Assessment of Knowledge, Attitude and Practice of Women about the Preconception Care in Al- Hilla Health Sectors

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Abstract: Background: The mother and child wellbeing depend on female's health even before pregnancy occur in which modifiable risk factors can be addressed in physical, psychological and social aspects which called the preconception care. **Objective:** To assess women's knowledge, attitude and practice about the preconception care in Al-Hilla health sectors. **Methods:** A cross-sectional study was conducted on 245 women attending the primary health care centers in Al-Hilla health sectors /Babylon. The data collection was conducted from 1st of February 2023 to the 31th of August 2023. A questionnaire was used for data collection. It consists of four sections, the 1st includes socio-demographic information, and the 2nd, 3rd and 4th sections assess the knowledge, attitude and practice of the participants respectively. Data was analyzed using SPSS program version 26, and a statistically significant level was determined at P ≤0.05. **Results**: In this study, we found more than half of the women have good knowledge about preconception care (56.73%), (32.65%) had fair knowledge and (10.61%) had poor knowledge. Good attitude was found in (77.96%) and good practice in (59.18%). Age above twenty years, higher education number of children and marital status were significantly associated with knowledge, attitude and practice. The attitude and practice were significantly associated with the knowledge level. **Conclusion:** Women in Al-Hilla have good knowledge, good attitude and good practice about the preconception care despite that only half of women were aware about preconception care. Attitude and practice have significant association with the knowledge.

Keywords: AAFP, DM, UK, HIV.

INTRODUCTION

The preconception care (PCC)defined by the (World Health Organization) WHO as: {the provision of biomedical, behavioral & social health interventions to women and couples before conception occur, aimed to improve their health status and reducing behavioral and individual and environmental factors that could contribute to poor maternal and child health outcomes}[World Health Organization, 2013]. The main aim of the preconception care is to improve the women's health prior to conception and improve any pregnancy related adverse outcome that affect both the mother and her newborn [Jf, A, 2006]. And this can be done by providing health promotion, screening, and interventions for women in reproductive age in order to reduce the risk factors that may affect their future pregnancies. PCC is recognized as a critical component of health care for women [Dean, S.V. *et al.,* 2014; Mason E. *et al.,* 2014] . Since most women are unaware of their pregnancy till they have their missed period which may be at 6 or 8 weeks of gestation which is the most critical period in pregnancy, it's the period of organogenesis is most critical period in the development of the fetus which start from week three to week eight [Kasim, R. *et al.,* 2016; Jafari, N. *et al.,* 2009; Rehman, B. *et al.,* 2023]. During organogenesis, the fetus is most susceptible to exposure to teratogens. A teratogen is defined as: {any infectious chemical agent, or other environmental exposure that can lead to the disruption of normal fetal development and lead to congenital abnormalities} [Smith, S. M. *et al.,* 2014; Donovan, M. F. *et al.,* 2022] . Therefore, important interventions to enhance the health behavior of women and their families should be started before pregnancy occur[Shibata, Y. *et al.,* 2023]. Regarding the fact that many risks factors can affect the fetus in the period of organogenesis and should be altered before pregnancy occur since the late counselling after the period of organogenesis do not improve the outcome especially the birth defects and placental malformation[Weisman, C. *et al.,* 2008] . Considering the fact that half of all pregnancies are unintended this increase the importance of PCC since [unfpa.org]. Many couples enter the pregnancy with unhealthy risky behaviors that contribute to poor outcome an example of these behaviors are smoking, bad nutritional habits and obesity and anemia, hence these risk factors need to be addressed before pregnancy happen [Lassi, Z. S. *et al.,* 2014 ; Yang, L. *et al.,* 2022] . All women in reproductive age should offered preconception counseling before getting pregnant. This counseling should be offered to all women who attend visits for any reason such as Pap smears contraception, or for the follow up for chronic diseases such as diabetes mellitus, epilepsy, thyroid diseases and hypertension [Yehuda, I. *et al.,* 2016 ; Błaszczyk, B. *et al.,* 2022 ;Ţarnă, M. *et al.,* 2022] . Despite the increasing and revolutionary achievement in maternal and fatal medicine the maternal and neonatal morbidity

