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Women's Knowledge of Preconception Care and Associated Factors in Ilu aba bor Zone, The Case of Some Selected Town

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Abstract

Preconception care is defined as "the provision of health-related biomedical, behavioral, and social interventions in the period before conception. Preconception care can effectively inform women on how to identify and reduce risk factors for Adverse Pregnancy Outcomes including birth defects, fatal loss, low birth weight, and preterm delivery thus reducing maternal and neonatal morbidity and mortality rate. Women's Knowledge of Preconception care has not been well understood in a resource-limited country like Ethiopia.

A community-based cross-sectional study was conducted on 673 women living in the selected kebele. A multistage sampling technique was used to select the study units. Data were analyzed using binary regression to determine the relationship between factors and the outcome variable at a p-value less than 0.05 then multiple logistic regression were used to compare the relationships of those significantly associated with the outcome. A total of 660 participants were involved in the study with a response rate of 98%. Thirty-three percent of the participants had good knowledge about preconception care. Using bivariate analysis, the candidate variables that showed association with outcome variables at p-value <0.25 were age, marital status, mother's occupation, mother's education, husband's education, and STI treatment. The result of multivariate analysis showed mother's occupation and mother's educational status were significantly associated with good knowledge of preconception care. Those worker mothers were 2.6 times more likely to have good knowledge than housewife mothers with CI (2.10-3.41) at p-value 0.02. Literate mothers were 4.5 times more likely to have good knowledge about preconception care as compared to illiterate mothers with CI (3.25-5.01) at p-value 0.001. The knowledge of PCC among women was very low and associated with women's educational status and whether they had occupations or not. To increase the knowledge of women about the PCC, the zonal health bureau, and NGOs working on the maternal issue should have to train and supervise health extension workers deeply on PCC.

Keywords: Preconception Care; Adverse Pregnancy Outcome; Birth Defect; Smoking; Alcohol

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Abbreviation

ADHD: Attention deficit hyperactivity disorder; **HIV**: Human immune virus; **FASD:** Fetal alcohol syndrome disorder; **IQ:** Intelligence quotient; **BMI**: Body mass index; **GWG**: Gestational weight gain; **EDHS**: Ethiopia demographic health survey; **PCC**: Preconception care; **CI**: Confidence interval; **STI**: Sexually transmitted infection; **Df**: Degree of freedom; **AOR**: Adjusted odd ratio.

Introduction

Preconception care is defined as "the provision of health-related biomedical, behavioral, and social interventions in the period before conception [1]. Preconception care can effectively inform women on how to identify and reduce risk factors for Adverse Pregnancy Outcomes through appropriate prevention [2]. Specifically, preconception interventions include smoking and alcohol cessation, achievement of proper weight, folic acid supplementation, review and update of vaccinations, and appropriate management and therapy of chronic diseases [2]. Family planning, education, and social services needed to provide these interventions are considered part of preconception care [3]. A previous study had shown that nearly all couples have one risk factor that requires individual advice in the preconception

phase and scientific evidence abounds on the beneficial role of preconception services in improving women's health before pregnancy resulting in better maternal and neonatal health outcomes - specifically, fewer pregnancy complications and a reduction in rates of birth defects, fatal loss, low birth weight, and preterm delivery thus reducing maternal and neonatal morbidity and mortality rate [3]. Having good utilization of preconception care decreases maternal and child mortality around by 57% and maternal and child morbidity by 73% [4]. Maternal mortality and morbidity are still the major health problems worldwide and these problems can be minimized with effective preconception care [5, 6]. Despite there being an improvement in maternal and child health in Ethiopia, maternal and child morbidity and mortality is the major problem [7, 8]. Many articles revealed that the magnitude of adverse birth outcomes like antepartum hemorrhage, post-partum hemorrhage, premature rupture of membrane, pregnancy-induced hypertension, anemia, low birth weight, stillbirth, preterm delivery, and multiple birth defects that can be minimized by effective PPC is high in Ethiopia [9-11]. According to EDHS 2016, 65% of Ethiopian women are married. According to the 2011 Ethiopian Demographic and Health Survey (EDHS), 25% of the women with births in the five years before the survey, and 32% of the current pregnancies were reported to be unintended (29). In Ethiopia study by the Hawassa city administration showed 20% of women who gave birth in public health institutions had good knowledge about preconception care (30). Understanding the status of women's knowledge of preconception care is very crucial in designing and implementing interventions to improve the health status of women and their children. The findings of this study would have great importance to the community, zonal health bureau, and non-governmental organizations working on maternal health in developing or reviewing zonal policy and guidelines regarding preconception care [12-21].

