REVIEW ARTICLE

# Prevalence and Determinants of Unintended Pregnancy in Sub –Saharan Africa: A Systematic Review

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## Abstract

Over forty percent of pregnancies worldwide are unintended, with a quarter of these from Africa. There is a growing body of evidence regarding the adverse health, economic, societal, and developmental consequences of unintended pregnancies. The main aim of this systematic review is to report on the current prevalence and determinants of unintended pregnancies in sub-Saharan Africa. A literature search (in PubMed, Embase, PsycINFO and Scopus) was performed up to 29 May 2019. The Joanna Briggs Institute Reviewers' Manual guidelines to assess the quality of peer-reviewed quantitative articles were used to select articles that met our inclusion criteria. A total of 29 articles from 9 countries were included in the final review. The mean unintended pregnancy rate was 33.9%. The mean unwanted pregnancy rate was 11.2%, while the mean mistimed pregnancy rate was 22.1%. Mistimed pregnancies were more frequent across the 13 studies that classified unintended pregnancies into the unwanted and mistimed pregnancy sub-groups. Being an adolescent (19 years old or less), single, and having 5 children or more were consistent risk factors for unintended pregnancy. Awareness and use of modern contraception, level of education, socio-economic status, religion, and area of residence as independent variables were either protective or associated with an increased risk of reporting a pregnancy as being unintended. The unintended pregnancy rate in sub–Saharan Africa remains high, especially among singles, adolescents, and women with 5 or more children. There was no uniform tool used across studies to capture pregnancy intention. The studies did not capture pregnancy intention among women whose pregnancies ended up as stillbirths or abortions. More research is required to ascertain when it is best to capture pregnancy intention, and how exclusion or inclusion of pregnancies ending up as stillbirths or abortions impact reported unintended pregnancy rates. *(Afr J Reprod Health 2020; 24[2]: 187-205).*

**Keywords:** Pregnancy, motherhood, unintended, unwanted, unplanned, mistimed, Africa, prevalence, odds, risk factors

## Résumé

Plus de quarante pour cent des grossesses dans le monde ne sont pas souhaitées, dont un quart en Afrique. Il existe de plus en plus de preuves concernant les conséquences néfastes sur la santé, l'économie, la société et le développement des grossesses non désirées. Le principal objectif de cette revue systématique est de rendre compte de la prévalence et des déterminants actuels des grossesses non désirées en Afrique subsaharienne. Une recherche documentaire (dans PubMed, Embase, PsycINFO et Scopus) a été effectuée jusqu'au 29 mai 2019. Les lignes directrices du Joanna Briggs Institute Reviewers 'Manual pour évaluer la qualité des articles quantitatifs évalués par les pairs ont été utilisées pour sélectionner les articles qui répondaient à nos critères d'inclusion. Au total, 29 articles provenant de 9 pays ont été inclus dans l'examen final. Le taux moyen de grossesses non désirées était de 33,9%. Le taux moyen de grossesses non désirées était de 11,2%, tandis que le taux moyen de grossesses erronées était de 22,1%. Les grossesses erronées étaient plus fréquentes dans les 13 études qui classaient les grossesses non désirées dans les sous-groupes de grossesses non désirées et mal évaluées. Être une adolescente (19 ans ou moins), célibataire et avoir 5 enfants ou plus étaient des facteurs de risque constants de grossesse non désirée. La connaissance et l'utilisation de la contraception moderne, le niveau d'éducation, le statut socio-économique, la religion et le lieu de résidence en tant que variables indépendantes étaient soit protecteurs, soit associés à un risque accru de déclarer une grossesse non désirée. Le taux de grossesses non désirées en Afrique subsaharienne reste élevé, en particulier chez les célibataires, les adolescentes et les femmes de 5 enfants ou plus. Aucun outil uniforme n'a été utilisé dans toutes les études pour saisir l'intention de grossesse. Les études n'ont pas saisi l'intention de grossesse chez les femmes dont les grossesses se sont terminées par des mortinaissances ou des avortements. Des recherches supplémentaires sont nécessaires pour déterminer quand il est préférable de saisir l'intention de la grossesse, et comment

l'exclusion ou l'inclusion des grossesses se terminant par des mortinaissances ou des avortements a un impact sur les taux de grossesses non désirées signalés. *(Afr J Reprod Health 2020; 24[2]: 187-205).*

# Introduction

Worldwide, 44% of the pregnancies that occurred between 2010 and 2014 were unintended[1], with a quarter in Africa. Unintended pregnancies consist of those occurring two or more years sooner than desired ("mistimed") and those that were not wanted at all by the mother ("unwanted"). Despite the gradual decrease in unintended pregnancy rates in Africa lately, high unintended pregnancy rates still constitute an important reproductive health challenge[1] There is a growing body of evidence regarding the adverse health, economic, societal, and developmental consequences of unintended pregnancies[2-6] The children resulting from unintended pregnancies have a greater tendency to die earlier, receive inadequate parental care and sub–optimal breast feeding, and experience lower educational attainment[4-6].

In the period 2010 - 2014, 56% of unintended pregnancies worldwide ended in abortions[3] .In Africa, 13% of pregnancies end in abortions, 97% of them classified as unsafe[7,8]. About 4.7% – 13.2% of maternal deaths are attributed to unsafe abortions, and these are recorded mainly in Africa and Asia[9]. In 2012 alone, about 7 million women were treated for abortion-related complications[10]. With many unintended pregnancies ending up as unsafe abortions in this region of the world[7,8], this imposes an extra budget burden on already economically disadvantaged health care systems in Africa. Post-abortion care packages do consume a considerable share of state budgets[11-14]. Reducing the prevalence of unintended pregnancies could contribute to reduce health care costs[15], reduce abortion-related deaths, and improve maternal and child health outcomes.

Starting life disadvantaged (as is the case for children from unintended pregnancies) could be a key obstacle to attaining the sustainable development goals 4 and 8 regarding education and economic growth, respectively[16]. Unintended pregnancies are more frequent in adolescents than adults. For instance, over 50% of pregnancies among adolescents are generally considered unintended, with half of them ending up being aborted[17,18]. Adolescents also face more adverse birth- and abortion-related complications compared to adults[19,20]. Optimal contraceptive uptake and use alone have the capacity to reduce the burden of unintended pregnancies and abortions by one-third[14,21]. Using modern contraception correctly for a year will cost 3–12% of the post-abortion care costs for a patient[14]. Many interventions have been implemented in low- and middle-income countries with the aim to reduce unintended pregnancy rates. However, the outcomes from such interventions have proven to be sub–optimal, with persistently high unintended pregnancy rates[1]. This is the first systematic review of empirical researches that reports on the prevalence and determinants of unintended pregnancies in Sub–Saharan Africa. The factors that predispose women to have unintended pregnancies need proper identification to provide well-guided interventions.

