ORIGINAL RESEARCH ARTICLE

Perceptions, attitude, and practice of undergraduates towards pre-conceptional care in Ado-Ekiti, Nigeria

DOI: 10.29063/ajrh2023/v27i6s.15

Risikat I. Fadare[1], Kayode Ajayi[2], Cecilia B. Bello[1], Funmilola T. Ojo[3], Victoria Obinatu[1]*

Department of Nursing Science, Afe Babalola University, Ado- Ekiti, Ekiti State, Nigeria[1]; Department of Human Nutrition and Dietetics, Afe Babalola University, Ado – Ekiti, Ekiti State, Nigeria[2]; Department of Public Health, Afe Babalola, University, Ado- Ekiti. Ekiti State, Nigeria[3]

***For Correspondence:** Email: *fadareri@abuad.edu.ng*; Phone: +2348034679248

Abstract

Periconceptional care (PCC) addresses the care before pregnancy occurs. The objectives of this study were to assess the knowledge, attitude of undergraduates towards and the practice of pre-conception care among the undergraduates. Quantitative approach with a descriptive, cross-sectional survey design was adopted using semi structured researcher- administered questionnaire with close - ended and restricted- choice questions. 273 female students were selected using a multistage and proportional sampling techniques from various departments in the University. Data were analysed using descriptive and inferential statistical methods with the aid of SPSS (version 23). Results showed that 75.2% had high knowledge of pre-conception care, 76.8% had positive attitude towards pre-conception., 66.1% had never sought pre-conception care as the majority were not married, but desired to complete schooling before considering such practices The knowledge of preconception care among the women was high, their attitude towards preconception care was good but their practice of preconception care was poor. Age, marital status and course of study were significant predictors of the respondents' adoption of PC. There is a need for health workers to lay more emphasis on the importance of PCC thus encouraging youths to adopt and utilize preconception care. *(Afr J Reprod Health 2023; 27[6s]: 129-137).*

Keywords: Attitude, pre-conception, youths, knowledge, reproductive age

Résumé

Les soins périconceptionnels (PCC) concernent les soins avant la grossesse. Les objectifs de cette étude étaient d'évaluer les connaissances, l'attitude des étudiants de premier cycle envers et la pratique des soins préconceptionnels chez les étudiants de premier cycle. Une approche quantitative avec une conception d'enquête descriptive et transversale a été adoptée à l'aide d'un questionnaire semi-structuré administré par le chercheur avec des questions fermées et à choix restreint. 273 étudiantes ont été sélectionnées à l'aide d'une technique d'échantillonnage à plusieurs degrés et proportionnelle dans divers départements de l'Université. Les données ont été analysées à l'aide de méthodes statistiques descriptives et inférentielles à l'aide de SPSS (version 23). Les résultats ont montré que 75,2 % avaient une connaissance élevée des soins préconceptionnels, 76,8 % avaient une attitude positive à l'égard de la préconception. 66,1 % n'avaient jamais recherché de soins préconceptionnels car la majorité n'étaient pas mariées, mais souhaitaient terminer leurs études avant d'envisager de telles pratiques. La connaissance des soins préconceptionnels chez les femmes était élevée, leur attitude envers les soins préconceptionnels était bonne mais leur pratique des soins préconceptionnels était médiocre. L'âge, l'état matrimonial et le programme d'études étaient des prédicteurs significatifs de l'adoption de la PC par les répondants. Il est nécessaire que les agents de santé mettent davantage l'accent sur l'importance du PCC, encourageant ainsi les jeunes à adopter et à utiliser les soins préconceptionnels. *(Afr J Reprod Health 2023; 27[6s]: 129-137).*

Mots-clés: Attitude, préconception, jeunes, connaissances, âge de procréer

Introduction

Preconception care (PCC) or pre-pregnancy care is "the provision of biomedical, behavioural and social health interventions for women and couples before conception occurs and through subsequent pregnancies in order to achieve successful childbirth outcomes[1,2]. The aim of this care is to improve the health status of individuals by reducing behaviours and environmental elements that contribute to poor pregnancy outcomes[3]. The WHO[3] reports suggest that intervening after conception has occurred is usually too late in reducing the risk factors which might affect the mother and her unborn child. Since a majority of women and couples of reproductive ages are

normally unaware of the effects that their own health conditions and health-related behaviors may have on the fetus during pregnancy, preconception care addresses the care before pregnancy occurs[4].