Materials and Methods

Study design and Study setting

A community-based cross-sectional study was conducted in the Ilu Aba Bora zone. Ilu Aba Bora zone is one of the twenty-one zones in the Oromiya region located in the southwest of Ethiopia. Mettu is the capital town of the zone and is found at 600km from the capital city of the country. It has 13 woredas and one city administration which are: Mettu Woreda, Yayo Woreda, Dorani Woreda, Hurumu Woreda, Alge Woreda, Nopa Woreda, Darimu Woreda, Gore Woreda, Uka Woreda, Bacho Woreda, Bure Woreda, Didu Woreda, Sale nono Woreda, and Metu town. This zone has 934,783 populations.

Study population

All women were selected women living in the selected kebeles of each Woreda.

Sample size determination

The sample size was determined by using a single population proportion formula with women's knowledge of preconception care at 27.5%, taken from a study conducted in Adet, North-Western Ethiopia(27), Level of significance to be 5% (α = 0.05), Z α/2= 1.96 and, Absolute precision or margin of error to be 5% (d = 0.05), Design effect = 2

The formula for calculating the sample size was,

$n=(z\alpha/2)2*P(1-P)/d^2=1.962*0.275*0.725/(0.05)^2=306$

2*306=612

Adding 10% of the non-response rate, 61+612=673

Sampling procedure

A multistage sampling technique was used to select the study units. Five Woreda from thirteen Woreda were selected by simple random sampling at primary sampling stages then at secondary sampling stages kebele from each Woreda was selected randomly and a household was selected at tertiary stages from each kebele. Then sample size for each kebele was proportionally allocated according to the size of their population or number of households.

Data collection tools and procedures

Data were collected using a pre-tested structured interview that was adapted from the study conducted in Ethiopia. The questionnaire was translated from English into Afan Oromo and back to English by language experts to check for consistency. The questionnaire consists of three parts: socio-demographic characteristics of respondents, knowledge of preconception care, and components of preconception care. Sixteen Health extension workers were used to collect data from April 10 to August 30, 2018. Four midwives from each kebele of the Health Center were assigned to supervise the data collection process. Both the data collectors and supervisors received two days of intensive training before the actual data collection on the aim of the study, procedures, data collection techniques, and the art of interviewing.

Variables of the study

Dependent /Outcome variable

Knowledge of Preconception care.

Independent variables

Socio-cultural variables (age of the mothers, marital status, educational status of the mothers, educational status of the husband, religion) Components of Preconception care.

Inclusion and Exclusion criteria

Inclusion criteria

All women.

Exclusion Criteria

Women who are recently(less than one year) or temporarily living in the zone and Severely Ill women.

Operational definitions

Preconception Care

Any interventions either advice or treatment, and lifestyle modification before being pregnant.

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Good Knowledge

Those who have scored>50% correct responses to preconception care knowledge questions.

Poor Knowledge

Those who have scored<50% correct responses to preconception care knowledge questions.

Smoking Status

Had a history of smoking or currently smokes regardless of the amount.

Alcohol Consumption

Consumption of alcoholic drinks on other than holidays and culturally special ceremony days.