# Methods

## *Search strategy*

A review protocol was developed based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement. A comprehensive search was performed in the bibliographic databases PubMed, Embase.com, Ebsco/PsycINFO, and Scopus in collaboration with a medical librarian. Databases were searched from inception up to 29 May 2019. The following terms were used (including synonyms and closely related words) as index terms or free-text words: "Africa South of the Sahara", "Unwanted Pregnancy", "Unplanned Pregnancy". The search was performed without date, language, or publication status restriction. Duplicate articles were excluded.

The full search strategies for all databases can be found in the Supplementary Information (See supplementary file 1). Two reviewers

assessed the papers and discussed any disagreements until they reached a consensus. A multi-step process for the selection and inclusion of studies is presented in Figure 1.

### Selection criteria

1.  Articles in peer-reviewed journals published between 2000 and 2019 from Sub–Saharan African countries
2.  Quantitative or mixed-method studies
3.  Articles published in English
4.  Studies which aimed to report the prevalence and determining factors associated with unintended pregnancies
5.  Studies carried out on mistimed pregnancies, unwanted pregnancies or both (unintended pregnancy)

### Quality assessment criteria

The Joanna Briggs Institute Reviewers' Manual guidelines to assess the quality of peer-reviewed quantitative articles were used[22].
In addition, two reviewers assessed:
-   Clear reporting of the study's aims and objectives
-   Adequate description of the context in which the research was carried out
-   Adequate description of the sample and the methods by which the sample was identified and recruited
-   Adequate description of the methods used to collect the data
-   Adequate description of the methods used to analyze the data

Figure 1 summarizes the process for study selection and inclusion.

### Data extraction and analysis

Data from each included study was summarized in a standardized form. The extracted data included: Author(s), country where the study was conducted, sample size, age range of study participants, study design and setting, prevalence of unintended, mistimed, and unwanted pregnancies, and determinants of unintended pregnancies. After carefully reading all retained

articles, key emerging themes and other findings of interest were extracted. Due to the heterogeneity, great variation in study designs adopted in retained primary studies (hospital-based cross-sectional studies, community surveys with or without the use of demographic health survey data), differences in operational questions to capture pregnancy intention (see Table 3), as well as variation in the researched populations (adolescents, elderly women, pregnant women, non-pregnant women, and sex workers), we opted for a descriptive and narrative synthesis approach.

## Results

After the literature search, 129 articles were considered to be eligible. After consensus meetings, 29 articles that met our inclusion and quality criteria were included. Ten of them were cross-sectional studies carried out among currently pregnant women in health facilities[23-25,35,40,41,43,46,47,51], 2 randomized, controlled, community-based cross-sectional studies among adolescents and sex workers, respectively[26, 33], 2 cross-sectional studies among female sex workers[27,28], 5 retrospective analyses of demographic health surveys[29-31,39,48], and 10 community-based cross-sectional surveys[32,34,36-38,42,44,45,49,50]. All of the retained studies collected data using questionnaires. None of them captured pregnancy intention for pregnancies that ended up as stillbirths or abortions. They were from nine countries: Senegal (01), Tanzania (02), Ghana (01), Kenya (05), Ethiopia (11), Nigeria (04), Democratic Republic of Congo (01), South Africa (01), Zambia (01) and Malawi (02).

The ages of the participants ranged from 10 – 49 years. The prevalence of unintended pregnancies ranged from 7.5% in Nigeria[29] to 91.2% among female sex workers in Kenya[27]. The mean unintended pregnancy rate was 33.9%. The mean unwanted pregnancy rate was 11.2%, and the mean mistimed pregnancy rate stood at 22.1%.

Less than half of the studies (13) classified unintended pregnancies into mistimed and unwanted categories[23–25,30,31,35,38,39,41,45,46,49,51]. The prevalence of mistimed pregnancy was greater than that of unwanted pregnancies in all studies
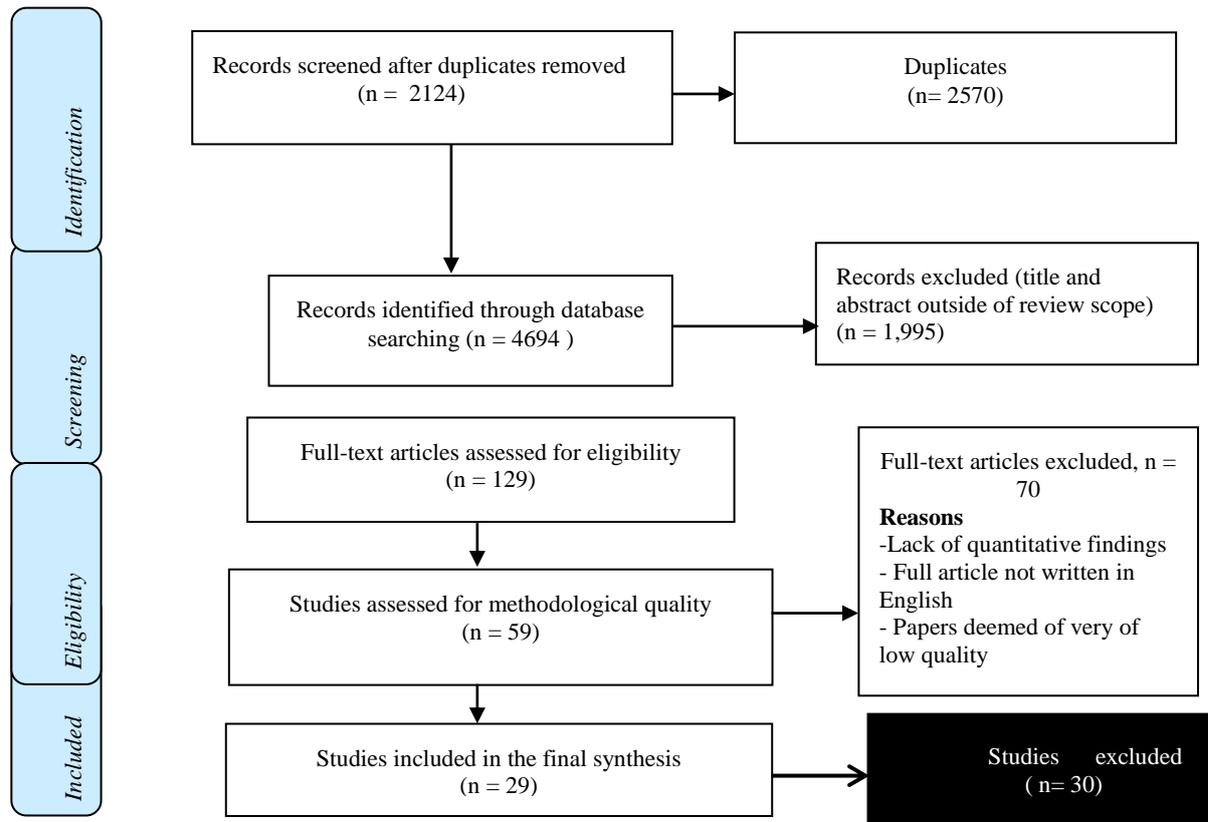
**Figure 1:** Multi-step process for study selection and inclusion

