

ORIGINAL

Systematic review evidence on the factors influencing teenage mothers utilization of maternal health services in Sub Saharan Africa

Revisión sistemática de los factores que influyen en la utilización de los servicios de salud materna por parte de las madres adolescentes en el África Subsahariana

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Abstract

Background: Adolescent pregnancy poses health concerns to both the mother and the fetus. Teenage girls are more likely than older women to experience preterm labor, protracted labor, and cephalic pelvic disproportion according to studies. Understanding the factors that influence adolescent mothers' use of services is essential to ensuring their involvement in maternity health care. The aim of this study was to provide sufficient evidence on the factors influencing the use of maternal health care among teenage women in Sub-Saharan Africa.

Methods: The preferred reporting item for systematic reviews and meta-analysis (PRISMA) was adopted in reporting the findings of this review. Studies reporting post-natal care services, antenatal care services, and skillful birth delivery among teenagers were included, and studies on the socioeconomic determinants, cultural factors, usage level, and social factors associated with teenage women's use of maternal health services in Sub-Saharan Africa published in English from 2000 to June 2022 were considered in the inclusion criteria. Studies focused on HIV-positive teenage mothers were excluded from the review. A literature search was conducted on PubMed, PsycINFO, Web of Science, EMBASE, CINAHL, and African Journal Online which identified 24 eligible studies. The Critical Appraisal Skill Program checklist and the International Society for Pharmacoeconomics and Outcomes Research (ISPOR) checklist were used for the quality assessment of the qualitative and quantitative studies included in this review.

Results: An array of factors is seen to influence the utilization and access to maternal health services among teenage mothers in sub-Saharan Africa. These factors range from demographic factors, cultural and economic factors, and inclusively economic-related factors. Interpersonal-level factors which influence young women's use of maternal health care were found to be peer pressure, family traditions and customs, spousal knowledge, opinions, and education, as well as the influence of other family members in this study. In addition, education level, place of residency, economic situation, and knowledge and perception of the need for maternal health care are individual factors that influence how adolescent mothers use of maternity care.

Conclusion: A significant proportion of teenage women do not have reliable access to utilization and access to maternal care throughout pregnancy. Teenage mothers in Sub-Saharan Africa have been shown to utilize and have access to maternal health care in response to a range of socioeconomic and environmental circumstances. Interventions such as educational programs through medical and allied health professionals and teenage female partners are imperative to improve their participation in the use of maternity care.

Keywords: Adolescents, Utilization, Teenage Mothers, Maternal health services, Sub Saharan Africa.

Resumen

Antecedentes: El embarazo en la adolescencia plantea problemas de salud tanto para la madre como para el feto. Según los estudios, las adolescentes tienen más probabilidades que las mujeres mayores de sufrir un parto prematuro, un parto prolongado y una desproporción cefálica-pélvica. Comprender los factores que influyen en el uso de los servicios por parte de las madres adolescentes es esencial para garantizar su participación en la atención sanitaria de la maternidad. El objetivo de este estudio era aportar pruebas suficientes sobre los factores que influyen en el uso de la atención sanitaria materna entre las mujeres adolescentes del África subsahariana.

Métodos: Se adoptó el ítem de reporte preferido para revisiones sistemáticas y meta-análisis (PRISMA) para reportar los hallazgos de esta revisión. Se incluyeron los estudios que informaban sobre los servicios de atención posnatal, los servicios de atención prenatal y el parto con habilidad entre las adolescentes, y se consideraron en los criterios de inclusión los estudios sobre los determinantes socioeconómicos, los factores culturales, el nivel de uso y los factores sociales asociados con el uso de los servicios de salud materna por parte de las mujeres adolescentes en el África subsahariana publicados en inglés desde 2000 hasta junio de 2022. Se excluyeron de la revisión los estudios centrados en madres adolescentes seropositivas. Se realizó una búsqueda bibliográfica en PubMed, PsycINFO, Web of Science, EMBASE, CINAHL y African Journal Online que identificó 24 estudios elegibles. Para la evaluación de la calidad de los estudios cualitativos y cuantitativos incluidos en esta revisión se utilizó la lista de comprobación del Critical Appraisal Skill Program y la lista de comprobación de la International Society for Pharmacoeconomics and Outcomes Research (ISPOR).

Resultados: Se observa una serie de factores que influyen en la utilización y el acceso a los servicios de salud materna entre las madres adolescentes del África subsahariana. Estos factores van desde factores demográficos, culturales y económicos, hasta factores relacionados con la economía. Los factores a nivel interpersonal que influyen en la utilización de los servicios de salud materna por parte de las jóvenes fueron la presión de los compañeros, las tradiciones y costumbres familiares, los conocimientos, las opiniones y la educación del cónyuge, así como la influencia de otros miembros de la familia en este estudio. Además, el nivel educativo, el lugar de residencia, la situación económica y el conocimiento y la percepción de la necesidad de atención sanitaria materna son factores individuales que influyen en el uso que las madres adolescentes hacen de la atención materna.

Conclusiones: Una proporción significativa de mujeres adolescentes no tiene un acceso fiable a la utilización y el acceso a la atención materna a lo largo del embarazo. Se ha demostrado que las madres adolescentes del África subsahariana utilizan y tienen acceso a la atención sanitaria materna en respuesta a una serie de circunstancias socioeconómicas y ambientales. Las intervenciones, como los programas educativos a través de los profesionales médicos y de la salud aliados y las parejas de las adolescentes, son imprescindibles para mejorar su participación en el uso de la atención materna.

Palabras clave: Adolescentes, Utilización, Madres adolescentes, Servicios de salud materna, África subsahariana.

Introduction

Background

One in five adolescent girls gives birth before the age of 18, according to a World Health Organization (WHO) survey, which estimates that 16 million females between the ages of 15 and 19 give birth each year¹. Adolescents are defined as individuals between the ages of 10 and 19 in a report by the United Nations Population Fund (UNFPA)². In the poorest regions, such as Sub-Saharan Africa and Southeast Asia, this ratio jumps to one in three females². For a variety of causes, from societal to personal ones, adolescent women are at risk for unwanted pregnancies^{3,4}.

Numerous studies have found that teen pregnancy is unhealthy for both the teen and the unborn child and these studies also show that preterm delivery, protracted labor, and cephalic pelvic disproportion are more common in adolescent girls than in older women^{5,6,7,8}. There is a 50% probability that a baby delivered to an adolescent would die before reaching their first month of life, and teenage women are more likely to have babies with low birth weights and Apgar scores, as well

as higher rates of admission to critical care units^{3,6,8,9}. In addition to the physical risks to their health outlined previously, adolescent mothers in Sub-Saharan Africa typically endure social deprivation⁶. Due to the fact that many of them are unable to finish their schooling and are thus required to raise their children alone, many of them have inadequate resources to sustain themselves and their children^{8,4}. Teenage mothers find it difficult to adjust to their new roles and deal with these concerns while simultaneously managing “adolescence” and all of its challenges^{9,13,14,15}.

According to a publication, it's important to recognize a variety of factors that can affect and improve access to and utilization of professional maternal health care, but it's also crucial to support young women in having a healthy and safe pregnancy, delivery, and infant. These factors include economic, cultural, and medical factors¹⁰. In the publication it was posited that teenagers who survive adolescent pregnancies may be more susceptible to pregnancy complications^{10,11},

pre-eclampsia, anemia, and postpartum hemorrhage [9] as a result of these circumstances and factors. Additionally, some studies have demonstrated that teenage women are more likely to have complications such as obstetric fistulas and adoption of mainstream maternal health services has significantly impacted the reduction of mortality and morbidity through the early detection of risk indicators and the management of potential issues with the maternal health care package, which includes postoperative care, skilled birth delivery care, and antenatal care^{4,7,12,11,13,14}.

