Systematic Review Protocol: Evaluating the influence of contextual factors on HIV/AIDS, STIs, and risky sexual behavior in sub-Saharan Africa using multilevel models
Updated 6/18/2016

ADMINISTRATIVE INFORMATION

Title: Evaluating the influence of contextual factors on HIV/AIDS, STIs, and risky sexual behavior in sub-Saharan Africa using multilevel models: A systematic review

Identification: This report is a protocol for a systematic review.

Registration: The protocol will be registered in PROSPERO, an international database of prospectively registered systematic reviews in health and social care.¹

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Contributions: Melissa Ward-Peterson is responsible for designing the review, screening articles for full-text review and inclusion, extracting data from selected studies, summarizing results, and drafting the final manuscript. She will have full access to the data and will take responsibility for the data integrity and accuracy of the review.

Daniel Mauck, Prasad Bhoite, Maryam Shakir, and Chelsea Cosner will assist with screening articles for full-text review and inclusion, extracting data from selected studies, and contributing to the final manuscript.

Financial Support: There will be no sources of financial or other support for the review.

INTRODUCTION

Rationale:

Epidemiologists must be careful to avoid the ecological fallacy, or a “false inference of the association of individual-level variables on the basis of the observed association of the parallel
ecological variables” in their analyses of health outcomes. However, the converse “atomistic fallacy,” or lack of focus on the context of health outcomes, must also be avoided. Multilevel models (MLMs) allow researchers to account for both ecological, or contextual, and individual-level, or compositional, variables. Relatively recent advances in quantitative statistical methods have increased the focus within epidemiology on the use of MLMs to examine the contextual factors, such as community or household variables, that may be part of the causal pathway for various health outcomes. MLMs are particularly useful for interpretations related to clustered data, causal processes that occur at multiple levels, and variation and heterogeneity--inferences that are often incorrectly made through the use single-level modelling.

The utility of MLMs has not been fully explored in developing nations. Montgomery and Hewett examined Demographic and Health Survey (DHS) data and found that poor communities in developing countries are not homogenous, noting the need for future research related to contextual factors in these settings. MLMs may be particularly useful for exploring how contextual factors might influence HIV/AIDS, sexually transmitted infections (STIs), and risky sexual behaviors at the individual level. However, a scoping search conducted by the authors shows that, to date, no systematic review has been undertaken to describe the existing literature and evidence base among sub-Saharan Africa (SSA).

**Objectives:**

The objective of this systematic review is to describe the use of multilevel models to evaluate the influence of contextual factors on HIV/AIDS, STIs, and risky sexual behavior determine in SSA. HIV/AIDS, STIs, and risky sexual behavior will be included as health topics because the scoping search conducted by the authors returned very few relevant articles.

The questions to be answered by the review include:

1. To what extent are MLMs being used to evaluate the impact of interventions related to contextual factors on HIV/AIDS, STIs, and risky sexual behavior in SSA?
2. What do the results of MLMs indicate about the role of contextual factors in HIV/AIDS, STIs, or risky sexual behavior in SSA?
3. In what settings are MLMs being used for analysis of the influence of contextual factors on HIV/AIDS, STIs, and risky sexual behavior in SSA?
4. Among what populations are MLMs being used to analyze the influence of contextual factors on HIV/AIDS, STIs, and risky sexual behavior in SSA?
5. Which study designs utilize MLMs to analyze the influence of contextual factors on HIV/AIDS, STIs, and risky sexual behavior in SSA?
6. What are the quality of studies that utilize MLMs to analyze the influence of contextual factors on HIV/AIDS, STIs, and risky sexual behavior in SSA?
7. What are the funding sources for these studies?
METHODS

Eligibility criteria: Any study design examining the influence of contextual factors on HIV/AIDS, STIs, and risky sexual behavior and utilizing MLMs (which may also be referred to as hierarchical linear models or mixed-effects models) for analysis will be included in the review. Studies examining as outcomes public health topics related to HIV/AIDS, STIs, and risky sexual behavior, such as counseling, testing, prevention of mother-to-child transmission (PMTCT), treatment, access to antiretrovirals, and stigma, will also be eligible for inclusion. Full-text articles included in the review will be limited to those set in SSA as defined by the World Bank’s 2016 country groups. Inclusion will also be limited to peer-reviewed articles, published in English, Spanish, or French. There will be no time limit for study inclusion.