Data Processing and Analysis

All the questionnaires were checked visually, coded, and entered into SPSS 20 software package for analysis. The data was analyzed using binary regression to determine the relationship between factors and the outcome variable at a p-value less than 0.05 then multiple logistic regression was used to compare the relationships of those significantly associated with the outcome. The results were presented in the form of tables using frequencies and percentages to describe the study population about relevant variables. The degree of association between independent and dependent variables was assessed using an odds ratio with a 95% confidence interval.

Data Quality control

The quality of data was assured by proper designing and pre-testing of the questionnaires in one of the Kebeles other than the selected kebeles on 10% of participants, and by giving training for the data collectors and supervisors before the actual data collection. Every day after data collection, questionnaires were reviewed and checked for completeness and relevance by the supervisors and principal investigator, and the necessary feedback was offered to data collectors the next morning.

Ethics Approval and Consent to Participate

The study was conducted following the 2013 revised declaration of Helsinki and ethical clearance was gained from the ethical review committee of Mettu University, faculty of public and medical sciences. A letter of permission was obtained from the Midwifery department. Participants were communicated about the purpose, risks, and benefits of the study and were invited to participate. Confidentiality was kept utmost and all related queries were responded and they provided written informed consent for participation.

Results

Socio-demographic characteristics

A total of 660 participants were involved in the study with a response rate of 98%. The mean age of the participant was 28 years with SD [9] and their age ranged between 16 to 65 years. The majority of the participant (25%) belonged to the age group, of 25-29 years. In terms of marital status, mainly 83% of the participant were married and followed by 9% who were single. Orthodox and protestant were the main religions with a contribution of 41% and 34 % respectively. The dominant ethnicities of participants were the Oromo ethnic group (78 %). According to their occupational status, 41% of the participants were housewives. The education level of the participants mainly belongs to those unable to read and write with 34% contributing while the least contributor was those who attended primary education (17%) [Table 1].

Table 1: Socio-demographic characteristics of the study population in the Illubabor zone (n=660).

S.N	Variables	Frequency	Percent
01	**Age group**		
	15-19	87	13
	20-24	193	29
	25-29	163	25
	30=34	84	13
	35-39	52	8
	≥39	79	12
02	**Marital status**		
	Married	545	83
	Divorced	26	4
	Widowed	28	4
	Single	62	9
03	**Religion**		
	Orthodox	273	41
	Muslim	159	24
	Protestant	225	34
	Others	5	1
04	**Ethnicity**		
	Oromoo	512	78
	Amhara	88	13
	Guraghe	38	6
	Others	21	3
05	**Mother occupation**		
	Housewife	273	41
	Government employer	149	23
	Farmer	88	13
	Merchant	92	14
	Daily laborer	36	5
	Other	24	4
06	**Mother education level**		
	Unable to read and write	178	27
	Read and write	223	34
	Primary education	114	17
	Secondary education and above	147	22
07	**Husband educational level**		
	Unable to read and write	103	16
	Read and write	272	11
	Primary education	81	14
	Secondary education and above	168	29
08	**Husband occupation**		
	Farmer	171	29
	Government employer	245	37
	Merchant	149	26
	Daily laborer	38	7
	Other	5	1

Characteristics of preconception care knowledge

Thirty three percent of participants had good knowledge of preconception cares while the remaining 67% of participants had poor knowledge. As [Table 2], shows; Seventy-two percent of the participants responded that PCC is not received before pregnancy and twenty percent didn't know when care is received. Sixty-nine percent of respondents not understood preconception care as a prevention strategy to improve health, twenty-nine participants didn't know whether PCC is a prevention strategy or not and ten percent understood that PCC is a prevention strategy to improve health. Six percent of participants knew PCC is about healthy living, eighty-one percent responded that PCC is not about healthy life and thirteen percent didn't know it. Seventy-four percent of women responded PCC does not encourage a healthy lifestyle, nineteen percent don't know about it and seven percent responded PCC encourages women to a healthy lifestyle. Seventy-five percent of women responded PCC doesn't prevent unintended pregnancy and promote birth space, seventeen percent don't know and eight percent responded PCC can prevent unintended pregnancy and promote birth space. Sixty-eight percent of women responded PCC don't include risk assessment, health promotion, and intervention to promote the health of mother and children, twenty-three percent don't know and nine percent responded Preconception care includes risk assessment, health promotion, and intervention to promote the health of mother and children. Sixty-eight percent of women responded effect of not seeking preconception care could not result in poor

Table 2: Knowledge status on preconception cares among study participants in the Illubabora zone (n=660).