Despite these benefits, teenage women still underuse maternal health interventions. Young women in Sub-Saharan Africa reportedly encounter issues including unlicensed births and inadequate antenatal care, according to one research¹⁵. Only 25% of Nigerian teenage women obtain safe birthing procedures, according to a poll¹⁶. Only one-third of teenage mothers in Sub-Saharan Africa receive postnatal care^{18,19}. Given that a number of factors influence how frequently young women in Sub-Saharan Africa use the services for maternal health, the empirical basis is tenuous. When women lack access to maternity care, negative effects on children, mothers, governments, and communities are inevitable, as outlined in the sustainable development goals²⁰. The use of maternal health services throughout the continuum of care, including antenatal, intrapartum (by trained birth attendants), and postpartum care, has been shown to depend on lowering maternal mortality and improving survival, as well as the health, quality of life, and outcomes for adolescent mothers^{19,20}. This study employed a social model to identify characteristics that influence how Sub-Saharan African teenage women use healthcare and related services, cutting through several elements including demographic, socioeconomic, and culturally connected issues to produce complete recommendations.

There have been several primary studies and systematic reviews looking at teenage use of maternity care in various parts of the world, according to a scoping search of the available data. However, although some of these studies and publications only analyzed data from a select few nations, others considered all women worldwide, in both wealthy and developing nations. The goal of this systematic review is to close this knowledge gap by providing clinicians, program designers, and policymakers with advice on how to improve young women's access to maternal health care in Sub-Saharan Africa. As a result of this review, significant evidence on the factors influencing maternal health service utilization by Sub-Saharan African teenage mothers will be provided to inform decision-making among concerned groups.

Aims and Objectives

This study seeks to offer enough information on the

factors influencing the use of maternal health care among teenage women in Sub-Saharan Africa. However, the specific goals given below will be looked at in order to achieve the overall purpose of this evaluation;

1. To analyze the use of maternal health care by teenage women in Sub-Saharan Africa.
2. To offer evidence on the socio-demographic and interpersonal variables that impact teenage women's use of maternal health services in Sub-Saharan Africa.
3. To evaluate the structural and organizational elements that affect teenage women's use of maternal health services in Sub-Saharan Africa.
4. To investigate how cultural and economic variables in Sub-Saharan Africa affect teen mothers' usage of maternal health care.

Methods

This research followed the PRISMA-P guidelines for reporting systematic reviews.

Inclusion Criteria

Inclusion criteria are the features or characteristics of potential participants that are regarded as suitable for inclusion in research. Nonetheless, the following were included in the review's inclusion criteria:

1. Studies published in the English language
2. Studies reporting post-natal care services, antenatal care services, and skillful birth delivery among teenagers
3. Studies on the socioeconomic determinants, cultural factors, usage level, and social factors associated with teenage women's use of maternal health services in Sub-Saharan Africa.
4. Quantitative, mixed methods and qualitative studies.
5. Primary studies addressing the research question of this review

Exclusion Criteria

The exclusion criteria for the review were:

1. Studies not in line with the inclusion criteria of this review
2. Studies addressing factors influencing maternal healthcare service use among HIV-positive adolescent mothers
3. Studies reporting post-natal care services, antenatal care services, and skillful birth delivery among HIV-positive teenagers
4. Studies are not published in English.
5. Studies that posit insufficiency in reporting design and methods utilized.

Database/Search Strategy

The following internet databases were explored to acquire evidence on variables impacting contemporary contraception use in Nigeria and Sub-Saharan Africa:

- MEDLINE
- SCOPUS
- Web of Science
- PUBMED
- EMBASE
- African Online Journal
- CINAHL
- Goggle Scholar

Search Strategy

The right Boolean operators were applied with the right search phrases and word variants. In order to merge similar search synonyms and words, the Boolean operator 'OR' was used inside each domain²¹. The 'AND' Boolean operator was then used to combine the domains. Depending on the database in use, medical subject headings, for example, are used in electronic search standards (MeSH or indexing words). To recover any alternate ends, the asterisk (*) was used for truncation. Wildcards such as the hash (#) and question mark (?) were also used to substitute one or more characters, depending on the database's capabilities.

Search terms utilized for the study

((Factors) OR (Enablers) OR (Barriers) OR (Determinants) OR (Causes) AND (Utiliz*) OR (Uptake) OR (Usage) OR (Use) AND ("Antenatal Care") OR ("Post-natal Care") OR ("Antenatal Servi*") OR ("Post-natal Serv*") OR ("Skill* Birth") OR ("Maternal Care") OR ("Maternal Servi*") OR ("Maternal Health") OR ("Health Care") AND ("Adolescent* Mothers") OR ("Adolescent Women") OR ("Teen* Women") OR ("Teen* Mother") AND ("Sub-Saharan Africa) OR (Africa)).

Study Selection and Extraction

Study Selection

The databases were searched online, and the results were published for each database. The search results were saved in an electronic reference management program (RefWorks). Duplicate articles were found and removed both within and between databases. The titles and abstracts were checked again to ensure that they met the qualifying criteria. It was also used to check the whole texts of articles that were recognized to be potentially important during the abstract screening phase and the title for eligibility. A reference list search of the publications that were included will be conducted in order to find any further relevant data. The screening stage is carried out by independent reviewers to minimize the likelihood of research being overlooked. This is also required to avoid the misapplication or misinterpretation of qualifying criteria, as well as the rejection of relevant research during the screening process due to a single screener's random error and prejudice. The screening technique was carried

out by a single reviewer due to the nature of this review being an academic dissertation. This saved time and money by eliminating the need for two reviewers.

Data Extraction

The strategy for gathering data was to read the reviews' linked articles and comb through them for relevant facts and information regarding the area of interest. Research has been provided in a proper and objective manner by data extraction, and this is why data extraction is important: it makes research simpler to synthesize, get information that may be used to assess the risk of bias, and identify numerical data²². The standardized data extraction form can be automated in computer format or manual in paper format, and it can be as short or as long as needed with coding, particularly if a quantitative analysis is necessary²². The electronic tool (Excel spreadsheet) established for this review will comprise study groups (inclusion and exclusion criteria), causes and impediments relevant to the review issue, author name and publication year, particular aims, and participant characteristics (age, ethnicity, and educational level, as well as socioeconomic status).

Quality Assessment

The International Society for Pharmacoeconomics and Outcomes Research (ISPOR) Good Research Practices for Retrospective Database Analysis (CHEERs Checklist) were used to assess the quality of the included quantitative studies, while the Critical Appraisal Skills Program (CASP) checklist was used to assess the quality of the included qualitative studies²³. This approach has been used to assess the quality of previous studies. The research will be graded on a three-level scale based on 17 factors. A total score of 70% or more suggests a high-quality study, a total score of 50-70% indicates a medium-quality study, and a total score of less than 50% indicates a low-quality study.

