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The distribution of work-related musculoskeletal disorders among nurses in sub-Saharan Africa: a scoping review

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Abstract

Background Musculoskeletal injuries are noticeably high among the nursing fraternity, with lower back pain (LBP) being the most prevalent. Therefore, this study aimed to map evidence on the burden of occupational musculoskeletal disorders (MSD) among nurses in sub-Saharan Africa (SSA).

Methods This scoping review was guided by Arksey and O'Malley's framework. We conducted a comprehensive literature search with no date limit from the following databases: Science Direct, PubMed, Sabinet (SA ePublications), EBSCOhost platform, World Health Organization (WHO) Library, Google Scholar, SCOPUS, Taylor and Francis, and WorldCat Academic Search with full text for published studies. The search took place from May 2022 to December 2022. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) was used for reporting the search results, and a thematic content analysis was used to present the emerging themes from the included studies.

Results A total of 16,714 studies were identified after the database search. Only 29 studies met the inclusion criteria after full-article screening and were included for data extraction. The studies reported a total of 6343 participants from different regions in SSA. The 29 included studies showed evidence on the prevalence of MSD, associated risk factors of MSD and LBP among nurses in SSA with some recommendations on how to reduce the prevalence of MSD among nurses.

Conclusion The study findings reveal that there is a high prevalence of MSD among nurses, especially LBP. The etiology of MSD among nurses is multifactorial, and multifaceted strategies to address MSD are recommended. Further research is recommended to explore strategies that can be used to curb the high prevalence of MSD among nurses.

Keywords Musculoskeletal disorders, Nurses, Low back pain, Hospitals, Sub-Saharan Africa, Prevalence, Incidence, Mortality, Risk factors, Economic costs

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Background

Musculoskeletal disorder (MSD) refers to a wide range of inflammatory and degenerative illnesses that cause pain, discomfort, or soreness in the joints, peripheral nerves, supporting blood vessels, muscles, tendons, and ligaments [1]. Various professions and occupations have reported cases of MSD, and according to the International Labour Organization (ILO), occupational MSD occurs due to specific work activities, and that the risk is increased by prolonged exposure to activities such as awkward postures, repetitive motions, and excessive loads to mention a few [2, 3]. Injuries associated with occupational MSD include lower back pain (LBP), disc prolapse, spinal disc degeneration, muscle tears, and spinal fractures [4–6]. The Global Burden of Disease (GBD) 2019 data showed that approximately 1.71 billion people globally live with MSD such as LBP, and the associated disease burden continues to rise [7].

Various epidemiological studies have reported that nursing profession is one of the occupations with the highest prevalence of MSD [3, 8, 9] as compared to other healthcare professionals such as doctors, pharmacists, and dentists [10, 11], due to intense physically demanding nature of their work which mostly involves manual handling of patients on day to day basis [12]. Research findings reveal a noticeable high prevalence of LBP being the most reported occupational MSD among nurses ranging from 33 to 90.1% globally [4, 13–17], while the general population is thought to have LBP prevalence between 30 and 80%, and it has been observed that the prevalence of LBP rises with age [18]. The burden of LBP in the world increased by 25% between 1990 and 2006 and by 18% between 2006 and 2016. Although LBP is regarded as an insignificant condition especially in SSA, reports from the GBD 2015 have indicated that LBP is the leading cause of disability associated with a significant amount of cost for medical conditions such as disc herniation and degeneration as well as spinal fractures [19]. In addition, the GBD 2010 study showed that, out of 291 illnesses, LBP has the sixth-highest burden at the moment and is the reason behind more years lived with disability (YLDs) worldwide than any other disease [18]. Furthermore, Anderson et al. reported that LBP is the 5th ranking reason for hospital admissions and 3rd cause for surgical procedures [20] with consequent activity limitation resulting in absenteeism from work, poor productivity leading to poor health care for patients, sick leaves, seeking for treatment, and unmotivated workers which can result in early job resignation and retirement [11, 21]. Despite all the growing evidence of occupational MSD especially LBP among nurses, it remains relatively less prioritized and investigated though its impact is substantial due to large compensation costs and hospital visits.

Although the cause of MSD is unknown, published studies elsewhere have reported many factors as being implicated in the etiology of occupational MSD among nurses, for example, it has been associated with sociodemographic factors including gender, high body weight, age of nurses, duration of employment, and experience. Moreover, literature on MSD has shown a frequent association of MSD with physical work-related risk factors such as workload, manual work such as lifting patients, bending while working, transferring patients from one place to the other, long working hours, working while injured, fixed postures, prolonged sitting positions, and working at night, and psychosocial risk factors such as job dissatisfaction, not having enough breaks, or pauses during working hours [22–27].

While several studies have been conducted on the prevalence and associated risk factors of MSD [6, 28–31], collating and synthesizing this information is important for broader understanding of individual and environmental factors that pose as risk factors in the evolution of MSD among nurses. It is anticipated that the findings of this scoping review may guide implementers on the ground to implement control and prevention policy, planning of prevention strategies incorporating behavioral changes, reveal research gaps, and shape policies aimed at reducing MSD prevalence among nurses in SSA. Therefore, the aim of this study was to map evidence on the burden of occupational MSD among nurses in SSA. Even though there is information about MSD and nurses, it has been shown that the prevalence of MSD, especially LBP, is still on the rise; therefore, contributions of a scoping review gain importance and relevance by demonstrating the current evidence to identify research gaps and suggest novel ideas for future research.

Methods

Study design

We conducted a scoping review of published peer-reviewed literature on the distribution of occupational MSD among nurses in SSA. This review was guided by Arksey and O'Malley's methodological framework [32]. The Arksey and O'Malley framework involves the following stages: (a) identifying the research question; (b) identifying the relevant literature; (c) identifying the study selection; charting the data; and (d) collating, summarizing, and reporting the results. We also followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis extension for Scoping Reviews (PRISMA-ScR) for reporting our results [33]. The protocol for this review was published a priori [34], and this review has been registered with the Open Science Framework databases (registration number: osf.io/q6ked).

Identifying the research question

The overall research question was as follows: What is the evidence on the burden of occupational MSD among nurses in SSA?

Eligibility of the research question

The PEO (population, exposure, and outcome) framework was employed in this study to determine the eligibility of the research question. That is participants were professional nurses, exposure was administering nursing activities/duties, and outcome was (i) prevalence and incidence of MSD in the past 12 months and (ii) associated risk factors, (iii) mortality rate, and (iv) economic costs related to MSD.

Search strategy

We conducted a comprehensive search on several online databases including Science Direct, PubMed, Sabinet (SA ePublications), EBSCOhost platform World Health Organization (WHO) Library, Google Scholar, Taylor and Francis, SCOPUS and WorldCat, Academic Search Complete, Health Source: Nursing/Academic Edition, and CINAHL with full text for published studies. The search took place from May 2022 to December 2022 with no date limit. We used the following keywords on the search databases: nurses, musculoskeletal disorders, low back pain, prevalence, incidence, mortality, economic costs related to MSD, risk factors, and SSA (to search titles of the eligible studies). Boolean terms AND/OR were used to separate the keywords during the search. Identification of studies was accomplished by searching published literature in the English language. Medical Subject Headings (MeSH) terms were included in the search. Furthermore, the reference lists of studies eligible for inclusion were screened for potential additional articles.