According to Voorst[5] firstly, regular antenatal care may be too late to adopt preventive interventions, as at this time the unborn child has already been exposed to the risks for adverse pregnancy outcomes. Secondly, PCC may improve the lifetime health of a person. This is because alteration during the embryonic period has the ability to affect the perinatal, child, and adult life of an individual. Even though many initiatives have been undertaken both globally and nationally to address this issue, the majority of such initiatives are not tackling pre conception health at the grassroots level[5].

Sub-Saharan Africa has been identified to be the area worst affected by the high rate of maternal and child mortality and morbidity rates[6]. According to the report published, 295,000 maternal deaths occurred worldwide in 2017, 94% of which were from low and middle-income countries. Over two thirds (60%) of maternal deaths occurred in sub-Saharan Africa. On the other hand, the likelihood of a 15-year-old girl in sub-Saharan Africa dying due to complications related to childbirth is as high as 1 in 45, when compared to 1 in 5400 in developed countries. In addition, it was projected that in sub-Saharan Africa, 1 in 12 children die before reaching the age of five, as compared to 1 in 147 seen in the developed countries[6,7].

In response to these unacceptable rates of maternal and child morbidity and mortality, stakeholders including the WHO[8], have advanced several intervention services. Preconception care is one way to achieve the targets of decreasing maternal and child morbidity and mortality rate[8]. The 'Draft Action Plan for the Prevention and Control of Non-communicable Diseases 2013-2020' that was deliberated at the 66th World Health Assembly in May 2013, urges governments to decrease the amendable risk factors for non-communicable diseases and their core social determinants[8]. The national policy framework also recognized preconception care as a significant contributor to the deterrence and regulation of non communicable disease with the aim of intervening in the early life[8].

As attention is now shifting towards access to care to optimize the quality of care received by mothers and babies. Several lifestyle modifications and medical interventions have been identified to be of advantage to the health of mothers and babies. Some of the proposed lifestyle modifications include termination of smoking, ending or reduction of alcohol intake, folic acid supplementation, diabetic control advancement and so many others[6]. Once all these measures are applied before conception occurs, it is believed that there will be a great improvement[8].

Globally, complications due to pregnancy are noted as the primary causes of death among women between the ages of 15-19 years[9]. Therefore, many high resource countries have initiated strategies and interventions to incorporate pre conception care into their health care system particularly at the primary health care level[10]. Studies conducted in the United States of America revealed that strategies that promote preconception health among the reproductive aged group are needed[9]. It was found that preconception care should start in the adolescent years and continue as inter-conception care to give chances for positive behavioural modifications to happen before pregnancy can occur[11]. Preconception care has also been recommended to be provided for every reproductive aged woman at each contact with the health care system. On the contrary, studies have shown that the awareness, knowledge and the utilization of preconception care in low- resource counties including Nigeria is low[10].

It is critical for health workers to promote the practice at every contact with women of reproductive age. Though the Primary Health Care (PHC) nurses are at the forefront of rendering preventive interventions, both in the primary health care and in the community settings, PCC is not always provided to women in the PHC setting and women find that health professionals scarcely discuss the availability and need for PCC with them[12]. This current study aimed at assessing the youths' knowledge, attitude and practice of preconception care in Ekiti State. The specific objectives that guided the study were to assess the

knowledge level on preconception care; to determine the attitude of the respondents towards PCC; to determine the practice of PCC and to determine the predictive factors for PCC utilization.

Theoretical framework

The theoretical underpinning this study is the Precede/Proceed Model[13]. The model comprised eight phases but phase three of the model has been adapted to suit the current study. Phase three comprised factors that influence behaviour, lifestyle, and responses to the environment. These include the "predisposing, enabling and reinforcing factors"[13].

The predisposing factors: In this study, the predisposing factors include the students' demographic characteristics, attitudes, beliefs, knowledge and previous practice of preconception care, which will enable them to adopt or reject the preconception care.

Enabling factors: The enabling factors in this study were represented in form of skills, training, resources, time, reimbursement, guidelines and policy, which determine whether the PHC nurses will render the services or not. These are the resources that if available will enable the nurse to render PCC services.