**Table 1:** Pregnancy intention assessment

| Reference – Author | Country | Age (years) | Study setting and target population | Pregnancy intention assessment |
|---|---|---|---|---|
| Agida *et al*; 2016 (23) | Nigeria | 19- 45 | Women attending the antenatal clinic | Pregnancy desired later or pregnancy not desired at all. |
| Mohammed *et al*; 2016 (24) | Ethiopia | 18 -35 | Antenatal care attendees | whether she wanted to delay the pregnancy for some time (mistimed), and whether she didn't want the pregnancy at all (unwanted) |
| Eliason *et al;* 2014 (25) | Ghana | 15 – 40 | Pregnant women attending four rural health facilities | …"respondents' reproductive history including status of current pregnancy (whether wanted, unwanted or mistimed)" was evaluated. |
| Chanda *et al*; 2017 (26) | Zambia | ≥18 | Cluster randomized trial investigating the effect of HIV self-testing provision among HIV testing outcomes among female sex workers in Zambian transit towns. | "We asked women who reported a history of pregnancy if they had ever been pregnant when they did not want to be." |
| Luchters *et al*; 2016 (27) | Kenya | ≥ 16 | Female Sex Workers in Mombassa, Kenya. | " Unintended pregnancy was defined as any positive pregnancy test among women who reported no intention to become pregnant in that period" |
| Weldegebreal *et al*; 2015 (28) | Ethiopia | 15 - <49 | Female Sex workers. Community-based cross-sectional study | "Unintended pregnancy is defined as a pregnancy that is either unplanned or unwanted or both at the time of |

| | | | | conception for the last 2 years". |
|---|---|---|---|---|
| Izugbara; 2015 (29) | Nigeria | 15-19 | 2008 Nigeria Demographic and Health Survey (NDHS) data. 6591 unmarried | "Unintended or unplanned pregnancy refers to the sum of mistimed and unwanted pregnancies". No specific definition |
| Tebekaw *et al*; 2014 (30) | Ethiopia | 15 - 49 | Ethiopia Demographic and Health Survey (2011). | Only last born children in the five years preceding the survey were concerned. They asked if the pregnancy or last childbirth occurred at a time when the woman would have wanted it, later or if she did not want it at all. |
| Beguy *et al*; 2014 (31) | Kenya | 15 - 22 | Nairobi Urban Health and Demographic Surveillance System (NUHDSS), adolescents (10 -22) living in the two slums | "At the time you became pregnant the last time, did you want to become pregnant then, did you want to wait until later, or did you not want to have any (more) children at all?"[non pregnant adolescents] and "For your current pregnancy, did you want to become pregnant, did you want to wait until later, or did you not want to have any (more) children at all?" The answers were "then", "later" and "not at all" [for pregnant adolescents]. |
| Calvert *et al*; 2013 (32) | Tanzania | 15 - 30 | Young women in 20 rural communities | Women were asked whether they had ever had a pregnancy that was unplanned. |
| Christofides *et al*; 2014(33) | South Africa | 15 - 18 | Teenage women aged 15–18 years, in a cluster randomized controlled trial of the Stepping Stones HIV prevention intervention. | 'At the time you became pregnant did you want to become pregnant then, did you want to wait until later, or did you not want to have any children at all?' |
| Dhakal *et al*; 2016 (34) | Democratic Republic of Congo | 15-49 | Baseline household survey data for the Maternal and Child Health Project of the Democratic Republic of Congo. | Currently pregnant women were asked if their pregnancy was intended or unintended. |
| Exavery *et al*; 2014 (35) | Tanzania | 15-49 | All pregnant women who were identified and were aged 15 and over. | A pregnancy was defined as "wanted" or "intended" if the respondent reported that she wanted to become pregnant at the time of conception. If the woman reported that she wanted the pregnancy but at a later time, her pregnancy was defined as "mistimed". Finally, if the woman reported that she did not want to become pregnant at all, the pregnancy was defined as "unwanted". |
| Faye *et al*; 2012 (36) | Senegal | 15-49 | Data from the baseline household survey of the Initiative Sénégalaise de Santé Urbaine (ISSU), a representative sample of 9614 women aged 15–49, who were pregnant in the last two years prior to data collection in six urban areas. | They were asked whether their last pregnancy was desired at that time, wanted later, or was not wanted at all. |
| Fotso *et al*; 2014 (37) | Kenya | 15 - 49 | Two non-slum settings and two slum settlements in Nairobi, Kenya. Women aged 15-49 included for analysis. | The actual question asked during data collection to capture pregnancy intention was not specified. |
| Getu *et al*; 2016 (38) | Ethiopia | <49 | Community-based cross-sectional study among currently pregnant women. | Participants were considered as having an unintended pregnancy if they reported their current pregnancy as either mistimed or unwanted at the time of conception. |
| Habte *et al*; 2012 (39) | Ethiopia | 20 - 34 | Third Ethiopian Demographic and Health Survey – 2011. 1267 women (15-49 years), who were pregnant at the time of data collection. | "If the pregnancy was wanted, then it was considered to be planned. It was considered to be mistimed if it was wanted but at a later time; and unwanted if it was not wanted at the time". |
| Hall *et al*; 2016 | Malawi | 15-49 | A rural district in the central region of | Pregnancy intention was measured using |

