Artículo de Revisión

Mortality rate and risk factors in adolescent pregnancy systemic review

Revisión sistemática de la tasa de mortalidad y los factores de riesgo en el embarazo adolescente

Moreno Arias, Erika Samanta; Peña Cordero, Susana Janeth; Mesa Cano, Isabel Cristina

Erika Samanta Moreno Arias
erika.moreno.60@est.ucacue.edu.ec
Universidad Católica de Cuenca

Susana Janeth Peña Cordero
spena@ucacue.edu.ec
Universidad Católica de Cuenca

Isabel Cristina Mesa Cano
imesac@ucacue.edu.ec
Universidad Católica de Cuenca

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Abstract: Teenage pregnancy has become a public health problem, with high percentages worldwide, which is why it is important to intervene to generate public policies that will help to reduce teenage pregnancy. To determine the mortality rate and risk factors in adolescent pregnancy through a literature review. A systematic review based on PRISMA was carried out in different databases such as: Web of Science, Scielo, Medline, Scopus, the key words were: Pregnancy, Adolescence, Women, Mortality, Risks and the languages searched were Spanish and English. Twelve articles were analyzed, and it was found that the highest prevalence percentage was 56% in Nepal, followed by a prevalence of 26.50% in Israel. Equal prevalence of 18% were found in Ecuador, and prevalence of 17% and 17.70% in Brazil. However, the lowest prevalence identified was 5.80% also in Ecuador for 2015. The main causes of death in pregnant adolescents were hypertensive disorders (28%), puerperal infection (16%), hemorrhage (12%), thromboembolism (12%) and abortion (10%). Increase intervention programs that help adolescents to be clear about contraceptive methods and family planning to reduce teenage pregnancy.

Keywords: pregnancy, adolescence, women, mortality, risks.

Resumen: En el 2020 se informó por primera vez sobre el síndrome inflamatorio multisistémico asociado a COVID-19 en niños, el cual puede tener un curso severo y puede requerir apoyo de cuidados. Examinar en la literatura científica sobre sintomatología, diagnóstico y tratamiento del síndrome inflamatorio multisistémico en niños con COVID-19. Se realizo una revisión sistemática de publicaciones indexadas en los siguientes exploradores: Pubmed, Scopus, Web of Science, desde el año 2017, se escogieron aquellos que tuvieron alguna relación con la temática a tratar, de forma complementaria esta búsqueda se realizara utilizando las palabras claves. Se encontró un total de 26 artículos relacionados con el tema que reflejan que el síndrome inflamatorio multisistémico se encuentra presente en un gran porcentaje de niños que sufrieron COVID-19, el MIS se caracteriza por presentar fiebre, manifestaciones gastrointestinales, cambios en la mucosa oral y erupción cutánea. Para el diagnostico de esta patología se emplean exámenes de laboratorio e imagen. El tratamiento consiste en aplicar principalmente inmunoglobulina IV. Al ser una

patología de reciente aparición en niños es importante estudiarla y definir los diferentes componentes para un diagnóstico y tratamiento adecuado.

Palabras clave: embarazo, adolescencia, mujeres, mortalidad, riesgos.

Introduction

Worldwide, approximately 16 million girls aged 15-19 years and 2 million girls younger than 15 years have children each year, with a higher frequency in developing countries (1). One- sixth of women in the reproductive age group are adolescents aged 15-19 years; sexual activity within or outside of marriage by adolescents can lead to adverse outcomes, amplified by their limited access to services (2). These pregnancies constitute a brake and obstacle to the socio-economic development of the country (3).

Complications of pregnancy and childbirth are the leading cause of death among adolescents in most countries (4), and most adolescent births (95%) occur in resource-limited countries (5). Adolescent pregnancy is associated with increased risks of adverse maternal and fetal outcomes; preeclampsia (PE) is one of the most common complications of adolescent pregnancy, several risk factors and adverse maternal outcomes are associated with PE, including gestational diabetes, obesity, postpartum hemorrhage, placental abruption, HELLP syndrome, renal or liver failure, and death (6).

There are many adolescent women who are mothers worldwide, therefore, it is necessary to develop research at national and local levels to determine the prevalence of adolescent pregnancies and the associated mortality risks, with the aim of developing programs to help and prevent early pregnancies. The main beneficiaries are adolescent women, especially those of low income, because they can be made aware of the risks in order to act in time and thus avoid the death of many young women.