Reinforcing factors: The reinforcing factors in this study is in the form of a colleague, patient and government support, which will enable the student to take preconception care

All the above three factors lead to the actual performance or non- performance of the action which is adopting PCC.

Methods

This study adopted quantitative, cross- sectional descriptive design. The study was conducted at the Afe Babalola University, a private University located in Ado-Ekiti, Ekiti State, Nigeria (ABUAD). The institution offers various undergraduate and postgraduate academic programmes in five colleges: including Sciences, Law, Engineering, Social and Management Sciences and Medicine and Health Sciences. The target population for this study comprised all 400-500 level undergraduates in the Colleges. The total population of undergraduates during the study period was 855. Sample size was determined using Taro Yamane's formula[14]. A sample size of 314 including 15% attrition rate was determined.

Multi-Stage and proportional sampling techniques were used. During the first stage, cluster random sampling was used to select two colleges (College of Law, College of Social Management and Sciences). In the second stage; stratified random sampling was used to select departments from each of the colleges based on their population with the aid of a prepared sampling frame, the list was obtained from the student representative council of the school, and then 30 departments were selected. At the third stage, convenience sampling was used to select the study participants based on their levels (400-500). Students were approached and given information regarding the purpose and nature of the study. Individual student that gave an informed consent and also met the other inclusion criteria were involved.

The inclusion criteria for this study included being an undergraduate student of ABUAD, in the selected departments and willingness to participate in the study. Students of non-selected departments and those that disinclined to participate in the study are excluded.

Instrument for data collection

The research instrument utilized semi structured interviewer- administered questionnaire adapted with four sections: Section A collected data about the demographic characteristics of the participants. Section B was designed to assess the knowledge of preconception care. Section C elicited information on the attitude of the participants towards preconception care, while section D identified their practice of preconception care.

To establish face and content validity of the questionnaire, research supervisor and other experts in the field of study closely examined the items in the questionnaire to ensure that they can accurately measure the intended variables.

The reliability was determined through test-retest method and the reliability coefficient was calculated to be 0.78 thus using the attribute of stability to ensure instrument reliability.

Data collection

This study used self-administered questionnaires. The questionnaires were given to the students that met the inclusion criteria in their hostels and after lectures, Participants were reminded of the importance of anonymity and confidentiality, and that only truthful responses were required. The participants were encouraged to take their time and pay utmost attention in the collection of data, which ensured accurate results, for the research study.

Data analysis

Statistical analysis of data was done using SPSS (version 23) software for windows. Descriptive statistics was calculated as frequencies, percentages and means. The data collected was analyzed with the use of tables, frequency charts and percentages, which was interpreted and conclusions were drawn as appropriate. The stated hypotheses were tested using the Pearson ‘s Chi square logistic regression.

Ethical consideration

Ethical approval was obtained from the Research and Ethics Committee of the Department of Nursing Science, Afe Babalola University. Also, ethical approval number AB/EC/21/3367 to conduct the study was obtained from the Director of Research Committee, ABUAD. Likewise, participants’ rights to full disclosure and self-determination were explained, they were informed about the nature of the study and what findings needed to be obtained thus informed consent was obtained. Confidentiality and anonymity were ensured thereby protecting the respondents’ privacy. Measures to ensure beneficence, non-maleficence and justice were taken. Also, they were assured that the study would not be more intrusive than it should be.

Results

The respondents’ socio-demographic result is as shown on table 1. The result revealed the respondents were within the age range 15-30years. More than half of the respondents were in 400 level.

Table 1: Showing socio-demographic data

	Frequency (n)	Percentage (%)
Age		
15-20	121	39.1
21-25	170	54.8
26-30	19	6.1
Ethnicity		
Yoruba	103	33.2
Igbo	119	38.4
Hausa	64	20.6
Other	24	7.7
Education level		
400	180	58.1
500	116	37.4
Religion		
Christianity	221	71.3
Islam	89	28.7
Marital status		
Married	3	0.9
Single	307	99.1
Department		
Social and management sciences	148	47.7
Law	162	52.3

Objective one: To assess the levels of knowledge of pre-conception care

Table 2 shows the respondents’ responses to items assessing their knowledge on preconception care. The majority answered ‘Yes’ to each of the items. The level of knowledge was assessed by computation of the items coded on a scale of ‘2” for yes, “1” for no and “0” for I don’t know to give a total computed score of 28. Interquartile percentage (≤25%, =50% & ≥75%) was used to grade knowledge as poor, moderate and high respectively. The result revealed 10.3% with poor knowledge, 14.5% with moderate knowledge and 75.2% with high knowledge of pre-conception care.

