

Prevalence of hypertension and its risk factor among cotton textile workers in low-and-middle-income countries: A systematic review protocol

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Protocol

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Abstract

Background: Cotton workers are exposed to various hazards in the textile industry that might result in different ailments including hypertension (HTN). However, few attempts have been made to systematically review the prevalence of hypertension and its risk factor among cotton textile workers in low-and-middle-income countries (LMICs). This review aims to identify the factors and burden of hypertension; considering that modifiable factors can be prevented in this high risk population.

Methods: We will carry out the systematic literature search on the major electronic databases including PubMed, CINAHL Plus, Science Direct, and Cochrane between January 2000 and December 2019, to identify the prevalence and incidence along with risk factors of hypertension in adults' cotton textile workers in LMIC. Two researchers will independently search the databases. The search strategy will be piloted to ensure sufficient specificity and sensitivity. We will limit the search findings to human studies conducted in the adult workers.

Discussion: This review will highlight the proportion of hypertension along with its risk factor among cotton textile workers in LMICs. Given that, some of the factors can be prevented in this high-risk population, we will call on health, experts to prioritize policies and commission and conduct programs to support the improvement in their health. The findings of this review will be made publicly available and the results will be disseminated via presentations and peer-reviewed publications **Conclusion:** The review provides detailed information about the prevalence and risk factors of hypertension that will help to progress the health of cotton workers in LMICs.

Background

Globally, hypertension (HTN) is identified as one of the leading causes of mortality and disability (1). It has led to 7.5 million deaths and accounted for 57 million disability adjusted life years (DALYS) or 3.7% of total DALYS(2). Hypertension is characterized as constant rise of systolic blood pressure and/or diastolic blood pressure of more than or equivalent to 140 mmHg and/or 90 mmHg respectively(3). Currently, around 1.13 billion individuals are suffering from hypertension globally and two-third of them resides in low- and middle-income countries (LMICs) (4) while, LMICs selection is based on World Bank's (WB) 2018 Country Classification list, having GNI per capita between \$996 and \$3,895 (5). The number of hypertensive people is projected to grow by 70 million individual from 2000 to 2025 in high income countries (HIC) while it is estimated to grow by >500 million in LMICs over the same period (6). A systematic review included data on 1,494,609 adults from 45 countries also showed that there is the highest burden of hypertension (32%) in LMICs and prevalence estimates were found to be higher in elders, overweight/obese, urban settlers and having informal education (7). Moreover, worldwide high blood pressure is one of the major risk factors for cardiovascular diseases (CVD) that refers to diseases of the heart and blood vessels (8, 9),stroke, coronary artery disease and peripheral vascular disease (9). The burden of CVD across the world is very high and in LMICs, 47% of mortality secondary to CVDs and 44% of CVDs burden are attributable to HTN/high blood pressure (BP) (9, 10). Generally, it is

asymptomatic and the primary presentation can be seen with a devastating event like stroke or heart disease (11). It is estimated that 45% of deaths with heart disease, and 51% of deaths with stroke are related to hypertension (12). This is the reason that it is referred to as the “silent killer” (11).

Worldwide, the textile industry has more than 60 million employees(13) who are involved in the production of fibers, yarns, fabrics, clothing and textile products for domestic and decoration, along with the technical and industrial purposes (14). Moreover, the textile industry involves a cluster of related industries that utilizes a range of natural fibers (cotton, wool, silk, etc.) and/or synthetic fibers to generate fabric(15) which eventually produces varying amounts of dust (16). Workers are exposed to various hazards in textile industry that might result in different ailments(17, 18). Studies reveal high level of oxidative stress in cotton textile workers (19)leading to the development of essential hypertension (20, 21). A study conducted in Kannur district in India found out that the prevalence of hypertension was 22.3% among cotton textile workers which was equivalent to the prevalence of general population (22). Furthermore, increasing age, alcohol consumption, family history of hypertension, BMI >25 kg/m² and high waist-hip ratio were identified as a strong factor of hypertension among cotton workers(22). Similarly, a study conducted in Dhaka, Bangladesh notified that both general and central obesity were found to be significantly associated with hypertension (23). Additionally, factors such as work-related stress, noise pollution, lack of earplug usage, tobacco smoking, and long duration of employment contributes towards the development of hypertension among the cotton textile workers. (22, 24-27). While, stress in job also have a negative impact on worker’s cardiovascular health which in turn will affect their job performance (28). However, the association between cotton dust and increased blood pressure may not be strong, as confounding factors and bias impact could not be excluded (18, 29)