Following keyword search and title screening, eligible studies were exported to Endnote version 20 library for abstract screening and full-article screening. Due to limited data on these studies in SSA, there was no date limit; hence, we included articles published from as far back as 2010 up to 2022. A detailed description of the database search strategy is attached in Additional file 1: Table S1.

Study selection

The initial database search for potentially eligible articles was conducted by the principal investigator (KK), guided by the eligibility criteria from different databases. All included studies for abstract screening were uploaded on Endnote Version 20 software. Prior to the beginning of the abstract screening, duplicates were eliminated. Using the inclusion criteria, Google Forms were used to create screening forms for both the abstract and the full-article screening. Using the qualifying criteria for this study as a guide, two independent reviewers—KK and UIN—conducted the abstract screening, followed by the full-article screening. Any disagreements between KK and UIN were resolved via discussions through engaging another reviewer MH until a consensus was reached. The eligibility criteria were designed to focus the study only on the articles that address issues described in the research question. We worked closely with the University of KwaZulu-Natal library services during database searching and retrieval of articles.

Eligibility criteria

Inclusion criteria

Studies were included if they met the following conditions: (a) focused on musculoskeletal disorders and reported at least one of the following: prevalence, risk factors, incidence, mortality, or economic costs related to MSD; (b) targeted nurses only (both male and female) as the study population; (c) utilized quantitative research designs; (d) specifically investigated lower back pain among nurses; (e) published in peer-reviewed journals and in the English language; (f) presenting evidence focusing in SSA.

Exclusion criteria

The following were excluded from the review: (a) studies published as a poster rather than full articles; (b) articles lacking an abstract; (c) studies that do not focus exclusively on nurses (e.g., mixed populations without subgroup analysis for nurses); (d) non-original research, such as commentaries, opinions, or secondary analyses of previously published data; (e) studies that lack clear reporting on outcomes related to prevalence, incidence, mortality, risk factors, or economic costs.

Charting the data

The relevant data was extracted using a piloted Google Form to corroborate the study characteristics in addition to their relevance. The data charting form was regularly updated to ascertain the addition of new information that address the research question. The following variables were extracted from included studies: author name(s), publication date, study title, study design, study setting, population, number of males and females, study aim, intervention, outcomes of the study with key findings, and recommendations.

Collating and summarizing

Thematic content analysis was used to analyze the narrative account of the data extracted from the included studies. Data was extracted around the

following outcomes: prevalence of MSD, prevalence of LBP, risk factors associated with MSD, and recommendations used to curb the occurrence of MSD among nurses.

Results

A total of 16,714 eligible studies were identified from the databases searched (Fig. 1). After duplicate removal and title screening, 16, 534 articles were removed because they did not meet our inclusion criteria and 180 studies were retained. Thereafter, abstract screening was conducted by two independent researchers of which a total of 147 studies were excluded, thus reducing the articles eligible for full-article screening to 33 articles. After the full-article screening, four studies were excluded for the following reasons: two studies reported on general healthcare workers [35, 36], one study was a poster and not an article [37], and one study did not report on the 12-month prevalence of MSD and the risk factors [38]. In the end, a total of 29 articles were finally included for data extraction in the review as they met our inclusion criteria. The Preferred Report Items for Systematic and Meta-Analysis (PRISMA) flow chart for the screening and selection of studies in this review is shown in Fig. 1:

The Preferred Report Items for Systematic and Meta-Analysis (PRISMA) flow chart for the selection and screening of studies in this study is shown in Fig. 1.

Characteristics of the included studies

A total of 29 studies that were published between 2010 and 2022 were found to be eligible for inclusion in our scoping review. Furthermore, all the included studies were conducted in different hospital settings, and the population was drawn from male and female nurses. In this study, 28% (8/29) of the included studies were conducted in Ethiopia [14, 39–45], 24% (7/29) in Nigeria [6, 11, 24, 46–49], 10.3% (3/29) in Kenya [13, 15, 50], 10.3% (3/29) in South Africa [31, 51, 52], 6.9% (2/29) in Ghana [3, 16], 6.9% (2/29) in Uganda [53, 54], and one each for the following countries: 3.4% (1/29) in Botswana [28], 3.4% (1/29) Zimbabwe [29], 3.4% (1/29) Zambia [30], and 3.4% (1/29) Sudan [17]. A total number of 6343 study participants were reported in the included studies, with over half (3527) of them being females. Participants' ages ranged from 18 to 65 years old. In addition, the majority

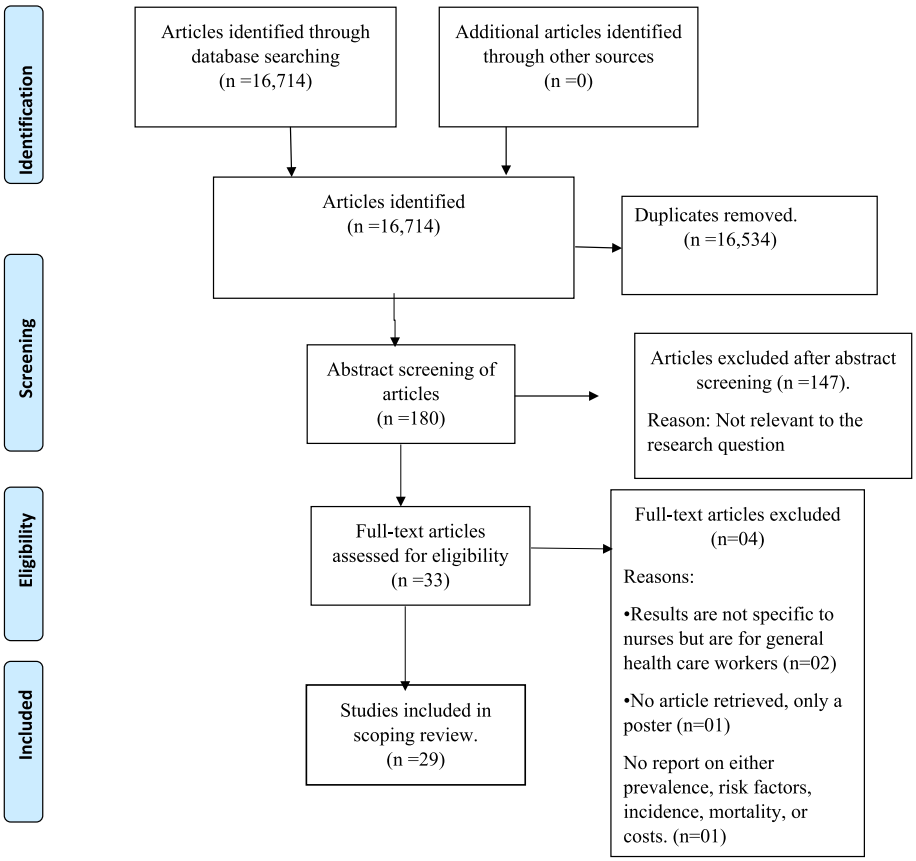

Fig. 1 PRISMA chart showing literature search and selection of studies

of the participants in the included studies were recorded in a study conducted in Uganda [54] comprising of 433 nurse. All the 29 included studies were cross-sectional surveys. The countries which were reported in the included studies are presented in Fig. 2

