Reproductive Health Education as a Strategy for Achieving the Sustainable Development Goal (SDGs)

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Abstract — One significant challenge in achieving the Sustainable Development Goals (SDGs) is the limited access to reproductive health education, especially in developing countries. SDG 3 targets good health and well-being, while SDG 4 focuses on quality education, demonstrating their close interconnection. The absence of reproductive health education negatively impacts the realization of other SDGs, such as gender equality (SDG 5) and reducing inequalities (SDG 10). This study aims to analyze the relationship between reproductive health, education, and the SDGs through data visualization methods and network analysis. The methodologies employed include Open Knowledge Maps, Publish or Perish, and VOS viewer. A search was conducted using the keywords "((Health Reproductive) OR (Health reproduction) AND education AND SDGs OR (sustainable Development goals))." The study identifies patterns and trends in academic literature while exploring interconnections among topics, authors, and key concepts in related research. The visualizations produced were complemented by bibliometric analysis and knowledge mapping to deepen the understanding of research structures and citation patterns in reproductive health. Findings indicate a strong link between reproductive health education and the achievement of SDG targets, particularly concerning good health, gender equality, and quality education. The visualizations from VOS viewer reveal key clusters centered on education, public policy, and reproductive health epidemiology, especially in developing countries. Mapping with Open Knowledge Maps outlines the structure of topics and subtopics, underscoring the crucial role of reproductive health education in enhancing community health and well-being. The study concludes that reproductive health and education are vital for achieving the SDGs and that inclusive, data-driven policy support is necessary. This visualization approach offers valuable insights for policymakers and practitioners to design effective interventions addressing reproductive health needs globally, particularly in developing regions.

Keywords- Education; Reproductive Health; SDGs; Open Knowledge Map; VOSviewer

I. INTRODUCTION

Currently, 119.3 million girls remain out of school, down 5.4 million since 2015. About 39 percent of young women fail to complete high school [1] . Reproductive health and education are important elements in achieving the Sustainable Development Goals (SDGs), especially in SDG 3 which is Good Health and Well-being and SDG 4 which is Quality Education and SGD 5 which is Gender Equality. Despite progress made, girls and women, especially in certain areas, still face barriers to education, including poverty, early marriage, and cultural bias [2], [3] .

Prioritizing the health and rights of women and girls as essential not only for their survival but also for their progress and empowerment [4] . The problem of adolescent pregnancy, sexually transmitted infections, and high maternal and infant mortality involves comprehensive reproductive health education is urgently needed to equip individuals, especially adolescents, with the correct knowledge of their reproductive health, so as to promote better health and wider well-being. being in society [5] Research on reproductive health and education has shown an increasing trend in recent years, in line with global efforts to achieve the SDGs by 2030, including the relationship between maternal health and the achievement of the SDGs as well as more specific topics such as violence against women, which is one of the goals of SDG 5 on gender equality [6], [7], [8] .

Data from visualization tools such as "Open Knowledge Maps, Publish or Perish and visualization by VOSviewer, show that since 2020, there has been a significant increase in the number of publications that relate with health reproduction and SDGs. This visualization identifies several research clusters, including the role of education in reproductive health, access to health services, and the importance of public policies that support the

achievement of the SDGs, as well as research related to violence against women and gender equality which is greatly influenced by the existence of reproductive health education [9] .

Reproductive health education also has important implications in creating gender equality and reducing inequality [6] . In many ways community, women often own more access limited to information and services health reproduction compared to with men . This is compounded by cultural stigma and lack of support from policy government [3] . With increasing attention to the SDGs, many study Now focus on how education health reproduction can become tool For empowering women and teenagers women to be more aware will right health they [10], [11] . Research this also encourages government For integrate education health reproduction in system formal education for ensure that all over population , without looking at gender or background behind economy , have access to adequate knowledge

Finally, development policy based proof become key in ensure sustainability education health reproduction and achievement of SDGs. With analysis bibliometrics and mapping knowledge, government and makers policy can understand global and local trends, identifying gaps in service health, as well as develop effective intervention for increase health reproduction society. Policies based on research data will more responsive to need society and more capable create impact term long, in line with objective big SDGs for create a more society healthy, educated and just study.