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|---|---|---|---|---|
| (40) | | | Malawi, all pregnant women aged 15years or more. | the validated Chichewa version of the London Measure of Unintended Pregnancy (LUMP[66],) |
| Hamdela *et al*; 2012 (41) | Ethiopia | 24 - 34 | A community-based cross-sectional study among pregnant married women residing in Hossana for at least six months prior to the survey. | Questionnaire, questions on previous unintended pregnancy (exact operational questions during data collection were not defined). |
| Ikamari *et al*; 2013 (42) | Kenya | 15 - 49 | Random sample of slum and non-slum women in Nairobi. | .. "Collected information on unintended pregnancy among women, the number of times this had happened, and why the pregnancy was considered unintended". Exact operational question was not specified. |
| Lamina; 2015 (43) | Nigeria | 15-48 | Urban and rural areas of Ogun State of Nigeria. Women of reproductive age (15-49 years) | Question capturing pregnancy intention during data collection was unclear. |
| Okereke; 2010 (44) | Nigeria | 10 – 19 | In-school and out-of-school female adolescents from Owerri aged 10–19 years. | Question asked was not clearly defined. |
| Wado *et al*; 2013 (45) | Ethiopia | 15-49 | Cross-sectional community-based study in an urban setting | "At the time you became pregnant, did you want to become pregnant then, did you want to wait until later, or did you not want to have any (more) children at all?" |
| Palamuleni *et al*; 2014 (46) | Malawi | Pregnant women at the time of the survey | 2010 Malawi Demographic and Health Survey | "At any time you became pregnant, did you want to become pregnant then, did you want to wait until later, or did you not want to have any (more) children at all?" |
| Solanke *et al*; 2019 (47) | Kenya | All women of reproductive age | 2014 Kenya Demographic and Health Survey (KDHS). Women who were currently pregnant or whose last child was born within the five years preceding the survey. | The pregnancy intention of women who reported that they wanted their last child or current pregnancy were categorized as 'intended' while the pregnancy intention of those who reported that they wanted the child or pregnancy later and those who did not want the child or current pregnancy were categorized as 'unintended'. |
| Admasu *et al*; 2018. (48) | Ethiopia | All women of reproductive age | A community-based cross-sectional study among currently pregnant women, or women with a child less than 1 year of age. | "The woman was considered having unintended pregnancy if she reported that her recent birth or current pregnancy was mistimed or unwanted". |
| Tsegaye *et al*; 2016 (49) | Ethiopia | Currently pregnant married women | Community-based cross-sectional study | "Unintended pregnancy was defined as a pregnancy that was either unwanted or mistimed" |
| Fite *et al*; 2018 (50) | Ethiopia | Currently pregnant married women | Community-based cross-sectional study | "It was assessed through a question asking women whether their pregnancy is entirely unwanted or wanted but at a later time." |
| Kassa *et al*; 2014 (51) | Ethiopia | Currently pregnant women visiting routine antenatal care services | Hospital-based study | Pregnancy was defined as "intended" if the respondent said she wanted to be pregnant or "unintended" if she did not want to be pregnant |

**Table 2:** Prevalence of unintended pregnancy

| Reference – Author | Country | Sample size (n) | Unintended Pregnancy Rate (%) |
|---|---|---|---|
| Agida *et al*; 2016 (23) | Nigeria | 300 | 16.0 [mistimed: 11.3; unwanted: 4.7] |
| Mohammed *et al*; 2016 (24) | Ethiopia | 413 | 27.1 [mistimed: 21.9; unwanted: 5.2] |
| Eliason *et al*; 2014 (25) | Ghana | 1,914 | 70.0 [mistimed: 39; unwanted: 31.0] |
| Chanda *et al*; 2017 (26) | Zambia | 946 | 61.6 |
| Luchters *et al*; 2016 (27) | Kenya | 103 | 91.2 |
| Weldegebreal *et al*; 2015 (28) | Ethiopia | 116 (1/3 of the 346 respondents who had ever given birth in two years prior to survey) | 28.6 |
| Izugbara; 2015 (29) | Nigeria | 6591 | 7.5 |
| Tebekaw *et al*; 2014 (30) | Ethiopia | 7759 | 32.0 [mistimed: 21.0; unwanted: 11.0] |
| Beguy *et al*; 2014 (31) | Kenya | 471 | 41.0 [mistimed: 26.0; unwanted: 15.0] |
| Calvert *et al*; 2013 (32) | Tanzania | 6513 | 27.1 |
| Christofides *et al*; 2014(33) | South Africa | 164 [only 10 of these reported as intended] | Missing intention data for 22 participants |
| Dhakal *et al*; 2016 (34) | Democratic Republic of Congo | 105 | 51.4 |
| Exavery *et al*; 2014 (35) | Tanzania | 2199 | 45.9 [mistimed: 32.5; unwanted: 13.4] |
| Faye *et al*; 2012 (36) | Senegal | 5769 | 14.3 |
| Fotso *et al*; 2014 (37) | Kenya | 1259 | 24.0 |
| Getu *et al*; 2016 (38) | Ethiopia | 690 | 23.5 [mistimed: 12.9; unwanted:10.6] |
| Habte *et al*; 2012 (39) | Ethiopia | 1267 | 24.0 [mistimed: 17.1; unwanted: 6.9] |
| Hall *et al*; 2016 (40) | Malawi | 4224 | 55.6 |
| Hamdela *et al*; 2012 (41) | Ethiopia | 385 | 34.0 [mistimed: 24.4; unwanted: 9.6]. |
| Ikamari *et al*; 2013 (42) | Kenya | 1262 | 24.0 |
| Lamina; 2015 (43) | Nigeria | 2031 | 35.9 |
| Okereke; 2010 (44) | Nigeria | 540 | 31.6 |
| Wado *et al*; 2013 (45) | Ethiopia | 1370 | 35.0 [mistimed: 25.0; unwanted: 10.0] |
| Palamuleni *et al*; 2014 (46) | Malawi | 2144 | 43.0 [mistimed: 25.0; unwanted: 18.0] |
| Solanke *et al*; 2019 (47) | Kenya | 6871 | 41.9 |
| Admasu *et al*; 2018 (48) | Ethiopia | 680 | 15.8 |
| Tsegaye *et al*; 2016 (49) | Ethiopia | 619 | 13.7 [mistimed: 10.1; unwanted: 3.6]. |
| Fite *et al*; 2018 (50) | Ethiopia | 644 | 41.5 |
| Kassa *et al*; 2014 (51) | Ethiopia | 2072 | 27.9 [mistimed: 21.2; unwanted: 6.7] |