Of the 29 included studies, 18 of them as presented in Fig. 3 showed evidence on the prevalence of MSD among nurses [3, 6, 11, 13, 14, 16, 28–31, 39, 41, 45–47, 51, 53, 54]. In addition, all the included studies described the associated risk factors of MSD and recommended some strategies that can be used to reduce the prevalence of MSD. However, all the included studies did not report any incidence, mortality, and economic costs of MSD among nurses. Furthermore, 23 of the included studies in this review reported evidence on LBP among nurses [3, 6, 13–17, 24, 28–31, 39, 40, 42–44, 46–49, 52, 53] as presented in Fig. 4.

Study findings

The following main themes emerged from the included studies: prevalence of MSD, lower back pain, associated risk factors of MSD among nurses. We would like

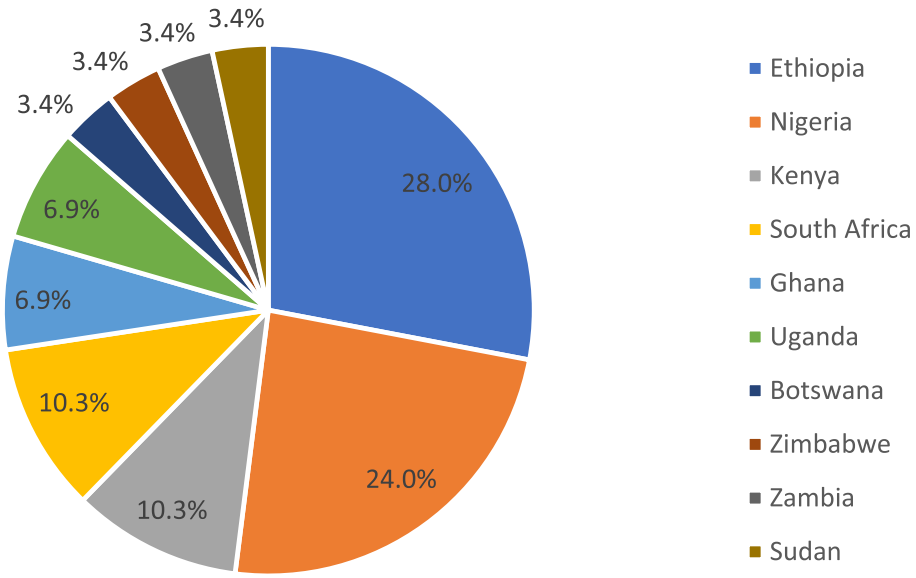

Fig. 2 Distribution of the countries represented in the included studies (*N* = 29)

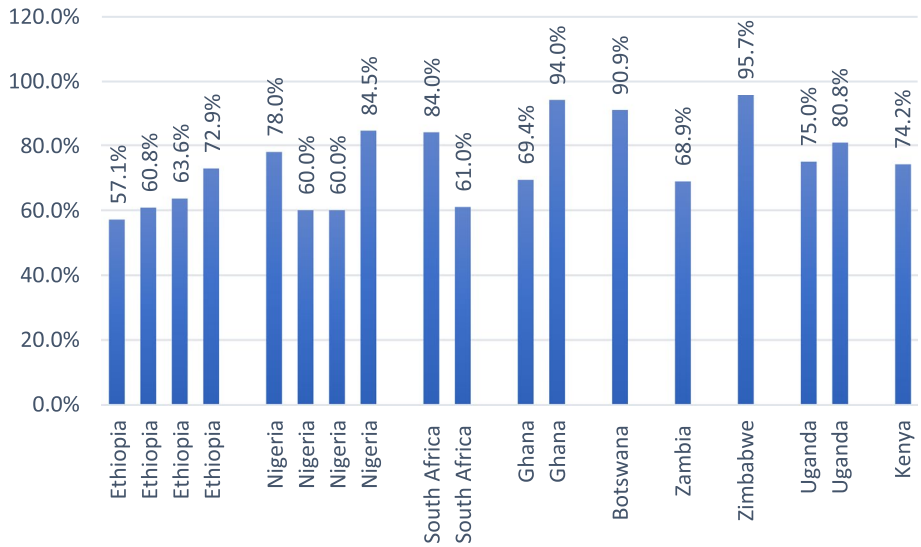

Fig. 3 The prevalence of musculoskeletal disorders from included studies (*N* = 18)

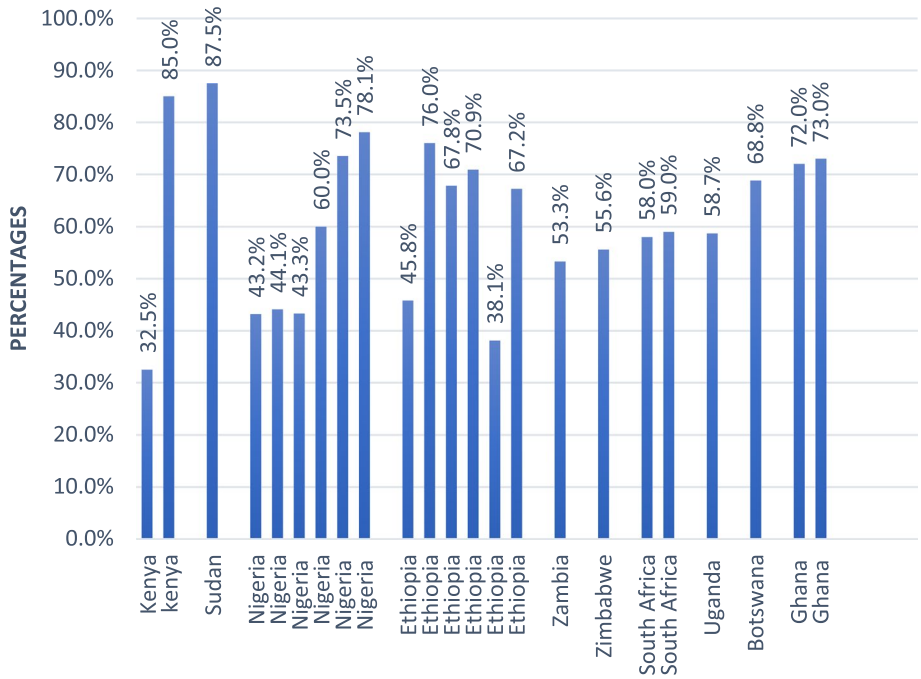

Fig. 4 The prevalence of low back pain from included studies (*N* = 23)

to highlight that although interventional strategies for controlling MSD among nurses were not in line with our review and aim of this review, it emerged as one of the themes, and given the scarcity of data on the cost of MSD, we decided to present data relating to interventions.