S.No	Variables	Frequency	Percent
01	Preconception knowledge status		
	Good	220	33
	Poor	438	67
02	Care received by women before pregnancy		
	Yes	50	8
	No	475	72
	Don't know	133	20
03	Preconception care is care given immediately after delivery		
	Yes	178	27
	No	259	39
	Don't know	222	34
04	Understanding preconception care as prevention strategy to improve health		
	Yes	69	10
	No	452	69
	Don't know	138	21
05	Preconception care about healthy life		
	Yes	42	6
	No	531	81
	Don't know	86	13
06	Preconception care involves encouraging women in healthy lifestyle		
	Yes	47	7
	No	487	74
	Don't know	124	19
07	Preconception care prevent unintended pregnancy and promote birth space		
	Yes	49	8
	No	496	75
	Don't know	114	17
08	Unintended pregnancy is associated with maternal morbidity and poor pregnancy outcome		
	Yes	113	17
	No	425	65
	Don't know	121	18
09	Preconception care includes risk assessment, health promotion and intervention to promote health of mother and children		
	Yes	62	9
	No	445	68
	Don't know	151	23
10	Effect of not seeking preconception care could result in poor pregnancy outcome		
	Yes	62	9
	No	445	68
	Don't know	151	23

pregnancy outcome, twenty-three percent of participants didn't know the effect of not having PCC and nine percent responded effect of not seeking preconception care could result in poor pregnancy outcome [Table 2].

Component of Preconception care

From total study participants 442(67%) knew healthy weight was maintained through exercise, 475(72%) knew Tobacco smoking cessation, 498(76%) knew Alcohol cessation, 608(92%) knew immunisation, 564(86%) knew reduction of stress, 386(59%) knew genetic counselling, 533(81%) knew treating STI, 544(83%) knew Avoid prescribed drug medication, 487(74%) knew Treating chronic disease, 514(78%) knew Avoid exposure to toxic chemical [Table 3].

Factors associated with knowledge of preconception care

The association between independent variables and dependent variable were analyzed using both binary and multiple logistic regressions. Using binary, the candidate variables that showed association at p value <0.25 were age, marital status, mother occupation, mother education, husband education and STI treatment. The result of multiple logistic analysis showed mother occupation was significantly associated with good knowledge of preconception care. Those worker mothers were 2.6 times more likely to have good knowledge than those house wife mothers with CI (2.10-3.41) at p-value 0.02. The mother education status was also found to be associated with good knowledge about preconception care. Literate mothers were 4.5 times more likely to have good knowledge about preconception care as compared to illiterate mothers with CI (3.25-5.01) at p-value 0.001 [Table 4].

Table 3: Component of preconception care among study participants in the Illubabora zone (n=660).

S.No	Variable	frequency	Percent
01	Maintain healthy weight through exercise		
	Yes	442	67
	No	217	33
02	Tobacco smoking cessation		
	Yes	475	72
	No	183	28
03	Alcohol cessation		
	Yes	498	76
	No	158	24
04	Immunization		
	Yes	608	92
	No	50	8
05	Reduction of stress		
	Yes	564	86
	No	94	13
06	Genetic counseling		
	Yes	386	59
	No	272	41
07	Treated STI		
	Yes	533	81
	No	126	19
08	Avoid prescribed drug medication		
	Yes	544	83
	No	114	17
09	Treated chronic disease		
	Yes	487	74
	No	171	26
10	Avoid exposure to toxic chemical		
	Yes	514	78
	No	144	22