Synthesis and Analysis

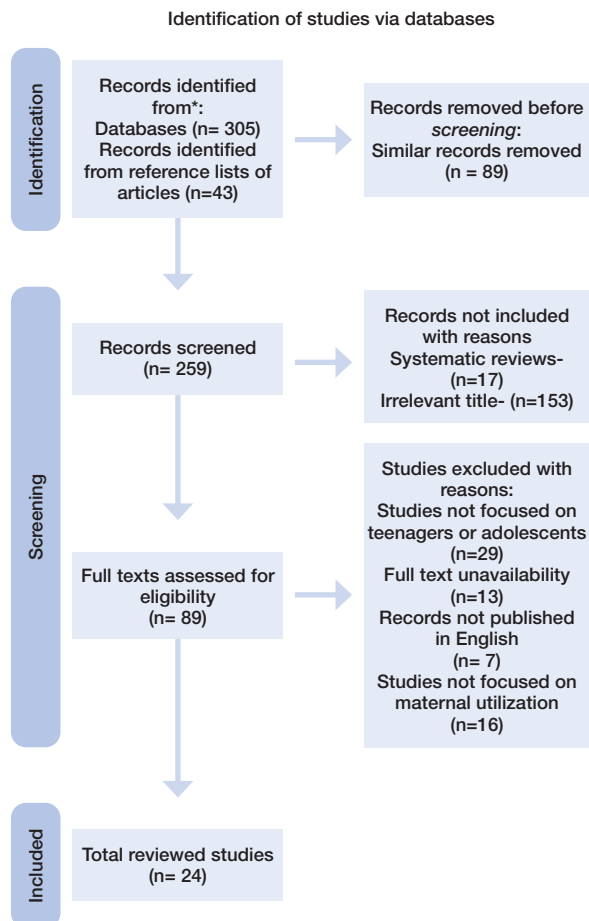
The act of merging data from several studies to develop a conclusion based on a body of evidence and address the research question is known as synthesis²⁴. It is critical to look for variability in research findings since there may be methodological discrepancies in the specifics of the included studies²⁴. Statistical meta-analysis was not done because the methods used in this review are diverse. In addition, unlike meta-analysis, narrative synthesis is a more subjective process²⁴, which aids in the integration of research presented in a review. In this strategy, which is akin to storytelling²⁵, textual and tabular summaries of the findings are used. The technique is rigorous and open to eliminate the chance of prejudice.

Results

A total of three hundred and five (305) studies were identified from the several databases where searches

were conducted. 43 potential studies were identified from the reference list of articles. Following screening of the identified records, a sum of twenty four studies were eligible and added in the review²⁶⁻⁴⁹. See **figure 1**.

Figure 1: Flow chart for study Identification based on PRISMA.



Characteristics of Studies Included

Considering the features of the studies in **table I** below, it was revealed that of the 24 studies²⁶⁻⁴⁹ included in this review, two studies were conducted in Nigeria^{32,46}. Also, it was seen that six studies were conducted in Kenya^{29,35,40,42,43,48}, three studies were carried out in South Africa^{28,31,38}, and two studies in Malawi^{36,41}. Antenatal care services, postnatal services, and skillful birth delivery were the key focus of 80% of the included studies. Also, it was demonstrated that eighteen studies adopted a quantitative design, whereas four studies adopted a qualitative design, and two studies utilized a mixed method model. Considering the theories adopted in three papers, Donabedian’s model, health belief model, and phenomenology were among the theories used in the framework of the primary studies. Three of the four studies that utilized a qualitative technique adopted a thematic model of analysis, whereas in most of the quantitative studies, multivariate logistic regression and binary logistic regression were utilized as data analysis methods. Most qualitative investigations used topic analysis, whereas most quantitative research used bivariate and multivariate logistic regression analysis.

Quality of Included Studies

Considering the assessment of the strength of the qualitative and quantitative studies included in this review based on tables 2 and 3 below, objectives, methods, results, and discussion were major components described in the CASP and CHEERs-ISPOR checklists used for the evaluation of the listed studies’ quality. For the CASP checklist, (+) shows that the study fulfils the criteria, (-) shows that the study does not fulfil the criteria, while (?) depicts or shows the criterion is unclear. While for the ISPOR checklist, score (2) depicts the criteria as “strong”, score (1) illustrates the criteria to be “moderate,” while a score of (0) reveals that it is weak. Based on the 19 quantitative studies appraised using the ISPOR checklist, results showed that eight (8) studies were of medium quality, two studies were of poor quality, and nine (9) studies had high quality. A total of four (4) qualitative studies were appraised using the CASP checklist.

Table I: Characteristics of the included studies.

Study	Care type	Measured Outcomes	Theory adopted	Sample Size	Study Design	Analysis of Data Method	Location
Gross <i>et al.</i> ²⁶	Antenatal Care	Factors that affect early and late ANC attendance	Not reported	N= 440	Quantitative design	Logistic Regression Model	Tanzania
Rukundo <i>et al.</i> ²⁷	Antenatal Care	Variables Influencing utilization of teenager friendly ANC	Not reported	Key informants	Qualitative design	Thematic Analysis	Uganda
Duggan and Adejumo ²⁸	Post Natal Care and Antenatal Care	Maternity care perception	Grounded theory	18 adolescent, 15-19 years	Qualitative design	Not reported	South Africa
Mulinge <i>et al.</i> ²⁹	Antenatal Care	Variables and factors affecting teens’ use of prenatal care services	Not reported	13-19 years	Quantitative survey design	Logistic regression and chi square	Kenya

Study	Care type	Measured Outcomes	Theory adopted	Sample Size	Study Design	Analysis of Data Method	Location
Singh <i>et al.</i> ³⁰	Antenatal Care Post natal care and Delivery	Variables and factors that influence the use of maternal services	Not reported	1646 adolescent mothers	Quantitative survey design	Multivariate and Bivariate analyses	Mali
Rall <i>et al.</i> ³¹	Antenatal Care	Communication in ANC	Not reported	12-19 years teenage women (n=20)	Qualitative design	Teach Data analysis method	South Africa
Rai <i>et al.</i> ³²	Immunization, safe delivery and ANC	Potential contributing variables to the use of Maternal Health care services	Not reported	934 adolescent mothers aged 15-19	Quantitative survey design	Multivariate logistic regression analyses	Nigeria
Alemayehu <i>et al.</i> ³³	Antenatal Care (ANC)	Factors that affect the use of Antenatal Care	Not reported	14-19 years teenage women (n=994)	Quantitative survey design	Multivariate and Bivariate analyses	Ethiopia
Ebeigbe and Gharoro ³⁴	PNC, safe delivery and Antenatal Care	Pregnancy frequency Interventions and complications	Not reported	N = 114	Quantitative design	Fishers exact Test	Nigeria
Banke-Thomas <i>et al.</i> ³⁵	Skilled Birth Attendance, PNC and ANC	Variables that affect the use of maternity care	Not reported	15-19 years married teenage women (n=898)	Quantitative survey design	Multivariate and Bivariate analyses	Kenya
Brabin <i>et al.</i> ³⁶	Antenatal Care	Why adolescent antenatal care (Antenatal Care) programs would need to be improved?	Not reported	10-19 years married teenage women (n=615)	Quantitative design	Binary logistic regression and Chi-square test	Malawi
Adam <i>et al.</i> ³⁷	Safe Delivery and ANC	Risk of prenatal problems, surgical delivery, and anemia	Not reported	459	Quantitative design	Chi-square Test and Fishers test	Sudan
Worku and Wolde-senbet ³⁸	Antenatal Care	Factors that affect the uptake of Antenatal Care	Not reported	383	Quantitative and Qualitative design	Bivariate and Multivariate Analysis	South Africa
Chaibva <i>et al.</i> ³⁹	Antenatal Care	Factors that prevent teenagers from using Antenatal Care services	Health belief model	19 years of age or less (80 adolescent women)	Quantitative design	Descriptive Analysis of frequency and proportion	Zimbabwe
Ronen <i>et al.</i> ⁴⁰	Antenatal Care	Factors influencing the use of Antenatal Care	Not reported	19 years below married teenage women (n=278)	Quantitative survey design	Multivariate and Bivariate analyses	Kenya
Rai <i>et al.</i> ⁴¹	Post-natal care and Antenatal Care	Factors influencing Antenatal Care and Post Natal care	Not reported	15-19 years married teenage women (n=2160)	Quantitative survey design	Multivariate and Bivariate analyses	Malawi
Birungi <i>et al.</i> ⁴²	PNC, skilled birth attendance and ANC	Antenatal Care and Post-natal care-influencing factors	Not reported	15-19 years old adolescents	Quantitative design	Multilevel Logistic models	Kenya
Banke-Thomas <i>et al.</i> ⁴³	Safe delivery, Post-natal care and Antenatal Care	Maternity care utilization	Not reported	15-19 years	Quantitative survey design	Multivariate and Bivariate analyses	Kenya
Hokororo <i>et al.</i> ⁴⁴	RH service and Antenatal Care	Barriers to SRH care	Phenomenology	Adolescents aged 15-20years	Focus group and Qualitative design	Thematic Analysis	Tanzania
Helleringer ⁴⁵	Antenatal Care	HIV testing in Antenatal Care	Not reported	10-19 years	Quantitative survey design	Multivariate and Bivariate analyses	Central and West Africa
Reynolds <i>et al.</i> ⁴⁶	Delivery, Post-natal care and Antenatal Care	Factors associated with maternity services	Not reported	2434 adolescents (married) of 15-24 years	Quantitative survey design	Binary Logistic Regression and Chi-square	Nigeria