According to the Amjad et al. study (7) the social determinants most frequently related to adverse outcomes in adolescent mothers are race, while the most frequently reported maternal and delivery outcomes are cesarean section and preterm delivery, respectively (7). Meta- analyses of this study showed that low maternal socioeconomic status and illiteracy increased the risk of adolescent maternal mortality and low birth weight infants. In Latin America, the 2016 Statistical Center for the Americas and the Caribbean (ECLAC) stated that Ecuador is the third country in the region with the highest rate of teenage pregnancy among adolescents between ten and nineteen 19 years of age, after Nicaragua and the Dominican Republic (8). In Brazil, there is a 20% prevalence of teenage pregnancy (6).

In the city of Cuenca, in a study conducted at the Hospital de Especialidades José Carrasco Arteaga, it was determined that the prevalence of teenage pregnancy in 2015 was 5.8%, which was lower compared to local, national, and international statistics (9). According to Amjad et al (7), maternal illiteracy was identified as a dictator of maternal mortality. In Africa, there is limited knowledge about sexual and reproductive health (8). Munakampe (2) points out that in 52 countries there is dissatisfaction with information on contraception between the ages of 15 and 19 years, while (6) includes as a risk factor for adolescent pregnancy the low economic level in 95%. This study will allow other researchers to have as initial data the prevalence of teenage pregnancies both nationally and internationally, and the risk factors involved in the mortality rate of teenage mothers, which can be considered as a starting point for further studies such as prevention studies. The main objective was to determine the mortality rate and risk factors in adolescent pregnancy through a literature review.

The specific objectives were a) examine the scientific literature on the prevalence and risk factors for adolescent pregnancy, and b) identify the mortality rate in adolescent pregnancy worldwide.

Methodology

Type of research

A systematic review of the literature was carried out, following the recommendations of the PRISMA statement.

Search strategies

Searches were performed in the Medline, Scopus, and Web of Science databases. The research strategy (keywords and search sequence) for each database was:

- Medline (49 articles): "Pregnancy in Adolescence/analysis" OR "Pregnancy in Adolescence/epidemiology" OR "Pregnancy in Adolescence/statistics and numerical data".
- Scopus (135 articles): "pregnancy" and "adolescence" and "female" and "pregnancy".
- Web of Science (27 articles): "adolescent" AND "pregnancy" AND "mortality" AND "risk".

Inclusion criteria

The selection of articles was carried out as follows:

- Languages : Spanish and English.
- Year of publication: 2017 to present.
- Original research article.
- Quantitative or mixed studies
- Quality of the articles.

Exclusion criteria

We excluded from the study articles that were not of the year of publication sought, thesis- type studies (undergraduate), monographs and argumentative essays, the impossibility of retrieving the full text of the article and duplicate articles.

Procedure

This systematic review was conducted in accordance with the eligibility criteria indicated in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (10) the Assessment of Multiple Systematic Reviews (AMSTAR) (11). The authors of this systematic review independently analyzed the title and abstract of each record according to the inclusion/exclusion criteria. Only studies that met the eligibility criteria were then extracted. Data validation was discussed by the authors themselves, and disagreements were resolved by discussion. The information considered to apply the eligibility criteria was: date and place of publication, journal, sample size and age range of participants, prevalence and risk.

Evaluation of the quality of the study

The guidelines of the Consolidated Standards for Reporting Trials (CONSORT-2010) were used to assess the quality of the studies (12). This checklist was used worldwide to improve reported randomized controlled clinical trials using a list of 25 items to assess the title (including the type of design), preparation of the abstract (structured and complete), background and explanation of rationale, definition of objectives and hypotheses, description of the trial design (including major

changes in methods after trial initiation and reasons), eligibility criteria for participants, setting and location where data were collected, description of the intervention (with sufficient detail to allow for replication), fully defined outcome measures, sample size calculation (or power analysis).

The selection process is summarized in the following flow chart.