Objective 2: To assess the respondents’ attitude towards preconception care

A total of 71.7% respondents agreed that preconception care is important during the reproductive age, Likewise, 80.0% of the respondents opined that private health facilities are the best place to receive preconception care, 77.1%

Table 2: Levels of knowledge of preconception care

	Yes n (%)	**No n (%)**	**I don't know n(%)**
Preconception care is a care received by women before pregnancy to improve pregnancy outcome	278(89.7)	8(2.6)	24(7.7)
Preconception care is a prevention strategy that helps men and women to prepare for pregnancy by improving their health prior to conception	188(60.6)	68(21.9)	54(17.4)
Preconception care is about healthy living	228(73.5)	33(10.6)	49(15.8)
It involves encouraging women to engage in healthy lifestyles before they become pregnant	200(64.5)	51(16.5)	59(19.0)
It prevents unintended pregnancies and promotes optimal birth spacing	181(58.4)	64(20.6	65(21.0)
Unintended pregnancy is associated with increased maternal morbidity and poor pregnancy outcomes	187(60.3)	40(12.9)	83(26.8)
Preconception care include risk assessment, health promotion and interventions to promote health of mother and child	198(63.9)	85(27.4)	27(8.7)

Table 3: Showing respondents' attitude towards pre-conception care

	SA n (%)	A n (%)	N n (%)	D n (%)	SD n (%)
Preconception care is important during the reproductive age	82(26.5)	140(45.2)	53(17.1)	27(8.7)	8(2.6)
Preconception care has implications for pregnancy and delivery	83(26.8)	72(23.2)	111(35.8)	34(11.0)	10(3.2)
Government facilities are the best place to receive preconception care	94(30.3)	106(34.2)	63(20.3)	36(11.6)	11(3.5)
Private health facilities are the best place to receive preconception care	157(50.6)	91(29.4)	49(15.8)	9(2.9)	4(1.3)
Ppreconception is an important time to ensure good health.	145(46.8)	94(30.3)	56(18.1)	13(4.2)	2(0.6)
Regular engagement in physical activity is regarded as one of the most important priorities in preconception care	177(57.1)	82(26.5)	43(13.9)	7(2.3)	1(0.3)
Maintaining a healthy diet and taking pre-pregnancy supplements, including folic acid, iodine, iron and vitamin D, are also considered important preconception behaviours.	145(46.8)	94(30.3)	37(11.9)	29(9.4)	5(1.6)

agreed that preconception is an important time to ensure good health while 83.6% agreed that regular engagement in physical activity is regarded as one of the most important priorities in preconception care. Lastly, 77.1% of the respondents strongly agreed that maintaining a healthy diet and taking pre-pregnancy supplements, including folic acid, iodine, iron and vitamin D are important preconception behaviours.

The attitude was assessed by computation of the items coded on a 5-point Likert scale of "4 through 1". From strongly agree (SA); agree (A); neutral (N); disagree (D) to strongly disagree respectively while neutral was coded with "0". The average score was used to denote attitude as negative and positive respectively. The result revealed 76.8% with positive and 23.2% with negative attitude towards pre-conception care.

Table 4 shows that 66.1% of the respondents never sought pre-conception care although most (51%) have received care from doctors and nurses. The reasons forwarded were their non-marital status, desire to complete schooling Majority of the respondents (65.2%) claimed that consumption of folic acid supplement before pregnancy is essential, 44.2% do receive health information more than once while a tangible percentage (35.8%) rarely performs physical exercise; although 26.5% claimed to perform exercise very often while 19.4% never had any.