Information sources: Databases to be searched include PubMed; Embase; Cumulative Index to Nursing and Allied Health Literature (CINAHL) Plus; Scopus; Global Index Medicus, which includes Latin American and Caribbean Health Science Literature Database (LILACS), Western Pacific Region Index Medicus (WPRIM), Index Medicus for the South-East Asian Region (IMSEAR), Index Medicus for the Eastern Mediterranean Region (IMEMR), WHO Library Database (WHOLIS), and African Index Medicus (AIM); Web of Science Core Collection; EconLit; ABI/INFORM Complete; Business Source Complete; and Applied Social Sciences Index and Abstracts (ASSIA).

Search strategy:

Keywords to be included in the search are shown in the table below.

<table>
<thead>
<tr>
<th>Includes at least one of:</th>
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<tbody>
<tr>
<td>contextual* OR communit* OR neighborhood* OR neighbourhood* OR network* OR &quot;social</td>
</tr>
<tr>
<td>support&quot; OR &quot;social capital&quot; OR &quot;social determinants&quot; OR &quot;structural determinants&quot; OR</td>
</tr>
<tr>
<td>&quot;proximal determinants&quot; OR &quot;intermediate determinants&quot; OR &quot;distal determinants&quot; OR &quot;social</td>
</tr>
<tr>
<td>inequality&quot; OR &quot;social inequalities&quot; OR &quot;social inequity&quot; OR &quot;social inequities&quot; OR &quot;social</td>
</tr>
<tr>
<td>class&quot; OR &quot;social classes&quot; OR socioeconomic OR SES OR SEP OR disparit* OR catchment* OR</td>
</tr>
<tr>
<td>&quot;health service area&quot; OR &quot;health service areas&quot; OR &quot;health services area&quot; OR &quot;health</td>
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<tr>
<td>services areas&quot; OR &quot;administrative boundary&quot; OR &quot;administrative boundaries&quot; OR &quot;administrative</td>
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<tr>
<td>area&quot; OR &quot;administrative areas&quot; OR &quot;administrative unit&quot; OR &quot;administrative units&quot; OR</td>
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<tr>
<td>income OR &quot;income inequality&quot; OR &quot;income inequalities&quot; OR poverty OR education OR &quot;social</td>
</tr>
<tr>
<td>gradient&quot; OR &quot;social gradients&quot; OR &quot;social status&quot; OR deprivation</td>
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</table>

<table>
<thead>
<tr>
<th>And one of (A), (B), or (C):</th>
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</thead>
<tbody>
<tr>
<td>(A) HIV OR AIDS OR &quot;human immunodeficiency virus&quot; OR &quot;acquired immune deficiency syndrome&quot;</td>
</tr>
<tr>
<td>(B) STI OR STIs OR STD OR STDs OR &quot;sexually transmitted infection&quot; OR &quot;sexually</td>
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<tr>
<td>transmitted infections&quot; OR &quot;sexually transmitted disease&quot; OR &quot;sexually transmitted</td>
</tr>
<tr>
<td>diseases&quot; OR &quot;bacterial vaginosis&quot; OR chlamydia OR gonorrhea OR hepatitis OR herpes OR</td>
</tr>
<tr>
<td>HSV OR &quot;human papillomavirus&quot; OR HPV OR &quot;pelvic inflammatory disease&quot; OR PID OR syphilis</td>
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<tr>
<td>OR trichomoniasis OR chancroid OR &quot;lymphogranuloma venereum&quot; OR LGV OR &quot;mycoplasma</td>
</tr>
<tr>
<td>genitalium&quot; OR &quot;pubic lice&quot; OR crabs OR scabies</td>
</tr>
</tbody>
</table>
(C) (sex OR sexual* OR intercourse) AND ((unsafe OR safe OR unprotect* OR protect* OR risk* OR condom*) OR (behavior* OR behaviour*))

And includes at least one of:

- multilevel OR multi-level OR MLM OR MLMs OR hierarch* OR HLM OR HLMs OR ICC OR ICCs OR "intra-class correlation coefficient" OR "intra-class correlation coefficients" OR "intra-cluster correlation coefficient" OR "intra-cluster correlation coefficients" OR "median odds ratio" OR "median odds ratios" OR MOR OR MORs OR "mixed model" OR "mixed models" OR "mixed effect" OR "mixed effects" OR cluster* OR nested

