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Bibliometric analysis of teen pregnancy research in Asia-Africa: Explore the future scope

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Abstract:

BACKGROUND: Adolescent pregnancy is prevalent in Asian-African countries. Hence, it is critical to track the progress of research and development trends related to the topic. The study aimed to characterize published articles on teen pregnancy by measuring the authors' country and affiliation, most relevant and cited journals, thematic research, and growth trends.

MATERIALS AND METHODS: Descriptive statistics and retrospective bibliometric analysis were used. Using the Scopus database, we collected published articles from 2010 to 2023. Titles and abstracts were screened. Eligible papers were reviewed based on co-occurrence analysis. Classification and visualization of results were conducted using VOSviewer software version 1.6.17.

RESULTS: A total of 369 articles were relevant and included in the review. The countries that produced the most publications were South Africa and the United States. The most relevant affiliation was with the University of Cape Town, the University of the Witwatersrand, and the University of Kwazulu-Natal. The most relevant source journals were PLOS One, Reproductive Health, and BMC Public Health. The most cited sources were Lancet, PLOS One, and AIDS Journal. Four clusters were obtained that reflect the main topics, including human immunodeficiency virus (HIV) infection, child, health services, and pregnancy. The current research terms include HIV infection and maternal health services.

CONCLUSIONS: This study suggests more research on the term "vertical transmission, breastfeeding, and partner violence" related to teen pregnancy. In addition, this research will inspire researchers and adolescent health policymakers to expand the scope of research to solve teenage pregnancy problems based on interdisciplinary theories and methods.

Keywords:

Adolescent health services, Africa, Asia, bibliometric analysis, teen pregnancy

Introduction

Maternal deaths related to pregnancy and childbirth are a significant component of mortality for girls aged 15 to 19 years. Adolescent pregnancy has remained persistently high in Asia and Africa, particularly in low- and middle-income countries (LMICs), which account for 99% of global maternal deaths among women aged 15 to 49 years. According to data, the global average for

adolescent pregnancy is 43 births per 1,000 adolescents.^[1,2] Around 14% of adolescent girls and young women gave birth before the age of 18 years in 2021.^[2] According to World Health Organization (WHO) data, 39% of adolescents married at the age of less than 18 years, and 12% of adolescents married at the age of less than 15 years in the least developed countries.^[3] Among these adolescents who are married, 95% of teenage pregnancies occur, and 99% cause maternal death. Furthermore, the percentage of adolescent pregnancies is

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expected to rise globally by 2030, particularly in LMICs in Asia-Africa.^[2,4] Meanwhile, the United Nations Sustainable Development Goals (SDGs) include sexual and reproductive health targets, and the indicators for the SDGs are critical for tracking global progress.^[5] Preventing adolescent pregnancy, including pregnancy-related mortality and morbidity, is critical to achieving positive health outcomes throughout life, and it is required to meet the SDGs for maternal and newborn health.

Teen pregnancy has serious health consequences, with far-reaching ramifications for society as well as the mothers and their babies. Teen mothers are especially vulnerable to mental health issues and sexually transmitted diseases, premature membrane rupture, poor nutrition, anemia, obstetric fistula, eclampsia, puerperal endometritis, systemic infection, and the possibility of bleeding due to weak uterine muscles, which could result in the mother's death. Poor maternal health is one of the leading causes of disability-adjusted life years (DALYs) and death among 15- to 19-year-old girls. There are several serious conditions that they may face in the short and long term for the health of the babies of adolescent mothers. Babies' health risks include intrauterine growth retardation, stillbirth, a high risk of low birth weight, preterm delivery with the possibility of asphyxia, and nutritional issues, such as stunting.^[6,7] Aside from these health-related consequences, adolescent pregnancies frequently have personal and social issues related to human rights protection, as well as socioeconomic consequences.^[4]

Poverty, negative peer and media influence, a low level of education, a dysfunctional family, a lack of communication between parents and their daughters, a lack of comprehensive sexual and reproductive health education, early marriage, coerced sex, misconception, and non-use of contraceptives are some of the triggering factors for teenage pregnancy. Adolescents with young married parents and low education, adolescents who do not live with their biological parents, drug-infested environments, inability to resist sexual temptation, excessive self-confidence and curiosity in adolescents, and a culture of young marriages were also discovered to be some of the determinants of teenage pregnancy.^[8-11]

