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Dietary mycotoxins exposure and child growth, immune system, morbidity and mortality: protocol for a systematic literature review

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Review question

Types of participants: this review will include children aged 5 years or younger.
Types of exposure: mycotoxin exposure during pregnancy, lactation and childhood. Concentrations of mycotoxin in the diet, breast milk, urine and blood will be taken into account.
This review will consider studies that include the following outcome measures:
• Child growth as measured by anthropometric measurements, such as weight for length/height, weight for age, length/height for age, mid-upper arm circumference (MUAC) and head circumference.
• Morbidity: hepatic, gastrointestinal and respiratory diseases. Marasmus, kwashiorkor and marasmic-kwashiorkor.
• Deaths occurring for children under five years of age: Perinatal mortality, neonatal mortality, infant mortality and child mortality.
• Studies on immune system of under-fives.
Setting There will be no restrictions by type of setting.

Searches

The databases to be searched will include: MEDLINE, EMBASE, Cochrane Library, CINAHL, Web of Science, PsycINFO, grey literature through Google Scholar and reference lists to the papers reviewed. Studies published in English and French will be considered for inclusion in this review. There will be no date restriction.
The full search strategy in PubMed included MeSH-terms and text words. The search strategy will be adapted as required for other electronic databases.

Types of study to be included

This review will consider both experimental and observational study designs including randomized controlled trials, non-randomized controlled trials, quasi-experimental studies, before and after studies, prospective and retrospective cohort studies, case control studies and analytical cross-sectional studies.

Condition or domain being studied

Mycotoxins, child growth, morbidity and mortality.

Participants/population

This review will include children aged 5 years or younger.

Animal studies, drug trials, diagnostic trials and case reports will be excluded from the study review. Studies only reporting qualitative results will not be retained.

Intervention(s), exposure(s)

Many important agricultural products, especially those rich in carbohydrates, are attractive colonization sites for fungi. Some toxic secondary metabolites of fungal growth are identified as mycotoxins, and may be found to contaminate agricultural products .
The contamination by mycotoxins can occur during pre-harvest at farm level, after harvest handling, storage and food processing. Among many mycotoxins, aflatoxins (AF) and fumonisins (FUM), are widespread in major cash-crops, agricultural commodities and their products in Africa. AF are highly carcinogenic, cause immune-system suppression, exert hepatocellular damage and even death in both humans and domestic animals. Furthermore, in the past, AFs exposure has caused acute outbreaks resulting in many casualties. Dietary exposure to AF in childhood occurs mainly through complementary infant foods and carryover via breast milk.

Comparator(s)/control

Not applicable

Primary outcome(s)

This review will consider studies that include the following outcome measures:
• Child growth as measured by anthropometric measurements, such as weight for length/height, weight for age, length/height for age, mid-upper arm circumference (MUAC) and head circumference.
• Morbidity: hepatic, gastrointestinal and respiratory diseases. Marasmus, kwashiorkor and marasmic-kwashiorkor.
• Deaths occurring for children under five years of age: perinatal mortality, neonatal mortality, infant mortality and child mortality.
• Studies on immune system of under-fives.

Secondary outcome(s)

Not applicable

Data extraction (selection and coding)

First, we will screen titles and abstracts retrieved through the search strategies in various electronic bibliographic databases for inclusion, then full texts will be examined in detail and screened for eligibility. We will hand search reference lists of eligible studies for additional articles. We will contact study authors and will ask them to provide additional information and further relevant references, if necessary.

KT will perform initial screening of studies by title. Next, KT, MDB and CL will assess the abstracts and the full text articles for eligibility. Every manuscript and paper will be reviewed by at least 2 reviewers at this stage. In case of disagreement, PK will be consulted for final decision.

Data will be extracted from articles using a template designed for this review. We will pilot the data collection form in a few studies and modifications will be made where necessary. The data extraction will include specific details about the author and year of publication, interventions/exposure, study population, study methods and designs, study setting, sample size, outcome measurement, outcome measurement method, biomarkers, outcomes of significance to the review question and specific objectives.

Risk of bias (quality) assessment

The methodological quality and bias of epidemiological studies will be evaluated using the Newcastle-Ottawa scale for observational studies. Each study will be judged on various items, categorized into three groups: the selection of the study groups, the comparability of the groups, the exposure and the outcome of interest for observational studies. The reviewers will make decision on the classification of risk of bias. The quality (risk of bias) for each observational study will be independently assessed by two reviewers. Discrepant scores will be resolved by discussion with a third reviewer.
To critically appraise the validity of each randomized and non-randomized trial included in this study, the Cochrane Collaboration's Risk of Bias Tool will be used.

Strategy for data synthesis

Where appropriate meta-analyses will be done to quantify the results of different studies. We will use the I^2 statistic to measure heterogeneity across studies. A random-effects meta-analysis will be used to incorporate heterogeneity among studies. In case of substantial heterogeneity subgroup analysis will be used. Separate sensitivity and/or sub-analyses will be conducted to assess heterogeneity.
We will estimate the effect of the intervention/exposure using odds ratios or risk ratio/risk difference for dichotomous data, together with their respective confidence intervals and mean difference or standardized mean difference for continuous data, together with the 95% appropriate associated confidence interval. Odds ratios will be used in cross-sectional or case-control studies. In any of the observational study designs (cohort, case control and cross-sectional studies), funnel plots will be used to assess publication bias provided that enough comparable studies are identified to conduct a meta-analysis.
Two review authors will independently assess the strength of the evidence (high, moderate, low, and very low) using the recommendations of the GRADE working group i.e. risk of bias, consistency of effect, imprecision, indirectness, and publication bias. Disagreements will be resolved through discussion with a third reviewer.
When quantitative synthesis is either not appropriate or not feasible, narrative synthesis will be performed, such as a structured summary and discussion of the studies' characteristics and findings. Further analysis will be performed depending on the type and nature of the data. We will contact investigators to obtain missing outcome data if necessary.
Results of this study will be presented according to the PRISMA Statement.

Analysis of subgroups or subsets

If the necessary data are available, in case of substantial heterogeneity, subgroup analysis will be used. Separate sensitivity and/or sub-analyses will be conducted to assess heterogeneity across methodological factors such as study design, overall study quality, length of follow-up, types of intervention/exposure, participant characteristics i.e. gender and nutritional status, geographical locations or type of variables.

Contact details for further information

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Organisational affiliation of the review

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22 November 2017

Anticipated completion date

22 July 2018

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Conflicts of interest

Language
English, French

Country
Ethiopia , Belgium

Stage of review
Review_Ongoing

Subject index terms status
Subject indexing assigned by CRD

Subject index terms
Biological Phenomena; Child; Dietary Exposure; Humans; Immune System; Mycotoxins; Physiological Phenomena

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Details of any existing review of the same topic by the same authors

Stage of review at time of this submission

Stage	Started	Completed
Preliminary searches	Yes	No
Piloting of the study selection process	No	No
Formal screening of search results against eligibility criteria	No	No
Data extraction	No	No
Risk of bias (quality) assessment	No	No
Data analysis	No	No

Versions

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