Chronic diseases make workers less productive, more prone to injury that leads to significant suffering and, add huge financial and service challenges on health care systems (23, 30-32). Furthermore, it is witnessed that collective monetary losses related with the hypertension, & diabetes mellitus (DM), in low and middle-income countries are estimated to be over \$7 trillion during the years 2011–2025 that move millions of individuals below the poverty line (33). Hypertension accounts for the global burden of cardiovascular disease which evidently have huge impact on individuals, organizations and country in terms of economy (11). Therefore, early detection of hypertension by identifying its risk factors is essential among high risk population particularly in LMIC. Therefore, this systematic review aims to highlight potential risk of hypertension among cotton textile workers. Additionally, the review will also notify the magnitude of hypertension in this occupational group.

Methods

The protocol for the systematic review is registered in the International Prospective Register for Systematic Reviews (PROSPERO) [167175]. The protocol has been designed and reported based on the guidelines Preferred Reporting Items for Systematic Reviews and Meta-analyses Protocols (PRISMA-P) checklist (34). (Figure. 1).

Exclusion and inclusion criteria:

All observational studies (cross-sectional, case-control or follow-up studies) published between 1 January, 2000 to 31 December, 2019 which reported a prevalence or incidence along with risk factors of hypertension will be included as the numbers of individual affected by hypertension is expected to increase in all areas of the world from 2000 to 2025 (35). Moreover, the recent data also suggests that prevalence of HTN has also risen in LMICs in the previous two decades (36). All adults cotton textile workers (≥ 18 years) in LMICs will be included. Original articles, conference proceedings or abstracts reporting the outcome of interest will also eligible for inclusion. Articles will be excluded if the adult workers are from other than cotton textile industry. Non-English articles will not be included as the authors are not proficient in other languages. Moreover, commentaries, editorials, symposium proceedings, and systematic reviews will also be excluded.

The inclusion and exclusion criterion is shown in Table 1.

Information sources and search strategy

We will carry out the systematic literature search on the major electronic databases including PubMed, CINAHL Plus, Science Direct, and Cochrane because they are usually considered as good databases for systematic reviews. Furthermore, gray literature (non-published, non-reviewed papers internal, or online repositories) will also be searched. In addition, the bibliography of the included records will be assessed to identify relevant studies. Besides, cross-referencing of identified systematic review will also be performed to include pertinent studies. Two researchers will independently search the data bases (NA, AF).

The search term will be group into following categories of interest: population (cotton textile, workers, factory workers, and cotton workers), exposure (risk-factors, factors, predictors, prevalence, prevalence and factors) outcome (hypertension, blood pressure, systolic blood pressure, diastolic blood pressure, hypertension, high blood pressure and HTN), and settings (LMICs). Additionally, indexed keywords in the Medical Subject Headings (MeSH) will be used in order to ensure uniform search terms. The search strategy will be piloted to ensure sufficient specificity and sensitivity. The preliminary search strategy is illustrated in Table 2. We will limit the search findings to human studies conducted in the adult cotton workers.

Study selection

Citation management system (Endnote software) will be used to manage the search results from the different databases(37). Firstly, the titles will be screened based on eligibility criteria using Endnote software. Secondly, the abstract will be screened within the short-listed studies guided by the inclusion and exclusion criteria. Lastly, the full text of potentially analyzed studies will be retrieved. For the reliability of selected studies among the two reviewers, a pre-defined screening tool will be prepared and pilot testing will be done as per the inclusion criteria. Two reviewers (NA & AF) will describe outcome

measures subsequently after reviewing the studies to confirm the relevance of the included articles. All studies will be given as a unique study ID to identify the data for this review. Each reviewer will give strong justification for excluding studies. Any disagreements between the two reviewers will be resolved through discussion or in consultation with a third reviewer (SF). We will contact the primary author of the study through email in case of any incomplete or missing information. The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) flow diagram will be used to report the study selection process as given in figure 1.

Data collection process

Data will be extracted onto a customized sheet in Excel that will be pilot tested prior to initiating the data extraction process. This sheet will be completed by two independent reviewers (NA, AF) for the eligible studies. Data extraction tables filled by two reviewers will be compared to confirm that all main findings are included. During the data extraction process a third assessor (SF) will be involved if any discordant data is witnessed. The primary data extraction table is shown in Table 3. Besides, existing studies on this research domain have been revised to assess items in the extraction form. The form included the primary author, year of publication, study setting, country of study, objective, study design, study population, male proportion, average age, BP measurement method, BP measurement apparatus, prevalence of hypertension, average BP risk-factors of hypertension co-morbidities, study limitations, included/excluded, and reason for exclusion, quality appraisal of included studies and reviewer name,.