Given the significance of the problem, the field of adolescent pregnancy is gaining increasing attention globally. Existing research has focused on teen pregnancy prevalence, risk factors, complications, and outcomes. Most of this research spread over original research with limited geographic areas^[12,13] or secondary analyses of nationally representative data^[14] as well as review studies.^[15,16] However, those studies have limitations in generalizing an overall view of a specific field over a large period. However, bibliometric analysis is key for assessing

scientific contributions across a wide range of areas of knowledge and helps bring the focus of research.^[17]

Researchers' use of bibliometric analysis to identify research trends through science mapping of knowledge dynamics has increased dramatically in the last 15 years. This big data approach has several advantages, including the following: Using available software, the process of analyzing and presenting data trends is faster, and it is simple to learn and practice.^[18] In the study of maternal and child health, bibliometric analysis has already been performed.^[19] However, research on teen pregnancy in Asia and Africa is still limited. As a result, a bibliometric study is required to determine research trends in the context of teenage pregnancy in Asia-African countries. The purpose of this research was to identify growth trends, collaboration patterns, author countries, and thematic research. The findings of these analyses will assist policymakers in charge of adolescent health and well-being programs in developing appropriate interventions to reduce the alarmingly high rates of adolescent pregnancies in LMICs and achieve key SDGs.

Materials and Methods

Study design

This study used bibliometric analysis. Bibliometrics is the analysis of a body of literature using statistical methods to reveal the historical development of subject fields and patterns of co-authorship, co-occurrence, citation, and network data.^[20,21] Scopus was chosen because it currently has the most bibliometric data. The data analysis process used co-occurrence analysis and cluster analysis to systematically analyze topics related to early pregnancy.

Database and search methods

The bibliometric analysis relied on the Scopus database. We used keyword (TITLE-ABS-KEY (*teen AND pregnancy*) OR TITLE-ABS-KEY (*teenage AND pregnancy*) OR TITLE-ABS-KEY (*adolescent AND pregnancy*) OR TITLE-ABS-KEY (*pregnancy AND in AND adolescence*) AND TITLE-ABS-KEY (*sex AND education*) OR TITLE-ABS-KEY (*primary AND prevention*) OR TITLE-ABS-KEY (*adolescent AND health AND services*) OR TITLE-ABS-KEY (*school AND health AND services*) OR TITLE-ABS-KEY (*community AND participation*) OR TITLE-ABS-KEY (*comprehensive AND sex AND education*) OR TITLE-ABS-KEY (*school-based AND intervention*) AND TITLE (*Asia*) OR TITLE (*Africa*)) AND PUBYEAR >2010 AND PUBYEAR <2023 AND PUBYEAR >2010 AND PUBYEAR <2023 to search the articles.

Study selection

We included teen pregnancy-related research from Asian and African countries. The date range of the

study included 13 years between January 1, 2010, and December 31, 2023. We further restricted the search records to original research and review articles and excluded book chapters, proceeding papers, commentaries, editorials, corrections, and letters. Only articles written in English were included.

Data analysis

The articles are downloaded in *.Ris format for visualization and then processed using VOSviewer version 1.6.17 to make them easier to analyze. Furthermore, VOSviewer was used to visualize and analyze trends on three visualizations, namely, network visualization, overlay visualization, and density visualization, in the form of bibliometric maps.^[22] Thematic maps based on keywords were created using network visualization. Overlay visualization was used to determine how keywords evolve from year to year. Density visualization was used to count the number of articles that used the same keywords and create groupings or clusters of articles based on data.^[23] The analysis process can be tweaked to your liking, and irrelevant keywords can be removed.^[20,24] The analysis process in this study began with the creation of a map based on text data to create a term co-occurrence map using fractional counting methods with a minimum number of terms.

Ethical consideration

Ethical review and approval were not required for this study because it used publicly available data from the Scopus database.

Results

We found 369 selected articles. This study showed a trending fluctuation of researchers who were interested in teen pregnancy in Asia-Africa as the focus of their

research. Articles related to early pregnancy published in 2010–2023. An increased number reached peaks in 2018 from the Scopus database was 53 articles published.

Our analysis demonstrated that research articles related to early pregnancy have increased in recent years, especially in 2018. The terms that often appeared had shifted before, discussing the impact of teenage pregnancy on mothers and babies and currently discussing human immunodeficiency virus (HIV) and terms closely related, such as virus load and anti-HIV. The limited number of main researchers from Asia and limited topics about “vertical transmission, breastfeeding, and partner violence” provided an opportunity for researchers who were interested in conducting research related to teen pregnancy to further explore related to adolescent health. The top 10 countries that produce the most publications are South Africa, the United States, the United Kingdom, Canada, Australia, Switzerland, Ghana, Ethiopia, India, and Nigeria.