**Table 3:** Determinants of unintended pregnancy

| Reference - Author | Country | Determinants |
|---|---|---|
| Agida *et al*; 2016 (23) | Nigeria | -increasing parity<br>-age* |
| Mohammed *et al*; 2016 (24) | Ethiopia | -age*<br>-being single *<br>-parity (>3 children)*<br>- modern contraception knowledge and use<br>-belief of being infertile |
| Eliason *et al*; 2014 (25) | Ghana | -knowledge of traditional methods of contraception (rhythm and withdrawal)<br>-being single*<br>-religion<br>-increasing parity*<br>-living in same house with partner |
| Chanda *et al*; 2017 (26) | Zambia | -condom availability at the workplace<br>-history of arrest and incarceration<br>-age at sexual debut |
| Luchters *et al*; 2016 (27) | Kenya | -age*<br>-use of modern contraception methods<br>-having an emotional partner<br>-income from sex work |
| Weldegebreal *et al*; 2015 (28) | Ethiopia | -drug use<br>-previous birth<br>-previous abortion<br>-having a steady partner<br>-Failure to use a condom by partner |
| Izugbara; 2015 (29) | Nigeria | -level of education<br>-sex of household head<br>-female-headed households<br>-area of residence<br>-age * |
| Tebekaw *et al*; 2014 (30) | Ethiopia | -age*<br>-being single*<br>- parity<br>-Religion<br>-decision-making power<br>-level of education<br>-household size<br>-socio-economic status *(*wealth)<br>-modern contraceptive knowledge and  use |
| Beguy *et al*; 2014 (31) | Kenya | -age *<br>-area of residence<br>-age at sexual debut<br>-schooling status<br>-living arrangement<br>-marital status (single)* |
| Calvert *et al*; 2013 (32) | Tanzania | -level of education<br>-marital status  (single)*<br>-age*<br>-knowledge of where to get condoms<br>-younger reported age at sexual debut<br>-number of lifetime partners<br>- modern contraception use<br>- casual sex |
| Christofides *et al*; 2014(33) | South Africa | -knowledge and use of modern contraception<br>-socio-economic status<br>-perception of relationship stability/confidence in partner<br>-physical abuse |

| | | |
|---|---|---|
| Dhakal *et al*; 2016 (34) | Democratic Republic of Congo | -age at sexual debut<br>- level of education<br>- parity*<br>-age of last child<br>-socio-economic status (wealth)<br>-modern contraception knowledge and usage patterns |
| Exavery *et al*; 2014 (35) | Tanzania | -age *<br>-marital status<br>-increasing parity *<br>-inter-partner discussion<br>religion<br>-area of residence |
| Faye *et al*; 2012 (36) | Senegal | -age*<br>-increasing parity*<br>-socio-economic status<br>-marital status (single)*<br>-decision-making capacity of women (economic)<br>-modern contraception knowledge and use<br>-area of residence<br>-decision-making about income use<br>-discussion on family planning with partner |
| Fotso *et al*; 2014 (37) | Kenya | -socio-economic status<br>-marital status (single)*<br>-area of residence<br>-modern contraception awareness and use |
| Getu *et al*; 2016 (38) | Ethiopia | -marital status (single)*<br>-walking distance to nearest health facility<br>-increasing parity*<br>-partner disagreement on desired number of children |
| Habte *et al*; 2012 (39) | Ethiopia | -age *<br>-level of education<br>-knowledge of ovulation timing<br>-area of residence<br>-modern contraception knowledge and usage patterns<br>-increasing parity *<br>-two or more deliveries in past 5 years |
| Hall *et al*; 2016 (40) | Malawi | -marital status (single)*<br>-sexual abuse<br>-Increasing parity*<br>-level of education<br>-socio-economic status<br>-depression<br>-age *<br>-intimate partner violence |
| Hamdela *et al*; 2012 (41) | Ethiopia | -increasing parity*<br>-previous unintended pregnancy<br>-husband's disagreement over family size |
| Ikamari *et al*; 2013 (42) | Kenya | -marital status (single)*<br>-Increasing parity*<br>- household size<br>-age *<br>-ethnicity<br>-Occupation<br>-area of residence |
| Lamina; 2015 (43) | Nigeria | -level of education<br>-marital status (single)*<br>-socio-economic status |
| Okereke; 2010 (44) | Nigeria | -socio-economic status<br>-knowledge and use of modern contraceptives |
| Wado *et al*; 2013 (45) | Ethiopia | -quality of antenatal care |

| | | |
|---|---|---|
| | | -level of education |
| | | -area of residence |
| | | - socio-economic status (wealth) |
| | | -distance from health facility |
| Palamuleni *et al*; 2014 (46) | Malawi | -age* |
| | | -region of origin |
| | | -fertility preferences of couple |
| | | -number of children ever born |
| | | -socio-economic status |
| Solanke *et al*; 2019 (47) | Kenya | -community education |
| | | -community timing for initiation of childbearing |
| | | -community fertility norms |
| | | -community media exposure significantly influenced the likelihood of unintended pregnancies |
| | | - marital status* |
| | | - parity* |
| | | - spousal violence * |
| Admasu *et al*; 2018 (48) | Ethiopia | -marital status* |
| | | - lack of exposure to mass media |
| | | - living away from the husband |
| Tsegaye *et al*; 2016 (49) | Ethiopia | -age* |
| | | - frequency of discussion of childbearing issues with husband |
| | | -history of stillbirth |
| Fite *et al*; 2018 (50) | Ethiopia | -marital status* |
| | | -parity* |
| | | - autonomy to use contraceptive method |
| | | - history of an abortion |
| Kassa *et al*; 2014 (51) | Ethiopia | socio-economic status |
| | | distance to health facility |
| | | parity* |

*(\*): Indicates constant risk factors of unintended pregnancies across studies.*
**Age\*** = being an adolescent was a consistent risk factor to report past pregnancies of interest as unintended
**Parity\*=**an increase in parity from 3 children or more was considered across studies as a risk factor for unintended pregnancy. The risk became even stronger when the parity increased to 5 or more.
**Marital status\***= single women were at an increased risk of reporting their pregnancy as unintended across studies

that distinguished them. For all eight study sites reported by Tebekaw *et al* in Ethiopia with the mistimed–unwanted pregnancy distinction, mistimed pregnancies were more prevalent compared to unwanted pregnancies[30].