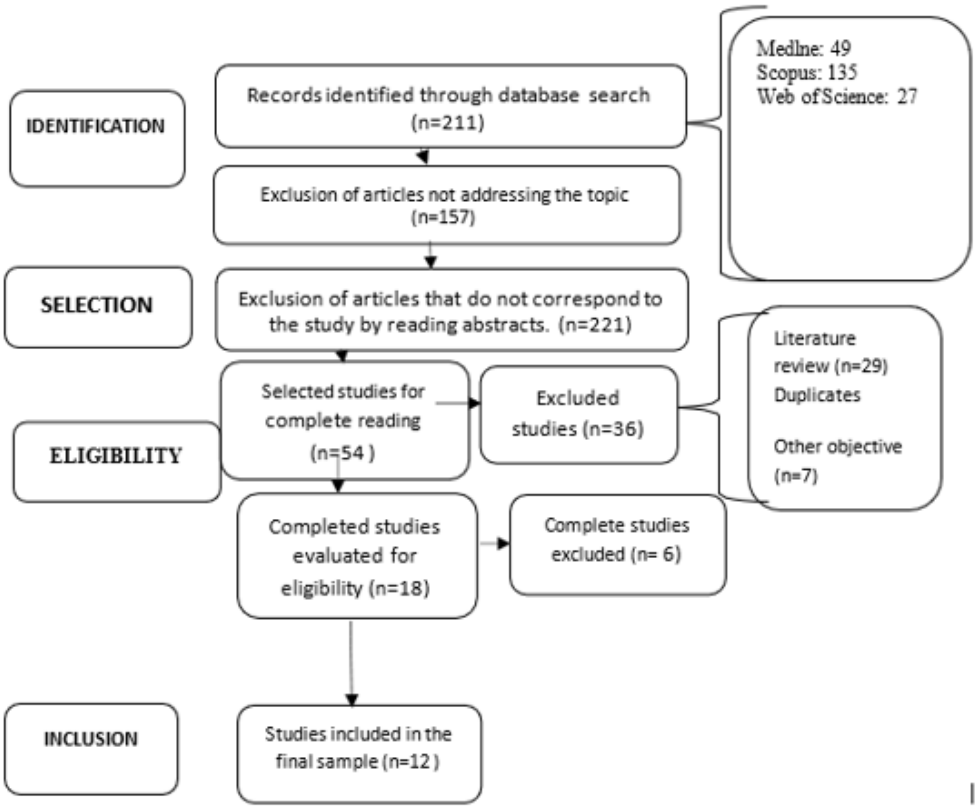

Figure 1: Summary of the article selection process.

The variables of interest for data extraction from the selected articles were the prevalence of adolescent pregnancy and the risk factors associated with these pregnancies.

Results

Table 1 shows the main results according to the authors, years of publication, type of study, population, and main objective of each article.

Table 1. Articles selected for the review with their main results.

Author. Year.	Type of study. Population. Country	Target	Main results
Maia Monteiro et al. 2019 (13)	Descriptive study The study included all women who had a LB in the years 2006 to 2015 in Brazil com mean age 10-19 years. Brazil	To assess the frequency of teenage pregnancy in Brazil from 2006 to 2015 and its association with the Human Development Index (HDI).	The number of live births increased 5.0% among mothers aged 10-14 years in the North and decreased in the other regions, with higher rates in the South (18.0%).