Prevalence of musculoskeletal disorders

Among the 29 included studies, 18 of them reported evidence about the 12-month prevalence of MSD among nurses. The prevalence of MSD ranged from as low as 57.1% up to 95.7%. The lowest prevalence of MSD was recorded in a study done in Ethiopia [14], while the highest prevalence of MSD was reported in a study conducted in Zimbabwe [29], respectively. Majority of the studies on prevalence of MSD were conducted in Ethiopia, thus four of them recording 57.1% [14], 60.8% [39], 63.6% [41], and 72.9% [45], and Nigeria with four as well, thus 60% [46], 78% [6], 60% [47], and 84.5% [6, 11, 46, 47], respectively, followed by South Africa with recordings of 84% and 61% [31, 51], respectively, Ghana two studies with 69.4% and 94% [3, 16], two studies as well in Uganda 75% [53], 80.8% [54], and only one of each in Botswana 90.9% [28], Zambia 68.9% [30], Zimbabwe 95.7% [29], and Kenya 74.2% [13]. From this review, we have noted that the prevalence rates of MSD in nurses vary according to studies but are generally high as all the studies recorded MSD prevalence rate was above 50%.

Evidence from this scoping review on the prevalence of MSD further generated a sub-theme on the prevalence of the most affected anatomical sites of MSD. Findings from the included studies revealed different body sites that are commonly reported by nurses as affected by MSD; in this review, LBP, ankle/feet, shoulders, neck, knees, upper back, and elbows emerged. Among all these anatomical sites, LBP emerged to be the most reported MSD by nurses and interventional strategies for controlling MSD among nurses.

Low back pain

From our findings, the outcome of our review showed that the burden of LBP emerged to be the most prevalent MSD among the nurses. Twenty-three of the included studies in this review reported evidence on LBP among nurses [3, 6, 13–17, 24, 28–31, 39, 40, 42–44, 46–49, 52, 53]. The lowest prevalence of MSD recorded in this scoping review was 32.5% from a study conducted in Kenya [13], while the highest prevalence of LBP was 87.5% reported in Sudan [17]. From these included studies, it indicates that the highest number of studies on LBP were reported from Nigeria with five reviews. Other reported sites of MSD from the included studies were the feet/ankle, shoulders, neck, knees, upper back, and elbow. Although the highest 12-month prevalence of MSD was recorded in Zimbabwe 95.7% [29], they did not record the highest prevalence of LBP, but it was recorded in Sudan with 87.5%, and the nurses in that study reported that

workload and poor working environment were the main contributors to LBP.

Associated risk factors of musculoskeletal disorders

All the 29 studies included in this scoping review reported evidence on the associated risk factors that contribute to the development of MSD. The evidence from this reviewed article generated four categories associated with MSD: thus personal, physical, work environment, and psychosocial factors.

Personal factors

Evidence on personal factors such as age [3, 13, 17, 49, 53, 54]; work experience [6, 13–15, 28, 29, 40, 41, 43], work status [46], sex [3, 24, 42, 46, 49], overweight [49, 55], past injuries [51], and qualification [29, 45] were revealed as associated factors for MSD among nurses. Age was found to be a significant predictor of musculoskeletal disorders among nurses. All the four studies were in agreement that old age is known to be a predisposing factor to MSD. Nine of the included studies reported about work experience being significantly associated with MSD. Four included studies have demonstrated that sex is also a predictor for MSD, that is MSD is more prevalent among female nurses. Findings from Yitayeh further revealed that being overweight was a significantly associated factor for self-reported MSD among nurses. One of the included studies [29] revealed that qualification attained is associated with MSD, and these findings were supported by the fact that most of nurses in Zimbabwe had attained a diploma as their highest qualification.

Physical factors

Physical demands of nurse–patient interaction involve daily nursing activities such as working in the same or awkward position for a long period which was reported in three articles [6, 30, 39] and is being implicated in the etiology of MSD especially LBP. Other included studies identified adjusting for bed heights [30], lifting heavy patients, transferring dependent patients, long standing hours, and treating an excessive number of patients in one day as sources of MSD [6, 11, 15, 16, 43, 47–49, 52]. Many of the above tasks require the nurse to alter her body position from the anatomical ideal posture to ensure that the task is completed successfully. Furthermore, two included studies [40, 42] purport that nurses who do not engage in regular physical exercise are more likely to experience MSD such as low back pain. Nurses are further exposed to work while bending, and as such, it exposes them to MSD [11, 28, 47]. Moreover, included studies identified long working shifts [3, 17, 31, 40, 41, 44, 45, 47], bedside wound dressing revealed by [39, 47], working with disoriented patients [39], and working while injured [50] as sources of MSD among nurses.

Work environment factors

Evidence on the unavailability of an assistive device for patients in hospital settings was revealed by six included studies [15, 24, 40, 42, 45, 47, 48] as being a risk factor for the development of MSD among nurses. In addition, a lack of training on intensive care, injury prevention, health, and ergonomic training was also reported in four studies [16, 24, 29, 42]. Results from a study conducted in South Africa further revealed that work area is also linked to MSD pain; thus, nurses working in critical areas like operating theatre rooms are at a higher risk of developing MSD than nurses working in general wards [31].

Psychosocial factors

Three of the included studies showed evidence that work distress, job dissatisfaction, and not having enough breaks or pauses during working hours were associated with an increased likelihood of experiencing MSD such as LBP [42, 50, 51, 54].

Recommended interventional strategies used to reduce the impact of occupational musculoskeletal disorders among nurses

All the included studies have made some recommendations on strategies that can be used to curb the high prevalence of MSD among nurses. Different themes emerged as follows:

Ergonomic training: Six included studies [11, 13, 14, 28, 45, 46, 48, 50] suggested that nurses should undergo ergonomic training as a way of trying to control the impact of MSD, and the following included studies from our review proposed education on preventive measures [6, 15, 16, 29, 30, 51, 52]. It has been reported that poor ergonomic practices play a major role in the development of MSD.

Physical exercise activitiesalso emerged as one of the strategies suggested by the following studies [11, 28, 40, 45, 46, 48]. These studies suggest the use of physical exercise programs as they have been evaluated and recommended as an effective strategy for the reduction of MSD, especially LBP among nurses. Some studies are of the view that ergonomic interventions should be coupled with some physical exercise for the effective prevention of MSD, especially LBP.

Lifestyle modification: Two authors [46, 49] from the included studies recommend lifestyle modification such as diet and weight loss as they are also implicated as personal factors that are associated with etiology of MSD.

Assistance devices/ transfer or lifting equipment: Four of the included studies [15, 24, 42, 47] stipulate that some devices like hoists should be used in hospital settings to lift heavy patients because heavy workload has been implicated as a predictor for MSD.