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and mortality is still in alarming level, this address the attention to the gap in the continuum of care, which is proved by the evidence is to be in the preconception period and the care provided to the couples. [W.H.O, 2013] One of the important part of the primary prevention is to investigate the knowledge, attitude and the practice level of a community about the studied subject of interest and in this study understanding the(Knowledge, Attitude and Practice) KAP level will be helpful is addressing the knowledge gap and the behaviors of the women which will assist in the implementation of preventive plan of adverse pregnancy outcome [Li, D. *et al.,* 2019] PCC is relatively recent concept and not fully explores worldwide and with no uniformed guidelines, each country has it's guidelines and this applied for both developed countries (Canada, Australia, Netherlands United Kingdom and united states of America) and the developing countries (Ethiopia, Nepal, India and middle east).[W.H.O, 2013] Many studies and researches had explored the PCC from many aspects regarding the population's knowledge and practice about PCC. Many studies suggested that women in reproductive-age in Africa had low awareness about PCC. For, example study carried out in Sudan which suggests that awareness level was only (11%) of the study's participants [Ahmed, K. *et al.,* 2015]. Other study carried out in Ethiopia recently found that only (17 %) had good knowledge [Lemma, T. *et al.,* 2022]. Other studies conducted in Egypt and Nigeria revealed a good PCC knowledge of (23.3%) and 20.5% respectively[Nabil Aboushady, R. M. *et al.,* 2021 ; Odeyemi, K, 2023] . In Iraq, not much is known about the knowledge, attitude and practices of the preconception health care apart from scattered studies assessing the component of PCC individually not as a one package of health service. many studies explored the knowledge and the practice of folic acid regarding it's importance in preventing neural tube defects, it's dosage and timing with or prior to pregnancy. An example of these studies the studies conducted in Babylon and Baghdad where their results showed. 44.8%, 79%. had fair level of knowledge respectively, while only 36.2%, 47.1% knew its benefit in pre-pregnancy respectively [Sadiq, Z. *et al.,* 2022; Yahyaa, B. T, 2019]. Regarding PCC studies in Iraq only one study was found conducted in Erbil 2017 showed a knowledge level of 3.3% only which is strikingly low level highlighted the defect in the health care system in Iraq and efforts needed to improve the women's knowledge [Mirkhan Ahmed, H. *et al.,* 2017].

1.1. Preconception Care Development

During the twentieth and twenty-first centuries there were a major advances in maternal and fetal medicine. However, we now face different and emerging concerns in the multifaceted area of maternal and fetal medicine. Over the last decades there has been a significant rise in the incidence of preterm birth which often associated with significant health issues for born children. Despite the major improvement and efforts addressed for the maternal and child health there were a significant numbers of maternal and child mortality This drive the attention to the gap in the health system which found to be the pre and periconceptional period and its related health challenges.[Beck, S . *et al.,* 2010]The history of the preconception care is back to the 1980 and continue to nowadays and to the future in a universal plan to improve the women health and their future children.[Health.gov, 2024] In 1990 the United States moved PCC into a standard expectation within the health care system as it was defined it as a one of health care system service and protection objectives.[Freda, M.C. *et al.,* 2006] In 2012 the WHO meeting in Geneva established the concept of PCC as a package of health care services three terms was suggested to represent these services which include:

Preconception Care — provision of preventive, promotive or curative health and social interventions before conception occurs;

Periconception Care — provision of these interventions in the period extending from 3 months before to 3 months after conception occurs;

**Interconception Care** — provision of these interventions between two pregnancies.

All these terms make good sense, but it was agreed that it would be useful to have one simple and clear term to deliver the idea, the term 'preconception care' includes both the period before conception and the interconception period and it was established in 2012 by the WHO.

1.2. Preconception Care Targeted Group: Both high- and low-income countries, preconception care should be integrated in the health care system to target individuals and couples who desire pregnancy or other health services related to pregnancy in families and communities who are socially and economically disadvantaged. Adolescent girls are mostly vulnerable in low- and

middle-income settings, and without special attention their needs are likely to be neglected and they constitute high risk group.[Freda, M. C, 2006]PCC addressed to both male and female as early as the adolescence period and extend to adulthood (reproductive years) continued through the pregnancy, child birth for both the mother and newborn in postnatal period and later on. [CDC, 2023.]

As shown by the picture below.
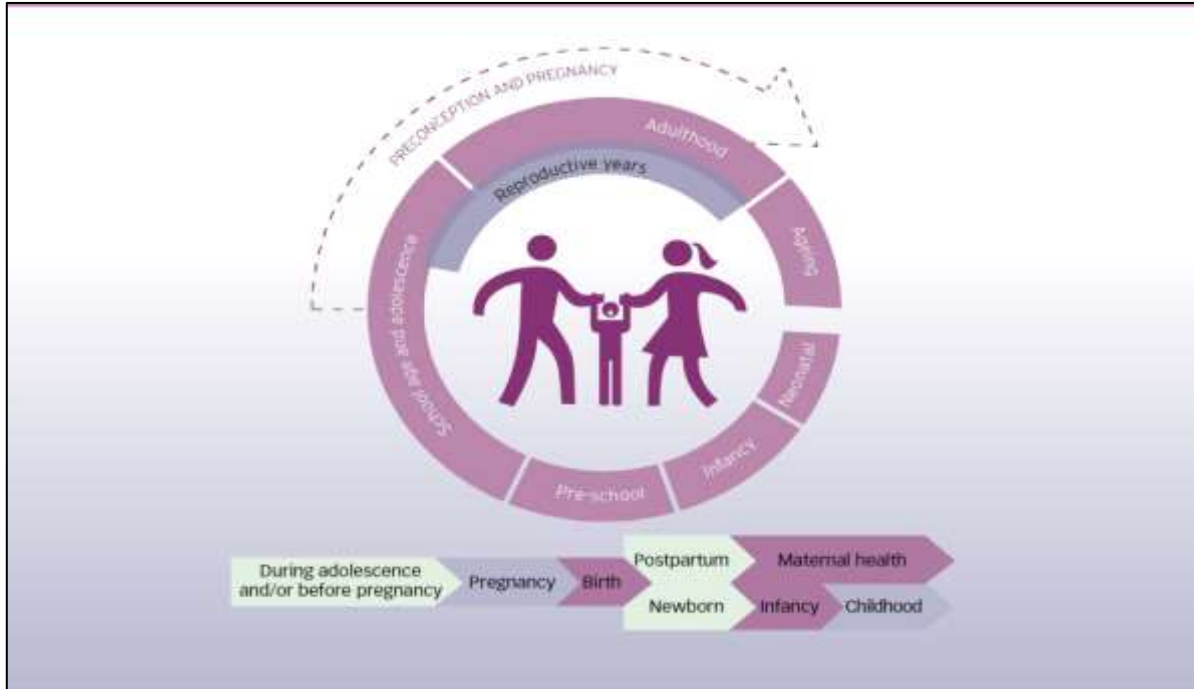
Picture (1.1): life course – when to intervene. [World Health Organization, 2013]

