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Physical activity and sedentary behaviour research in Ghana: A systematic review protocol

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ABSTRACT

Introduction: Mortality caused by preventable non-communicable diseases such as diabetes, cancer, stroke and cardiovascular disease is on the increase. In 2016, noncommunicable diseases (NCDs) caused 41 million of the world's 57 million deaths. Two modifiable behavioural health risk factors namely physical inactivity and sedentary behaviour are associated with many of these NCDs. In Ghana, several studies have reported the prevalence of physical activity and/or sedentary behaviours. However, to date no systematic review has synthesised the findings from these studies. The aim of this systematic review is to synthesise studies that reported the prevalence of physical activity and/or sedentary behaviours in Ghana.
Methods: The Preferred Reporting Items for Systematic review and Meta-Analysis Protocols (PRISMA-P) guideline will be followed to conduct and report the outcomes of this systematic review. EMBASE, MEDLINE (OVID), PsycINFO, PsychARTICLES, CINAHL and SCOPUS are electronic databases that will be searched to identify eligible studies. Only quantitative studies that reported the prevalence of physical activity and/or sedentary behaviours using cross-sectional design, observational cohort design and case-control design will be included. Two members of the review team will independently screen the articles to determine eligibility, ascertain the quality of eligible studies, and extract data. Any discrepancy that arise at any stage of the review will be resolved through discussion between the two. The outcome of the review will be reported as a narrative synthesis if there is no homogeneity across studies and a meta-analyses will be conducted if there sufficient homogeneity across studies.
Discussion: This systematic review will synthesise the available literature on prevalence of physical activity and/or sedentary behaviours in Ghana. It is expected that the outcome of this systematic review will provide an understanding of the trend of these two health risk factors among Ghanaians.
Systematic review registration: PROSPERO CRD42019119574

Introduction

Non-communicable diseases (NCDs) such as cardiovascular diseases (CVDs), diabetes, chronic obstructive pulmonary diseases (COPDs) and cancers are on the increase and are responsible for the majority of deaths worldwide [1]. In 2016 alone, 41 million of the world's 57 million deaths were attributed to NCDs [2]. In low and middle-income countries (LMICs), the burden of NCDs is high with 78% of the world's NCD deaths occurring in these areas [2]. In a middle income country like Ghana, 94,400 (43%) of the total deaths in 2016 were as a result of NCDs [2]. It is estimated that about 80% of the global burden of diseases will be caused by NCDs by the year 2020, with 7 out of these 10 deaths occurring in developing countries [3].

Physical inactivity and sedentary behaviour are two modifiable behavioural health risk factors associated with the development of NCDs and mortality [4,5]. For instance, physical inactivity has been identified as the fourth leading risk factor for global mortality and the main cause for approximately 21–25% of breast and colon cancers, 27% of diabetes

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cases and around 30% of ischemic heart disease cases [6]. Sedentary behaviour is any waking behaviour in which energy expenditure is ≤1.5 metabolic equivalent (METS) while in a sitting or reclining posture [7]. Sedentary behaviour has also been associated with many NCDs such as cardiovascular disease [8–10].

Globally, insufficient physical activity and sedentary behaviour in both adults and children have increased as people have become less conscious of maintaining a healthy lifestyle [11]. For example, globally in 2016, 28% of all adults aged 18 years and above were not meeting the World Health Organisation (WHO) recommended 150 min of moderate-intensity physical activity per week or 75 min of vigorous-intensity aerobic physical activity per week [2]. While many factors may have caused this growth in physical inactivity and sedentary behaviour, two cultural shifts, namely globalization and urbanization, which come with drastic changes in lifestyle may account for this increase in physical inactivity and sedentary behaviour in low and middle-income countries like Ghana [12,13].

A systematic review reporting the prevalence of physical inactivity among Ghanaians and Nigerians conducted by Abubakari and colleagues did not include any studies from Ghana in the review [14]. Another systematic review by Muthuri and colleagues reviewed the literature for trends and correlates of physical activity, sedentary behaviour and physical fitness among school-aged children in sub-Saharan Africa. However, only one study from Ghana was included [13]. Since the publication of these two reviews, many studies examining the prevalence of physical activity and/or sedentary behaviour across different population and age groups (i.e. children, adolescents and adults recruited from clinical and non-clinical population) in Ghana have been conducted; yet, there is no systematic review to the best of our knowledge that has synthesized the findings from these studies.

As asserted by Hallal and colleagues [11] in order to plan and implement effective non-communicable disease prevention programs that encourage people to become physically active, researchers and policy makers need data on the trend of physical activity and sedentary behaviour. With that in mind, an examination of the trends of physical activity and sedentary behaviour in the Ghanaian population through a systematic review is required.

The aim of this review will be to systematically identify and evaluate the evidence on physical activity and sedentary behaviour among children, adolescents and adults recruited from non-clinical or clinical populations in Ghana.

Methods

Protocol registration

The review was registered with PROSPERO (International Prospective Register of Systematic Reviews) database (registration number: CRD42019119574) on 19 February 2019. The review will be conducted and reported by following the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) 2015 guidelines [15,16].