Author. Year.	Type of study. Population. Country	Target	Main results
Demera Muentes et al. 2017 (14)	Descriptive study An interview was conducted with 20 students in the first year of general unified high school at the Unidad Educativa Fiscal "Olmedo" in the city of Portoviejo 20, average age 10-24 years old. Ecuador	To make a theoretical analysis of the main theoretical conceptions on early pregnancy and the necessary measures for its prevention based on the promotion of sexuality education in this age group.	Prevalence of pregnancy: 18%. Risk factors: - Gestational diabetes and preeclampsia, while the baby may be born prematurely and with a congenital malformation. - Increased risk of miscarriage
Pradhan Rina 2017 (15)	Mixed quantitative and qualitative approach study. In-depth interviews were conducted with young women (married and unmarried) aged 15- 24 years from rural Lalitpur district of Nepal. Nepal	To describe the prevalence and determinants of adolescent pregnancy in Nepal using the Nepal Demographic and Health Surveys (NDHS).	Prevalence of pregnancy: 56%. Risk factors: - Living in the eastern development region with fewer resources, low socioeconomic status, age of the couple and early sexual debut.
Chodick et al. 2021 (16)	Retrospective cohort study Included 109,905 Israeli female members of Maccabi Healthcare Services (MHS), who as adolescents (aged 16-19 years) underwent medical evaluations by the Israel Defense Forces one year prior to their compulsory military service Israel	To investigate the possible associations of adolescent BMI and changes in BMI experienced before the first pregnancy with the risk of gestational diabetes.	Prevalence of pregnancy: 26.50%. Risk factors: Change in BMI status from adolescence to pre- pregnancy may contribute to the risk of gestational diabetes mellitus.
Tipparat Udmuangpia et al. 2017(17)	A descriptive qualitative research approach Participants were recruited among Thai adolescents living in a small village in central Sweden. The sampling of participants was purposive. 18 met the eligibility criteria at mean age 15-19 years. Sweden	Exploring perceptions of teenage pregnancy among Thai teenage girls living in Sweden.	Risk factors: Family preparedness, economic factors, maturity and cultural influences, particularly those related to Buddhist beliefs, are key factors in Thai adolescents' decision making about abortion when faced with an unwanted pregnancy.
Sürer Adanir et al. 2020 (18)	All pregnant adolescents aged 12-19 years who attended the obstetrics and gynecology clinic of Antalya Training and Research Hospital were invited to participate, 47 adolescents were included. Turkey	Assessing post-traumatic stress disorder in this high-risk group.	Risk factors:Post-traumatic stress disorder was observed more frequently in adolescents with pregnancy compared to their healthy peers.

Author. Year.	Type of study. Population. Country	Target	Main results
Nunes et al. 2019 (19)	Cross-sectional study A survey of maternal deaths was conducted in Piauí, from January 2008 to December 2013, with emphasis on deaths among adolescents and analyzed adolescent deaths due to abortion. There were 50 eligible adolescents in mean age 10-19 years. Brazil	Analyzing adolescent maternal deaths in Piauí and describes the histories of those who died from induced abortion between 2008 and 2013.	Prevalence of pregnancy: 17%. Risk factors: The causes of death were hypertensive disorders (28%), puerperal infection (16%), hemorrhage (12%), thromboembolism (12%) and abortion (10%).
Ñauta et al. 2017 (20)	Cross-sectional descriptive study A total of 125 medical records of adolescents aged 10-19 years were analyzed. Ecuador	To determine the prevalence in the Hospital de Especialidades "José Carrasco Arteaga" during 2015.	Prevalence of pregnancy: 5.80%.
Bakwa-Kanyinga et al. 2017(21)	Cross-sectional study Adolescent girls admitted to the Obstetric Center of the Hospital de Clínicas de Porto Alegre (HCPA), Brazil, were invited to participate. From 2014 to j2015, 3006 deliveries were registered, of which 533 (17.73%) were from adolescent mothers. Their mean age was 17.5±1.4 years. Brazil	To determine the prevalence of preeclampsia (PE) in adolescents and to evaluate its association with risk factors and the occurrence of adverse maternal and fetal outcomes.	Prevalence of pregnancy: 17.70%. Risk factors: - Preeclampsia, vitamin and mineral supplements were associated with the development of preeclampsia.
Munakampe et al. 2018 (22)	Systematic review. Literature searches in 6 databases covering the period 1970 to 2016 and on adolescents aged 15 to 19 years, and 21 studies were read and analyzed by thematic analysis. Africa	To conduct a systematic review of adolescent knowledge, attitudes, and practices about contraception and abortion in low- and middle-income countries.	Risk factors: limited knowledge about sexual and reproductive health among adolescents was an important cause of reduced access to contraception and safe abortion services.
Martínez et al. 2020 (23)	Bibliographic review The search for scientific information was developed using different digital databases and 26 articles that were discussed and helped to answer the research question. Ecuador	Addressing teenage pregnancy as a public health problem in Latin America with critical research.	In Latin America, the number of teenage pregnancies is increasing, which indicates that something is going wrong in the education on the management of sexuality at an early age.