This aiming For analyze connection between Health Education reproduction and purpose development sustainable development (SDGs) using method data visualization and analysis network. With utilise *Open Knowledge Maps* , and *VOSviewer*, studies This identify patterns and trends in literature academic, as well as explore relatedness inter-topic , author , and concept main in study related. Visualization methods like. This including in technique **analysis bibliometrics** and **mapping knowledge** that enables understanding deep to structure study as well as pattern citation in field health reproduction.

II. METHOD

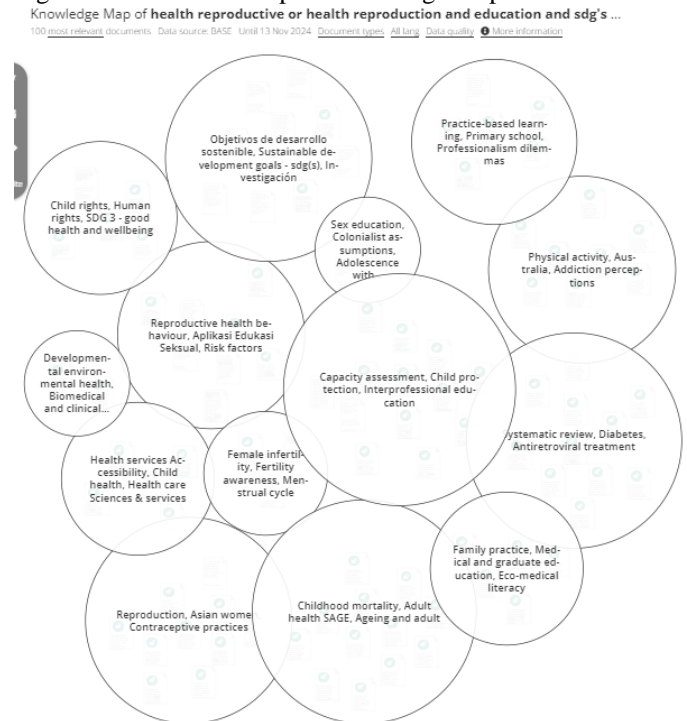### A. Selecting a Template (Heading 2)

Methods used is Open Knowledge Maps, Publish or Perish and VOSviewer. The search process with using keywords" ((Health Reproductive) OR (Health reproduction) AND education AND SDG's OR (sustainable Development goals))". This study identify patterns and trends in literature academic, as well as explore relatedness inter-topic, author, and concept main in study related. This method is part from Scientometrics or Analysis Method Networks in research scientific. Namely approach for analyze literature and patterns study in a field. This method is very useful for researcher For understand structure research, found gap

research , as well as to weave collaboration new based on connection topics and researchers .

III. RESULT AND DISCUSSION

Following This is results visualization using Open Knowledge Map, with source BASE (all Discipline)

Fig. 1 Visualization of Open Knowledge Map

In the map knowledge this , every circle show theme or Topic certain relevant with Topic main . Next is explanation and analysis from a number of Topic the main thing that appears in map This :

a. Unloading objectives sostenible (SDGs): This shows study or related studies with objective development sustainable . Topic This towards achieving the SDGs, especially in matter health reproduction and education . Practice-based learning and Primary school: Topics This show connection between learning based on practice at school the basis and dilemma professionalism . This can covers method education in health reproduction and how skills This taught at the level school . Sex education, Colonialist assumptions, and Adolescence: This shows How education sexual Can framed by assumptions colonialists , especially in context teenagers . There is a possibility research that discusses impact inheritance colonial to approach education sexual .

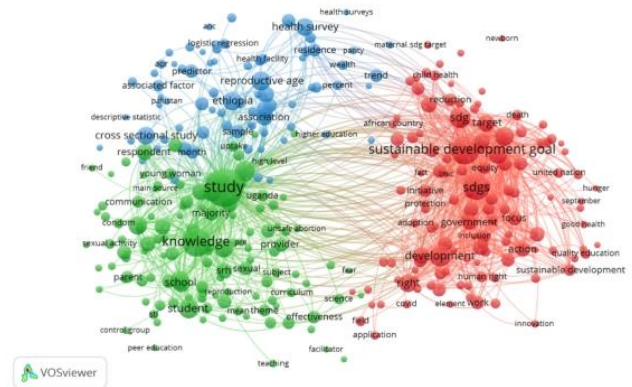b. Child rights, Human rights, SDG3 - good health and wellbeing: Topics This connect right children and

rights basic man with SDG3, which focuses on good health and well - being . This may relate with advocacy right health reproduction children and their impact to well-being . Reproductive health behavior , Application Education Sexual , Risk factors: Topics This focus on behavior health reproduction , application or tool help education sexual , and factors associated risks with health reproduction .

