

## Development of preconceptions health modules in adolescents based on information and communication technology



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### ABSTRACT

**Background:** Preconception health is a behavioral and social health intervention for women and couples before conception occurs. Intervention starts from adolescence to improved health and readiness in pregnancy. This research is aimed at the development of preconception health modules for adolescents based on Information and Communication Technology (ICT).

**Method:** Qualitative study of exploration conducted on adolescents in the working area of Sidemen Health Center data collection was conducted in August 2020 against 4 informants consisting of 2 adolescents, 1 head of Public Health Center, and 1 obstetrician specialist. Data is collected by in-depth interview methods online. The data of the results of the study is analyzed thematically.

**Result:** The results of the interview obtained 4 (four) themes that are preconception health problems in adolescents, the content of the material of modules, methods of dissemination of information and the place of preconception health services. The teen had never heard of preconception health. Suitable materials presented in the preconception health module in adolescents are the introduction of reproductive devices, menstrual cycles, pregnancy cycles, premarital screening preparations, and preconception health interventions. Preconception health services are provided in private health services, hospitals and public health centers. Nevertheless, preconception health services in adolescents have not been optimally provided. Precisely the media chosen in the dissemination of knowledge about preconception health is face-to-face, lectures, video and book.

**Conclusion:** Based on this, it can be concluded that this module is expected to improve the teen's knowledge of preconception health.

Keywords: modules, preconception health, pregnancy, women reproductive age.

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### INTRODUCTION

Preconception health is all interventions given to women of childbearing age who have not yet become pregnant to improve pregnancy outcomes.<sup>1</sup> Meanwhile, WHO defines preconception health as the provision of biomedical services, behavioral and social health interventions for women and their partners before conception occurs.<sup>2</sup> It aims to improve their health status, and reduce behavioral, individual and environmental factors that contribute to poor maternal and child health outcomes. Its main objective is to improve short and long-term maternal and child health.<sup>2</sup>

The preconception period is the period from adolescence to adulthood

or adolescence to reproductive age.<sup>3</sup> Maternal health during the preconception period does not only have an impact on the mother's pregnancy (*In Utero*) environment but also has an impact on health for the next generation, such as stunting, neuro-cell development, obesity, cardiovascular disorders and metabolic disorders in children. The International Federation of Gynecology and Obstetrics (FIGO) issued recommendations for groups of adolescents, preconception and nutrition of pregnant women. One of the recommendations issued is to provide the widest possible access to preconception services for women of reproductive age through planning and preparation for a healthy pregnancy and healthy child.<sup>4</sup>

Currently, 41% of women worldwide report that their pregnancy was unplanned. This problem is getting worse because pregnant women also experience nutritional deficiencies and iron deficiency anemia which increases the risk of maternal death by 20%.<sup>2</sup> Based on the results of a survey on adolescents at SMA I Sidemen, it was revealed that 80% of students had less knowledge about preconception health.

Research on the low number of women receiving preconception care services has been widely carried out but is still very limited to the adolescent group. Research at the Isfahan Hospital in Iran found that the prevalence of preconception care was 47.7%.<sup>5</sup> More than half of

the women (53.4%) did not receive preconception services and only 33.9% of the women received regular iron-folate supplementation.<sup>6</sup> On the other hand, the study on women of childbearing age, living in Adet city found that the women's knowledge level of preconception care is still low, namely 27.5%.<sup>7</sup> Based on this, a more effective method of disseminating information about preconception health is needed to increase adolescent knowledge about preconception health.

Information and Communication Technology (ICT) is an appropriate medium for disseminating information including preconception health information. Moreover, it is very easy for teenagers nowadays to access the internet. This is supported by the 2019 APJII report, which states that internet users in Indonesia are dominated by millennials. From the report, it is said that more than 50% are teenagers, and almost all teenagers use smartphones to access the internet. Through the dissemination of information through smartphones as the media, it can also expand the target range.<sup>8</sup> One of the advantages of using ICT-based technology is that it allows users (in this study, the subject of teenagers) to interact through the system that was built. This makes it easier for users to access information quickly. An information system based on a network and interactive multimedia allows users to interact with the system in a real and direct way.<sup>9</sup> Some examples are web-based learning systems that are used in the delivery of teaching and learning processes in several universities and courses.<sup>10</sup> Consequently, this research aims to compile a preconception health module

for ICT-based adolescents as the first step in disseminating information.