1.2.   Elements of Preconception Care:

PCC is not identical for every person, varying according to their individualized needs. Based on a person's health, the availability of the health services and health care professional opinion about the needed services and the method and how it delivered to the clients.[CDC, 2023] The components of PCC defined by WHO to include 13 conditions as follows: nutritional conditions, tobacco use, environmental health, genetic conditions, too early/unwanted and rapid successive pregnancies, interpersonal violence infertility/ subfertility, vaccine preventable diseases, sexually transmitted infections, HIV, psychoactive substance use, mental health and female genital mutilation.[World Health Organization, 2013]
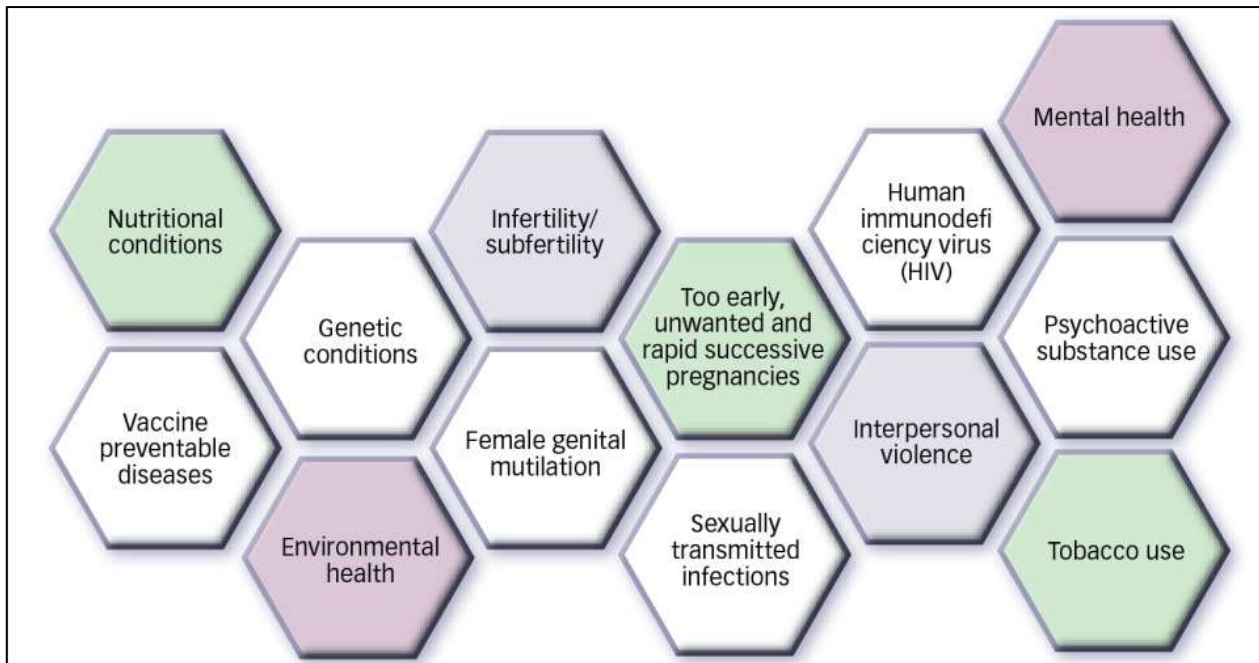
Picture (1.2): Areas addressed by the preconception care package.[World Health Organization, 2013]

1.2.1.The Nutritional Condition : This include addressing many health conditions which include screening for anemia, supplementing iron and folic acid, monitoring nutritional status, screening diabetes and management of diabetes, promoting exercise, iodization of salt and counselling education.[World Health Organization, 2013]

1.2.1.1. Screening for Anemia: According to the WHO anemia defined as "a condition in which the number of red blood cells or the hemoglobin concentration within them is lower than normal". Anemia is a worldwide public health problem that mostly affects young children, menstruating adolescent and adult females along with pregnant and postpartum women. According to the WHO last updates 30% of women 15–49 years of age and 37% of pregnant women are anemic. Iron deficiency is the most common nutritional cause of anemia.[Atrash, H. *et al.,* 2020; World Health Organization, 2013] , The WHO recommends intermittent or daily iron and folic acid supplementation to improve iron status and reduce the risk of anemia in women of reproductive age as part of WHO goal for reducing anemia in women through their reproductive years in which the WHO goal has been set to reduce the anemia by 50% by 2030.[World Health Organization ,2013; Pai, R. D, 2023],