Table 4: Showing respondents' practice of pre-conception care

	Frequency (n)	Percentage (%)
Have you sought for preconception care before		
Yes	105	33.9
No	208	66.1
If yes, where did you receive the care		
Chemist	159	51.3
House	94	30.3
Hospital	50	16.1
School	6	1.9
Not applicable	1	0.3
Who provided the care		
Doctor	158	51.0
Nurses	91	29.4
Pharmacists	43	13.9
Friends	15	4.8
School counselor	3	1.0
If no, what is/are your reason(s)		
Not married yet	14	6.7
Not intending to marry soon	93	44.7
Want to complete school first	103	49.5
Non availability of preconception services	-	-
Consumption of folic acid before pregnancy is essential		
Yes	202	65.2
No	108	34.8
How often do you receive health information per week		
More than once	137	44.2
Once	98	31.6
None	75	24.2
How often do you exercise		
Very often	82	26.5
Seldom	57	18.4
Rarely	111	35.8
Never	58	19.4

Hypothesis testing

H_O: There is no significant association between the respondents' demographic vriables and their use of PCC

A logistic regression model was used to determine which of the socio -demographic variables significantly predict the practice of PPC. From the table, age, marital status and department are significant at $p<0.05$.

The results of this study indicate that the majority of the respondents have high knowledge level of preconception care. More than half of the students have heard of pre-conception care of which most claimed to have heard from health workers or mass media. This is an indication that the students were well aware of pre-conception care; a result in contrast to previous studies which reported low PCC knowledge level among undergraduates[15] and also among nurses and other health care workers[16] who were expected to educate the public. The high level of knowledge displayed by the participants in this present study was similarly observed in a Jordanian study[3] which revealed the participants' awareness of preconception care. However, the finding was in contrast to the finding reported in Nepal among undergraduates where only few students (9.4%) had adequate with the majority (85.9%) having moderate knowledge level on preconception care level [17.] The high knowledge level found in this current study also disagreed with an Italian survey where women aged 18- 25 displayed poor knowledge of preconception health[18]. Preconception care is a prerequisite to reduction of maternal mortality rate, it is paramount for health workers to promote the practice at every contact with women of reproductive age.

In this current study, it was found that the participants had positive attitude towards pre-conception care. Most of them claimed that preconception care is important during the reproductive age and that private health facilities are the best place to receive preconception care. The positive attitude shown by the participants is a clear indication that pre-conception care is actually important for a reproductive aged woman. This finding corroborated the research evidence that women under 40 years generally have positive attitude towards preconception care[20] and particularly the younger ones who showed more interest. Respondents in this study also believed that maintaining a healthy lifestyle especially physical activities, healthy diet, taking pre-pregnancy supplements including folic acid, iodine, iron and vitamin D, are also considered important preconception behaviours. This finding was similarly reported in previous studies[19-21].

Findings also revealed that the majority of the students never sought pre-conception care. This

Table 5: Logistic regression between socio-demographic variables and use of PPE

	B	S.E.	Wald	Df	Sig.	Exp(B)
Age	-0.176	0.099	3.149	1	0.046*	0.839
Ethnicity						
(Yoruba)	1.32	0.368	0	1	0.038	4.681
(Igbo)	1.854	1.788	1.076	1	0.3	6.388
(Hausa)	0.23	0.154	0.732	1		
()thers)	2.34	1.973	2.365	1		
Educational. Level			1.004	3	0.8	
400	1.183	2.97	0	1	1	3.26
500	1.553	1.973	0.619	1	0.431	4.73
Religion						
Christianity	3.125	2.643	0.702	2	0.704	22.76
Islam	1.082	2.663	0	1	0.998	2.95
Marital Status						
Married	1.254	5.325	3.708	1	0.44	3.5
Single	1.348	1.608	0.702	1	0.002	3.85
Department/course of study						
SMS	1.48	4.77	0.693	1	0.324	4.39
Law	1.62	5.23	0.571	1	0.0412	5.05

P<0.05

finding could be explained from the fact that the respondents were still students with the majority being unmarried but whose major goal is to graduate from the university as evidenced by their responses. This finding corroborated the findings from recent studies in Nigeria where the uptake of preconception care services was low despite the high level of awareness and knowledge on the components of PCC[22,23]. The study also found that age, ethnicity (Yoruba), marital status and course of study were significant factors predicting the respondents' uptake of PCC. This present study also found that most respondents claimed to have received care at one time or the other from the health providers. This finding found support from previous studies[24,25]. Single women who are not preparing themselves for pregnancy are less likely to utilize PCC services as found out by study in Kenya[25]. Furthermore, it had been found that younger women aged 15 – 24 are less likely to utilize preconception services in contrast with older women aged 34 – 49[24]. Older women may perceive themselves at higher risk of pregnancy and delivery complications and tend to utilize PCC.