Most relevant affiliations

Figure 1 shows that 20 affiliates generate the most publications, the top 3 namely the University of Cape Town, the University of the Witwatersrand, and the University of Kwazulu-Natal.

Most relevant journals

Figure 2 shows the results of the analysis that the top 10 most widely used journal names for publications are PLOS One with 29 publications, then followed by Reproductive Health with 20 publications, and BMC Public Health with 18 publications.

Top cited journals

Figure 3 summarizes the top 20 most cited journals. The most cited journal (448 citations) was Lancet (488 citations), PLOS One (321 citations), and AIDS (233

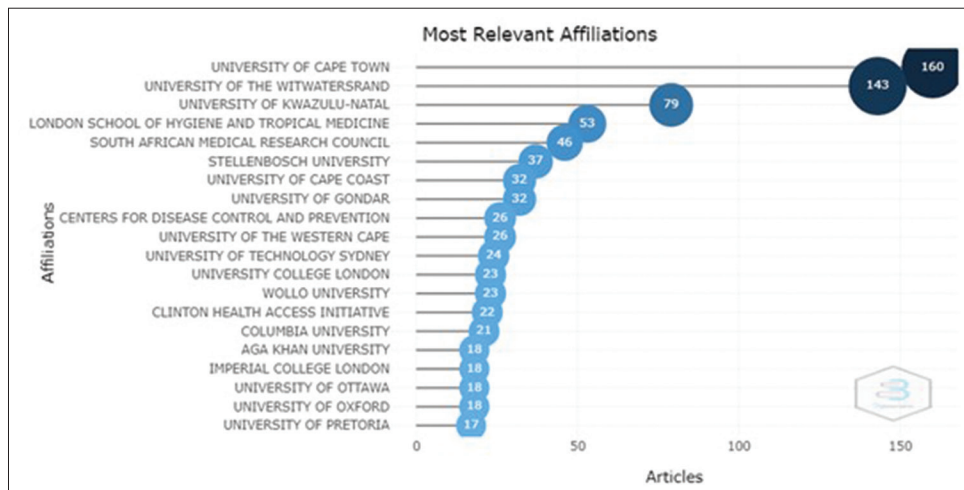


Figure 1: Top 20 most relevant affiliations

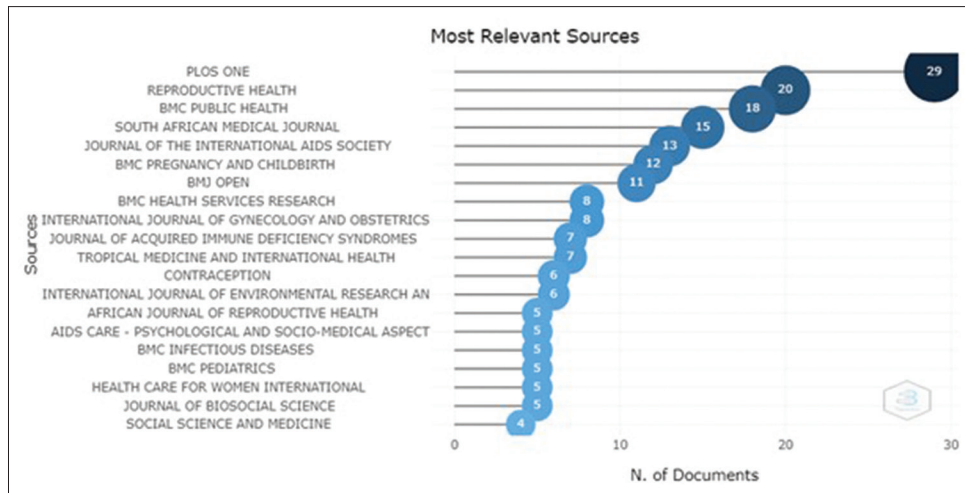


Figure 2: Top 20 most relevant journals

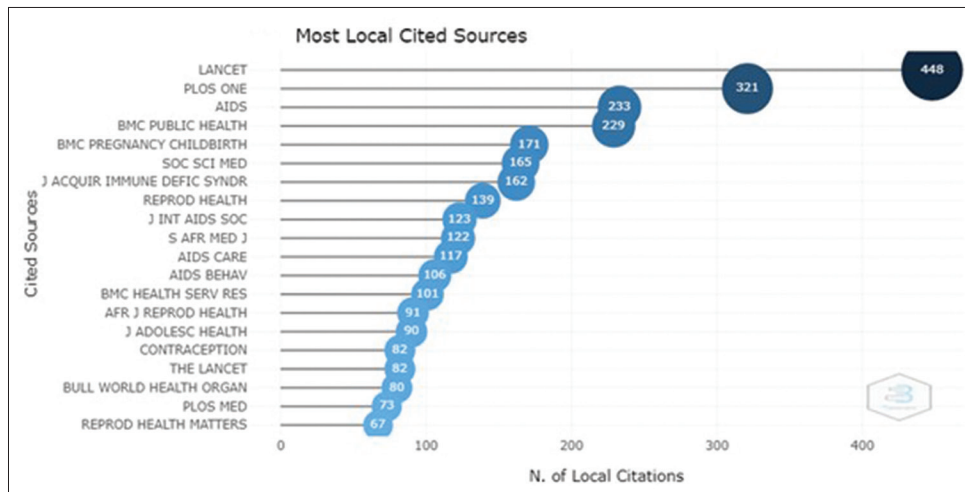


Figure 3: Top 20 most cited journals

citations). Journal with the most citations linear with the categorization of reputable journals by Scopus. The higher the Scopus index (Q1), the more opportunities to be cited by other authors. According to the findings of this study, the journal that had the most citations was Lancet, with 448 citations or four times more citations by other researchers than journals that had been indexed in Scopus index Q2, such as South Africa Medical Journal.

Co-occurrence analysis