1.2.1.2. Supplementing Iron and Folic Acid. Folic acid (vitamin B9) is one of the most important vitamins required for healthy females during their reproductive years it's essential for the

embryonic growth and development along with it's crucial importance in preventing the occurrence of congenital malformations especially neurological birth defects in which can reach up to 72% comparing to placebo[Dorney, E. *et al.,* 2018] , which are a major health concern in developing countries and around the world because they have a direct impact on the affected babies, their families, and the community.[Pai, R. D. *et al.,* 2023] The recommend dose of folic acid is 400 µg of folic acid per day to be taken by all women of childbearing age as the guidelines of The Preventive Services Task Force and the Institute of Medicine at the Centers for Disease Control and Prevention in the United States institutes. [Sadiq, Z. *et al.,* 2022].It is recommended for with iron deficiency diagnosed by blood tests women to have supplementary iron in a dose of 60 mg of elemental iron to prevent anemia.[Dorney, E. *et al.,* 2018]

1.2.1.3. Monitoring Nutritional Status: Females should maintain normal BMI since maternal undernutrition in which their (BMI ≤18.5 kg/m2) leads to poor fetal development and associated with nutritional deficiencies, females with whom (BMI≥25 kg/m2) are or (BMI>30 kg/m2) are obese before pregnancy are at greater risk of developing hypertensive disorders during pregnancy (eclampsia or pre-eclampsia) [W.H.O. 2013].

1.2.1.4. Screening Diabetes and Management of diabetes: The AAFP recommend that "All

individuals of childbearing age with diabetes should be counseled about the importance of glycemic control before pregnancy " since the poor glycemic control can increase the miscarriage, congenital malformations, preterm birth and birth abnormalities.[Dorney, E. *et al.,* 2018; Wilkes, J. *et al.,* 2016];

1.2.2. Tobacco Use: All couples (male and female) should be advised about smoking and it's adverse effect on mother and the future children. [1]

1.2.3. Vaccine-Preventable Diseases: Hepatitis B, diphtheria, tetanus and rubella are the main diseases that women need to be vaccinated against.[World Health Organization, 2013]

1.2.4. Sexually Transmitted Infections (STIs) and (Human Immunodeficiency Virus) HIV: For all individuals of childbearing age and their sexual partners, assess STI and HIV risk, Screening, provide counseling, immunizations, as indicated and increasing access to treatment and health services, and for HIV mother ensure providing antiretroviral prophylaxis in order to prevent mother-to-child transmission.[World Health Organization, 2013; Wilkes, J, 2016]

1.2.5. Genetic Carrier Screening: A woman and her partner should be screened for if their obstetric and family history or ethnic background suggests. [Wilkes, J, 2016]

1.2.6. Rapid Successive Pregnancies: Short interpregnancy period associated with an increased risk of adverse perinatal outcomes, birth spacing should be discussed with patients during prenatal and postpartum care. Many studies on birth spacing and perinatal outcomes found that an interpregnancy interval of 18-24 months was associated with lower risks of poor outcomes than intervals shorter than six months. A gap of at least 24 months is consistent with the WHO's birth interval recommendation and the United Nations Children Fund (UNICEF) recommendation that breastfeeding for two years or more is optimal. [United Nations Children's Fund, 2023; Wilkes, J, 2016]

1.3. Preconception Care in Iraq: In Iraq preconception care is not provided as a package of health care services and this term is not familiar to the majority of women, nevertheless most of the health care services included in the PCC are offered by the Ministry Of Health (MOH) in Iraq but as individualized services this is accepted by

the WHO which is interested in the aims of the PCC rather than the term [W.H.O, 2013] In Iraq the premarital examination is mandatory before marriage certificate is granted for the married couples this include {blood group & Rh, CBC, VDRL, HIV, HBV sag, HCV sag, electrophoresis for couples if thalassemia is suspected chest x-ray to exclude(tuberculosis) TB and full family history about genetic, mental and non-communicable diseases such as Diabetes and hypertension. [https://mofa.gov.iq]

Other Health Services that Available for Women are:
1.Anti-tetanus vaccination (Td).
2.Prenatal care (screening and treatment of chronic diseases).
3.Antenatal care (diagnosis of pregnancy, screening of DM, hypertension, anemia, UTI and fetal congenital anomalies with folic acid and iron supplementation).
4.Postnatal care (screening and treatment of anemia, supplementation of iron and vitamin D, encouragement of breast feeding, screening of post-partum depression and neonate primary examination).
5.Provision of contraception methods and counselling.
6.Adolescent Health Services (a few pilot interventions of adolescent health services were launched in 9 Primary Health Care Services by MOH in collaboration with United Nations Population Fund (UNFPA) in 2012-2013 [https://moh.gov; https://moh.gov.iq]

Despite all the effort and the improvement in the maternal and child health services in the last few years maternal and infant morbidity and mortality still in alarming level, the maternal mortality ratio was 35.7 per 100 000 live births in 2013.[https://moh.gov] This drives the attention to the gap in the health care provided to women in Iraq in which the health care services provided as single service at a time not as a one package this leads to the missing of the health care provided to women and in turn affect the women and their husbands and future children which drives the attention to the importance of the PCC in decreasing maternal and infant mortality and morbidity.