It was also claimed that the consumption of folic acid supplement before pregnancy is essential while most will not indulge themselves in physical activities. The relevance of consumption of folic acid as well engaging in physical activities before pregnancy were similarly reported in previous studies[19,23].

Conclusion

Based on the findings from this study, it could be concluded that the students of Afe Babalola University have good knowledge and understanding of pre-conception care. Also, the students have positive attitude towards pre-conception care as most asserted that preconception care is a prerequisite in reducing maternal mortality rate. Nevertheless, the respondents' practice of PCC was low. Their uptake of PCC was significantly predicted by age, marital status and course of study. It is therefore paramount for health workers to intensify efforts to encourage the practice of PCC at every contact with women of reproductive age.

Strength of the study

The study has highlighted the status the undergraduates in relation to preconception health. The findings might have added to the existing body of knowledge which may be relevant to future researches on preconception health.

Limitations

This study was conducted among students in two departments. The opinions of the students may not have fully represented those of all other students in other departments as well as in other universities. In addition, the study was conducted among the female students. Preconception care is not only a female issue, addressing male preconceptual has the tendency to improve the future reproductive health of a couple. Thus, it is suggested that research should also be directed towards males' preconception care.

Recommendations

Based on the findings from this study, the following recommendations were made:
There is the need for health workers at all levels of care to lay more emphasis on the importance of preconception care and the need for youths to improve their health status by reducing behaviors and environmental elements that could contribute to poor pregnancy outcomes.

It is equally important for stakeholders in public and private hospitals as well as Federal Ministry of Health to understand the uptake level of preconception care and then address the barriers.

Government at all levels should try as much as possible to formulate policies that will enhance utilization of pre conception care particularly by the youths.

Roll out university-wide PCC sensitization strategies could inprove students' awareness, and understanding of the details and the importance. Thus facilitating the increase in its adoption among youths, effort should be directed towards this very important aspect of care.

Implication to nursing practice

Preventive care in nursing is the area that requires serious attention as a lot of maternal and child morbidity and mortality can be averted through rendering comprehensive holistic care to reproductive-aged women. Also, as part of the national policy framework, preconception care is recognized as a significant contributor to the deterrence and regulation of non-communicable disease with the aim of intervening in the early life. It is hereby important for nurses and mid-wives to know that preconception health is perceived as part of a general healthy lifestyle, and not just in a short period before the conception. It is therefore imperative of the nurses and other health professionals to give recommendations that will reduce complications before and after pregnancy. Swift medical interventions among reproductive age women will subsequently reduce the maternal mortality rate and thereby enhance good quality of life before and after pregnancy.

Authors' contribution

RIF conceived the topic and designed the study, RIF and VO collected and analyzed the data, RIF and FTO prepared the manuscript, KA and CBB proofread the manuscript. All the authors mentioned in the article approved the manuscript

Acknowledgement

Authors wish to acknowledge and appreciate the sponsorship of Afe Babalola University, Ado – Ekiti.
The women who participated in the study were also acknowledged and appreciated.

References

1. Mason E, Chandra-Mouli V, Baltag V, Christiansen C, Lassi ZS and Bhutta ZA. Preconception care: advancing from 'important to do and can be done' to 'is being done and is making a difference, Reproductive Health, 2014, 11, S8. 10.1186/1742-4755-11-S3-S8
2. Habte A, Dessu S and Haile D. Determinants of practice of preconception care among women of reproductive age group in southern Ethiopia, 2020: content analysis. Reproductive Health, 2021, **18,** 100. 10.1186/s12978-021-01154-3
3. Al-Akour N, Sou'Ub R, Mohammad K and Zayed F. Awareness of preconception care among women and men: A study from Jordan. Journal of Obstetrics and Gynaecology, 2015, 246-250. 10.3109/01443615.2014.958145
4. Pregnancy, birth & baby. https://www.pregnancybirthbaby.org.au/about-pregnancy-birth-and-baby#service
5. Voorst SF. *Preconception care: from policy to practice and back.* Erasmus University Rotterdam. Netherland. Doctorate Degree Thesis. 2017.Retrieved from http://hdl.handle.net/1765/100018