Policy formulation and standards advocacy on zero lifting policy and formulation of lifting teams suggested by [11, 49] and to guide nurses working environments and emphasis on good working postures were also identified in our included studies [15, 24, 28, 31, 39, 41, 44, 45, 47, 50]. On the other hand, two included studies further suggested periodic assessments of MSD among nurses as a way to identify and control any injuries [3, 28] and lastly physiotherapy visits is also recommended by [14, 45].

Discussion

This review aimed to map the existing evidence on the distribution of occupational musculoskeletal disorders among nurses in SSA. This scoping review provided a general overview and evidence on the prevalence of MSD, LBP, associated risk factors and some recommendations that can be used to curb the high prevalence of MSD in SSA. Our results presented evidence from ten countries within SSA. Furthermore, the findings demonstrated a gap in literature on the mortality and economic costs related to economic costs associated with MSD among nurses in SSA, and generally, there is a scarcity of studies aimed at evaluating the incidence of MSD among nurses, as most studies are rather focusing on the prevalence rates only.

In this article, MSD is defined as a condition that includes a gamut of inflammatory and degenerative conditions that affects the tendons, muscles, joints, ligaments, peripheral nerves, and supporting blood vessels with consequent pain, ache, or discomfort [2], while LBP is defined as pain between the lower rib and the gluteal folds [56], and can be categorized according to the duration of symptoms being (i) acute LBP which refers to pain lasting less than 6 weeks, (ii) sub-acute pain referring to pain symptom that lasts more than 6 weeks but less than 12 weeks, and lastly (iii) chronic LBP which means pain exceeding 12 weeks [57].

Occupational injuries are a major public health concern globally, and healthcare workers are the most affected, especially nurses [58, 59]. From this scoping review, the 12-month prevalence of MSD among nurses is generally high ranging from 57.1 to 95.7% as recorded in Ethiopia and Zimbabwe respectively [14, 29]. The prevalence of MSD from this study is comparable to other studies conducted elsewhere other than SSA. For example, the prevalence for MSD among nurses was 55.5% in India [8], 74.7% in Vietnam [60], 70% in Mainland China [61], 80% in Australia [4], 85.5 in Japan [62], and 95% in Iran [63]. However, contrary to these findings, one study conducted in Pakistan reported a lower MSD prevalence of 31.6% among Pakistan nurses [64]; a possible rationale for this low prevalence rate among Pakistani nurses can be associated with some of the following factors: The shifts of nurses in the range from 6 to 8 h per day, and the workload of patient care is less as Pakistan nurses usually do not lift or transfer patients, particularly male patients. This role of direct patient care is often handed over to male nursing assistants. Moreover, low prevalence is also linked to some cultural factors as it is reported that in Pakistan, women including nurses tend not to report problems like pain and discomfort and tend to suffer in silence.

The most prevalent MSD among nurses is LBP, and its etiology is multifactorial. In their day-to-day work, nurses are exposed to manual handling of patients such as lifting and transferring of patients and heavy equipment. This is because most hospital settings especially in developing countries do not have lifting aids such as automated hoists [17, 47]. As such, these heavy liftings introduce the strenuous effect on their back with consequent LBP complaints. Likewise, some biomechanical investigations have also revealed that heavy workload on the back results in spinal load [65, 66]. Consequently, LBP results in poor performance and low productivity towards patient care, as well as poor quality health for the nurses on their part, and in addition, there is a loss of working hours due to absenteeism from work, early retirement from work, and loss of experienced workforce [8, 47, 64, 67].

In this review, LBP has emerged to be the most prevalent MSD among nurses with a prevalence rate ranging from 32.5 to 87.5% [13, 17]. Similarly, the prevalence of LBP among nurses is reported elsewhere other than SSA, in which reports from China and Hong Kong revealed LBP prevalence of 40.6% in Hong Kong [68], 56.7% in China [61], France 57.9% [69], Nepal 65% [70], Greece 72% [71], and Japan 82.6% [1]. These findings are comparable to what we found in our included articles. In this present study, Sudan reported the highest 87.5% prevalence of LBP, and the nurses believed that poor work environment, workload, and lifting of patients were the main contributors to the development of LBP.

Risk factors predisposing nurses to occupational musculoskeletal disorders

Several personal characteristics could be related to occupational MSD. This scoping review found out that age

is among the characteristics that are associated with a greater risk of LBP. The relationship between age and MSD among nurses tends to be associated with task allocation among different age groups. In most cases, younger nurses are mostly allocated heavier duties as they are still energetic to execute most duties as compared to older nurses who are mostly engaged in administrative duties. In addition, one study conducted in Nigeria further reported that MSD decreases with age which might be since older nurses tend to do less handling of patients coupled with more experience on preventive strategies and knowledge on coping strategies as compared to younger nurses [6, 13]. In our study, gender is also revealed as one of the risk factors in this scoping review, that is MSD is more prevalent among female nurses than male nurses, and it is said that this might be related to physiological, anatomical, and structural differences between males and females. In addition, it is reported that women are socially and culturally compelled to execute all home chores which ultimately expose them to heavier workload and higher risk to LBP than males. Moreover, it is reported that women have a lower threshold than men; hence, they are more likely to report pain than men [17, 40]. Although some of the studies did not find any relationship between weight and MSD, one of the studies in this scoping review [14] revealed an association between age and MSD and stated that this might be due to increased mechanical stress as a result of being overweight.

The results of our scoping review also showed that some physical demands of the nursing profession are implicated in the development of MSD among nurses. In their day-to-day nursing activities, nurses tend to work in awkward postures, adjusting bed heights, lifting and transferring of patients, working while bending, having long standing hours, doing bedside wound dressing, working while injured, and treating many patients. All these nurse-patient interaction activities are believed to be the source of MSD and LBP among nurses because these tasks force nurses to deviate their body positions from their normal body anatomical positions. Moreover, they are exposed to long standing hours which also puts more pressure on the spine with consequent LBP. It has also been found out that nurses engage in manual heavy lifting and transferring of patients as they execute their daily tasks, and these flex their vertebral column which is the most likely explanation for LBP complaints among nurses [72].

Some psychosocial factors like work stress, job dissatisfaction, and not having enough breaks have been identified in our study as predictors for MSD. A possible explanation for this could be related to the fact that nurses who endure huge amount of stress are more likely to develop LBP, because of the nature of the nursing activities they do, and as they get stressed, it results in fatigue which in turn affects some muscles with the justification that stress normally increases sensation of pain receptors hence LBP [42, 50, 51].