Study	Care type	Measured Outcomes	Theory adopted	Sample Size	Study Design	Analysis of Data Method	Location
Musaran-dega <i>et al.</i> ⁴⁷	PMTCT and Antenatal Care	Gaps in service uptake	Not reported	N=40	Retrospective and Quantitative design	Multi variable binomial regression analyses	Zimbabwe
Ochako <i>et al.</i> ⁴⁸	Antenatal Care	The time of Antenatal Care and the type of delivery aid are related	Not reported	1675 women of 15-24years	Quantitative survey design	Multivariate Logistic regression analyses	Kenya
Mngadi <i>et al.</i> ⁴⁹	PNC and Safe Delivery	Quality of maternity care	Donabedian Model	N=33 pregnant adolescent mothers	Quantitative and qualitative design	Content Analysis	Swaziland

Table II: CASP Findings for Qualitative included Studies.

Criteria	Rukundo <i>et al.</i> (2015)	Duggan and Adejumo (2012)	Hokororo (2015)	Rall (2013)
Is the objective of the research clearly stated?	+	+	+	+
Does a qualitative technique make sense?	+	+	+	+
How well did the research plan to take into consideration and account of the researches objective?	?	+	+	?
Was the recruitment strategy suitable for the objective of the research?	?	+	+	+
Did the data collection method address the topic of the study?	+	+	+	+
Has the relationship between the researcher and the participants been properly taken into account?	+	?	+	+
Have ethical considerations been made?	+	+	-	+
Was the data analysis thorough enough?	+	+	+	+
Is the conclusion made in a clear manner?	+	?	+	?
How valuable is the Research	+	+	+	+

Key: Fulfill Criteria (+)
Doesn't fulfill criteria (-)
Unclear (?)

Table III: ISPOR Checklist for Quality of Quantitative Included Studies.

Section	Item	Quality Criteria Description	Reynolds <i>et al.</i>	Brabin <i>et al.</i>	Ebeigbe <i>et al.</i>	Elhassan <i>et al.</i>	Chaibva	Alemayhue <i>et al.</i>	Gross <i>et al.</i>	Banke-Thomas <i>et al.</i>	Birungu <i>et al.</i>	Ochako <i>et al.</i>
Objectives	1	Specific goals should be stated, along with any established hypotheses	2	2	1	2	2	2	2	1	2	2
Study design	2	Describe the main research design components	2	1	1	1	2	1	2	2	1	2
Setting	3	Describe the environment or setting, the locations, and the pertinent times, such as the recruiting, exposure, follow-up, and data collecting times	1	2	2	1	2	2	2	1	2	2
Participants	4	Provide the qualifying requirements, as well as the sources and procedures used to choose the participants	2	1	1	1	2	2	2	2	2	1
Variables	5	All outcomes, exposures, predictors, possible confounders, and effect modifiers should be precisely defined.	2	2	1	2	1	2	1	2	1	1
Data sources/ measurement	6	Provide sources of information and information on the evaluation techniques for each variable of interest (measurement)	2	1	0	0	2	2	1	2	1	2
Bias	7	Describe any steps made to address any bias sources	2	1	0	0	1	1	1	2	1	1
Study size	8	Describe how the study size was determined.	2	1	0	2	1	2	2	1	1	2

Section	Item	Quality Criteria Description	Reynolds et al.	Brabin et al.	Ebeigbe et al.	Elhassan et al.	Chaibva	Alemayhue et al.	Gross et al.	Banke-Thomas et al.	Birungu et al.	Ochako et al.
Quantitative variables	9	Describe the methods used to handle quantitative variables in the analysis. Describe the classifications that were chosen, if relevant, and why5	1	2	1	1	2	2	0	2	2	1
Statistical methods	10	List all statistical techniques, including those that are used to account for confounding	2	2	1	1	1	1	1		1	1
	11	Describe how missing data were handled	1	1	1	1	0	0	0	1	1	1
Participants	12	Report on the study's participation and response rates	2	1	1	1	2	1	2	2	1	2
Descriptive data	13	Give details on the research participants' demographic, clinical, and social features, as well as information about their exposure to and potential for confounders.	2	2	2	2	1	2	1	2	2	2
Main results	14	Give unadjusted estimates and, if necessary, estimates that have been confounder-adjusted along with their accuracy (e.g 95 percent confidence interval) Make it clear which confounders were taken into account and how	2	1	1	0	1	1	0	2	1	1
Key Results	15	Summarize the main findings in relation to the study's goals	2	2	2	1	1	2	2	2	1	2
Limitations	16	Address the study's limitations while considering the potential bias or imprecision sources, OR discuss the direction and amount of any potential bias	2	1	1	0	2	1	1	2	2	1
Interpretation	17	Give a careful overall interpretation of the findings while taking into account the goals, restrictions, variety of analyses, outcomes from related research, and other pertinent data	2	1	1	2	1	2	2	2	2	1
Score			24	17	32	17	23	23	24	31	19	25
Quality Score (%)			70	50	94	50	67	67	70	91	55	73

Table III (contd): ISPOR Checklist for Quality of Quantitative Included Studies.