Discussion

Preconception care is defined as "the provision of health-related biomedical, behavioral, and social interventions in the period before conception [1]. In this study, 33% of the participants had good knowledge about preconception care which is higher than the study finding in India (27.5%) which may result from the commitment of the Ethiopian ministry of health to promoting the health of women through training and deploying of health extension workers to the rural area of countries and but lower than Nigeria (65.3) and Kenya (38.3%) as this may occur due to economic levels and literacy levels of the community of each country. But this finding is higher than that found in Hawassa (20%) town and adet, west gojjam(27.5%), northwest Ethiopia; this variation may be due to the time when the study was conducted because as time passes the numbers of HEW increases; this may increase awareness of PCC in the community. Preconception care can effectively inform women on how to identify and reduce risk factors for Adverse Pregnancy Outcomes through appropriate prevention [2].

This study showed that Sixty-nine percent of the respondent not understood preconception care was a prevention strategy to improve health, eighty-one percent responded PCC was not about healthy life, Seventy-four percent of women responded PCC does not encourage a healthy lifestyle, Seventy-five percent of women responded PCC doesn't prevent unintended pregnancy and promote birth space, Sixty-eight percent of women responded PCC don't include risk assessment, health promotion and intervention to promote the health of mother and children, Sixty-eight percent women responded effect of not seeking preconception care could not result for poor pregnancy outcome. The finding shows there is a huge knowledge gap on the importance of PCC among study participants which may affect the utilization of PCC. Whereas Nigeria Cross-sectional study in Nigeria showed that281(74.9%) knew Preconception care is a care received by a woman before pregnancy to improve pregnancy outcome, 111(29.6%) knew Preconception care is a care given immediately after delivery, 249(66.4%) knew Preconception care is a prevention strategy that helps men and women to prepare for pregnancy by improving their health before conception, 243(64.8%) knew Preconception care is about healthy living,254(67.7%) knew It involves encouraging women to engage in healthy lifestyles before they become pregnant,212(56.5%) knew It prevents unintended pregnancies and promotes optimal birth spacing, 180(48 .0%) knew Unintended pregnancy is associated with increased maternal morbidity and poor pregnancy outcomes and 220(58.7%) knew

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Table 4: Factors associated with good knowledge of preconception care among study participants in the Illubabora zone.

S.no	Variables	Knowledge status				COR	AOR	P-value
		Good		poor				
		No	Percent	No	Percent			
1	Age							
	<29	296	45	148	22	1	1	
	>=29	143	22	72	11	0.99(0.64-1.58)	0.50(0.30-2.50	0.09
2	Marital status							
	Married	267	41	119	18	1	1	
	Not married	171	26	101	15	0.78(0.86-2.01)	0.76(0.55-2.60)	0.11
3	Mother occupation							
	House wife	150	23	99	15	1	1	
	Worker	289	44	121	18	1.58(1.40-3.0)*	2.60(2.10-3.41)*	0.02
4	Mother education							
	Illiterate	62	10	101	15	1	1	
	Literate	376	57	119	18	5.1(3.0-8.0)*	4.5(3.25-5.01)*	0.001
5	Husband education							
	Illiterate	55	8	55	8	1	1	
	Literate	419	64	133	20	3.02(2.01-5.2)*	2.05(0.67-4.02)	0.12
6	Husband occupation							
	Farmer	131	20	89	13	1	1	
	Other work	344	52	98	15	2.4(1.5-4.3)*	2.6(0.45-4.21)	0.07
7	Treated STI							
	Yes	378	57	155	24	1	1	
	No	60	9	66	910	0.37(0.4-2.4)	0.56(0.33-2.04)	0.23