Aim of the study: To assess women's knowledge, attitude and practice about the preconception care in Al-Hilla health sectors.

2. METHODS

2.1. Study Design, Setting and Time Frame

A cross sectional interviewing study targeting Iraqi women attending primary health care centers (PHCC) in Al-Hilla health sectors (the 1st and the 2nd) from the 1st of February 2023 to the 31th of January 2024.

2.2. Sampling Technique:

It's a probability simple random sample was done at the primary health care centers in Al-Hilla health sectors in which 6 PHCCs were chosen 3 PHCCs from each health sector in which each health sectors contain 11 PHCCs and the selection of the primary health care centers done by simple random sampling(lottery) [Hay Al-Imamm, Al-Muhandseen and Al-Qudus in the 1st Hilla health sector] and in the 2nd Hilla health sector [Al Zahraa , Shuhadaa Al-Aqsa and Babil training center].Time needed to complete the questionnaire was 10-15 minutes, the collection of the data was 3 times a week during the work hours of the PHCCs.

2.3. Pilot Study

Before starting to collect the data a pilot study was done for 2 weeks. The pilot study was done at the Hay Al- Imam primary health care center in Hilla from the 1st of February to the 14th of February 2023 aimed to test the validity and reliability of the research questionnaire to detect any obstacles and challenges and modify accordingly and to estimate the time needed for interviewing the study subjects. The pilot study was done in a sample of 24 women attending Hay Al-Imam PHCC in Hilla and this sample was excluded from the study sample. During the pilot study the sociodemographic domain was adjusted according to the understanding of the participants, knowledge questionnaire was adjusted to become easily understood by the participants.

2.4. Ethical Consideration

An official permission was obtained from faculty of Medicine /family and community medicine department, University of Kufa, Babylon heath directorate, Al-Hillah health sectors (1st and 2nd) and the PHCCs the research took place in. Before collecting data the oral consent was obtained from all study participants and the purpose of the study was explained.

2.5. Inclusion Criteria:

Female age 15 years old and older who are mentally eligible for answering the questionnaire.

2.6. Exclusion Criteria:

1.Females who were mentally and psychologically not eligible for answering the questionnaire.
2. Female who were critically ill or had medical emergency.
3. Females with any disability (difficulties in hearing or speech).

2.7. Data Collection Tool

The data was collected using a pretested structured questionnaire (5)
 which was validated by a community medicine and two family physicians

The questionnaire was administered to interviewing women at the age 15 years and older to pertain the following:

•**Sociodemographic and Personal Information** (age, marital status, parity, Education of the woman and her husband, occupation of the woman and her husband and family income).

•**The knowledge, Attitude and Practice Section** that includes questions regarding the knowledge part testing women's knowledge about the awareness of preconception health, the effect of maternal diseases in the fetal development and newborn health ,the importance of preconception counselling regarding maternal chronic illnesses ,folic acid supplements, preconception immunization ,drugs consumption pre pregnancy and in pregnancy, the birth space and the role of consanguinity in delivering a child with congenital diseases.for the knowledge part each correct answer will be scored 3 and each incorrect answers scored 1 and for the not sure answers will scored 2.

• The attitude part consists of 4 main questions the answer will be according to Likert score 3 for agree, 2 for neutral and 1 for the disagree.
• The practice part consists of 6 questions regarding preconception health practice
• The score for the practice domain is of (3) for the good practice, (2) for the not sure for the poor practice(1) similar scoring system was applied in Egyptian study (Nabil Aboushady, R. M. et al./, 2021).

Categorical responses (good/fair and poor) were then generated for the knowledge, attitude and practice domains. The grading was determined according to the percentage of the total score for each domain:

0.0%-49.9% was poor, and 50%-75% was considered fair and >75 % considered good.

For each domain, it was considered that the respondents had to obtain 75% and above for their knowledge, attitude and practice to be considered good.

Those whom scored 50-75% in each domain considered to have fair knowledge, attitude and practice. And those whom scored less than 50% in each domain were considered to have poor knowledge, poor attitudes and poor practices. The same categories were applied in the study conducted in Iraq in 2017.

2.8 Sample Size
Fisher's formula [37] was used to calculate sample size as follows:

n = Z² P (1 − P) / d²
n = sample size
Z = 95% the value that corresponds for the 95% interval
of confidence = 1.96
P = prevalence of poor knowledge in study conducted in Erbil, Iraq [25]
d = the degree of precision was at 0.05 at 95% confidence
interval
n = (1.96)² (0.2) (1 − 0.2) / (0.05)²
=245

So the desired sample size was 245

2.9. Statistical Analysis:
Data of the studied sample were entered and analyzed by using Statistical Package for the Social Sciences SPSS, version 26 from online source. Descriptive statistics were presented as frequencies, proportions (%), and means and standard deviation (SD). Analytic statistics such as Chi -square test was used to estimate the association between two categorical variables, A P-value of ≤ 0.05 was considered statistically significant.