Recommended interventional strategies to reduce the impact of musculoskeletal disorders among nurses

Due to the nature of their demanding work, nurses are at a higher risk of occupational injury; therefore, multifaceted preventive strategies are proposed as they can be highly impactful if combined. In our review, several preventive strategies have been recommended: physical activity—although there is limited evidence of physical exercise therapy and reduction of LBP, six of our includes studies [11, 28, 40, 45, 46, 48] proposed physical exercise training as one of the preventive strategies that can be used to reduce the symptoms of LBP; thus, stretching exercises are highly recommended as they tend to enhance flexibility and improve lumbar range of motion. These recommendations are consistent with a study that was conducted in Estonia that exercise programs can improve lumbar range of motion with consequent reduction of LBP [26, 73]. Despite this being a good strategy to use it often comes with challenges of time limitation at work, but other authors suggest home-based exercise physical programs as well. Besides physical exercise therapy, ergonomic education and training can also be used to prevent MSD among nurses as recommended by fourteen included studies in our review [6, 11, 13–16, 28–30, 45, 46, 48, 50, 51]. Education, for example in ergonomics and safe lifting techniques, can improve their knowledge and the quality of their life. Furthermore, four included studies [15, 24, 42, 47] in our scoping review proposed the use of assistive devices like hoists which can help in lifting of heavy patients to reduce excessive manual handling of patients. Lastly, another recommendation strategy identified from our review is lifestyle modification which involves diet modification [46, 49] for the purpose of weight management and physiotherapy visits [14, 45] which are in line with studies conducted in America by [74] who purports that dietary modifications can be influenced by health promotion programs.

Strengths and limitations of the study

To our knowledge, this is the first scoping review to map the distribution of occupational MSD among nurses in SSA. A comprehensive search strategy was conducted in this study with no limitation on publication dates which facilitated identifying a considerable number of studies. This scoping review methodology has allowed us to use

Table 1 Summary of characteristics of the included studies

Author and year	Study setting	Study aim/ objectives	Study design	Population	Sample	Mean / age range of participants	Outcome	Significant risk factors	Economic costs	Recommended interventions
Mailutha et al., 2020 [13]	Kenya	To assess the prevalence and magnitude of musculoskeletal disorders among Kenyan nurses, and the contributory anthropometric factors	Cross-sectional study	Male and female nurses	244 responses	-	74.2% prevalence Incidence (nil) Mortality rate (nil) Key findings back, feet, and shoulders, revealing a rate of 32.5, 21.5, and 20.4%, respectively	Age in the female nurses Work experience	Nil	Ergonomic and administrative interventions
Nkhata et al., 2015 [30]	Zambia	To determine the prevalence of work-related musculoskeletal disorders within the last year among nurses at the University Teaching Hospital, in Lusaka, Zambia, and to establish the demographic characteristics and perceived job tasks associated with this outcome	Cross-sectional study	Male and female nurses	267 responses M, 48 F, 219	36.5	68.9%-MSD (12-month prevalence Incidence (nil) Mortality rate (nil) Key findings Ankles and feet were the most commonly affected body part 54.8% ($n=101$) followed by the low back 53.3% ($N=98$	Decreased height, increased weight and years of professional experience, full-time position, working in the same position for a long period, and adjusting for bed height	Nil	Education on prevention and coping strategies for work-related musculoskeletal disorders
Akodu et al., 2019 [46]	Nigeria	Investigated the association between work-related musculoskeletal disorders (WMSDs) and work ability among nurses in South-west Nigeria	Cross-sectional study	Male and female nurses	135 nurses M, 9 F, 126	40.23	12-month prevalence (60%) Incidence (nil) Mortality (nil) Key findings Lower back pain (35%, (43.2%) was the most common	Sex, work status, and work ability	Nil	Recommended that nurses be enlightened on the high prevalence of the symptoms of WMSDs and possible predisposing factors. They should undergo ergonomic training and be educated on lifestyle health promotion programs like exercise, lifestyle modification, diet, physical activity, and weight management to prevent the symptoms of WMSDs and improve their work ability
Yitayeh et al., 2015 [14, 55]	Ethiopia	To assess annual prevalence of self-reported work-related musculoskeletal disorders and associated factors among nurses	Cross-sectional study	Male and female nurses	389 nurses M, 180 F, 209	30 ± 5.8	12-month prevalence = 57.1% Incidence (nil) Mortality (nil) Key findings Low back pain (70.9%)	Overweight and professional experiences	Nil	Education on ergonometric intervention strategies to raise awareness regarding work-related musculoskeletal disorders It is also mandatory that nurses should be advised to visit physiotherapists when they have work-related musculoskeletal disorders

Table 1 (continued)

Author and year	Study setting	Study aim/ objectives	Study design	Population	Sample	Mean / age range of participants	Outcome	Significant risk factors	Economic costs	Recommended interventions
Tinubu et al., 2010 [6]	Nigeria	This study sought to determine the lifetime, 12-month period and point prevalence of work-related musculoskeletal disorders (WMSDs); the associated job risk factors and the coping strategies toward reducing the risk among nurses	Survey	Male and female nurses	128 responses	36.4 ± 7.75	12-month prevalence = 78% Incidence (nil) Mortality (nil) Key findings Low back (44.1%), neck (28.0%), and knees (22.4%)	Nurses with > 20 years of clinical experience, working in the same positions for long periods, lifting or transferring dependent patients, and treating an excessive number of patients in one day	Nil	Education programs on prevention and coping strategies for musculoskeletal disorders be made mandatory
Tefera et al., 2021 [42]	Ethiopia	To assess the magnitude of low back pain and associated factors among nurses who work at intensive care units	Cross-sectional study	Male and female nurses	412 M, 195 F, 217	30	The magnitude of low back pain was 313 (76%) Incidence (nil) Mortality (nil)	Being female, unavailability of an assistive device for patient handling, lack of training on intensive care, lack of regular exercise, and job stress	Nil	Policymakers and concerned bodies should emphasize the accessibility of assistive devices for patient care, provision of training on intensive care, and adaptive working environment for intensive care unit nurses
Hinmikaiye and. Bamishaiye (2012) [48]	Nigeria	To determine the incidences of low back pain among theatre nurses	Survey	Male and female nurses	80 responses M, 24 F, 56	-	57 (78.1%) LBP Incidence (nil) Mortality (nil)	Lifting patients within bed without assistance	Nil	Nurses can be advised to do regular exercise to strengthen back muscles, their adjustment employer to ensure ergonomic to reduce risk of back pain such as manual handling, awkward body position at work and monotonous work posture. The high incidence of back pain is brought about by factors which seem to be entirely preventable. It is apparent that nurses are taking risks or are pursuing questionable practices
Munyao and Meng'anyi (2020) [15]	Kenya	To determine factors contributing to back pain among nurses in the maternity department	Cross-sectional study	Male and female nurses	20 M, 3 F, 17	-	85%-LBP Incidence (nil) Mortality (nil)	It was noted that equipment for heavy weightlifting were not readily available in the hospital	Nil	Policies and standards be formulated that will guide the nurse-working environment. Emphasis on good working postures, provision of heavy weightlifting equipment, and sensitization of nurses on the pathophysiology of back pain are other recommended measures to lower maternity

Table 1 (continued)