Preconception care include risk assessment, health promotion and interventions to promote the health of mother and child. The finding of these two studies shows inconsistency which may also occur due to economic and policy difference between two countries in promoting awareness' about PCC. Preconception interventions include smoking and alcohol cessation, achievement of proper weight, folic acid supplementation, review and update of vaccinations, and appropriate management and therapy of chronic diseases [2]. From the total study participants,442(67%) knew to Maintain a healthy weight through exercise,475(72%) knew about Tobacco smoking cessation,498(76%),608(92%)knew about immunization, 564(86%) knew reduction of stress,386(59%) knew genetic counseling,533(81%) knew treating STI,544(83%) knew to Avoid prescribed drug medication,487(74%) knew Treating chronic disease,514(78%) knew to Avoid exposure to toxic chemical as components of PCC. This shows the majority of the participants know the components of PCC despite this they don't know what the benefits they received before pregnancy. Similar conducted on women of reproductive age (15-49 years) in Ruiru sub-county in Kenya showed that 16.7% knew family planning, Vaccination E.g. Rubella, Tetanus 19.8%, Screening for medical conditions (E.g. Hypertension, DM) 25.3%, Use of environmental toxins (Alcohol ceassation, smoking)25.0%, Lifestyle changes (healthy weight, folic acid supplement) 11.5% Screening for genetic diseases (E.g. sickle cell anemia) 7.6% and Screening for infectious diseases (E.g. Syphilis) 28.4% as components of PCC. There is consistency between the findings of this study and that in Kenya showing that the knowledge of women on PCC components is higher in Ethiopia than that found in Kenya. This may result from policy differences between the two countries. This study also showed mother's occupation was significantly associated with knowledge of preconception care. Those worker mothers were 2.6 times more likely to have good knowledge than those housewife mothers. The mother's education status was also found to be associated with good knowledge about preconception care. Literate mothers were 4.5 times more likely to have good knowledge about preconception care as compared to illiterate mothers this is consistent with the study finding in north Ethiopia where women who attended more primary education were more than three times more likely to know preconception care (AOR: 3.37; 95% CI: 1.35, 8.42). And a study on diabetic women in Zambia showed Participants up to the primary level of education were 4.54 times more likely to have poor knowledge of PCC than those with tertiary education [AOR 4.54, 95% CI (2.23, 9.27)].

Conclusion

This study showed that the knowledge of PCC among women was very low and associated with women's educational status and whether they had occupation or not. Those worker mothers were 2.6 times more likely to have good knowledge than those house wife mothers. Literate mothers were 4.5 times more likely to have good knowledge about preconception care as compared to illiterate mothers.

Recommendation

To increase the knowledge of women's about the PCC zonal health bureau should have to train and supervise health extension worker deeply on PCC**.** Health center administration should have to include PCC and education service in their facility to increase awareness and utilization it**.**

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Strength of the study

Intervention strategy may develop from the finding of this study.

Limitation of the study

This study only addressed the knowledge status of women on PCC not the utilization levels.

Consent for publication

Not applicable.

Availability of data and materials

Data sets used and examined in this study are obtainable from the corresponding author upon sound request.

Competing interests

The authors state that they have no competing interests, financial or otherwise.

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Declaration of interests

The authors state that they have no competing interests, financial or otherwise.

References

1 World Health Organization (2013) Meeting to develop a global consensus on preconception care to reduce maternal and childhood mortality and morbidity: World Health Organization Headquarters, Geneva, 6–7 February 2012: meeting report. World Health Organization.

2 Poels M, van Stel HF, Franx A, Koster MPH (2017) Actively preparing for pregnancy is associated with healthier lifestyle of women during the preconception period. Midwifery 50: 228-234.

3 Johnson K, Posner SF, Biermann J, Cordero JF, Atrash HK, et al. (2006) CDC/ATSDR Preconception Care Work Group, Select Panel on Preconception Care: Recommendations to improve preconception health and health care–United States. A report of the CDC/ATSDR Preconception Care Work Group and the Select Panel on Preconception Care. MMWR Recomm Rep 55: 1–23.