Section	Item	Quality Criteria Description	Singh	Rai 2014	Worku	Rai et al. 2012	Rai 2013	Banke-T	Helleringer	Musaranda	Ronen
Objectives	1	Specific goals should be stated, along with any established hypotheses	2	2	2	2	2	2	2	1	1
Study design	2	Describe the main research design components	1	1	1	2	1	1	2	2	2
Setting	3	Describe the environment or setting, the locations, and the pertinent times, such as the recruiting, exposure, follow-up, and data collecting times	1	1	2	2	2	2	2	1	2
Participants	4	Give the qualifying requirements, as well as the sources and procedures used to choose the participants	1	2	1	2	2	2	2	2	2
Variables	5	All outcomes, exposures, predictors, possible confounders, and effect modifiers should be precisely defined.	2	2	1	2	2	2	1	2	2
Data sources/ measurement	6	Provide sources of information and information on the evaluation techniques for each variable of interest (measurement)	2	1	2	1	1	1	2	2	1
Bias	7	Describe any steps made to address any bias sources	1	1	2	1	1	2	1	2	1
Study size	8	Describe how the study size was determined.	1	2	1	2	2	1	2	2	1
Quantitative variables	9	Describe the methods used to handle quantitative variables in the analysis. Describe the classifications that were chosen, if relevant, and why ⁵	2	2	1	2	1	2	1	2	1
Statistical methods	10	Describe all statistical techniques, including confounding correction techniques	1	2	1	1	1	2	1	1	1
	11	Describe how missing data were handled	1	0	0	1	0	0	0	0	0
Participants	12	Report on the study's participation and response rates	2	1	1	1	1	1	1	1	1
Descriptive data	13	Give details on the research participants' demographic, clinical, and social features, as well as information about their exposure to and potential for confounders.	2	2	2	2	2	2	1	2	1
Main results	14	Give unadjusted estimates and, if necessary, estimates that have been confounder-adjusted along with their accuracy (e.g 95 percent confidence interval) Make it clear which confounders were taken into account and how	1	1	1	1 1	1	2	1	1	1
Key Results	15	Summarize the main findings in relation to the study's goals	2	1	2	2	2	2	2	2	1

Section	Item	Quality Criteria Description	Singh	Rai 2014	Worku	Rai et al. 2012	Rai 2013	Banke-T	Helleringer	Musaranda	Ronen
Limitations	16	Talk about the study's limitations taking into consideration any sources of potential bias or error, OR talk about the direction and size of any potential bias	1	1	2	0	1	1	1	1	1
Interpretation	17	Give a careful overall interpretation of the findings while taking into account the goals, restrictions, variety of analyses, outcomes from related research, and other pertinent data	1	2	2	2	2	2	1	1	1
Score			24	24	27	29	21	26	24	23	19
Quality Score (%)			70	70	79	85	61	76	70	67	55

Maternal Health Service Utilization

Based on the study, eighteen (18) out of a total of twenty-four (24) studies reported that adolescent mothers engage in antenatal care service utilization. From the studies, a range of women who participated in antenatal care visits showed that 93.7% of women in Malawi had more than three visits; over 90% of women in South Africa, and in Ethiopia, 30% of women had at least one visit and more than four visits respectively.

Maternal Health Service Utilization Influencing Factors

Demographic individual factors, social and family factors, and organizational or institutional factors were explained in the included studies based on the socio-ecological model.

Demographic Individual factors

According to this study, there are a number of individual characteristics that affect how frequently teenage mothers in Sub-Saharan Africa seek maternity care, including age, education level, domicile or place of residency, economic position, awareness of and perception of the need for maternal health care. Women's education is the most important predictor of their use of maternal health services, according to the majority of the research examined in this review, as those who have completed secondary school or higher are more likely to seek maternity care than those who have not^{48,41,36,35,32,43}. Women who have access to education are more equipped to make health-related decisions³³. In addition, four studies found that women who reside in rural locations are less likely to seek maternity care than those who live in urban areas^{48,43,32,29}. The disparity between urban and rural locations and the attitudes, cultural expectations, and convictions that prevent women from obtaining maternity care have been the subject of some studies^{33,48,30,42}. The reviewed research indicates that rural women are more likely to be underprivileged than urban women, which has an influence on access disparities to maternal health resources³⁵ and contributes to the explanation of the rural-

urban difference in the use of health services. Because they are concerned about declaring their pregnancy and lack the funds for prenatal care registration, young women opt to give birth with the assistance of a skilled practitioner and employ local procedures with long-lasting benefits rather than antenatal care³⁹. In comparison to individuals who had fewer children or more than two years between pregnancies, adolescent women who had more than three children and had less than two years between pregnancies were likewise less likely to use postnatal services³². A number of factors, including media exposure^{35,32,43}, poor parity^{48,40}, work status⁴⁰, and others, have been associated to young mothers' use of maternal healthcare.

Social and family factors

In this synthesis, it was discovered that peer pressure, family traditions and customs, spouse knowledge, opinions, and education, as well as the impact of other family members, are additional interpersonal-level variables that affect young women's utilization of maternal health care. According to the viewpoints of health professionals gathered in a specific study, adolescent women usually have unintended pregnancies, which further complicates their maternal health-seeking behaviors and itineraries. In these circumstances, teenage mothers commonly experience social exclusion and romantic rejection⁴⁴. As a result of these rejections, some young women were lucky enough to continue living with their parents, but with little in the way of social, emotional, or financial assistance²⁶. Other adolescent women may not be asked to leave, rejected, or sent away from their homes and communities⁴⁴. These issues are caused by negative sociocultural notions about young pregnancies, which are frequently infused into the system by widely held spiritual, religious, or traditional beliefs⁴⁴.

Additionally, a research indicated that teenage women were less likely to get maternity care if they said their pregnancy was undesired³². Due to these factors,

adolescent women who are pregnant cannot obtain or use reproductive health care services²⁷. But being married and having a smart husband³² were linked to a higher likelihood of young women seeking out maternal health care⁴⁸. Young women's relationships with medical professionals had a positive and negative impact on how they felt about receiving prenatal care. Studies^{27,31} claim that when it comes to protecting patient confidentiality, medical practitioners are "cruel," "condemnatory," and "not reliable"^{27,31}. Adolescent women were deterred as a result from obtaining maternity care⁴⁴.

Factors from Institutional and Organizational level

We outline a number of organizational or institutional characteristics that either favorably or unfavorably affects how frequently young women in Sub-Saharan Africa seek maternity care. Despite the fact that healthcare professionals are aware that teenage mothers are a special population that needs particular care, young mothers still choose to go to adult-oriented prenatal care services that do not provide enough training, privacy, time, or knowledge on adolescent pregnancy. As a result, fewer women are using prenatal care services^{44,27}. Due to their lack of faith in medical experts, young pregnant women have also had trouble connecting with them when they require prenatal care³¹. Other mothers said that there was a major scarcity of healthcare providers, which extended waiting periods for the pregnant adolescents seeking antenatal care services and dissatisfaction with the programs^{38,27,28}. The ability of adolescent mothers to make use of maternity care was also reported to be restricted by the distance from their home to the health institution³⁸. Although many of the young women who participated in the research thought that they needed information to better get them ready for pregnancy and parenthood responsibilities, many of them did not get it because there were not enough resources and services accessible²⁸. The teenage women's claims that there were insufficient laws and tools to educate young mothers about maternal health⁴⁹ were also supported by medical professionals. A minimum of four prenatal visits (antenatal care)⁴² substantially affected the use of postnatal care services and promoted the use of safe or skilled birth delivery care³². These findings highlight the need for integrated maternal health care services to promote young women's usage of maternity care⁴¹. This was essential for improving newborn health as well since infants whose mothers received prenatal care were more likely to receive the full course of recommended vaccines⁴¹. Four further investigations further uncovered any connections between skilled labor, delivery services, and prenatal care. Other studies^{29,41,32} and ⁴² found that frequent antenatal care visits, with at least four visits, increased the use of skilled birth delivery, contrary to the findings of Ochako and colleagues⁴⁸, who found that frequent antenatal care visits, with at least four visits, had a significant impact on young women's use of skilled birth delivery care. However, a research showed that

adolescent Malawian women in rural areas who received prenatal care throughout the first and early second trimester were less likely to deliver their babies safely³⁶.