Evaluation of study quality

The quality of the included studies will be evaluated by standardized quality assessment tool which will be conducted by two authors (NA, AF). Mixed Methods Appraisal Tool (MMAT) tool will be used to evaluate the methodological quality of all non-randomized studies(38). This tool is used to assess several aspects like selection of study participant, study tool, exposure period, missing data, measurement in outcomes, and selection of the reported result. Two reviewer (NA, AF) will rate each study as critical, serious, moderate, or low risk of bias via judgment of the gathered information. If there is limited information then the risk of bias will be categorized as “no information” or the reviewer will contact corresponding study authors for complete information.

Synthesis of included studies

Firstly, we will note down the main characteristics of studies that includes study authors, publication year, study aim, study methods, sampling strategy, characteristics of study participants and study outcomes. Both reviewers (NA, AF) will read each included study several times to extract data. We will present dichotomous outcomes as relative risks, odds ratio and prevalence ratios and continuous outcomes as mean differences (MD) with SD. We will use the standardized mean difference if the continuous outcomes have been reported in diverse ways across studies. The reviewers will report the prevalence of blood pressure across different studies along with variation in the distribution of risk factors for hypertension. We will conduct a meta-analysis if the included studies are sufficiently homogenous.

Random or Fixed effect will be yield on the insights to the data that is about the nature of the variation of included studies to account for the heterogeneity. We will also conduct a sub-group analysis under different categories including age, gender, years of service, and textile department. If the characteristics of included studies are excessively heterogeneous, we will not pool results, but we will present a narrative synthesis of the results.

Discussion

This review will highlight the proportion of hypertension along with its risk factor among cotton textile workers in LMICs. Given that, some of the modifiable factors may be prevented in this high risk population, we will call on health experts including policy makers, stake holders, cardiovascular epidemiologist and occupational health and safety specialists to prioritize policies and commission and conduct screening and awareness programs to improve worker's health. Besides, this review will highlight an urgent need for further research on hypertension in cotton textile workers that fill in some of the data gaps such as the trends and determinants of hypertension. The review findings will be made publicly available. The results of the review will be disseminated through peer-reviewed publications and presenting at professional conferences either in the form of oral or poster presentations.

Abbreviations

HTN: Hypertension; DALYS: disability adjusted life years; CVD: cardiovascular disease; LMICs: Lower-Middle-Income Countries; DM: Diabetes Mellitus; PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-analyses

Declarations

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

Availability of data and materials

Not applicable

Competing interests

The authors declare that they have no competing interests.

Funding

Not applicable

Authors' contributions

NA has conceived and designed the study. NA has drafted the manuscript and is the guarantor of the systematic review. AF & NA has developed the search strategy and methods of the systematic review. AF & NA has extensively review the manuscript and incorporated intellectual inputs. All authors have read, and approved the final version of the manuscript.

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Tables

Table 1 Eligibility criteria

Contribute	Inclusion Criteria	Exclusion Criteria
Population	Studies involving adult cotton textile workers of both genders	Studies involving target groups of adult workers working in another factory mill (oil mill, steel mill and coal mill)
Type of studies	Observational studies (survey, descriptive, cross-sectional cohort and case control study and brief communication studies having full-text article)	RCT and quasi-experimental study, Qualitative formative studies, systematic reviews case studies, protocols, commentaries, editorials, unpublished articles, symposium proceedings, conference abstracts and irretrievable documents
Outcome	Studies demonstrating outcomes related to prevalence, incidence along with risk factor of hypertension	Studies demonstrating outcomes in workers having different comorbidity
Setting	Studies conducted in LMICs	Studies conducted elsewhere
Language	Studies available in the English Language	Studies in other languages
Time period	Studies published between the period of 1 January, 2000 to 31 December, 2019	Studies published out of the period of 2000 to 2019
Sources	Systematic literature search on the major electronic databases including PubMed, CINAHL Plus, Science Direct, and Cochrane	Systematic literature search other than these electronic databases including PubMed, CINAHL Plus, Science Direct, and Cochrane

Table 2: Search strategy

Population	('textile* [Mesh] OR 'workers*' OR 'factory worker*' OR 'mill worker'* OR 'male worker*'OR ' cotton worker*' [Mesh]) AND
Exposure	('Risk-factors' OR 'factors' OR 'predictors' OR 'prevalence' OR 'incidence' 'risks', 'prevalence and factors') AND
Outcome	Outcome ('hypertension' OR 'blood pressure' OR 'systolic blood pressure' OR 'diastolic blood pressure' OR hypertension* OR high blood pressure OR HTN) AND
Setting	Studies conducted in LMIC
Filters	Publication date from 1 January, 2000 to 31 December, 2019; Humans