We conducted thematic keywords on Scopus data-based, it was then using VOSviewer with full counting calculation with the analysis stage using a minimum number of occurrences of 13 terms, getting as many as 199 terms that met the minimum requirements from 2814 existing terms. The data network and overlay visualization display on Scopus data related to the keyword Co-occurrence “early pregnancy in Asia-Africa” that has been refined in search can be seen in Figure 4 and the visualization of density in Figure 5.

Keywords were labeled with a circle. The size of the circle is positively correlated with the appearance of keywords in the titles and abstract. Therefore, the size letter and circle were determined by the frequency of occurrences. The more often a keyword appeared, the greater the size of letters and circles.^[24] Then, 199 suitable terms that met the requirements were obtained which were divided into fourth clusters. In each cluster, the main elements/topics of research related to “teen pregnancy” are obtained, namely: in the first cluster “HIV infection,” in the second cluster “Child,” in the third cluster “Health services,” and in the fourth cluster “Pregnancy.” The relevance and occurrence of the main topic could be further seen in the visualization image. In terms of research topics, the keywords HIV infection, pregnancy complication, and pregnancy outcome (red area) were with the larger label and the circle. Our results indicated a close relationship between them. Meanwhile, overlay visualization shows the trend from year to year related to this research. The yellow color indicates the most recently discovered