Author and year	Study setting	Study aim/ objectives	Study design	Population	Sample	Mean / age range of participants	Outcome	Significant risk factors	Economic costs	Recommended interventions
Mijena et al., 2020 [43]	Ethiopia	Assessed the prevalence of low back pain and factors associated with it among nurses	Cross-sectional study	Male and female nurses	404 F, 225 M, 179	30.4	12-month prevalence of LBP – 38.1% Incidence (nil) Mortality (nil)	More than 5 years of work experience, manual lifting of weight > 10 kg, working in awkward posture	Nil	Tailored intervention to retain experienced nurse staff. Future
Boakye et al., 2018 [16]	Ghana	To determine the prevalence of work-related musculoskeletal disorders (WMSDs) among nurses and midwives, the associated job risk factors, and the adopted coping strategies	Cross-sectional study	Male and female nurses	151 responses M, 11 F, 123	33.03 ± 9.65	Overall, 12-month prevalence 69.4% Incidence (nil) Mortality (nil) Key findings The three most affected body parts were the lower back 67 (72.0%), the neck 37 (39.8%), and the upper back 35 (37.6%)	Lifting or transferring of dependent patients, inadequate training on injury prevention, and working in awkward or cramped positions	Nil	Periodic education on body mechanics is imperative to alleviate the risk factors
Kgakge et al., 2019 [28]	Botswana	To determine the prevalence of WMSD symptoms among nurses in a tertiary public hospital in Botswana, and their associated risk factors	Cross-sectional study	Male and female nurses	220 responses F, 165 M, 55	35.2	Overall, 12-month prevalence – 90.9%Incidence (nil)Mortality (nil)Key findingsLBP = 68.8% most prevalent	Work experience and working while bending	Nil	There is a need for periodic assessments of MSDs among nurses, along with greater advocacy of safe working environments and strategies to improve work practices and ergonomics
Chiwaridzo et al., 2018 [29]	Zimbabwe	To provide cross-sectional evidence of the 12-month prevalence, consequences and factors associated with WMSDs among nurses	Cross-sectional study	Male and female nurses	Responses 117 M, 18 F, 99	-	Overall, 12-month prevalence – 95.7% Incidence (nil) Mortality (nil) Key findings Low back pain was the most common WMSDs reported ($n = 55$, 67.9%)	WMSDs were significantly associated with qualification attained, postgraduate ergonomic training and working experience	Nil	This creates a need for prompt hospital education programs aimed at raising awareness among nurses
Belay et al., 2016 [44]	Ethiopia	To determine the prevalence and to identify the risk factors of LBP among nurses	Cross-sectional study	Male and female nurses	395 responses M, 110 F, 285	30.6 (± 8.4)	Prevalence of LBP in the previous 12 months was 181 (45.8%) Incidence (nil) Mortality (nil)	Working shift, physical activities at work	Nil	Comprehensive preventive measures: arranging proper rest periods, healthier schedules and proper use of body mechanics, improving nurse staffing, and reducing the frequency of night shifts
Al-samawi and Awad (2015) [17]	Sudan	To estimate the incidence, to identify risk factors, and impact of illness of LBP among nurses in	Cross-sectional study	Male and female nurses	80 responses F, 65 M, 15	-	Overall incidence of low back pain among nurses was 87.5% Mortality (nil)	Age and working hours	Nil	A comprehensive policy guideline, Comprehensive back programs, including physical and psychological components, regular change in all hospital departments

Table 1 (continued)

Author and year	Study setting	Study aim/ objectives	Study design	Population	Sample	Mean / age range of participants	Outcome	Significant risk factors	Economic costs	Recommended interventions
Bolarinde et al., 2019 [47]	Nigeria	Investigated the prevalence and pattern of work-related MSDs, risk factors, and the strategies of management among nurses	Cross-sectional study	Male and female nurses	150 responses M, 20 F, 130	-	Overall, 12-month prevalence -60% Incidence (nil) Mortality (nil) Key findings (LBP) (60.0%), followed by neck pain (48.0%), while elbow pain was the lowest work-related musculoskeletal pain (5.3%)	Frequent bending, prolong standing, lifting patients in the bed without assistance, and bedside wound dressing	Nil	Educational back care programs, back care ergonomics and patient transfer, procurement of adequate transferring or lifting equipment
Mutanda et al., 2017 [53]	Uganda	To assess the prevalence and factors associated with musculoskeletal disorders among nurses	Cross-sectional study	Male and female nurses	266 responses	-	Overall, 12-month prevalence – 75% Incidence (nil) Mortality (nil) Key findings Low back pain, 58.7% was the commonest musculoskeletal disorders, followed by knee pain, 38.5%	Being older than 41 years and older	Nil	There is a need for stakeholders to have a positive and supportive approach towards the health of nurses and their working conditions
Regassa et al., 2018 [39]	Ethiopia	To assess work-related musculoskeletal disorders and associated factors among nurses	Cross-sectional study	Male and female nurses	301 responses M, 159 F, 142	-	Prevalence-60.8% Incidence (nil) Mortality (nil) Key findings 67.8% was seen in the lower back which was followed by the neck 44 (24%) and knees 43 (23.6%)	Lifting and transferring dependent patients, giving wound care, working in medical ward and Intensive care unit], working in malpositions, working in the same positions for long period of time, working with disoriented patients, and bending or twisting back during work	Nil	Nurses should follow the principles of body mechanics during lifting and transferring patients to prevent injuries
Madiba et., 2013 [31]	South Africa	To investigate the prevalence of musculoskeletal disorders (MSDs) among nurses	Cross-sectional study	Male and female nurses	125-responses M, 5 F, 120	42	12-month prevalence Prevalence, 84% Incidence (nil) Mortality (nil) Key findings LBP most reported body site (58%), followed by the shoulder (21%), and neck (20%)	Nurses working 12-h shifts, work area, and areas of pain	Nil	Employ more nursing staff so nurses can work shorter shifts
Kore et al., 2021 [40]	Ethiopia	To assess the prevalence of low back pain and associated factors among nurses,	Cross-sectional study	Male and female nurses	192 responses	28 (± 7.38)	12-month prevalence 67.2% Incidence (nil) Mortality (nil)	Work experience, prolonged standing during sessions, and duration of working hours per week, physical activity, and using nursing aid	Nil	Minimize the time for which the nurses spent per week by increasing the number of nurses. Nurses should be actively involved in regular physical exercises increasing access to nursing aid

Table 1 (continued)