c. Physical activity, Addiction perceptions, Australia : Towards research focused on physical activity physical and perceptual addiction , particularly in Australia. This may be involving studies about influence education health reproduction and activity physical on addiction among teenager or adults .

d. Developmental environment, Biomedical and clinical: Topics This Can referring to the environment development and impact biomedical as well as clinical in health reproduction , in particular in context education and influence environment to development health reproduction .

e. Capacity assessment, Child protection, Inter-professional education: Topics This discuss evaluation capacity in protection children and education inter-professional , which can involving collaboration various field in support health reproduction children and adolescents .

f. Systematic review, Diabetes, Antiretroviral treatment: Topics This Possible relate with review systematic regarding diabetes and antiretroviral treatment , as well as its relevance with education health reproduction .

g. Female infertility, Fertility awareness, Menstrual cycle: It focuses on the problems infertility in women , awareness fertility , and cycle Menstruation . Education and awareness around Topic This become important in health reproduction .

h. Family practice, Medical and graduate education, Eco-medical literacy: Connecting practice family with education medical and literacy ecomedical , which may discuss method education health reproduction applied at the level family and community .

i. Reproduction, Asian women, Contraceptive practices: Topics This highlight reproduction , in particular in context Asian women and practice contraception . This can refers to studies that focus on access and use contraception in Asian communities .

This map give visual view of How various research and topics in health reproduction and education related One with each other and with the SDGs. Analysis This can help researchers or maker policy For identify relevant areas For intervention or study more carry on in health reproduction and education in accordance with objective development sustainable .

Fig 2. Network Visualization

Visualization This show relationships and interconnectedness relevant inter- topic with the "sustainable development goals" (SDGs), in particular in context health reproduction and education . The following is explanation and analysis from a number of component main in visualization This :

a) Color Division in Cluster

Cluster : Cluster This focuses on "study," "knowledge," and "education," as well as aspects related such as "student," "school," "communication," and "sexual activity." This show that study in cluster This related close with knowledge , education sexual , and communication . This includes themes important like education sex in school , knowledge about health reproduction , as well as its impact on students and society young .

Cluster : Cluster This focus on health reproduction at the level survey health , especially in countries like Ethiopia and Uganda. Words like "reproductive age," "health facility," and "logistic regression" indicate studies of a nature quantitative and epidemiological , which discusses factors that influence health reproduction , including access to facility health and factors socio-demographic other .

Cluster : Cluster This focused on "sustainable development goals" (SDGs), especially in context of "government," "equity," "rights," and "action." Cluster This it seems related with role government and organizations in achieve the SDGs, with emphasis on issues such as "child health," "newborn," "quality education," and "human rights." This shows existence focus on achieving SDGs targets through policy public , advocacy right basic human beings , and action government .

2. Analysis Inter- Cluster Relationships

Connection between " clusters green " and " cluster red " indicates existence relatedness between education health reproduction and purpose development sustainable . As example , knowledge and education in the field health

reproduction in school potential support achievement of the SDGs, in particular in matter Good Health and Wellbeing and education quality (Quality Education).

" Cluster blue " which focuses on surveys health and demography in African countries interact with " cluster red " through the theme of "equity" and "rights." This show that There is attention to equality access health in developing countries and the importance of epidemiological data in compile policies that support the SDGs.

