.7	96.8

Discussion

In a meta-analysis of mixed quality data, we found that more than half of the healthcare professionals in Africa suffered work-related MSDs, the majority being from the North Africa region. Out of nine commonly affected body areas, nearly half of the healthcare professionals had pain in their lower back. Considering the different professional groupings in this review, physiotherapists had a high prevalence, followed by dentists and medical laboratory staff.

To our knowledge, this is the first systematic review and meta-analysis that presented pooled prevalence of MSDs among healthcare professionals in the African region. This study was prospectively registered and reported according to Preferred Reporting Systematic Review and Meta-Analysis (PRISMA) standards [15]. Our study was comprehensive and captured studies from Africa with some regional gaps due to scarcity of relevant prevalence studies. A previous review of MSDs among healthcare professionals did not include meta-analysis [35]. We had a comprehensive search and more than half of the studies were of high quality. The estimates of the prevalence rates obtained were heterogenous with both low and high prevalence data among individual studies. This may be because of the differences among healthcare professional groupings and the nature of occupational posture in various countries.

A recent systematic review conducted on physiotherapists [37], found a similar prevalence of MSDs in Africa regions among physiotherapists, and half of them suffered lower back pain. Their results were similar to findings of our meta-analysis. Several other studies conducted in countries outside Africa have shown comparable rates of MSDs in physiotherapists, dentists and nurses [34, [26], [23], [27], [22]. The reason for this could be that their work activities involve unnatural positions for a long period of time regardless of geographical distribution globally. Our review provides comparative regional data within Africa concerning MSDs among healthcare professionals. Adding to existing information it helps to draw conclusions about the appropriate healthcare policy measures required for supporting staff and preventing injuries.

Study limitations

A key concern may be linked to the time period covered and the language restriction applied. These factors should be considered in the interpretation of our findings. Another concern may be that the data extracted were questionnaire based. There may be differences in the way various professions respond to questionnaires and this might cause the prevalence rates of MSD to vary. The evidence synthesis could be strengthened by harmonization of the survey methodologies conducted in different professions and countries.

Conclusion

In meta-analysis pooling studies of mixed quality, a high prevalence of MSD was seen among healthcare professionals in Africa. Methodological harmonization with respect to MSD questionnaire assessments is a key recommendation for future research in this area. Our data should help in development of regional occupational health policy and prevention programs among various healthcare professions.

Declarations

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

Availability of data and materials

All data generated or analyzed during this study are included in this published article [and its supplementary files].

Competing interests

The authors declare no competing interests

Funding

No funding agency or organization.

Authors contributions

ABA participated in conception of the research idea, literature search, research question, screening of journal articles for meta-analysis, quality score and manuscript writing. IBA contributed to literature search, screening of journal articles, quality score analysis and review of the manuscript. OAO supervised the work during the analysis, proofread the manuscript and gave technical guidance. SS assisted in manuscript writing, quality assessment and manuscript formatting. KSK gave methodological input, supervised the manuscript writing and formatting. All authors approved this manuscript before sending it for publication.

Acknowledgements

We thank the management of Islamic university in Uganda Habib Medical School, Faculty of Health science for giving us the opportunity to access the university subscribed databases. Professor Khan is a distinguished investigator at the University of Granada funded by the Beatriz Galindo (senior modality) program of the Spanish Ministry of Education.

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Figures

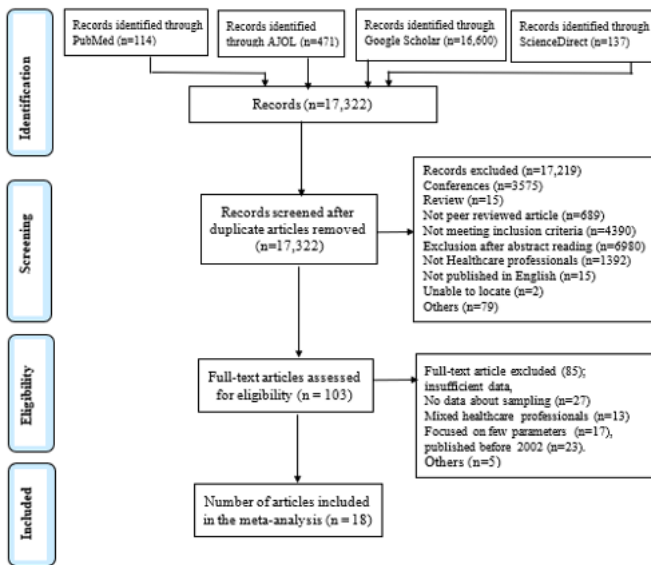


Figure 1

Study selection in the meta-analysis on prevalence of Musculoskeletal Disorders among healthcare professionals in Africa.