Cultural and Economic Factors

According to the papers included in this review, several cultural and economic variables were shown to have an impact on adolescent mothers' usage of maternal health care. According to several studies, use of all three maternal healthcare services rises as income quintiles rise^{33,48,35,43}, with middle- and upper-income adolescent women far more likely to do so^{48,41,35,43}. Teenagers who were alone and pregnant were afraid to visit medical facilities because of shame and embarrassment from acquaintances, neighbors, and even family members⁴⁴. Based on their faith, it was discovered that Islamic teens were more receptive to getting maternity care than other teenagers³². The accessibility of prenatal care services, such as antenatal care with traditional birth attendants, has proven difficult for young adolescents as a whole, which lessens the perceived necessity for teenage women to get professional maternity care³⁹. Thus, a variety of factors and interventions aimed at adolescent women in an effort to protect their safety and well-being have an influence on the utilization of maternal health care by adolescent women.

Discussion

The objective of the review was to provide enough proof of the factors influencing young mothers' use of maternity care in Sub-Saharan Africa. Low rates of maternal health use are found in much of Sub-Saharan Africa^{2,5,10}. The study found that young women use maternity care facilities quite differently depending on whatever Sub-Saharan African country they are in. The data in this paper have been analyzed, and the results highlight the need for a variety of multi-layer interventions aimed at this group. These components include demographic features, culturally linked factors, economic considerations, and social aspects. This is crucial since pregnancies, deliveries, and postpartum complications among young women are more likely to result in long-term health problems or even the death of the mother or the child. The majority of research found that young girls began their prenatal care visits later than the advised minimum of four visits during pregnancy^{31,42,28}, often in the second or third trimester. This is true even though the global health organization categorizes adolescent pregnancy as high risk and advises careful monitoring by experienced professionals from the beginning³.

Despite the recommendations^{1,4}, the findings revealed that many teenage women delayed their attendance at prenatal care appointments until the second or third trimester^{26,29-37,48}. In two studies conducted in Kenya, it was shown that young mothers benefited by being aware

of the common pregnancy warning symptoms^{35,45}. This shows that women who have reported at least one prenatal care visit now have a greater level of understanding. The majority of the study also found, according to the analysis, that women's and their partners' educational backgrounds had a significant impact on their usage of prenatal care, professional delivery, and postpartum care. This agrees with past studies¹². Men and women with higher levels of education are more likely to be aware of the advantages of professional maternity care and to be empowered enough to seek it^{12,13,51,52}. Expanding the non-formal educational choices accessible to adolescent ladies and encouraging them to return to school after having children are two strategies for increasing school attendance. This is significant since, in Sub-Saharan Africa, cultural and institutional attitudes make it difficult for adolescent mothers to return to school⁵³. Without a doubt, governments and non-governmental organizations (NGOs) must work to remove these barriers because they prevent young women from accessing education, potential employment, financial stability, and empowerment all necessary components for boosting maternal health care utilization and access and so continue cycles of disadvantage⁵⁴. Another strategy utilized to improve young women's attendance at school was paying for direct unneeded expenditures such books, uniforms, and transportation as well as indirect (opportunity) costs of education⁵³. The socioeconomic position of young mothers and their use of maternity care were connected, with teens in the richer group reporting higher levels of engagement in maternity care than those in the poorer group. Low-income teenagers may not be able to afford medical treatment. Activities intended to increase teenage women' utilization of maternal health care are also less likely to reach them because poor adolescents are more likely to be socially isolated⁵⁴. Therefore, poverty-reduction initiatives targeted directly at adolescent girls may have a greater impact and improve the consequences of their future sexual and reproductive health. Socio-cultural beliefs about conception, pregnancy, and delivery have a big impact on maternal health⁵⁵. For instance, in South Asia and Sub-Saharan Africa, the use of effective maternal health treatments is commonly influenced by religious beliefs, practices, and values⁵⁶. For instance, some communities and women could believe that giving birth is a test of one's courage that asking for aid is a sign of weakness, or that hospital births should only be performed in very difficult or protracted labors^{56,57}. However, prior research indicates that many Nigerian women, particularly those who reside in rural areas, believe that traditional birth attendants (TBAs) provide superior care to modern medical experts, particularly when it comes to interpersonal connections and communication⁵⁸. When teens attend prenatal care, promoting the advantages of maternal healthcare must be given high emphasis. A staffing shortfall is a major obstacle to provide high-quality services, hence improving the workforce is a priority in order to achieve this⁴¹. Adolescent females require more access to family planning services if they are to avoid

early births and poor maternal health outcomes¹⁴. It is essential that family planning education and services are offered as part of an integrated system involving schools, communities, health organizations, and governments to ensure that young women are empowered to make decisions about their sexual and reproductive health as soon as possible rather than after birth, when such counselling is typically provided. Additionally, appropriate actions must be taken to persuade local authorities and other significant players to participate as change agents⁵⁴. Rural areas^{56,57} require such organizational restructuring because of the numerous barriers that these women must surmount in order to access and subsequently use maternal health care.

The study's findings imply that the traits of health professionals such as unfavorable views, a lack of knowledge, and insensitivity to the requirements of teenage women have an impact on how frequently adolescent mothers in Sub-Saharan Africa seek out maternal health care. These findings are consistent with past research that showed adolescent mothers are perceptive to healthcare experts' judgments and soon lose interest in obtaining care^{59,60,61,62,63}. According to this study, adolescent mothers have trouble communicating with medical professionals since they don't feel confident in or trustworthy with them. Because they are more likely than older parents to have extra diseases like STIs and HIV and because they need more knowledge on maternity care and parenthood, adolescent mothers need greater attention from medical experts⁴¹. Healthcare providers will also need additional training to deliver care that is sensitive to and responsive to the requirements of teenage women³³. The majority of research on young women's use of maternal health care in Sub-Saharan Africa focuses on prenatal care, whereas just a small number of studies have looked at skilled delivery of babies and postnatal care. This suggests that further research is required to understand how young women obtain skilled delivery and postnatal care. Despite the relatively modest number of teenage females, the great majority of the studies also used quantitative techniques. The representativeness of this research is thus questioned given the high prevalence of adolescent fertility in Sub-Saharan Africa. The major window of opportunity for avoiding unplanned births among this vulnerable population is the provision of contraceptive services through maternity care, therefore it is essential. More research is needed to better understand how medical personnel see and cope with care for young women during their pregnancies.

The Limitations and Strengths of the Findings

It is essential to stress a few limitations in light of this review. Since French is the official language of some Sub-Saharan African nations, it may be challenging to generalize from research that have not been published

in English for this region. Additionally, results could only have been based on research that was published, leaving out unpublished studies that would have been relevant to this analysis. Additionally, it is probable that the involvement of just few reviewers throughout the screening process and the small sample sizes from some of the included studies would make it hard to have a completely representative sample. The distinctiveness of the enhanced search approach used to find the primary papers is this systematic review's strength. It is also the first to specifically model a few sub-Saharan African nations.