6. UNICEF. Levels and Trends in Child Mortality. 2016.Available at https://data.unicef.org/resources/levels-trends-child-mortality
7. WHO Maternal mortality Available at https://www.who.int/news-room/fact-sheets/detail/maternal-mortality 2019.
8. WHO. Preconception health and care (PHC)—a strategy for improved maternal and child health. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5098484/
9. Toivonen K, Oinonen K and Duchene K. Preconception health behaviours: A scoping review. Preventive medicine, 2017. *96*(1), 1-15.
10. Ojifinni OO and Ibisomi L. Preconception care practices in Nigeria: a descriptive qualitative study. Reproductive Health, 2020, 17, 172. https://doi.org/10.1186/s12978-020-01030-6
11. Upadhya K, Jalazo E, Connor K, Mistry K and Cheng T. Optimizing Preconception Health among Young Women: What Are We Missing? *PEDADO* Journal of Pediatric and Adolescent Gynecology, (2016). 464-466.
12. Collins L. *Knowledge, Attitudes, and Beliefs About Preconception Care Among American Adolescent Females*, Walden University. Doctorate Degree Thesis,2016.
13. Green L and Kreuter M. *Health program planning: An educational and ecological approach*. 4th Edition, McGraw Hill, 2005, New York.
14. Yamane Taro. (1967). Statistics: An Introductory Analysis, 2nd Edition, New York: Harper and Row.
15. Bortolus R., Oprandi N, Morasutti F, Marchetto L, Filippini F, Tozzi A and Mastroicovo P. Why women do not ask for information on preconception health? A qualitative study. BMC Pregnancy, 2017. 1-11.
16. Dean SV, Mason EM, Howson CP, Lassi ZS, Imam AM and Bhutta ZA. Born Too Soon: Care before and between pregnancy to prevent preterm births: from evidence to action. Reproductive Health, 2015. 10, S3. https://doi.org/10.1186/1742-4755-10-S1-S3
17. Crusenberry KJ. An online study on undergraduates' knowledge, awareness and attitude of preconception care. University of Tennessee. Master's thesis.2016.
18. Zace D, Orfino A, Viteritti AM, Diakanthos M and Di Pietro ML. Knowledge and attitudes of young women regarding preconception health: An Italian survey. European Journal of Public Health. 2021,31(3): https://doi.org/10.1093/eurpub/ckab164.072
19. Daly MP, White J, Sanders J and Kipping RR. Women's knowledge, 2016 attitudes and views of preconception health and intervention delivery methods: a cross-sectional survey. BMC Pregnancy Childbirth, 2022. 22, 729 https://doi.org/10.1186/s12884-022-05058-3
20. Ezzeddin N, Zavoshy R and Naroozi M "Prevalence of folic acid supplement consumption before and during pregnancy, and its determinants among community health center referrals." Obstetrics & Gynecology Science, 2019, 62(6), 454-461. https://doi.org/:10.5468/ogs.2019.62.6.454
21. Doke PP, Gothankar JS, Pore PD, Palkar SH, Chutke AP, Patil AV, Deshpande AV, Bhuyan KK, Karnataki MV and Shrotri AN. Meager Perception of Preconception Care Among Women Desiring Pregnancy in Rural Areas: A Qualitative Study Using Focus Group Discussions. Frontiers in Public Health. 2021:1489.
22. Idris SH, Sambo MN and Ibrahim MS. Barriers to utilisation of maternal health services in a semi-urban community in northern Nigeria: the clients′ perspective. Niger Med J. 2013;54(1)
23. Olowokere AE, Komolafe A and Owofadeju C. Awareness, knowledge and uptake of preconception care among women in Ife Central Local Government Area of Osun State, Nigeria. J Community Heal Prim Heal Care. 2015;27(2):83–92.
24. Demisse TL, Aliyu SA, Kitila SB, Tafesse TT, Gelaw KA and Zerihun MS. Utilization of preconception care and associated factors among reproductive age group women in Debre Birhan town, North Shewa, Ethiopia. Reproductive Health, 2019, 16, 96. https://doi.org/10.1186/s12978-019-0758-x
25. Okemo J, Temmerman M, Mwaniki M and Kamya D. Preconception Care among Pregnant Women in an Urban and a Rural Health Facility in Kenya: A Quantitative Study. International Journal of Environmental Research and Public Health. 2020; 17(20):7430. https://doi.org/10.3390/ijerph17207430.