Connection between " clusters green " and " cluster blue " shows connection between knowledge about health reproduction and factors health reproduction in a population certain . This describes importance education in increase understanding public about health reproduction , which in turn can increase health among age reproduction .
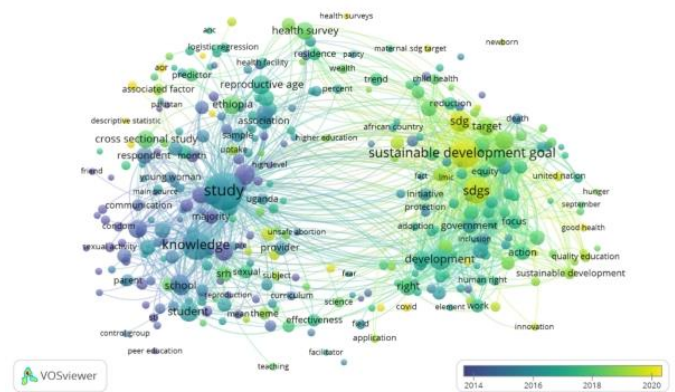
3. Key Issues Based on Node Size

Node with size more big such as "study," "sustainable development goal," " knowledge," and "government" indicate that terms This is very influential theme in network This shows that Lots research and literature that connects studies conducted in the field education health reproduction with policies related to SDGs and the role government .

4. Interpretation In general Overall

Visualization This describe How research in the field education and health reproduction each other related with goals development sustainable . Education in the field of health reproduction play role important in supporting the SDGs targets by How to : Increase knowledge health reproduction among students and population young . Produce relevant data (through survey health) for compile policy health reproduction .

Strengthen role government in reach welfare and equality through appropriate policies and interventions with SDGs goals . This map give description that there is strong connection between education health reproduction , epidemiological data , and achievement of the SDGs, especially in matter health , education , and equality . Research and policy focused on education health reproduction and rights health reproduction can in a way significant support global efforts to achieving the SDGs, especially in areas with need tall like Africa.

Fig 3 Overlay Vsualization

The image show connection inter-topic relevant research with the "sustainable development goals" (SDGs) in context education and health reproduction . Visualization This No only show connection inter-topic , but also using color For represent development time research , from 2014 to 2020, which can seen on a scale color in part lower .

1. Color Analysis Based on Time

Inner color visualization This range from purple (older research , around 2014) to yellow (further research) new , around 2020).

Topics in the section left images , such as "cross sectional study," "reproductive age," "health facility," and "young woman," tend to own color more to direction purple or blue greenish , indicating that focus on research This started more beginning .

More topics new , colored green or yellow , such as "sustainable development goals," "equity," "human rights," and "quality education," indicate improvement attention in a number of year lastly . This is show existence change focus study from studies health reproduction and survey health going to a more approach broad on SDGs, rights basic human beings , and education quality .

2. Division Cluster Based on Main Topics

Green and Yellow Clusters (SDGs and Governance): Clusters This related with term such as "sustainable development goals," "government," "equity," "human rights," and "quality education." Topics This show focus on the role government and policy public in reach objective development sustainable , especially on rights basic human , education , and health .

Blue Cluster (Reproductive Health Studies and Surveys): On the side left , there is more clusters focus on health reproduction with term such as "study," "reproductive age," "health survey," and "health facility." Research in cluster This tend nature quantitative and focused on analysis factors that influence health reproduction , especially in developing countries such as Ethiopia and Uganda.

Dark Green Cluster (Education and Knowledge): Center -left show related topics with education , such as

"knowledge," "student," "school," and "sexual activity." This indicates focus on education health reproduction among students and population young as well as importance education and communication in field This .

3. Inter- Cluster Relationships

Connection between Blue and Yellow/Green Clusters : Relationships between cluster health reproduction (blue) with SDGs cluster and rights basic human (yellow / green) indicates existence effort For integrate results study health reproduction to in policy public that supports the SDGs. For example , survey data health from countries like Ethiopia is used For to design more policies fair and inclusive .

Connection between Education Cluster (Dark Green) and SDGs (Yellow): Connections This show that education health reproduction become part important in achieving the SDGs, especially in matter quality education (quality education) and gender equality (equity).

4. Interpretation Based on Development Study

Development Topic study in visualization This show existence shift from research that focuses on collecting health data reproduction going to application findings This in framework SDGs policies and rights basic man .

More colors new around Topic such as "equity," "human rights," and "sustainable development goals" indicate that the SDGs become the more relevant in a number of year Lastly , with developing research to direction implementation results in policy public and advocacy rights basic .