Author. Year.	Type of study. Population. Country	Target	Main results
Vázquez et al. 2020 (24)	Cross-sectional study Conducted in 200 female adolescents . The Family APGAR test and the questionnaire of the National Institute of Statistics and Census (INEC) were used , the average age was 16.9 years. Ecuador	To determine the prevalence of adolescent pregnancy and associated factors in the Luis F. Martínez Hospital, province of Cañar, year 2017.	The prevalence 18%. The factors associated with adolescent pregnancy were: housing distant from the health center (PR: 1.25, 95%CI 1.06-1.14, p=0.004), psychoactive substance use (PR 1.24, 95%CI 1.06-1.46, p=0.005), migration of one of the parents (PR 1.28, 95%CI 1.10-1.49, p=0.002, p=0.002). 46, p=0.005), migration of a parent (PR 1.28, 95%CI 1.10-1.49, p=0.002), school dropout (PR 1.65, 95%CI 1.34-2.03, p=0.000) and family dysfunction (PR 1.66, 95%CI 1.5-2.21, p=0.000).

Discussion

Regarding the first specific objective, the highest percentage of prevalence was found in the study by Pradhan (15) with a prevalence of 56% in Nepal. To a lesser extent, a prevalence of 26.50% was identified in the study by Chodick et al. (16) in Israel. On the other hand, Muentes et al. (14) and Vázquez et al. (24) found equal prevalences of 18% in Ecuador. Similarly, Nunes et al. (19) and Bakwa-Kanyinga (21) defined prevalences of 17% and 17.70% respectively in Brazil. However, the lowest prevalence identified was 5.80% in the study by Ñauta et al. (20) also conducted in Ecuador for 2015. According to Monteiro et al. (13) in Brazil, the number of live births increased 5.0% among mothers aged 10-14 years in the North and decreased in the other regions, with higher rates in the South. Regarding risk factors, Muentes et al. (14) mention that pregnant adolescents may suffer from gestational diabetes and preeclampsia, while the baby may be born prematurely and with a congenital malformation, and there is an increased risk of miscarriage. Chodick et al. (16) argue that the change in BMI (Body Mass Index) status from adolescence to pre-pregnancy may contribute to the risk of gestational diabetes mellitus, while for Bakwa-Kanyinga et al. (21) vitamins and mineral supplements were associated with the development of preeclampsia in pregnant adolescents.

On the other hand, Sürer Adanir et al. (18) point out that pregnant adolescents are prone to develop post-traumatic stress disorder, which was observed more frequently in pregnant adolescents compared to their healthy peers. According to Pradhan (15), factors related to adolescent pregnancy include living in the less affluent eastern development region, low socioeconomic status, age of the couple, and early sexual debut. Similarly, Tipparat-Udmuangpia et al. (17) further argue that family readiness, maturity, and cultural influences, particularly those related to Buddhist beliefs, are key factors in Thai adolescents' decision making about abortion when faced with an unwanted pregnancy.

On the other hand, Munakampe et al. (22) indicate that limited knowledge about sexual and reproductive health among adolescents was an important cause of reduced access to contraceptive and safe abortion services. Similarly, according to Vázquez et al. (24), the factors associated with adolescent pregnancy were: living far from the health center, use of psychoactive substances, migration of one of the parents, school dropout and family dysfunction.

Finally, regarding the second specific objective, Nunes et al. (19) identified the main causes of death in pregnant adolescents as hypertensive disorders (28%), puerperal infection (16%), hemorrhage (12%), thromboembolism (12%) and abortion (10%). Thus, Martínez et al. (23) emphasize that in Latin America the number of adolescent pregnancies is increasing, which indicates that something is failing in education on the management of sexuality at an early age.

Conclusions

Our results show that the factors that most influence the high prevalence of adolescent pregnancies are low economic resources, living in areas of extreme poverty, and social factors such as cultural and family beliefs. Therefore, it is necessary that plans and programs for the prevention of premature pregnancies focus on rural and low-income areas. It became evident that among the main causes of death of pregnant adolescents are hypertensive disorders, puerperal infection, hemorrhage, thromboembolism, and abortion; therefore, it is necessary that prevention talks, and programs include all the risks to which not only the woman is exposed, but also the newborns, to raise awareness among adolescents and their parents. On the other hand, it would be interesting to conduct empirical studies with the geriatric depression scale in the face of the health emergency due to the COVID-19 pandemic in both confinement, estrangement, and vaccination stage in various populations (22,23,24) related to emotional and educational aspects (26,27,28).

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Conflict of interest

There are no personal, professional, or other conflicts of interest.

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