## METHOD

An exploratory qualitative study was conducted on adolescents in the age category of 17–25 years, in Sidemen District, Karangasem Regency, Bali Province-Indonesia. Informants of this study were selected purposely consisting of one specialist in obstetrics and gynecology, one Head of the *Puskesmas* (Community Health Centre), one organizer of the youth program and six teenagers. The inclusion criterion of the informants was willing to participate by filling out the consent form. Meanwhile, the exclusion criterion was not completing the full interview. Data collection was carried out in August 2020. Data was collected using in-depth interviews. The questionnaire used has been tested on informants in different villages from the research area but have relatively the same characteristics. Interviews were conducted online via WhatsApp call media. The interview was audio-recorded, verbatim transcribed and validated by the researchers after they listened to the recording and re-reading the transcript. The data from the interviews were analyzed using the thematic method. The results of the interviews were compiled into a manuscript, and a theme was formed, which was then used as material in preparing the preconception health module. This research has obtained an ethical feasibility permit number: 1746/UN14.2.2.VII.14/LT/2020 by the ethics commission of the Medical Faculty of Udayana University/Sanglah Hospital.

## RESULT

The age of the informants ranged from 17-50 years, and as many as 55.5% were female. In addition, all respondents had a higher education level, as many as four informants had not worked and three were married, as shown in [Table 1](#).

Based on the results of the interviews, there were four sub-themes from the preconception health module for adolescents, namely the sub-themes of preconception health problems in adolescents, content of materials, methods of disseminating information and places of preconception health services, as shown in [Table 2](#).

[Table 2](#) also shows several problems related to preconception health among adolescents, such as the relatively high incidence of adolescent pregnancy, consultation after the problem occurred, and lack of knowledge about preconception health, as quoted below:

*.....in this area, the rate of pregnancy among adolescents below 20 years old is quite high.....about twenty percent....this includes high-risk pregnancies, and should receive more attention from the officers... (D2)*

*....ever been to the doctor....umm with my boyfriend... umm yeah... umm late (menstruation)....it was before marriage... (R4)*

Adolescents and/or preconception age groups rarely do pre-pregnancy consultations, they will come in early pregnancy or when experiencing problems related to preconception health, as in the following quote:

**Table 1.** The characteristic of respondents

No	Informant Code	Age	Sex	Education Level	Occupation	Marital Status
1	D1	48 years	Female	Magister	Obstetrics & gynecology specialist	Married
2	D2	50 years	Male	Magister	Doctor	Married
3	P1	45 years	Female	Diploma	Nurse	Married
4	R1	17 years	Female	High school student	Not Worked	Not married
5	R2	21 years	Female	College student	Not Worked	Not married
6	R3	18 years	Female	High school student	Not Worked	Not married
7	R4	24 years	Male	High school student	Private - employee	Married
8	R5	17 years	Male	High school student	Student	Not married
9	R6	19 years	Male	College student	Not Worked	Not married

**Table 2. Coding, sub-themes and themes of preconception health modules**

Code	Sub-Theme	Theme
1. The rate of adolescent pregnancy is relatively high 2. Teenagers will consult after experiencing problems 3. Most of the teenagers who consult are married teenagers 4. Lack of knowledge on preconception health	Adolescent preconception health problems	
1. Introduction of reproductive organs 2. Menstrual cycle 3. Pregnancy cycle 4. Preparation for premarital screening 5. Preconception health interventions	Contents of the materials	Materials of preconception health module
1. Face-to-face meetings 2. Lectures 3. Video screenings 4. Books	Methods of disseminating information	
1. Doctor's Office 2. <i>Puskesmas</i> (Community Health Centre) or <i>Posyandu</i> (Integrated Service Post) 3. Polyclinic	Locations of preconception health services	

.....in my office, there is a preconception service available... they come to consult about infertility.... I've been married for a long time, why haven't I gotten pregnant... From here I took an anamnesis to explore the causes of infertility and sometimes it's related to lifestyle, diet and maybe genetic factors... (D1)

Adolescent knowledge about preconception health is still low, as in the following statements:

....don't know....never heard of it....umm, what is it?....(R1)

....never knew.... he he he, health term huh.... don't understand...(R2)

....what is that, ha ha ha (laughs)....don't know....don't get the lesson....(R5)

.....emmm...preconception health.... emmm..what is it...just heard that term.... (R6)

Materials that are suitable to be delivered in the preconception health module for adolescents are the introduction of reproductive organs, the menstrual cycle, the pregnancy cycle, premarital preparation/premarital screening, and preconception health interventions. This is obtained from the following interview results.