5. Conclusions and Implications

Visualization This give description that in a number of year Lastly , there is improvement attention to role education and health reproduction in achievement of the SDGs, especially in matter right basic human and equality . Some implications that can taken is :
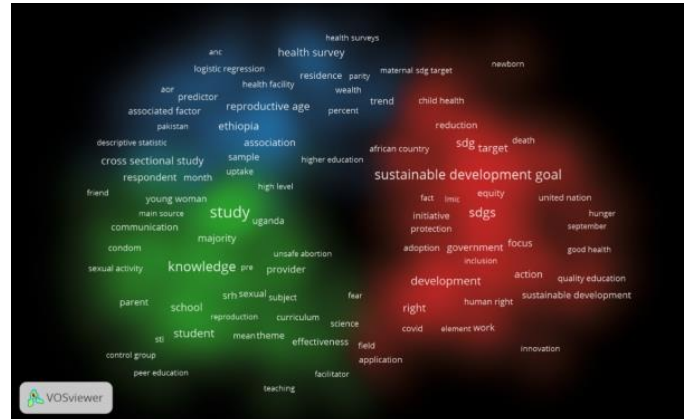
Future research Possible will the more focus on interconnectedness direct between results studies health reproduction with implementation policy SDGs for increase quality life society , especially in developing countries .

Health education reproduction can reinforced in system education For support SDGs such as education quality and gender equality .

Collaboration between government , institution health and education become important For ensure that the SDGs can achieved in a way effective through empirical data and education based on proof .

Visualization This describe how the SDGs have been become focus main study in a number of year lastly , and how health reproduction and education play a role important in reach goals This .

Fig 4. Density Visualization

Visualization image network VOSviewer the show connection relevant inter- topic with the "sustainable development goals" (SDGs) in context education and health reproduction . Visualization This shared become some color areas For separate cluster main in Topics research , which is represented by more specific keywords bigger and more thick, indicating that Topic the own frequency or high connectivity.

Following is analysis and interpretation from displayed clusters :

1. Green Cluster (Education and Knowledge)

Keywords main : "study", "knowledge", "student", "school, "communication", "sexual activity", "peer education".

Focus cluster This is on education and knowledge , especially in context education health reproduction and communication between students . Terms such as "student," "school," and "peer education" indicate that study in cluster This Lots related with the learning process teaching and improvement knowledge at school .

Topics This Possible covers study about method education health reproduction , impact knowledge of behavior students , as well as importance communication and education same age in increase understanding about health sexual and reproductive .

2. Blue Cluster (Reproductive Health Study)

Keywords main : "reproductive age", "Ethiopia", "health survey", "cross-sectional study", "predictor", "health facility".

Cluster This focus on research health reproduction , with Lots studies based on population like survey health and cross-sectional studies . The terms "reproductive age," "health survey," and "association" indicate existence study about factors that influence health reproduction in groups age reproduction .

Countries like "Ethiopia" and "Uganda" were mentioned , which indicates focus geographically in developing countries in Africa. Research This Possible discuss access to facility health , predictor health

reproduction , and factors risks that affect health reproduction in these countries .

3. Red Cluster (SDGs and Policies) Government)

Keywords main : "sustainable development goals (SDGs)", "government", "development", "right", "equity", "human rights", "action", "protection", "quality education".

Cluster red This covers related aspects direct with policy government and SDGs. Terms such as "government," "equity," and "human rights" indicate that cluster This focus on role policy public in support objective development sustainable , especially related with health reproduction , education quality , and rights basic man .

Topics This involving advocacy For equality and protection rights (protection) in the context of the SDGs, which includes right health , education quality , and protection child .

4. Analysis Inter- Cluster Relationships

Connection between Green and Red Clusters : Relationships between education health reproduction (cluster green) and purpose development sustainable (cluster red) indicates that improvement education health reproduction is part important from achievement of the SDGs. This underlines role education in reach goals like good health , well-being , and gender equality .

Connection between Blue and Red Clusters : Connections between health reproduction and SDGs show the importance of epidemiological data For SDGs policy . Research health reproduction conducted in countries such as Ethiopia provides valuable data that can used For planning inclusive and community - based policies proof .

5. Conclusions and Implications

Education as a Pillar of SDGs: Visualization This underline importance education health reproduction in reach SDGs goals . Improvement knowledge among student can increase awareness about health reproduction , which ultimately support achievement of SDGs targets.