Author and year	Study setting	Study aim/ objectives	Study design	Population	Sample	Mean / age range of participants	Outcome	Significant risk factors	Economic costs	Recommended interventions
Sikiru and Hanifa (2010) [24]	Nigeria	To determine the prevalence and risk factors of LBP among nurses	Cross-sectional study	Male and female nurses	408 respondents M, 148 F, 260	39.20 + 9.09	12-month prevalence of LBP 73.53% Incidence (nil) Mortality (nil)	Poor knowledge of back care ergonomics and unavailability of lifting equipment are major predisposing factors. There was a significant association between sex and severity of LBP	Nil	Refresher course on back care ergonomics and patient transfer also hospitals should be well equipped with all necessary lifting equipment
Bediako et al., 2021 [3]	Ghana	To determine the prevalence and risk factors of LBP among nurses	Cross-sectional study	Male and female nurses	139 responses	34.80 ± 8.01	12-month prevalence 94% Incidence (nil) Mortality (nil) Key findings (73.3%), upper back pain (55.7%), ankle/feet pain (55.0%), and neck pain	Significantly higher prevalence in females (97%) than males (87%). Age and working hours were significantly associated with MSDs	Nil	Need for a thorough assessment of ergonomic risk factors
Made (2019) [51]	South Africa	To compare risk factors of multisite MSP in nurses and bank workers	Cross-sectional study	Male and female nurses	252 nurses F, 242 M, 10	-	12-month prevalence 61% Incidence (nil) Mortality (nil)	Somatic symptoms of distress, job dissatisfaction, and past injuries, also age and adverse health beliefs	Nil	Education and counselling to help workers deal with psychosocial factors
Olutende et al., 2022 [50]	Kenya	To investigate the risk factors for work-related musculoskeletal disorders among nurses	Cross-sectional study	Male and female nurses	130 responses	35	12-month prevalence (nil) Incidence (nil) Mortality (nil)	Not having enough breaks or pauses during working hours, working in awkward, and working while injured or hurt	Nil	Nurses need to be trained on proper handling and lifting of patients and loads, modification of work procedures to reduce injuries, take breaks, and avoid awkward cramp position, repetitive work and strenuous tasks
Mekonnen (2019) [41]	Ethiopia	To investigate the prevalence and work-related factors associated with low back pain among nurses	Cross-sectional study	Male and female nurses	418 responses M, 185 F, 233	31.39	12-month prevalence 63.6% Incidence (nil) Mortality (nil)	Work experience shift work, and health and safety training significantly associated with LBP	Nil	Proper management of workplace conditions, like shift work and regular provision of health and safety training
Ganiyu et al., (2015) [11]	Nigeria	To determine the pattern of WMSDs and their relationship with ergonomic hazard among health care professional	Cross-sectional study	Male and Female healthcare workers	71 nurses	Not specified to nurses	12-month MSD prevalence 84.5%	Prolonged sitting, standing, and working in an awkward posture	Nil	Stop working when back hurts, taking more rest breaks during the work day, change of work setting or reducing patient contact hours, exercises and further training in lifting skills
Awosan et al., (2017) [49]	Nigeria	To determine the prevalence, perception, and correlates of LBP among healthcare workers	Cross-sectional	Male and female healthcare workers	141 nurses	Not specified to nurses	12-month prevalence of LBP 43.3%	Older age and female sex, being in practice for 10 years and above, overweight/obesity, and lifting heavy objects/patients	Nil	Maintain normal weight and normal postures at work, establishing "lift teams" as a temporary measure, and also implement "zero lift programs"

Table 1 (continued)

Author and year	Study setting	Study aim/ objectives	Study design	Population	Sample	Mean / age range of participants	Outcome	Significant risk factors	Economic costs	Recommended interventions
Yizengaw et al., (2021) [45]	Ethiopia	To determine the prevalence and factors associated with work-related musculoskeletal diseases among health care providers working in the operating room	Cross-sectional	Male and female healthcare workers	96 nurses	Not specified to nurses	12-month prevalence of MSD 72.9%	Working overtime, not having assistance during procedures, educational status and working at night shifts	Nil	Comfortable body posture when performing their tasks, doing physical exercise, taking ergonomic training, having breaks during working hours, visiting physiotherapists
Dlungwane et al., (2018) [52]	South Africa	To determine the prevalence and factors associated with LBP among nurses	Cross-sectional	Male and female nurses	242 nurses	-	Point prevalence of LBP 59%	Lifting, bending, pulling, pushing, and sustained position	Nil	Education programmes on prevention and workplace interventions are required
Munabi et al., (2014)	Uganda	To identify and compare factors associated with musculoskeletal disorders among nursing staff	Cross-sectional	Male and female nurses	433 nurses	35.4	12-month prevalence of MSD 80.8%	Age, self-reported poor general health status, and stress	Nil	-

a systematic approach to identify relevant studies, charting, and analysis of outcomes [34]. In addition, our studies were selected according to population, exposure, and outcome framework as it was relevant to address our research question. Also, our study findings were reported following the PRISMA flow diagram for the purpose of transparency and completeness (Table 1). We acknowledge that the application of filters during our database search might have led to the exclusion of other relevant studies. We further acknowledge that there is a limitation of studies in most of the SSA countries and a concentration of the same studies in one region of the country which might affect the general impression of MSD in SSA.

Implications for research

This study shows limited evidence on incidence, mortality, and the economic costs related to MSD among nurses as none of the included studies revealed any information on that. Therefore, we hope that this study will prompt researchers to investigate more on this aspect to give more insight on the implications of MSD and related economic costs. Additionally, a call for more MSD studies to be conducted in different regions of SSA that include experimental interventions for MSD.

Implications for practice

This study revealed the need for policymakers to be aware of the rising MSD among nurses for the purpose of planning and decision making to ensure sufficient allocation of healthcare resources for the betterment of improving the healthcare system performance and thus also improving the quality of life for nurses. Our findings also suggest that hospitals should have effective occupational committees for the purpose of implementing some of the preventive strategies as well as conducting periodic assessments of nurses on MSD-related issues. Furthermore, implementing some recommended strategies may play a positive role in significantly reducing the high prevalence of MSD among nurses.

Conclusion

This study has provided evidence that there is a high prevalence of MSD among nurses, especially LBP in SSA. Although this study demonstrated a shortage of evidence from published studies on incidence, mortality, and economic costs of MSD among nurses, numerous studies have found a link between the following risk factors (personal, physical, environmental factors) and MSD which lead to a greater burden of musculoskeletal injuries especially LBP. Therefore, it is important to strengthen ergonomic training and education, provide assistive lifting devices, and promote physical exercise activities and lifestyle modification among nurses in hospitals. Lastly, large-scale studies are recommended using experimental methods to establish the root cause of MSD among nurses.

Abbreviations

DALY	Disability-adjusted life year
GBD	Global Burden of Disease
LBP	Low back pain
MeSH	Medical Subject Headings
MSD	Musculoskeletal disorders
PRISMA-ScR	Preferred Reporting Items for Systematic Reviews and Meta-Analysis extension for Scoping Reviews
SSA	Sub-Saharan Africa
WHO	World Health Organization
YLD	Years lived with disability

Supplementary Information

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Additional file 1. Table S1.

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Authors' contributions

KK conceptualized the study and designed data collection methods under the supervision of TG. KK, MH, UIN, and TG contributed to writing the first draft of the manuscript. All authors critically reviewed and approved the final manuscript.

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Data availability

All data generated or analyzed during this study will be included in the published systematic review article.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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