RESULTS
Table (3.1) represent the sociodemographic characteristics of the participant in which a sample of 245 females participated in this study from which 108 (44.1%) of them aged (30 -39) with a mean age of (34.2), in which 218 (89 %) of them are married and 21 (8.6%) are single, with an education of 127 (51.8%) of higher education and 107 (43.7%) employed. The married participants were with number of children range (0-6). 112 (45.7%) of their husbands had higher education and 116 (47.3%) were employed. Regarding the income, 44 (18%)had a monthly income of <500000 and about three quarter of them 180 (73.5%) had an income of 500000-1000000.

Table 3.1: the sociodemographic data frequencies and percentage

Variables		frequency	percentage
Age/years	<20	16	6.5
	20-29	77	31.4
	30-39	108	44.1
	40-49	33	13.5
	50-59	8	3.3
	≥60	3	1.2
No. of children	0	8	3.3
	1	32	13.1
	2	97	39.6
	3	49	20.0
	4	30	12.2
	> 4	8	3.3
	unmarried	21	8.6
Education	illiterate	5	2.0
	primary	29	11.8
	secondary	84	34.3
	higher education	127	51.8
Husband education	illiterate	2	0.8
	primary	18	8
	secondary	94	41
	higher education	115	50
Occupation	employed	107	43.7
	unemployed	138	56.3
Occupation of the husband	employed	116	51.7

	unemployed	105	46.8
	retired	3	1.3
Marital status	single	21	8.6
	married	218	89.0
	divorce	4	1.6
	widow	2	0.8
The income /IQD	<500000	44	18.0
	500000-1000000	180	73.5
	>1000000	21	8.6

Table (3.2): percentage distribution of women's knowledge , attitude and practice across the studied sample.

	poor	**Fair**	**Good**	**Mean ± SD**
Knowledge	26 (10.6)	80 (32.7)	139 (56.7)	47.35 ± 9.55
Attitude	5 (2)	49 (20)	191 (78)	10.64 ± 1.51
Practice	19 (7.8)	81 (33.1)	145 (59.2)	16.42 ± 3.51

Table (3.3): The association between knowledge and attitude.

Knowledge	**Poor**	**The Attitude Fair**	**Good**	**P value**
Poor	3 (1.2)	6 (2.4)	17 (6.9)	
Fair	2 (0.8)	17 (6.9)	61 (4.9)	
Good	0 (0)	26 (10.6)	113 (46.1)	0.004

Table (3.4): The association between knowledge and practice..

Knowledge	**Poor**	**Practice Fair**	**Good**	**P value**
Poor	11 (4.5)	8 (3.3)	7 (2.9)	
Fair	3 (1.2)	32 (13.1)	45 (18.4)	
Good	5 (2)	41 (16.7)	93 (38)	0.001

Table (3.5) demonstrates the association between the knowledge level and the sociodemographic characteristics of the participants in which there are significant association between the participant's knowledge level and the participant's age the higher score was for the participant whose age was 20-40 , educational level of the husband and marital status the married women had higher knowledge { p-value were 0.02 , 0.01 ,and 0.02 respectively , while the association between the knowledge level and parity (number of children), the female education was found to be highly significant {0.001} the higher score was for those with educational level of higher education. The association between the knowledge level and the occupation of the female husband's occupation and the income was not significant with a P -value of {0.05 ,0.07 and 0.08 respectively.

Table (3.5): The association of sociodemographic characters and knowledge score

		Poor 26(10.6%)	**Knowledge Fair 80 (32.75)**	**Good 139(56.7%)**	**P value**
Age/years	<20	6 (2.4)	6 (2.4%)	4 (1.6)	0.02
	20-29	8(3.3%)	27 (11.0%)	42 (17.1)	
	30-39	7(2.9%)	33(13.5%)	68 (27.8)	
	40-49	2 0.(8%)	11(4.5%)	20 (8.2)	
	50-59	2 (0.8%)	2 (0.8%)	4 (1.6)	
	≥60	1 (0.4%)	1(0.4%)	1 (0.4)	
No. of children	0	3 (1.2)	2 (0.8)	4 (1.6)	
	1	5 (2.0)	9 (3.7)	24 (9.8)	
	2	5 (2.0)	44 (18)	78 (31.8)	
	3	4 (1.6)	7(2.9)	41 (16.7)	0.001

		Poor	Fair	Good	P value
	4	1 (0.4)	6 (2.4)	28 (11.4)	
	> 4	2 (0.8)	4 (1.6)	2 (0.8)	
	unmarried	6 (2.4)	8 (3.3)	10 (4.1)	
Education	illiterate primary secondary higher education	0 (0.0) 6 (2.4) 10 (4.1) 10 (4.1)	3 (1.2) 15 (6.1) 30 (12.2) 32 (13.1)	2 (0.8) 8 (3.3) 44 (18.0) 85 (34.7)	0.001
Husband's education	illiterate primary secondary higher education	1 (0.4) 1 (0.4) 4 (1.6) 14 (6)	0 (0.0) 8 (3.5) 33 (14.7) 31 (13.8)	1 (0.4) 9 (4) 55 (24.5) 67 (30)	0.01
Occupation	employed unemployed	7 (2.9) 19 (7.8)	31 (12.7) 49 (20.0)	69 (28.2) 70 (28.6)	0.05
Husband's occupation	employed unemployed retired	14 (6.6) 6 (2.6) 1 (0.4)	34 (15) 36 (16) 1 (0.4)	68 (30) 63 (28) 1 (0.4)	0.07
Marital status	single married divorced widow	6 (2.4) 19 (7.80) 0 (0.0) 1 (0.4)	8 (3.3) 70 (28.6) 1 (0.4) 1 (0.4)	7 (2.9) 129 (52.7) 3 (1.2) 0 (0.0)	0.02
The income IQD	<500000 500000-1000000 >1000000	8 (3.30) 16 (6.5) 2 (0.8)	18 (7.3) 53 (21.6) 9 (3.7)	18 (7.3) 111 (45.3%) 10 (4.1)	0.08