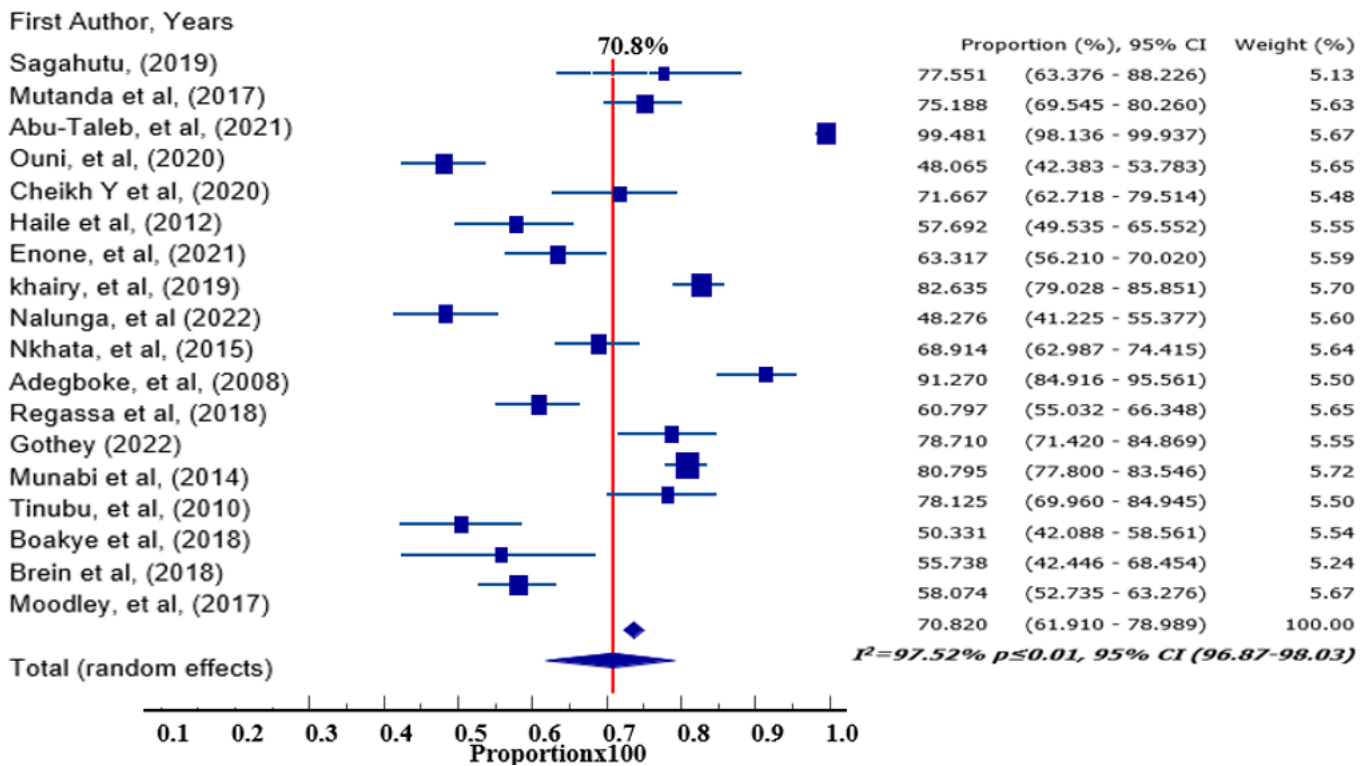


Figure 2

Overall prevalence of Musculoskeletal Disorders among healthcare professionals in Africa.