### Determinants of unintended pregnancy

Table 3 summarizes the main determinant risk factors for unintended pregnancies across the various studies included for in-depth review. Other factors showed inconsistent results across studies; being protective against unintended pregnancy, being reported as risk factors, or having no effect on unintended pregnancy risk.

### Age and age at sexual debut

Most of the adolescents aged 15–19 years were more likely to report their pregnancies as unintended[25,27,29,35,36,39,40,42,47]. In Nigeria, the odds of having an unintended pregnancy were 14 times greater among adolescents than adults[29]. Unintended pregnancy rates were highest in women older than 35 years[23,24,29-31,39, 40-42, 46,49]. In a community survey in the Democratic Republic of Congo, no association between age and odds of reporting a pregnancy as unintended was found[34]. Having debuted sexual activity before the age of 18 was associated with an increased unintended pregnancy risk in Kenya, Nigeria, and South Africa[27,31,33].

### Religion

Habte *et al* reported 14.1% of a sample of 1267 women in Ethiopia did not know upfront the number of children they will want in the future or attributed the future number of children to God's plan for their lives[39]. Unintended pregnancies were more frequent amongst Muslims compared to

Christians[25]. In contrast, Tebekaw *et al* in Ethiopia and Exavery and colleagues in Tanzania reported that Muslims had the lowest unintended pregnancy birth rates, compared to orthodox and protestant Christians[30,35]. Dhakal *et al* found no association between religion and unintended pregnancy risk [34] in the Democratic Republic of Congo.

## Marital status and parity

Living in a stable marriage was protective against unintended pregnancies[25-29,30-33,35,45]. Having more than 2 children was associated with increased odds of reporting recent pregnancies as unintended, with greatest odds reported by women with 5 children or more[23–27,30,34–36,39,45,51]. Singles, the divorced, widowed and other unstable living arrangements were all associated with increased odds of reporting a pregnancy as unintended[23–27,30,34–36,39,45]. In Ethiopia, the odds for singles reporting recent pregnancies as unintended were 5 times greater compared to married women[45].

## Level of education

There was no agreement across studies regarding the impact of the level of education on the risk of having unintended pregnancies. The outcomes ranged from reporting no association with level of education and odds of having unintended pregnancies in Nigeria, South Africa, Southern Ethiopia, and Kenya[23,33,41,42], through an increased risk of reporting the last pregnancy as unintended as the level of education increases in the Democratic Republic of Congo[34], to an increase in the level of education being protective against unintended pregnancies[29,32,45] in Nigeria, Tanzania, and South-West Ethiopia. Two other studies in Ethiopia that analyzed demographic health survey data from nationally representative samples showed discordant findings[30,39]. Tebekaw *et al*[30] analyzed the 2011 demographic health survey data for 7,759 women who had been pregnant at least once and reported an increase in the level of education to be protective against unintended pregnancies. Habte *et al* analyzing the same data set with 1267 pregnant women found no association between the level of education and unintended pregnancy risk[39]. Beguy *et al* found

that staying in school was protective against having an unintended pregnancy, with a 10% decrease in the risk of having an unintended pregnancy in the urban slums of Nairobi[31].

## Socio-economic status and unintended pregnancy risk

The impact of socio-economic status on unintended pregnancy risk was not uniform across the studies. Most studies reported a protective role of having a higher socio-economic status on the odds of having an unintended pregnancy[30,33,36,42,45–47]. In the Democratic Republic of Congo and parts of Kenya (comparing slum and non–slum urban settings of Nairobi), there was no association between socio-economic status and odds of experiencing an unintended pregnancy[34,37].

## Unintended pregnancy, awareness and use of modern contraception

Awareness of at least one method of modern contraception was as high as 95.9% among pregnant women seen for antenatal care in a reference hospital in Eastern Ethiopia[24]. Three Ethiopian studies reported awareness levels of 91.0%, 93.3%, and 93.5%[28,39,41]. The history of ever using a contraceptive method was high (96%) among female sex workers in Kenya[27], but only 7% of them reported ever having used Long Acting Reversible Contraceptives (LARC). However, these high awareness levels were not accompanied by consistent modern contraceptive use by these women. Over half (50.5%) of the women surveyed in the Democratic Republic of Congo did not use any family planning method[34]. In Ethiopia, of the 93.3% of the population who were aware of a modern contraception method, only one-third had experience with using any of the methods[39,41]. Most women who reported using contraceptives used mainly condoms, with usage rates exceeding 96.0% in Kenya and Tanzania[27,32]. Non-use of antenatal care services was associated with increased odds of reporting the pregnancy as unintended in Ethiopia[24]. Condom use was not found to be protective against unintended pregnancies among young South African women[33]. Weldegebreal *et al* did not find any association in Ethiopia between knowing or using

a modern contraceptive method and having an unintended pregnancy[28]. Three studies from Ethiopia, South Africa, and Senegal reported a protective role of contraception knowledge and use against the likelihood of experiencing an unintended pregnancy[24,33,36]. Surprisingly, 5 studies found awareness and use of modern contraceptives as risk factors for experiencing unintended pregnancies[30,34,37,39,47]. Knowledge regarding emergency contraception was generally low. In Ethiopia, despite the awareness levels of the existence of modern contraception (91%), close to half (47.1%) of respondents had never heard of emergency contraception[28]. Despite high awareness rates of 86.3% in Nigeria, over 62% of them had never used any form of contraception[23].

Use of antenatal care services was associated with increased odds of having a pregnancy being reported as intended in Ethiopia[45]. However, only 17% of these women had received adequate antenatal care (more than four prenatal visits) during their previous pregnancies. The association between knowledge of modern contraception and unintended pregnancy risk is inconclusive. Weldegebreal *et al* did not find any association in Northern Ethiopia between knowledge of modern contraception and risk of having an unintended pregnancy[45]. In Eastern Ethiopia and South Africa, knowing at least one modern contraceptive method was associated with reduced odds of reporting a pregnancy as unintended [95%CI, OR 2.73: 1.15 - 6.50; 95% CI, OR 0.40: 0.21 – 0.79 respectively][24,33]. In Ethiopia, a strong association was reported between knowledge and use of modern contraception and unintended pregnancy risk [95%CI, OR1.82:1.25 - 2.65, p<001; 95%CI, OR0.64: 0.56 - 0.73, P<0.0001][30]. In Tanzania, the odds of reporting a pregnancy as unintended were higher among those who knew where to access condoms[32]. Chanda *et al* reported a rather protective role of condom availability at the workplace against unplanned pregnancies and induced abortions among female sex workers in Zambia[26].