4 Amaje E, Fikrie A, Utura T (2022) Utilization of Preconception Care and Its Associated Factors among Pregnant Women of West Guji Zone, Oromia, Ethiopia, 2021: A Community-Based Cross-Sectional Study. Health Serv Res Manag Epidemiol 21: 23333928221088720.

5 Brown HK, Mueller M, Edwards S, Mill C, Enders J, et al. (2017) Preconception health interventions delivered in public health and community settings: A systematic review. Can J Public Health 108: e388-e397.

6 Cherie N, Mebratu A (2017) Adverse birth out comes and associated factors among delivered mothers in Dessie Referral Hospital, North East Ethiopia. J Women's Health Reprod Med 1: 4.

7 Adane AA (2014) Adverse birth outcomes among deliveries at Gondar University Hospital, Northwest Ethiopia. BMC Pregnancy and Childbirth 14: 90.

8 Desta SA, Damte A, Hailu T (2020) Maternal factors associated with low birth weight in public hospitals of Mekelle city, Ethiopia: a case-control study. Ital J Pediatr 46: 124.

9 Abu Talib R, Idris IB, Sutan R, Ahmad N, Abu Bakar N (2018) Patterns of Pre-pregnancy Care Usage among Reproductive Age Women in Kedah, Malaysia. Iran J Public Health 47: 1694-1702.

10 Glover V (2014) Maternal depression, anxiety and stress during pregnancy and child outcome; what needs to be done. Best Pract Res Clin Obstet Gynaecol 28: 25-35.

11 Artal R, Lockwood CJ, Brown HL (2010) Weight gain recommendations in pregnancy and the obesity epidemic. Obstet Gynecol 115: 152-155.

12 Gogoi M, Unisa S (2017) Chronic Diseases during Pregnancy and Birth Outcome: A Study Based on Tertiary Hospital of Mumbai. Women's Heal 3: 61–68.

13 Poels M, Koster MP, Boeije HR, Franx A, van Stel HF (2016) Why Do Women Not Use Preconception Care? A Systematic Review On Barriers And Facilitators. Obstet Gynecol Surv 71: 603-612.

14 Connor KA, Cheng D, Strobino D, Minkovitz CS (2014) Preconception health promotion among Maryland women. Matern Child Health J 18: 2437-2445.

15 Shadab P, Nekuei N, Yadegarfar G (2017) The prevalence of preconception care, its relation with recipients' individuality, fertility, and the causes of lack of checkup in women who gave birth in Isfahan hospitals in 2016. J Educ Health Promot 6: 88.

16 Rosnani K, Nani D, Kadir A, Azidah, Rosediani M (2016) Knowledge, Attitudes and Practice of Preconception Care among Women Attending Appointments at a Rural Clinic in Kelantan. Education in Medicine Journal 8.

17 Goshu YA, Liyeh TM, Ayele AS, Zeleke LB, Kassie YT (2018) Women's Awareness and Associated Factors on Preconception Folic Acid Supplementation in Adet, Northwestern Ethiopia, 2016: Implication of Reproductive Health. J Nutr Metab 17: 4936080.

18 Rania E, Kassem K, Eshra D (2022) Effectiveness of Structured Teaching Programme on Knowledge about Self- assessment of Fetal Wellbeing among Primigravida women. 12-21.

19 Kassa A, Yohannes Z (2018) Women's knowledge and associated factors on preconception care at Public Health Institution in Hawassa City, South Ethiopia. BMC Res Notes 28: 841.

20 Agricola E, Pandolfi E, Gonfiantini MV, Gesualdo F, Romano M, et al (2014) A cohort study of a tailored web intervention for preconception care. BMC Med Inform Decis Mak 14: 33

21 Brown HK, Mueller M, Edwards S, Mill C, Enders J, et al (2017) Preconception health interventions delivered in public health and community settings: A systematic review. Can J Public Health 108: e388-e397.