.....in terms of suitable materials, it is better to start by informing about the physiology of the reproductive organs, what their respective functions are, how pregnancy can occur, and what to do, so that the pregnancy is in a normal...healthy condition....(D1)

Preconception health services should

be provided in every health service, such as in hospitals, health centers, private doctor's practices, and others.

.....this service should be available everywhere, right...so that those who need it can easily get the service they want.... (D1)

.....if preconception health services specifically for adolescents are not yet available, which have not been available so far, the polyclinic we have for general services and the KIA KB (maternal and child health and family planning) polyclinics.... if anyone needs preconception services, we will provide services at KIA KB...(D1)

....at the *Puskesmas* (Community Health Centre), we have a program for adolescents... in collaboration with schools... yeah... like... giving blood tablets...which is often done... blood tablets are also given to newlyweds....only rarely done....(P1)

Disseminating information about preconception health is carried out through counseling to schools

.....it is the counseling about reproductive health that we often do....when we visit schools...(D2)

.....for the adolescents, we give information about reproductive health....which concerns a little about health before pregnancy.... we give lectures...directly.. ..counseling... almost never done...(P1)

.....it is better... directly... meeting in person... if we don't understand, we can directly ask....(R2)

... it's better to read a book... we can read it

again... if we search it on the internet... we don't often find it when we want to read it again. He he he (laughs)...(R7)

...umm actually..the internet can be accessed everywhere,.....only the signal here is often interrupted...and internet quota is not always available anyways he he he (laughs) (R4)

## DISCUSSION

Adolescent knowledge on preconception health is still low and the desire to do pregnancy screening is also low, in line with the results of a study by the National Health Service (NHS) Board area in Scotland, which shows that awareness of preconception health is still low.<sup>11</sup> Factors related to knowledge of preconception health include having ANC, living in an urban area, high school education level and above.<sup>12</sup> WHO recommends that interventions on preconception health should consist of pregnancy planning, delaying pregnancy in adolescence, controlling body weight, smoking and drinking alcoholic beverages, and screening for diseases that have negative impacts on pregnancy.<sup>3</sup>

Information dissemination that is currently the most easily-obtained and accessed by adolescents is through online media, especially during the COVID-19 pandemic situation which requires them to comply with the COVID-19 protocols. However, this is not the case

for adolescents. Instead, the media chosen to disseminate knowledge about preconception health were face-to-face meetings, lectures, video screenings and books. This is supported by the results of web research, which found that the preconception health information found by the group of pre-conceptual women via the web was: poor or not in accordance with the recommended information, thus requiring improved strategies for finding and disseminating information online.<sup>13-14</sup> The potential bias in this study is possible because the study was only conducted in one Puskesmas work area which may not describe the situation of the entire Puskesmas. In addition, the research took place during the COVID-19 pandemic, causing limitations in choosing informants and data collection methods.

## CONCLUSIONS

Adolescent knowledge about preconception health is still lacking. The information needed in the preparation of the preconception health module for adolescents is the topic of adolescent preconception health problems, the contents of the material, the methods of disseminating information, and the locations of preconception health services. Hence, it is recommended to develop and disseminate a preconception health module for adolescents and to retrace the effective methods of disseminating this information.

## CONFLICT OF INTERESTS

All the authors declare that they have no conflict of interests.

## AUTHORS' CONTRIBUTIONS

Luh Seri Ani, I Gusti Ayu Sri Darmayani,

I Komang Ari Mogi, and Ni Wayan Arya Utami conceived, wrote and revised this review.

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## ETHICAL CLEARANCE

This research has obtained an ethical feasibility permit number: 1746/UN14.2.2.VII.14/LT/2020 by the ethics commission of the Medical Faculty of Udayana University/Sanglah Hospital.

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