Conclusion

Based on this review, in sub-Saharan Africa, it could be said that a significant proportion of teenage women do not have reliable access to utilization and access to maternal care throughout pregnancy. A wide array of factors is seen to influence the utilization and access to maternal health services among teenage mothers in sub-Saharan Africa. These factors span from demographic variables to cultural, economic, and even economic-related variables. To enhance their involvement in using maternal health care, it appears that interventions like training programmed offered by medical and allied health professionals to teenage female partners are essential. Additionally, this would enhance their prenatal appointments and offer them more choice in choosing treatments that would result in better outcomes for mother health. Adolescent mothers in rural regions and the vast majority of communities should be made aware of the importance of these treatments using community mobilization strategies.

Ethics Approval and consent to Participate

Not Applicable.

Consent to Publish

Not applicable.

Availability of Data and Materials

The Data set from the study are available to the corresponding author upon request.

Competing Interests

Authors have declared that they have no competing interests.

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Authors Contribution

All Authors contributed in the drafting and execution of this systematic review

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References

1. WHO. Adolescence and Transition; Making pregnancy safer: WHO, ICM and FIGO; 2004
2. UNFPA. Motherhood in childhood: facing the challenge of adolescent pregnancy. New York: United Nations Population Fund; 2013.
3. UN. Definition of youth. 2016. <http://www.un.org/esa/socdev/documents/youth/fact-sheets/youth-definition.pdf>.
4. WHO. Reproductive health indicators: guidelines for their generation, interpretation and analysis for global monitoring. Geneva: World Health Organization; 2016.
5. Kumar KC, Singh PK, Rai RK. Coverage gap in maternal and child health services in India: assessing trends and regional deprivation during 1992–2006. *Journal of Public Health*. 2013;35(4):598-606. doi: 10.1093/pubmed/fds108.
6. Mangiaterra V, Pendse R, McClure K, Rosen J. Department of making pregnancy safer (MPS) 1. Vol. 1. WHO MPS note; 2008. Adolescent pregnancy. Available at http://www.who.int/making_pregnancy_safer/documents/mpsnnotes_2_lr.pdf.
7. Kurth F, Bélard S, Mombo-Ngoma G, Schuster K, Adegnikaa AA, Bouyou-Akotet MK, et al. Adolescence as risk factor for adverse pregnancy outcome in Central Africa—a cross-sectional study. *PLoS One*. 2010;5(12):e14367.
8. Mukhopadhyay P, Chaudhuri R, Paul B. Hospital-based perinatal outcomes and complications in teenage pregnancy in India. *J Health Popul Nutr*. 2010;28(5):494.
9. Elimam BG, Abdel-Rahman ME, Saghiron AO. Foetal and maternal pregnancy outcomes among teenage and adult mothers at Omdurman maternity hospital in Sudan. *Khartoum Med J*. 2014;6:2
10. Mengistu TA, Tafere TE. Effect of antenatal care on institutional delivery in developing countries: a systematic review. *JB Library of Systematic Reviews*. 2011;19(64):1-15
11. Graham WJ, Bell JS, Bullough CH. Can skilled attendance at delivery reduce maternal mortality in developing countries? In: *Safe motherhood strategies: a review of the evidence*; 2001.
12. Robinson JJ, Wharrad H. The relationship between attendance at birth and maternal mortality rates: an exploration of United Nations' data sets including the ratios of physicians and nurses to population, GNP per capita and female literacy. *J Adv Nurs*. 2001;34(4):445-55.
13. Buor D, Bream K. An analysis of the determinants of maternal mortality in sub-Saharan Africa. *J Women's Health* (2002). 2004; 13(8):926-38.
14. Masters SH, Burstein R, Amofah G, Aboagye P, Kumar S, Hanlon M. Travel time to maternity care and its effect on utilization in rural Ghana: a multilevel analysis. *Social Science & Medicine*. 2013;93:147–154. doi: 10.1016/j.socscimed.2013.06.012.
15. Magadi MA, Agwanda AO, Obare FO. A comparative analysis of the use of maternal health services between teenagers and older mothers in sub-Saharan Africa: evidence from demographic and health surveys (DHS). *Soc Sci Med*. 2007;64(6):1311-25.
16. Rai R, Singh P, Singh L. Utilization of maternal health care services among married adolescent women: insights from the Nigeria demographic and health survey, 2008. *Women Health Issues*. 2012;22(4):e407-14.
17. Maternal mortality [<http://www.who.int/mediacentre/factsheets/fs348/en/>]. Accessed 01 May 2018.
18. Simkhada B, Erv T, Porter M, Simkhada P. Factors affecting the utilization of antenatal care in developing countries: systematic review of the literature. *J Adv Nurs*. 2008;61(3):244-60.
19. Say L, Raine R. A systematic review of inequalities in the use of maternal health care in developing countries: examining the scale of the problem and the importance of context. *Bull World Health Organ*. 2007;85(10):812-9.
20. United Nations Goals: a scoping review of the literature. <http://www.un.org/esa/socdev/documents/youth/fact-sheets/youth-definition.pdf>
21. Aromataris, GO, Riitano, M. The Joanna Briggs Institute Systematic Review, Step by Step Constructing a Search Strategy and Searching for Evidence -A guide to the Literature Search for a Systematic Review. *AJN, [Online]* 2014. 114, No. 5 Available at: <https://alliedhealth.ceconnection.com/files/ConstructingaSearchStrategyandSearchingforEvidence-1430415746583>.
22. Li Y, Herbert RD, Kiv, AM, Elkins U Enrollment of Participants Criteria and Reliability of the PEDro scale for rating quality of randomized controlled trials. *Physical Therapy*, 2019,83 (8), 713-21.
23. International Society for Pharmacoeconomics and Outcomes Research (ISPOR) Good Research Practices for Retrospective Database Analysis Checklist.
24. McKenzie, O, Sherrington, C, Herbert, RD, Moseley, AM, Elkins, U Narrative Methods in Research Issues relating to study design including non-randomized studies in systematic reviews on the effects of interventions. *Research Synthesis and Methods*, 20214(1), pp. 12-25.
25. Bettany-Saltikov, IB. Assessing Risk of Bias in Included Studies. In: J. Higgins, and S. Green (eds). *Cochrane Handbook for Systematic Reviews of Interventions*. Chichester : Wiley & Sons Ltd., 2016, 187-241
26. Gross K, Alba S, Glass T, Schellenberg J, Obrist B. Timing of antenatal care for adolescent and adult pregnant women in south-eastern Tanzania. *BMC Pregnancy Childbirth*. 2012;12:16.
27. Rukundo GZ, Abaasa C, Natukunda PB, Ashabahebwa BH, Allain D. Antenatal services for pregnant teenagers in Mbarara municipality, southwestern Uganda: health workers and community leaders' views. *BMC Pregnancy Childbirth*. 2015;15:351.
28. Duggan R, Adejumo O. Adolescent clients' perceptions of maternity care in KwaZulu-Natal, South Africa. *Women Birth*. 2012;25(4):e62-7.
29. Mulinge N, Bidemi O, Aimakhu C. Factors influencing utilization of antenatal care services among teenage mothers in Malindi Sub-County Kenya—a cross sectional study. *Sci J Publ Health*. 2017;5:61-7.
30. Singh P, Singh L, Kumar C, Rai R. Correlates of maternal healthcare service utilization among adolescent women in Mali: analysis of a nationally representative cross-sectional survey, 2006. *J Publ Health*. 2013;21(1):15-27.
31. Rall N, James S V, Strümpher J. Pregnant teenagers' experiences of communication at antenatal clinics in South Africa. *Afr J Nurs Midwife*. 2013;15(2):144-56
32. Rai R, Singh P, Kumar C, Singh L. Factors associated with the utilization of maternal health care services among adolescent women in Malawi. *Home Health Care Serv Q*. 2013;32(2):106-25.