Table (3.6) demonstrates the association between the attitude level and the sociodemographic characteristics of the participants in which there are significant association between the participant's attitude level and the participant's age {p-value were 0.03, while the association between the attitude level and the female education good attitude with higher education, husband's occupation and marital status was found to be highly significant {0.001}, parity (number of children) were found to have significant association with the attitude level P-value was { 0.003}. The association between the attitude level and the occupation of the female, educational level of the husband and the income was not significant with a P -value of {0.06 ,0.07 and 0.4 respectively.

Table (3.6): The association of sociodemographic characters and Attitude score.

		Poor 5 (2%)	Attitude Fair 49 (20%)	Good 191 (78%)	P value
Age/years	<20 20-29 30-39 40-49 50-59 >60	2 (0.8) 1(0.4) 1(0.4) 0(0) 1 (0.4) 0 (0.0)	6 (2.4) 19 (7.8) 22 (9) 2 (0.8) 0 (0.0) 0 (0.0)	8 (3.3) 57 (3.3) 85 (34.7) 31 (12.7) 7 (2.9) 3 (1.2)	0.03
No.of children	0 1 2 3 4 > 4 unmarried	0 (0.0) 0 (0.0) 2 (0.8) 0 (0.0) 0 (0.0) 1 (0.4) 2 (0.8)	4 (1.6) 8 (3.3) 17 (6.9) 8 (3.3) 2 (0.8) 1 (0.4) 9 (3.7)	4 (1.6) 24 (9.8) 78 (31.8) 41 (16.7) 28 (11.4) 6 (2.4) 10 (4.1)	0.003
Education	illiterate primary	0 (0.0) 0 0.0)	2 (0.8) 1 (0.4)	3 (1.2) 28 (11.4)	0.001

	secondary	5 (2.0)	16 (6.5)	63 (25.7)	
	higher education	0 (0.0)	30 (12.2)	97 (39.6)	
Husband's education					
	illiterate	0 (0.0)	1 (0.4)	1 (0.4)	
	primary	0 (0.0)	2 (0.8)	16 (7)	0.07
	secondary	3(1.2)	13 (5.8)	76 (33)	
	higher education	0 (0.0)	24 (10.7)	88 (40)	
Occupation	employed	0 (0.0)	18 (7.3)	89 (36.3)	0.06
	unemployed	5 (2.0)	31 (12.70)	102 (41.60	
Husband's occupation	employed	2 (0.8)	11 (5)	103 (42.0)	
	unemployed	2 (0.8)	30 (13.3)	75 (32.5)	0.001
	retired	0 (0.0)	0 (0.0)	3 (1.2)	
Marital status	single	2 (0.8)	9 (3.7)	10 (4.1)	
	married	3 (1.2)	37 (15.1)	178 (72.7)	
	divorced	0 (0.0)	3 (1.2)	1 (0.4)	0.001
	widow	0 (0.0)	0 (0)	2 (0.8)	
The income IQD	<500000	2 (0.8)	10 (4.1)	32 (13.1)	
	500000-1000000	3 (1.2)	37 (15.1)	140 (57.1)	0.4
	>1000000	0 (0.0)	2 (0.8)	19 (7.8)	

Table (3.7) demonstrates the association between the practice level and the sociodemographic characteristics of the participants in which there are significant association between the participant's practice level and parity (number of children {p-value was 0.01 each}, while the association between the practice level and participant's age, the female education, the husband's occupation and marital status was found to be highly significant {0.001}. Educational level of the husband and the income was significant p - value (0.003,0.01) respectively. The association between the practice level and the occupation of the female, was not significant with a P -value of {0.08}.