And includes at least one of:

- Africa* OR Angola OR Benin OR Botswana OR "Burkina Faso" OR Burundi OR "Cabo Verde" OR Cameroon OR "Cape Verde" OR "Central African Republic" OR Chad OR Comoros OR Congo OR “Côte d’Ivoire” OR “Cote d’Ivoire” OR “Equatorial Guinea” OR Eritrea OR Ethiopia OR Gabon OR Gambia OR Ghana OR Guinea OR Guinea-Bissau OR “Ivory Coast” OR Kenya OR Lesotho OR Liberia OR Madagascar OR Malawi OR Mali OR Mauritania OR Mauritius OR Mozambique OR Namibia OR Niger OR Nigeria OR Rwanda OR "São Tomé and Principe" OR “Sao Tome and Principe” OR Senegal OR Seychelles OR "Sierra Leone" OR Somalia OR “South Africa” OR “South Sudan” OR Sudan OR Swaziland OR Tanzania OR Togo OR Uganda OR Zambia OR Zimbabwe

The list of STIs included in the search is defined by the CDC, and the list of countries is defined by the World Bank’s definition of sub-Saharan Africa. Database-specific subject headings (such as EMTREE and MeSH terms for Embase and PubMed, respectively) will also be included for each keyword when available. The bibliographies of studies selected for inclusion will be hand searched for additional studies that might meet eligibility criteria. Systematic reviews which include studies that might be eligible for full-text inclusion will be included in the screening process; review of the relevant studies will be conducted to determine if they are eligible for inclusion.

**Study records**

**Data management:** Covidence will be used to manage article screening and selection by the team of reviewers and to eliminate duplicates. RefWorks will be used to manage citations selected for full-text inclusion. NVivo 10 will be used to manage full-text review, and a standardized form in Microsoft Excel will be used for data extraction.

**Selection process:** Two reviewers will screen titles and abstracts for inclusion in the full-text review. Both reviewers will complete the full-text review and will independently determine if studies are eligible for inclusion in the systematic review. Any discrepancies will be resolved through discussion and consensus.

**Data collection process:** Once final selection of studies for inclusion is completed, information related to each of the data items below will be extracted and entered into an electronic database.
The Quality Assessment tool for Quantitative Studies, developed by the Effective Public Health Practice Project and recommended by the Cochrane Collaboration, will be used to evaluate study quality. Two reviewers will extract information related to each data item and evaluate the quality of the studies independently. Any discrepancies will be resolved through discussion and consensus.

Data items

Descriptive information related to the following items will be collected:

1. Study Identification
   a. Author
   b. Publication Year
   c. Journal/citation
   d. Funding source

2. Methods
   a. Study Design
   b. If RCT: Description of intervention
   c. Quality of study (evaluated using the Quality Assessment tool for Quantitative Studies)

3. Study Setting
   a. Location/Nation
   b. Setting Description (Community, Health Service Area, etc.)
   c. Health issue (HIV/AIDS, STIs, or risky sexual behavior, or related public health topic)
   d. Participant Characteristics
      i. Age
      ii. Sex
      iii. Income
      iv. Education
      v. Total number
   e. Study time period

4. Summary of Results
   a. Individual-level (included effect sizes, such as OR)
   b. Influence of contextual factors (community or health facility level, etc.; include effect sizes, such as OR)

Outcomes and prioritization: Since the main objective of this systematic review is to describe the use of multilevel models to evaluate the influence of contextual factors on HIV/AIDS, STIs, and risky sexual behavior, all outcomes included in studies meeting eligibility criteria will be documented and tabulated. No meta-analyses related to outcomes will be undertaken.
Risk of bias in individual studies: The Quality Assessment tool for Quantitative Studies, developed by the Effective Public Health Practice Project and recommended by the Cochrane Collaboration, will be used to evaluate risk of bias at the study level. Two reviewers will evaluate the quality of the studies independently. Any discrepancies will be resolved through discussion and consensus.

Data

Synthesis: After information related to each of the data items above is extracted, results will be tabulated. Since the objective of this review is descriptive, no meta-analyses related to study results will be undertaken.

Meta-bias(es): If possible from the final studies included, the presence of publication bias will be assessed using funnel plots.

Confidence in cumulative evidence: The aims of this systematic review are descriptive, and therefore no recommendations related to confidence in the cumulative evidence will be given.

References