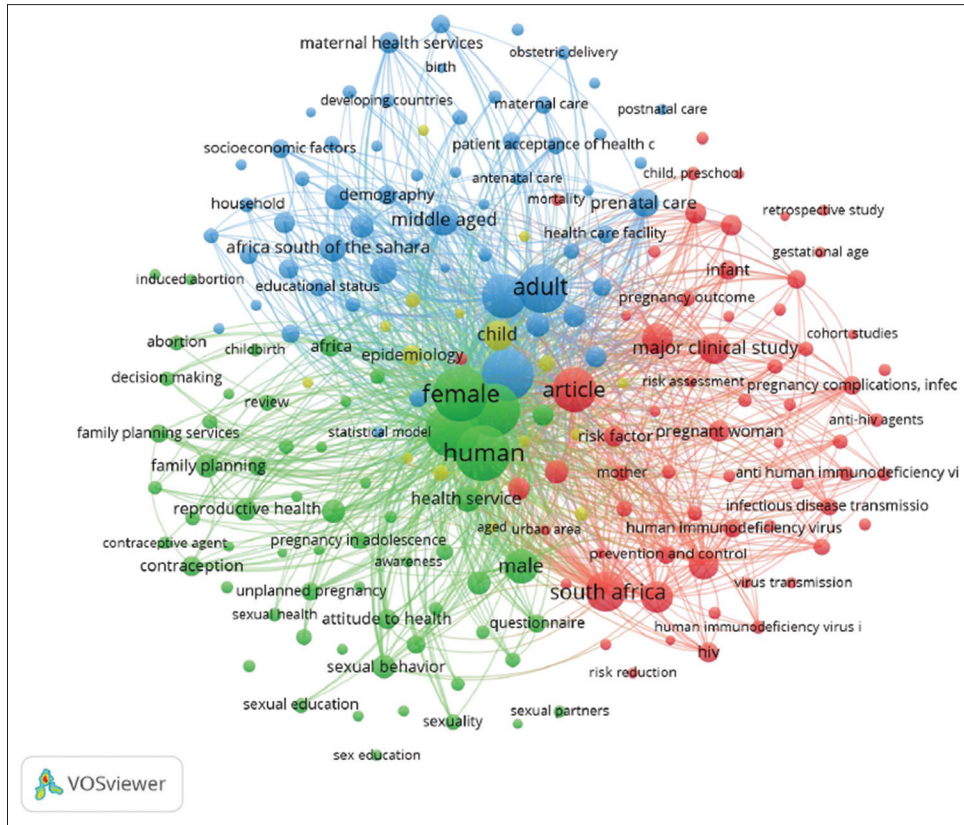


Figure 4: Visualization topic area using VOSviewer using network visualization

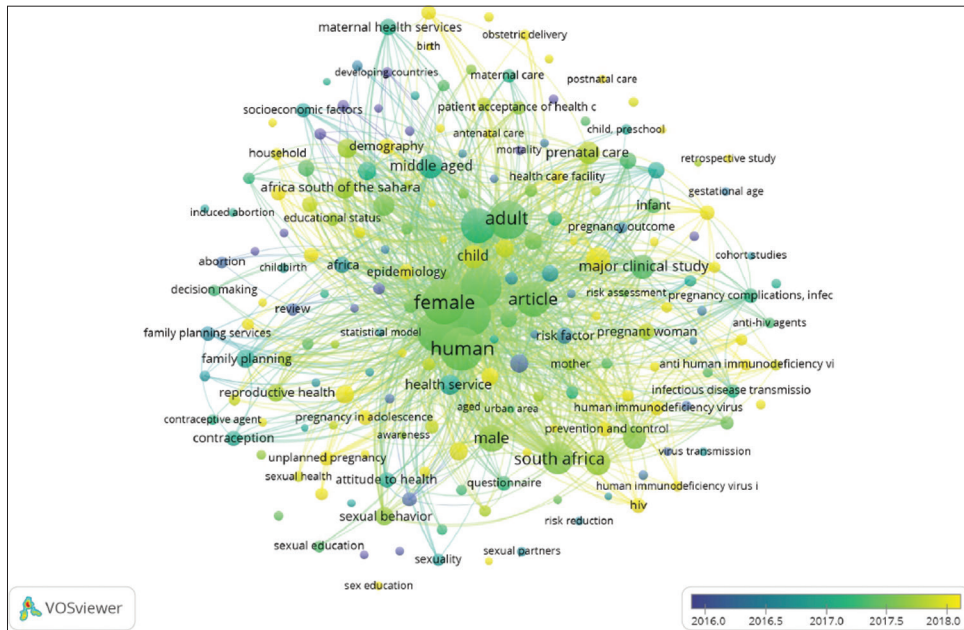


Figure 5: Visualization topic using VOSviewer using overlay visualization

topics researched, such as topics HIV infection and maternal health services.

The density of research, indicating that the more focused that emerged and the quantity of research grew. The larger the number of items in the neighborhood of a point

and the higher the weights of the neighboring items, the closer the color of the point is to yellow.^[21] From Figure 3, it can be seen that the keywords that often appeared were “Child, South Africa, and sexual behavior.” Some topics are still quite discussed related to vertical transmission, breastfeeding, and partner violence.

Discussion

The countries that produced the most publications in Asia-Africa that are interested in research related to teen pregnancy are predominantly from Africa, such as South Africa, and authors from outside Asia-Africa, such as the United States and the United Kingdom. While the number of Asian authors is limited, researchers, particularly those from Asia-Africa, frequently expressed barriers that included a lack of research training facilities to solve research problems, a lack of a sufficient financial budget for research activities, and organizational-managerial barriers as the most significant scientific barriers aside from language barriers.^[25-28] With more inter-regional research collaborations on the problem of teen pregnancy involving researchers from Asia and Africa, funding support from all parties is required for research.