Information sources/database searches

The following electronic databases will be searched to identify eligible studies: EMBASE (OVID interface, from 1948 onwards, MEDLINE (OVID interface, from 1948 onwards), PsycINFO, PsychARTICLES, CINAHL and SCOPUS. The reference lists of eligible articles and systematic reviews will also be checked to ensure that studies which are not captured during the search of the electronic databases are identified. Furthermore, grey literature will also be searched to identify studies that report on the prevalence of physical activity and/or sedentary behaviour in Ghana. This will be done by searching institutional repositories of universities in Ghana to identify theses and dissertations related to physical activity and/or sedentary behaviour.

Search strategy

The electronic databases (i.e. EMBASE (OVID interface, from 1948 onwards, MEDLINE (OVID interface, from 1948 onwards), PsycINFO, PsychARTICLES, CINAHL and SCOPUS) will be searched. The search will be conducted using keywords and medical subject headings (MeSH) related to physical activity and sedentary behaviour. Suitable Boolean operators (e.g. 'OR' and 'AND') will be used to combine keywords where appropriate. The search strategy will be developed by PA and reviewed by the other members of the research team before the search is conducted. PA will undertake the search in the selected databases. Table 1 below has a draft of the EMBASE (OVID) search strategy. After these keywords are finalised, they will be used in the other database searches. If any amendments are made to the search strategy below, it will be indicated in the final review, along with the reasons for changes and date when these changes were made.

Inclusion criteria

A study will be included if they meet the following criteria:

Type of data

This review will include published studies that used quantitative data. Published theses/dissertations related to physical activity and/or sedentary behaviour that reported quantitative data will also be included.

Study design

Observational studies (i.e. cross-sectional, longitudinal/cohort and case-control studies) that reported the prevalence of physical activity and/or sedentary behaviour.

Study participants and settings

Studies conducted in Ghana that recruited participants (i.e. children, adolescents or adults) from the non-clinical population or clinical population and reported the prevalence of physical activity and/or sedentary behaviour from any setting will be included.

Language

The focus of this systetmatic review is to synthesise studies that have examined the prevalence of physical activity and/or sedentary behaviour in Ghana. The official language of communication and publication of research in Ghana is English, hence only studies published in English will be included.

Search limitations

There will be no limitations with regard to the date studies were published.

Table 1
Draft EMBASE (Ovid) search strategy.

Search #	Search terms
1.	Active living.mp.
2.	Exercise/ or Exercise.mp.
3.	Physical activity.mp.
4.	Physical inactivity.mp.
5.	Leisure Activities/ or Leisure time physical activity.mp.
6.	Walking/ or Walking.mp.
7.	Sports/ or Sports.mp.
8.	Running/ or jogging/ or swimming.mp.
9.	Screen time.mp.
10.	Sedentary lifestyle/ or Sedentary.mp.
11.	Sitting.mp.
12.	Television viewing.mp.
13.	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12
14.	ghana.mp. or GHANA/
15.	13 and 14

Study focus

Studies that reported the prevalence of physical activity and/or sedentary behaviour will be included. We will use the Sedentary Behaviour Research Network (SBRN) Terminology Consensus Project agreed definitions of physical inactivity and sedentary behaviour [7].

Exclusion criteria

The following will be excluded: proceedings from conferences, non-peer reviewed papers, opinion papers, commentaries, case reports, abstracts and systematic reviews. In addition, studies will be excluded if they do not report any data on physical activity or sedentary behaviour.

Data management, screening and selection

PA will export all the search results from the databases into ENDNOTE version X8 reference manager. Duplicates will be removed and the remaining search results will be exported to Covidence for title, abstract and full-text screening. PA and FTG will screen the title and abstract of the articles to determine eligibility. After the title and abstract screening, conflicts will be resolved between PA and FTG. Where agreement is not reached, a third member of the review team will be contacted to resolve discrepancies. Full-text screening will be done independently by PA and FTG. A third person will be contacted if there is any conflict during the full-text screening to resolve the conflict. Given that this systematic review is being reported in accordance with the PRISMA flow diagram, the selection process and reasons for excluding articles that do not meet the inclusion criteria will be stated when the final review is published [16].

Characteristics of included studies

The following data will be extracted from the eligible studies. The extraction will be done independently by two reviewers (FTG and ZM) and recorded on a form that has been used in a previous review [17]. Demographic information, methodology, and prevalence of physical activity and sedentary behaviour are included in the form. Conflicts will be resolved between the two reviewers and a third person will be contacted if agreement is not reached.

Publication details

Author(s) names, year of publication, year data was collected and region where study was conducted.

Study population

Studies that recruited children, adolescents, or adults from non-clinical population or clinical population.

Study design

Observational studies (i.e.cross-sectional, longitudinal/cohort and case-control).

Other details of study methodology

Sociodemographic characteristics (e.g. sex, age, level of education, ethnicity, religion, marital status, etc.), sample size, sampling method, consent rate, inclusion/exclusion criteria.