## Previous abortions and risk of unintended pregnancy

Previous unintended pregnancy was a risk factor for subsequent unintended pregnancy amongst pregnant women 41. In Nigeria, 66.3% of unintended pregnancies ended up in abortions[44]. Two studies from Ethiopia reported that 32.4%[24] and 59.6%[28], respectively, of women with unintended pregnancies had had at least one induced abortion in the past. In Nigeria, Lamina found 33.5% of women who reported the last pregnancy as unintended had also had at least one induced abortion previously[43]. In Zambia, 47.7% of the unintended pregnancies ended up as induced abortions[26]. In the prospective study reported by Luchters *et al* in Kenya with female sex workers, 84 of the 400 (21%) respondents reported at least one induced abortion within the last 12 months[27].

## Area of residence

There was a broad variation regarding where women lived and their odds of reporting pregnancies as unintended[29,30,35,42,37,47]. In Nigeria, findings from a national demographic health survey reported most unintended pregnancies from women living in rural areas[29]. Lamina did not find any differences in the unintended pregnancy rates in urban and rural Nigeria[43]. Pregnancies were more likely to be reported as unintended in slums than in non–slum areas in Kenya[37,42]. In Ethiopia, the unintended pregnancy rate ranged from 1.5% in Afar Regional State to 39.8% in Oromiya Regional State[39].

## Other factors

Drug users were at increased risk of having an unintended pregnancy compared to non-users [OR 2.68; CI: 1.30 – 5.52] in Ethiopia[28]. This study was carried out among female sex workers only. Women and girls experiencing physical violence were at increased risk of having unintended pregnancies in South Africa[33]. Partner disagreement over limiting family size increased the odds of having a pregnancy being considered

as unintended in Northern Nigeria, Ethiopia, Tanzania, Senegal, and Malawi[23,30,35,36,40,41]. Distance from a health facility was reported as a predictor of unintended pregnancy in two studies from Ethiopia[45,51]. Religious affiliation affected unintended pregnancy rates differently across studies[25,30,34,35,39].

The constant risk factors for unintended pregnancies across studies were: being an adolescent (19 years old or less), single, or having more than 5 children. Other factors like the level of education, socio-economic status, awareness and use of modern contraception, previous abortions, area of residence, and drug use were either protective against or risk factors for unintended pregnancies in the individual studies.

# Discussion

## *Overall key findings*

The aim of this review was to provide an update on the prevalence and determinant factors of unintended pregnancies in Sub–Saharan Africa from the year 2000 to the present. Many interventions have been implemented in recent years to curb the unintended pregnancy burden. However, unintended pregnancy rates remain high on a global scale[1]. Proper appreciation of the burden and predictive factors for unintended pregnancies are needed to properly target public health interventions. The mean unintended pregnancy rate obtained from this review (33.9%) is slightly lower than the global unintended pregnancy rate of 40%[1]. The highest prevalence of 91.2% was reported among female sex workers in Kenya[27].

## *Overall observation of methodological aspects in the compared studies*

Independent variables like awareness of contraception, previous use of contraception, level of education, and socio-economic status had varying impacts on the odds of reporting previous pregnancies as unintended. The interplay of determinant factors at various levels and through different combinations in the various countries and settings could explain such a variation. Some studies investigated if pregnancies were intended

or unintended retrospectively. These different outcomes could be explained by the variety of study designs used to report the determinants of unintended pregnancies, and the variety of questions asked to capture pregnancy intention. Some were interested in pregnancies registered within the past 2 years[36] and others up to 5 years[30,37] before the survey. Though recall bias is a limitation in both groups, its effect in accurately categorizing a pregnancy as intended or not could differ, depending on the time lapse since the pregnancy of interest and the time of pregnancy intention assessment. Hospital-based studies are also more likely to obtain responses that are socially acceptable. Some women might feel uncomfortable reporting their pregnancies as unintended. It is therefore likely that the true prevalence is underreported. The prevalence estimates of unintended pregnancies could vary depending on how and when the question is asked. Table 1 summarizes the various questions asked to assess if a pregnancy was considered intended or not.

It is unclear if the women included in the various studies actually understood the difference between an unwanted pregnancy and a mistimed pregnancy. Different studies captured pregnancy intention differently. The London Measure of Unplanned Pregnancy (LMUP) is a psychometrically validated measure of the degree of intention of a current or recent pregnancy that is increasingly being tested and validated in many parts of the world[61-66]. Hall *et al* (2013) reported the validity and reliability of the LUMP in Malawi[63]. However, the studies we examined for our review did not use this tool in capturing pregnancy intention. It could be useful to test this tool in more settings to guide how best to capture pregnancy intention. Women who have already given birth at the time of data collection or interviews may be influenced by the resulting child's health—including their vital status[67]. Retrospective reporting of pregnancy desire/intention may be influenced by the experience of parenthood when pregnancy leads to the birth of a child. Joyce and colleagues have highlighted the fact that retrospective determination of pregnancy intention is likely to be influenced by the presence of the infant. The

child's smile could lead to a more positive recollection of the past[68]. It is important to know when it is best to capture pregnancy intention and if standardized tools offer consistent findings when pregnancy intention is investigated among pregnant women, and retrospectively.

The reported prevalence of mistimed pregnancies was generally greater than that of unwanted pregnancies (22.1% against 11.2%) in all studies. Tebekaw *et al* in Ethiopia reported similar results from eight study sites[30]. Pregnancy intention was captured retrospectively in most of the studies. It could be more culturally acceptable to retrospectively admit a pregnancy to have been mistimed, rather than unwanted. This can play a role in overestimating the number of mistimed pregnancies. Also, pregnancies are more likely to be reported as mistimed among younger women compared to older women[35,53,54]. With most of the respondents in most of the surveys being young women, this could partly explain why most unintended pregnancies were classified as mistimed. Ambivalence was not a consideration, nor an option in the questionnaires used in capturing pregnancy intention.