Data and Policy : Research health reproduction carried out in developing countries play role important in provide empirical data to support policy health . Knowledge This important for government and organizations international For to design effective intervention .

Focus on Justice and Human Rights Human : Topic such as "equity" and "human rights" in cluster red show that SDGs efforts are closely related with protection right basic human and equality . Government need consider rights This in every related policies with education and health reproduction .

In general overall , visualization This show How education , health reproduction , and SDGs policies are interrelated related and supportive One each other in context development sustainable . Education and research based on data about health reproduction give strong foundation for development fair and effective policies , which can support global efforts in achieve the SDGs.

Summary about equality from results analysis conducted on various visualization , namely *Open Knowledge Map*, * VOSviewer * related with topic " health reproduction ", " education ", and " purpose development (SDGs). Summary of Node Analysis Equations from Open Knowledge Map, and Publish or Perish and VOSviewer

Focus on Reproductive Health and SDGs

Third visualization This show that research in the field health reproduction own very close relationship with achievement objective development sustainable development (SDGs). Both "Open Knowledge Map", " VOSviewer ",

Gender Equality : Especially in education and awareness health reproduction .

Good Health and Well- being : Focus on improving health reproduction For reach greater welfare wide .

Quality Education : Education health reproduction in schools and the environment public For support better understanding Good about right health reproduction .

2. Importance Reproductive Health Education and Awareness

Third tool analysis This highlight that education and knowledge about health reproduction become element important in support health and well-being in a way general . Terms such as "knowledge", "education", "student", and "school" appear in third visualization , showing importance education in increase awareness and understanding about health reproduction .

3. The Relationship Between Reproductive Health Research with Policy and Governance

In "Publish or Perish and VOSviewer ", seen that health reproduction No only become attention community academic, but also closely the relation with policy public and role government . Nodes that indicate connection between "government", "equity", and "human rights" shows that health reproduction is issues that must be supported by policy For achieve the SDGs. This is also reflected in the "Open Knowledge Map" which shows theme such as "child protection" and "interprofessional education".

6. Collaboration and Interconnectedness Inter- Researcher Research

Visualization display network connected researchers based on quote or Topic similar , shows that study This No stand alone , but each other related and building One This is also visible in the ' VOSviewer ' which shows the related nodes from various research focused on SDGs, health reproduction , and education . Collaboration inter-researcher This show existence encouragement collective For explore theme This more in and from various perspective .

7.Human Rights Theme Human Rights and Equity

In the third visualization , theme right basic Humanity and Equality often appear as theme central . " VOSviewer " and "Open Knowledge Map" are explicit display term such as "human rights", "equity", and "child rights", which indicate that health reproduction No only problem medical but also a problem rights and equality . Education health reproduction considered important For ensure that every individual own equal rights on information health and access to service health .

Conclusion

In general overall , third tool analysis (Open Knowledge Map, Publish or Perish, VOSviewer) shows that health reproduction , education , and SDGs are interrelated topics related and supportive One each other. Education health reproduction No only functioning For increase understanding individual , but also supports global policies and efforts in achieve the SDGs, especially in the field of gender equality , good health , and education quality . Research This own impact big in create policy based evidence and ensure that health reproduction as well as rights related maintained and promoted throughout the world, especially in developing countries . With analysis this , can concluded that There is encouragement collective For explore more in Topic This in SDGs context and rights basic human , which is expected will produce more solutions inclusive and effective in face challenge health reproduction and education in the future .

IV. CONCLUSION

A. CONCLUSION

Overall, the analytical tools (Open Knowledge Map, Publish or Perish, VOS viewer) show that reproductive health, education, and SDGs are interrelated and mutually supportive topics.

Reproductive health education not only serves to increase individual understanding, but also supports global policies and efforts in achieving the SDGs, especially in the areas of gender equality, good health, and quality education. This research has a major impact on creating evidence-based policies and ensuring that reproductive health and related rights are protected and promoted worldwide, especially in developing countries.

B. SUGGESTION

Overall, this visualization shows how education, reproductive health, and SDG policies are interconnected and support each other in the context of sustainable development. The information we can take is that with the many research results on SDGs, there are still opportunities to utilize research results for government policies or research on policy analysis based on the SDGs foundation.

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