Type of measures

Measures used to assess physical activity and/or sedentary behaviour. Measures can be self-reported measures such as validated questionnaires examining physical activity and/or sedentary behaviour or objective measures (e.g. pedometers or accelerometer) measuring physical activity level and/or sedentary behaviour.

Outcome

Prevalence of physical activity and/or sedentary behaviour. The prevalence of physical activity and/or sedentary behaviour measured with self-reported measure (e.g.validated questionnaires) and/or objective measure (e.g. pedometers or accelerometer) will be included.

Quality assessment/risk of bias

To assess the quality or risk of bias of eligible studies, the National Heart, Lung and Blood Institute (NHLBI) standardised quality assessment tool will be used [18]. The purpose of this tool is to identify potential flaws in the methodology of included studies. Sources of bias, sampling, study power and other relevant factors will be identified. The NHLBI tool has 14 items. Examples of some items on the tool are: "Was the research question or objective in this paper clearly stated?", "Were the outcome measures (dependent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?". The tool has three response options (i.e. Yes: if the study has detail(s) of what the question is asking for, No: if it does not and others which are further categorised as CD: cannot determine, ND: not applicable, and NR: not reported). For each included study, a quality judgement will be made as "good", "fair" or "poor" based on how a study compares to items on the scale. A study will be judged as "good" if it has least risk of bias and is considered valid. A study will be considered "fair" if it has some elements of bias but the biases are not sufficient enough to make the findings invalid. A study will be judged as "poor" if it has a high risk of bias and is classified as invalid. Two members (PA and CO) of the research team will independently undertake the quality assessment. Differences will be resolved between the two and if an agreement is not reached, the other members of the team will be consulted for resolution.

Data analysis and synthesis

A narrative synthesis will be conducted if there is insufficient homogeneity across studies. However, if there is sufficient homogeneity across studies, statistical meta-analysis will be conducted using STATA version 15.

The prevalence of physical activity and/or sedentary behaviour of included studies will be pooled together using the random-effects model. This model is considered appropriate for this review because we are not certain that all the variables of interest in this study will be measured in the same way and with similar values [19]. Individual studies will be weighted using the inverse probability weighting method and the population sizes of these studies will be used as weights. To generate a summary prevalence of physical activity and sedentary behaviour, the prevalence of physical activity and/or sedentary behaviour will be presented in a forest plot.

To assess for heterogeneity among studies, we will use both the χ^2 and the I^2 statistics. The I^2 score of zero will be an indication of no heterogeneity, a score of more than zero but <25% will be considered as low heterogeneity. An I^2 value >50% will be an indication of substantial heterogeneity and no meta-analysis will be conducted.

If necessary, subgroup analysis (e.g. by age-groups, sex, by study designs) will be conducted to ensure that only studies that have similar effect measures are compared. The sample size of included studies will be considered if a meta-analysis is conducted.

Where appropriate, sensitivity analysis may be conducted for risk of bias (i.e the analysis is limited to only studies with low risk of bias or measurement of outcome) to identify possible sources of heterogeneity.

The studies included in this review are observational studies (i.e. cross-sectional, cohort/longitudinal and case-control). However, we will check to see if protocol papers were published before the main studies were conducted. This will help to identify any publication bias or selective reporting by authors.

To determine the quality of evidence for all the outcomes of this review, the Grading of Recommendations Assessment, Development and

Evaluation working group methodology will be used [20,21]. Assessment of quality of evidence will be done taking into consideration risk of bias, directness of evidence, consistency of results, precision and publication bias [20,21]. Evidence will be judged as high (if confidence in the estimate of effect will not change as a result of further research), moderate (if confidence in estimate of effect is likely to change as a result of further research), low (if confidence in estimate of effect is likely to be impacted and changed as a result of further study), or very low (if we are uncertain about what will happen to the estimate of effect as a result of further research) [21].

Extracted data from eligible studies would be presented in table and narrative summaries will be done. The narrative synthesis will be done in accordance with the framework proposed by Popay et al. [22].

Amendments

Although no amendment to the methodology outlined in this protocol is anticipated, should that happen, the amendments made will be stated, the date for making the amendment will also be stated and the rationale for making the amendment(s) will be indicated. Authors will approve all amendment(s). Furthermore, amendment(s) will be made in the PROSPERO registration if any change is made in the review. Amendment(s) will be made available for readers when the systematic review is finally completed. No changes will however be incorporated into the protocol.

Discussion

The aim of this systematic review is to synthesise studies that have examined physical inactivity and/or sedentary behaviour in Ghana. To the best of our knowledge, this will be the first systematic review that has synthesized studies examining these two health risk behaviours in Ghana. Systematically reviewing the literature on the prevalence of physical activity and sedentary behaviour in Ghana will provide evidence that researchers interested in physical activity and sedentary behaviour research can reference. The outcome of this review could also lead to the development of interventions targeting physical inactivity and sedentary behaviour among Ghanaians.

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Declaration of competing interest

No competing interests.

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