It is not always straightforward for a woman to state definitively if a pregnancy is/was intended or not[53,55]. In a study where the option "I don't know" was offered to women regarding the previous live birth, 8% of them used it[53]. Young women might tend to classify an unintended pregnancy as mistimed, which appears to be more socially appealing than reporting a previous live birth as being unwanted. In South Africa for instance, women who reported previous use of hormonal contraception were less likely to report their pregnancies as mistimed, which was not true for unwanted pregnancies[33].

Access to and attitudes towards abortion could influence the reported variation in prevalence of reported unwanted pregnancies. Most unwanted pregnancies do end up in induced abortions and are generally not taken into consideration in most pregnancy intention evaluation studies[1,8,53]. This provides a possible reason for unwanted pregnancies being underreported in our selection of papers. Therefore, it is impossible to estimate how many of the pregnancies that end up as abortions or

miscarriages are to be classified as either intended or unintended (unwanted or mistimed). Only live births were concerned in most surveys. This gap in the research literature makes it impossible to know if the characteristics of these women are similar to or different from those of women whose pregnancies end up as abortions or miscarriages.

Analyzing the same data set (The Ethiopian 2011 Demographic Health Survey), the level of education was reported to be protective against unintended pregnancy in non–pregnant women who reported pregnancy intention for past pregnancies[30], but no association was reported by Habte *et al* among pregnant women[39]. There was a significant difference in unintended pregnancies between the two areas sampled: The unintended pregnancy rate ranged from 1.5% in Afar Regional State to 39.8% in Oromiya Regional State[39]. However, given that 'religion' was not included as a determinant in this last study, and we learned from Eliason *et al*[25] that Muslims had the lowest unintended pregnancy birth rates compared to orthodox and protestant Christians, a possible explanation might be found in the predominance of Muslims in the Afar region (95% against 47% in the Oromiya region). Further research is needed in this direction, not only to ascertain when it is best to capture pregnancy intention, but also to explore predictors of unintended pregnancies.

## *Age and socioeconomic status*

Age was reported as a key determinant of unintended pregnancies in all studies, with adolescents having the highest odds[25,27,29,35,36,39,40,42,47]. Reproductive health interventions targeting the reduction of unintended pregnancies among adolescents are key to improving adolescent health, reducing abortion-related mortality and morbidity, and permitting adolescents to attain their economic potential[4,6,7,15,16]. Previous unintended pregnancies and previous abortions were reported to be risk factors for subsequent unintended pregnancies[24,27,28,43,44]. This could be an indication of inadequate sex education, contraception education, or sub–optimal post-abortion counseling among women with previous unintended pregnancies.

Socio-economic status and level of education could mediate unintended pregnancy risk through different combinations with other factors in Sub–Saharan Africa. Singles, adolescents, and women with more than 5 five children were most likely to report pregnancies as unintended[23–27,30,34–36,39,45]. The level of education was either protective, or a reported risk factor, of having an unintended pregnancy. Staying longer in school has been reported to be protective elsewhere, not only against early sexual debut, but also against unintended pregnancies among adolescents[31,48,73,74]. Age at sexual debut was generally as low as 15 years and was reported to be a key determinant of unintended pregnancies[27,28,31,33]. This finding is consistent with reports from other Sub–Saharan African countries[58-60]. In Cameroon for instance, the age of sexual debut can be as low as 10[60]. Interventions aimed at delaying sexual debut should be considered within the unintended pregnancy prevention package.

### Blind spots

Ambivalence in deciding whether a pregnancy is intended or not was not taken into consideration in most studies. Of the 174 adolescents who became pregnant in a South African cohort, 22 of them could not say whether their pregnancies were intended or not[33]. This could be a key consideration for further studies as this special population might have specific health care needs. No study took into account the intention of the male partner. It has been argued elsewhere that measures of pregnancy intention should incorporate the intentions of male partners, especially in the African context, where the partner plays an important role in the determination of the size of the family[52].

Consistent use of modern contraceptives remains key in reducing unintended pregnancies and abortion rates[48]. Despite the high reported awareness levels of the existence of modern methods of contraception, the corresponding usage rates were low[23,24,28,39,41,42]. Long Acting Reversible Contraceptives (LARC) remain the recommended first-line option for adolescents and young women[71,72], but availability and uptake rates remain worrisome. In Kenya for instance, in a high-risk population like female sex workers, only 7% of them had ever used Long Acting Reversible Contraceptives (LARC)[27]. It could be of interest to always couple LARCs to other barrier methods like condoms, especially among young sex workers. Use of a modern method of contraception was reported to be associated with increased odds of reporting a pregnancy as unintended in some studies[30,34,37,39,47]. This could be explained by the fact that most questions were retrospective, and thus subject to recall bias. Elsewhere, the authors did not investigate consistency and accuracy in contraceptive method(s) use.

### Strengths and limitations

This is the first systematic review evaluating the prevalence and determinant factors of unintended pregnancies in Sub–Saharan Africa. Other reports have synthesized findings mostly from demographic health surveys only. Our review is the first to provide a synthesis from findings from empirical research.

The non–uniformity of questions used in capturing pregnancy intention, diversity of methods (cross–sectional and retrospective, community and hospital-based studies), as well as research participants (pregnant and non-pregnant women) render comparison across studies difficult.

## Conclusion

The mean unintended pregnancy rate in Sub–Saharan Africa is 33.9%. This review identified adolescents, singles, and grand multiparous women (having five children or more) as priority groups for interventions that aim at reducing unintended pregnancy rates. The fact that mainly pregnancies that ended up in births are included in this review is a possible structural source of bias. Independent risk factors for unwanted and mistimed pregnancies could be similar, but lead in different combinations to unintended pregnancies. Very few studies evaluated the risk factors for mistimed pregnancies and unwanted pregnancies separately. Future studies should do so, to better tailor resources and actors to target these sub-types of unintended pregnancies. There is a need to develop a validated tool that could be used in

different settings and studies to better capture pregnancy intention and ascertain the true burden of unintended pregnancies.

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## Author's Contributions

LB, MZ and TB conceived the study. LB developed the study protocol and did the literature searches. LB and MZ selected the articles for in-depth review. LB did the data extraction. MZ and TB did the in-depth review of the articles and provided the required intellectual inputs. All authors read and agreed to the submission of the final version of the manuscript.

## Competing Interests

The authors declare having no conflict of interest.

## Consent for Publication

Non applicable

## Ethics Approval and Consent to Participate

Ethics approval was not needed for the systematic review.

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