Table 3 Data Extraction Table

Characteristics	Study 1	Study 2	Study 3	Study 4	Study 5	Study 6	Study 7	Study 8
Study Author & Year								
Setting & Country								
Study Aim								
Study Design								
Study Population								
Male proportion								
Average age								
Average BP								
BP Measurement Methods								
BP Measurement Apparatus								
Prevalence								
Risk-Factors								
Co-Morbidities								

Figures

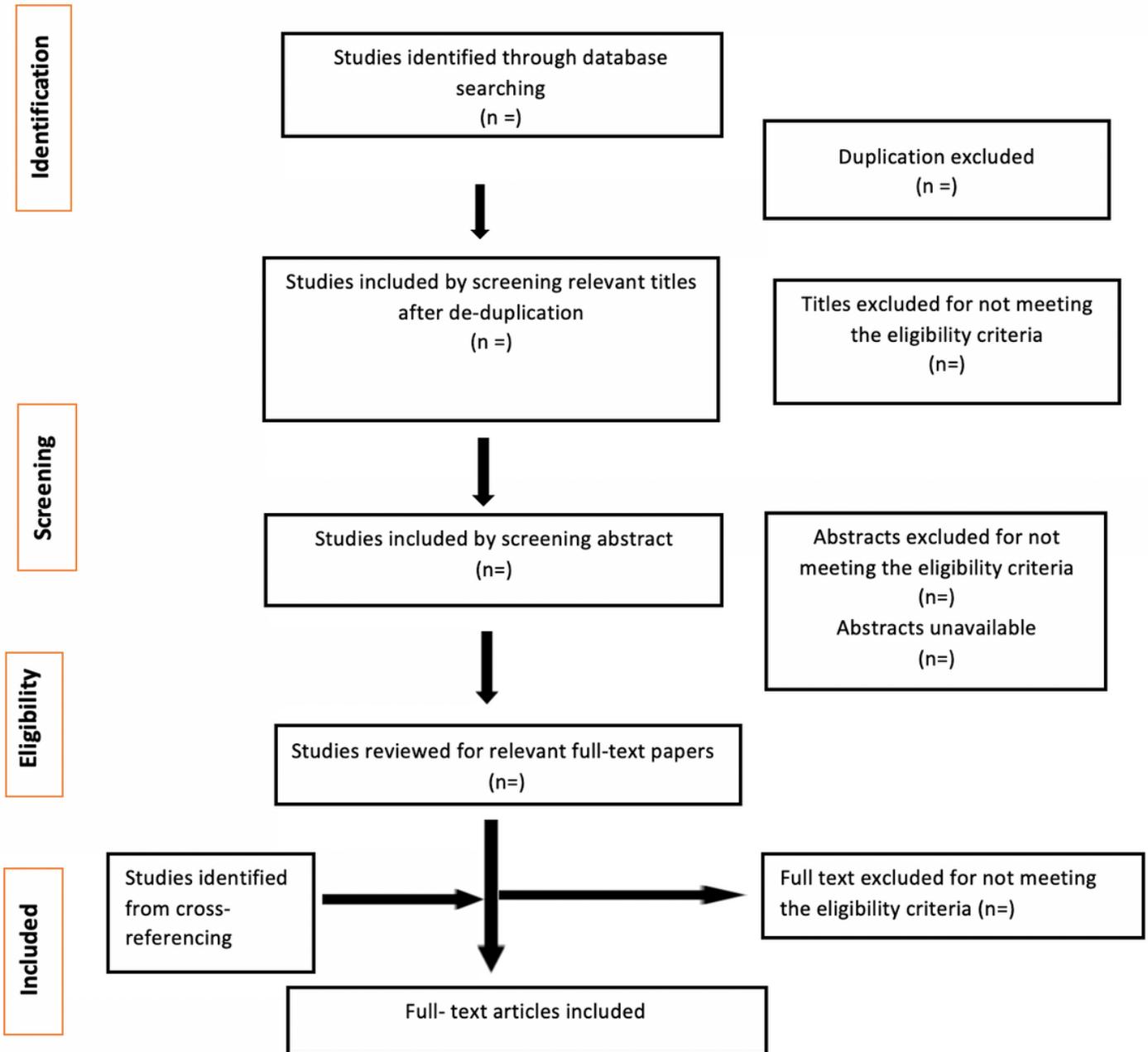


Figure 1

PRISMA Flow Diagram for Database Search of Studies