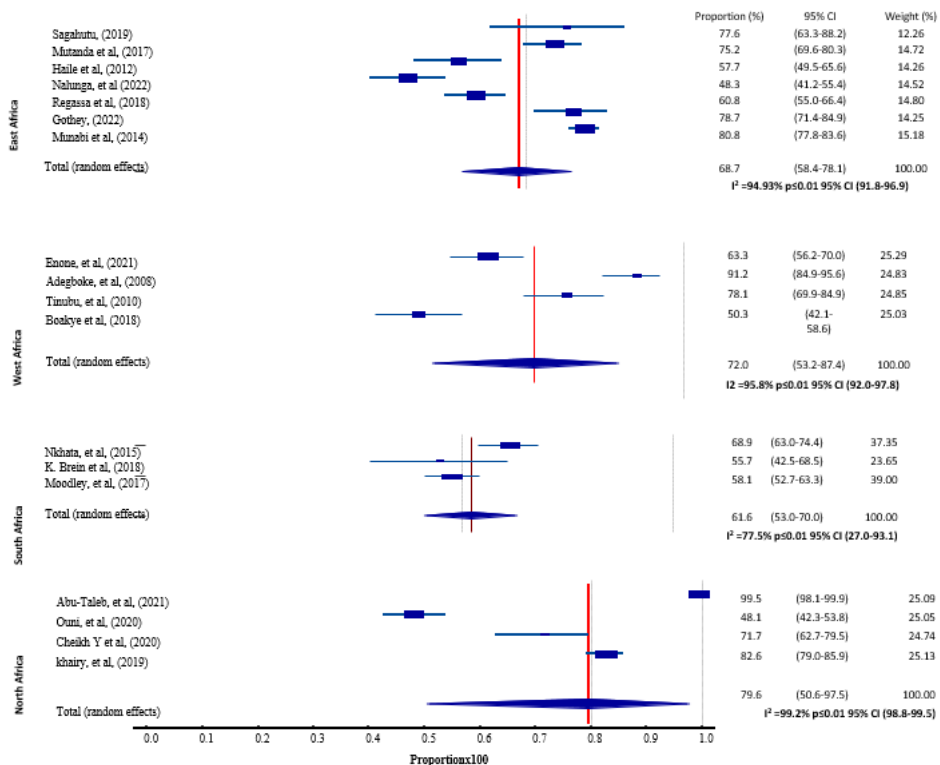


Figure 3

Prevalence of Musculoskeletal Disorders by regions among healthcare professionals in Africa.

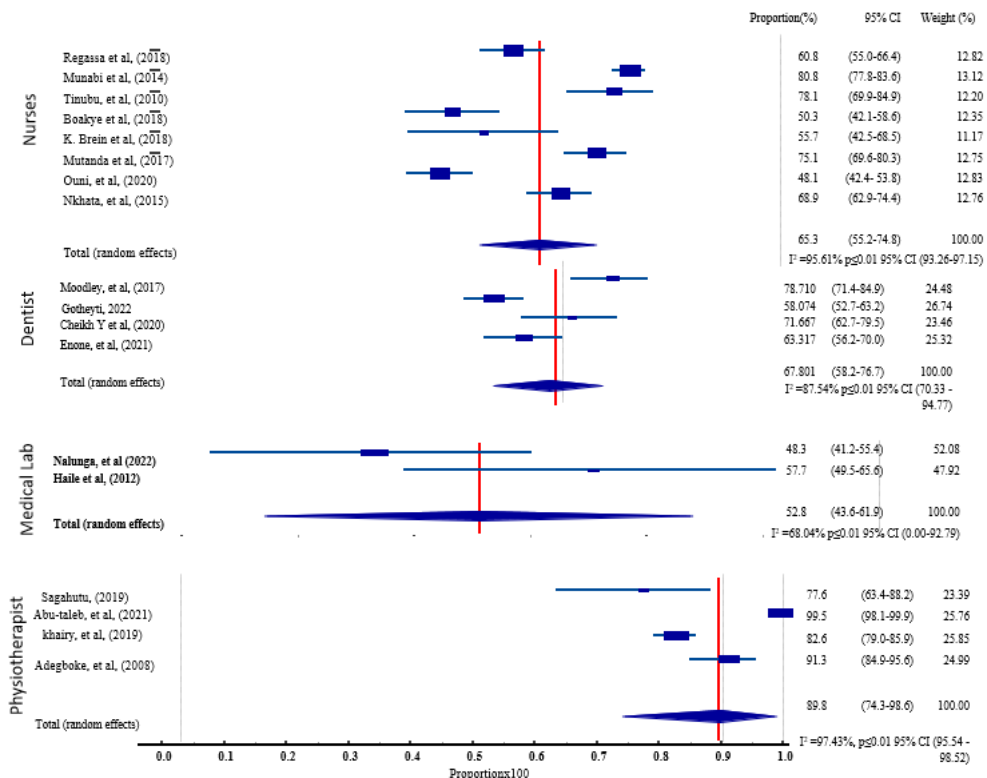


Figure 4

Prevalence of Musculoskeletal Disorders by professional groupings among healthcare professionals in Africa.