Most relevant affiliations are dominated by affiliations in Africa, such as the University of Cape Town, and affiliations outside Asia and Africa, such as the London School of Hygiene and Tropical Medicine. There was limited affiliation with Asia. In our findings, no affiliation from Asia is found in the top 10 most relevant affiliations, but only Aga Khan University is found in the top 20 most relevant affiliations from Asia. This indicates that there are not many research centers productively producing publications related to reproductive health, especially on the topic of teen pregnancy in Asian countries. It is necessary to establish a research collaboration center in Asian countries to reduce the incidence of teenage pregnancy in Asia based on evidence.

The authors' preferred journals for teen pregnancy in Asia and Africa included PLOS One, Reproductive Health, and BMC Public Health, taking into account the context or scope of the journals that are more relevant to the topic of teen pregnancy. Another feature enables the journal's selection of authors as well as the processing time of articles from submission to publication.^[29] Furthermore, journals published under the open access journal (OAJ) model dominated author selection. Researchers preferred to publish their research on OAJ due to the benefits of getting more readers' access and providing opportunities for higher citations.^[29]

Terms that met the requirements were obtained, which were divided into four clusters. For example, in the red area, it can be seen that the keywords risk factor, pregnancy complication, and pregnancy outcome were in the same cluster. Our results show the close relationship between risk factors and the possibility of complications arising from teenage pregnancy that will affect the pregnancy outcome, so it is necessary to strengthen adolescent health services. Adolescent mothers are at a high risk of developing mental health problems and

contracting sexually transmitted diseases. Obstetric fistula, eclampsia, puerperal endometritis, systemic infection, and the possibility of bleeding due to weak uterine muscles leading to the mother's death are just a few of the serious conditions they may face in the short and long term. However, health consequences for babies of adolescent mothers face a high risk of low birth weight, preterm delivery with the possibility of asphyxia, and nutritional problems referred to in the occurrence of stunting.^[6,9] So, some of these terms have a close relationship.

The trend in the topic of early pregnancy has been growing for the past decades, such as discussing risk factors, pregnancy complications, and pregnancy outcomes. This time, the most recently discovered topics have shifted, such as those regarding HIV, anti-HIV, and virus transmission. This shows the interest of researchers in the impact of early pregnancy on the long-term spread of disease. This is supported by previous research, which stated that HIV prevention requires policy support from the government accompanied by the integration of services to suppress long-term outcomes.^[30] However, topics related to vertical transmission, breastfeeding, and partner violence are still limited.

This bibliometric analysis is not without limitations. Our research was restricted to published articles that were indexed by the Scopus database. We chose the Scopus database because it is one of the most reputable scholarly journal article databases. As a result, we may have overlooked reports from other databases (publication bias). Our findings point to the next research agenda, which will focus on topics related to teen pregnancy. Some unused words can be linked and investigated further. Many more topics based on these terms, such as "vertical transmission, breastfeeding, and partner violence," can be developed. Further research could look into vertical transmission and its effects on babies. Another researcher is still investigating how teenagers who become pregnant are accepted into the breastfeeding process, whether they face violence from partners, parents, and the community, and how it affects them in the future. These previously mentioned elements could provide a more thorough analysis. Furthermore, more research is required, particularly in Africa and Asia, where teen pregnancy rates are highest.

Conclusion

In recent years, our review found a rising trend in adolescent health in Asia-African countries. The majority of productive authors and affiliations were conducted in South African countries, where resources from Asian countries are still very limited. There is a need for increased capacity among researchers as well as funding assistance in overcoming the problems of teen pregnancy, particularly in Asian countries. The finding

also emphasizes the need for more research, particularly on topics such as “vertical transmission, breastfeeding, and partner violence,” which have yet to be discussed by researchers using a multidisciplinary research approach.

Key messages

- The most updated topics have shifted to HIV, anti-HIV, and virus transmission.
- The most productive authors and affiliations took place in South African countries, whereas resources from Asian countries remain scarce. To address the issues, particularly in Asian nations, there is a need for both financial support and enhanced research capability.
- Future research regarding “vertical transmission, breastfeeding, and partner violence” related to adolescent pregnancy is needed.

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Conflicts of interest

There are no conflicts of interest.

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