33. Alemayehu T, Haidar J, Habte D. Utilization of antenatal care services among teenagers in Ethiopia: a cross sectional study. *Ethiop J Heal Dev.* 2010;24(3):121.
34. Ebeigbe PN, Gharoro EP. Obstetric complications, intervention rates and maternofetal outcome in teenage nullipara in Benin City, Nigeria. *Trop Doct.* 2007;37(2):79-83.
35. Banke-Thomas A, Banke-Thomas O, Kivuvani M, Ameh C. Maternal health services utilisation by Kenyan adolescent mothers: analysis of the demographic health survey 2014. *Sex Reprod Healthc.* 2017;12:37-46.
36. Brabin L, Verhoeff F, Kazembe P, Brabin B, Chimsuku L, Broadhead R. Improving antenatal care for pregnant adolescents in southern Malawi. *Acta Obstet Gynecol Scand.* 1998;77(4):402-9.
37. Adam GK, Elhassan EM, Ahmed AM, Adam I. Maternal and perinatal outcome in teenage pregnancies in Sudan. *Int J Gynaecol Obstet.* 2009;105(2):170-1.
38. Worku EB, Woldesenbet SA. Factors that influence teenage antenatal care utilization in John Taolo Gaetsewe (JTG) district of northern Cape Province, South Africa: underscoring the need for tackling social determinants of health. *Int J MCH and AIDS.* 2016;5(2):134-45
39. Chaibva CN, Roos JH, Ehlers VJ. Adolescent mothers' non-utilisation of antenatal care services in Bulawayo, Zimbabwe. *Curationis.* 2009;32(3):14-21.
40. Ronen K, McGrath CJ, Langat AC, Kinuthia J, Omolo D, Singa B, et al. Gaps in adolescent engagement in antenatal care and prevention of mother-to-child HIV transmission services in Kenya. *J Acquir Immune Defic Syndr.* 2017;74(1):30-7.
41. Rai R, Singh P, Singh L, Kumar C. Individual characteristics and use of maternal and child health services by adolescent mothers in Niger. *Matern Child Health J.* 2014;18(3):592-603.
42. Birungi H, Obare F, van der Kwaak A, Namwebya JH. Maternal health care utilization among HIV-positive female adolescents in Kenya. *Int Perspect Sex Reprod Health.* 2011;37(3):143-9.
43. Banke-Thomas O, Banke-Thomas A, Ameh CA. Utilisation of maternal health services by adolescent mothers in Kenya: analysis of the demographic health survey 2008-2009. *International journal of adolescent medicine and health* 2016;30(2).
44. Hikororo A, Kihunrwa A, Kalluyva S, Changanlucha J, Fitzgerald D, Downs J. Barriers to access reproductive health care for pregnant adolescent girls: a qualitative study in Tanzania. *Acta Paediatrica.* 2015;104(12):1291-7.
45. Helleringer S. Understanding the adolescent gap in HIV testing among clients of antenatal Care Services in West and Central African Countries. *AIDS & Behavior.* 2017;21(9):2760-73.
46. Reynolds HW, Wong EL, Tucker H. Adolescents' use of maternal and child health services in developing countries. *Int Fam Plan Perspect.* 2006;32(1):6-16.
47. Musarandega R, Machezano R, Chideme M, Muchuchuti C, Mushavi A, Mahomva A, et al. PMTCT service uptake among adolescents and adult women attending antenatal Care in Selected Health Facilities in Zimbabwe. *J Acquir Immune Defic Syndr.* 2017;75(2):148-55.
48. Ochako R, Fotso J-C, Ikamari L, Khasakhala A. Utilization of maternal health services among young women in Kenya: insights from the Kenya demographic and health survey, 2003. *BMC Pregnancy Childbirth.* 2011;11(1):1.
49. Mngadi PT, Thembi IT, Ransjö-Arvidson AB, Ahlberg BM. Quality of maternity care for adolescent mothers in Mbabane, Swaziland. *Int Nurs Rev.* 2002;49(1):38-46.
50. Chilisa B. National policies on pregnancy in education systems in sub-Saharan Africa: the case of Botswana. *Gend Educ.* 2002;14(1):21-35.
51. Filmer D, Fox L. Youth employment in sub-Saharan Africa. Washington: World Bank Publications; 2014.
52. Rani M, Lule E. Exploring the socioeconomic dimension of adolescent reproductive health: a multicountry analysis. *Int Fam Plan Perspect.* 2004;30(3):110-7.
53. Goodburn EA, Gazi R, Chowdhury M. Beliefs and practices regarding delivery and postpartum maternal morbidity in rural Bangladesh. *Studies in family planning.* 1995;26(1):22-32.
54. Mrisho M, Schellenberg JA, Mushi AK, Obrist B, Mshinda H, Tanner M, et al. Factors affecting home delivery in rural Tanzania. *Trop Med Int Health.* 2007;12(7):862-72.
55. Walton D, Maria L, Schbley M. Maternal healthcare in Bangladesh and gender equity: a review article. *Online J Health Ethics.* 2013;9(1):8.
56. Sarker BK, Rahman M, Rahman T, Hossain J, Reichenbach L, Mitra DK. Reasons for Preference of Home Delivery with Traditional Birth Attendants (TBAs) in Rural Bangladesh: A Qualitative Exploration. *PLoS one.* 2016;11(1):e0146161-e0146161.
57. Wakefield MA, Loken B, Hornik RC. Use of mass media campaigns to change health behaviour. *Lancet.* 2010;376(9748):1261-71.
58. Svanemyr J, Chandra-Mouli V, Christiansen CS, Mbizvo M. Preventing child marriages: first international day of the girl child "my life, my right, end child marriage". *Reprod Health.* 2012;9(1):31.
59. Nair M, Baltag V, Bose K, Boschi-Pinto C, Lambrechts T, Mathai M. Improving the quality of health Care Services for Adolescents, globally: a standards-driven approach. *J Adolesc Health.* 2015;57(3):288-98.
60. Stern E, Pascoe L, Shand T, Richmond S. Lessons learned from engaging men in sexual and reproductive health as clients, partners and advocates of change in the Hoima district of Uganda. *Cult Health Sex.* 2015;17(sup2):190-205.
61. Atuoye KN, Dixon J, Rishworth A, Galaa SZ, Boamah SA, Luginaah I. Can she make it? Transportation barriers to accessing maternal and child health care services in rural Ghana. *BMC Health Serv Res.* 2015;15:333.
62. Puchalski Ritchie LM, Khan S, Moore JE, Timmings C, van Lettow M, Vogel JP, et al. Low- and middle-income countries face many common barriers to implementation of maternal health evidence products. *J Clin Epidemiol.* 2016;76:229-37.
63. Aaro LE, Flisher AJ, Kaaya S, Onya H, Fuglesang M, Klepp KI, et al. Promoting sexual and reproductive health in early adolescence in South Africa and Tanzania: development of a theory- and evidence-based intervention programme. *Scand J Public Health.* 2006;34(2):150-8.