Table (3.7): Association between sociodemographic characters and practice score

		Practice score			P value
		Poor 19 (7.8%)	Fair 81 (33.1%)	Good 145(59.2%)	
Age/years	<20	5 (2)	8 (3.3)	3 (1.2)	
	20-29	4(1.6)	23 (9.4)	50 (20.4)	
	30-39	5 (2)	36 (14.7)	67 (27.3)	0.001
	40-49	1 (0.4)	10 (4.1)	22 (9)	
	50-59	2(0.8)	4 (1.6)	2 (0.8)	
	≥60	2 (0.8)	0 (0)	1(0.4)	
No.of children	0	0 (0)	5 (2)	3 (1.2)	
	1	2 (0.8)	10 (4.1)	20 (8.2)	
	2	5 (2)	31 (12.7)	61 (24.9)	
	3	1 (0.4)	16 (6.5)	32 (13.1)	0.01
	4	4 (1.6)	9 (3.7)	17 (6.9)	
	>4	1 (0.4)	1 (0.4)	6 (2.4)	
	unmarried	6 (2.4)	9 (3.7)	6 (2.4)	
Education	illiterate	0 (0)	3 (1.2)	2 (0.8)	
	primary	5 (2)	2 (0.8)	22 (9)	0.001
	secondary	9 (3.7)	26 (10.6)	49 (20)	
	higher education	5 (2)	50 (20.4)	72 (29.4)	
Husband's education	illiterate	1 (0.4)	0 (0.0)	1 (0.4)	
	primary	1 (0.4)	5 (2.2)	12 (5.2)	0.003
	secondary	4 (1.6)	29 (12.9)	59 (24.5)	

	higher education	7 (3)	38 (16.9)	67 (30)	
Occupation	employed unemployed	4 (1.6) 15 (6.1)	34 (13.9) 47 (19.2)	69 (28.20 76 (31.0)	0.08
Husband's occupation	employed unemployed retired	8 (3.5) 5(2.2) 1 (0.4)	41 (18.3) 30 (13.3) 0 (0.0)	67 (30) 70 (31.1) 2 (0.8)	0.001
Marital status	single married divorced widow	6 (2.4) 12 (4.9) 0 (0.0) 1 (0.4)	9 (3.7) 68 (27.8) 3 (1.2) 1 (0.4)	6 (2.4) 138 (56.3) 1 (0.4) 0 (0.0)	0.001
The income IQD	<500000 500000-1000000 >1000000	8 (3.3) 10 (4.1) 1 (0.4)	18 (7.3) 55 (22.4) 8 (3.3)	18 (7.3) 115 (46.9) 12 (4.9)	0.01

Figure (3.1) demonstrate the percentage of subjects whom heard about the PCC in which in a sample of 245 { 132 (53,88%) heard about the PCC and 113 (46.12 %) not heard about PCC }.
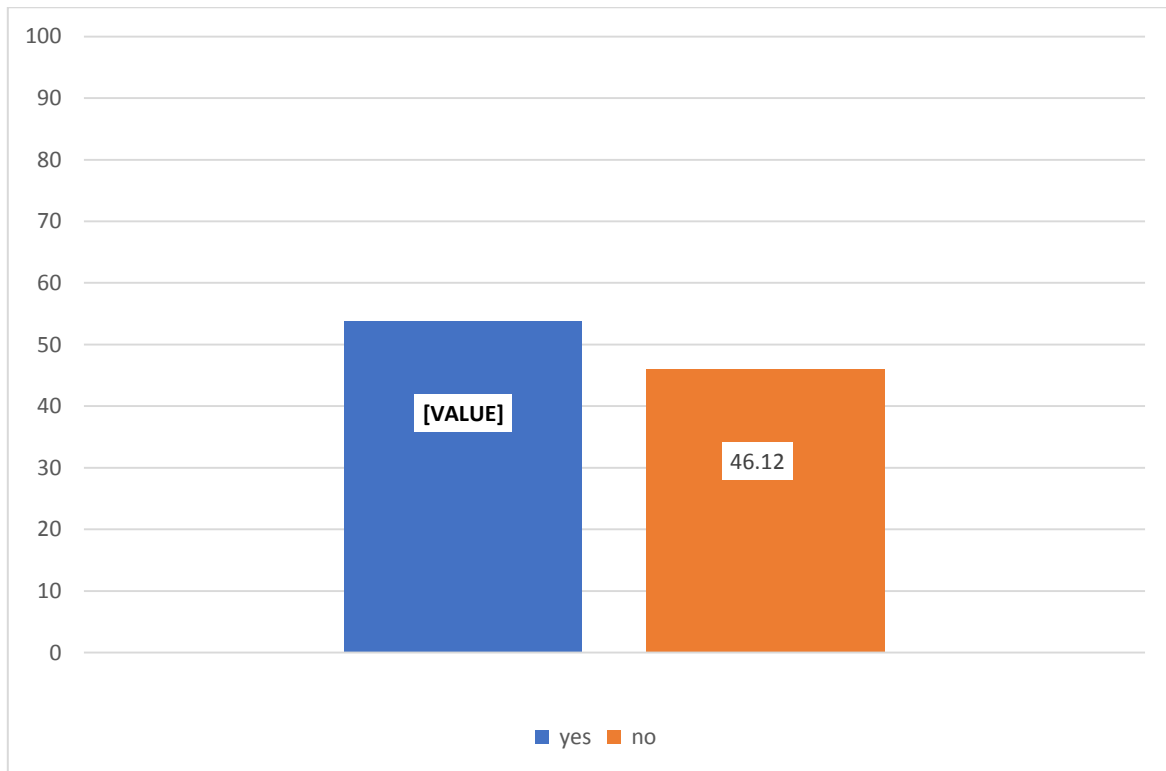
Figure (3.1): hearing about the PCC

Figure (3.2) demonstrate the response of the participant to the rule of folic acid usage in decreasing birth defects and the responses were as the following: 9(3.67%) , 47 (19.18%) and 189(77.14%) for disagree , not sure and agree respectively.
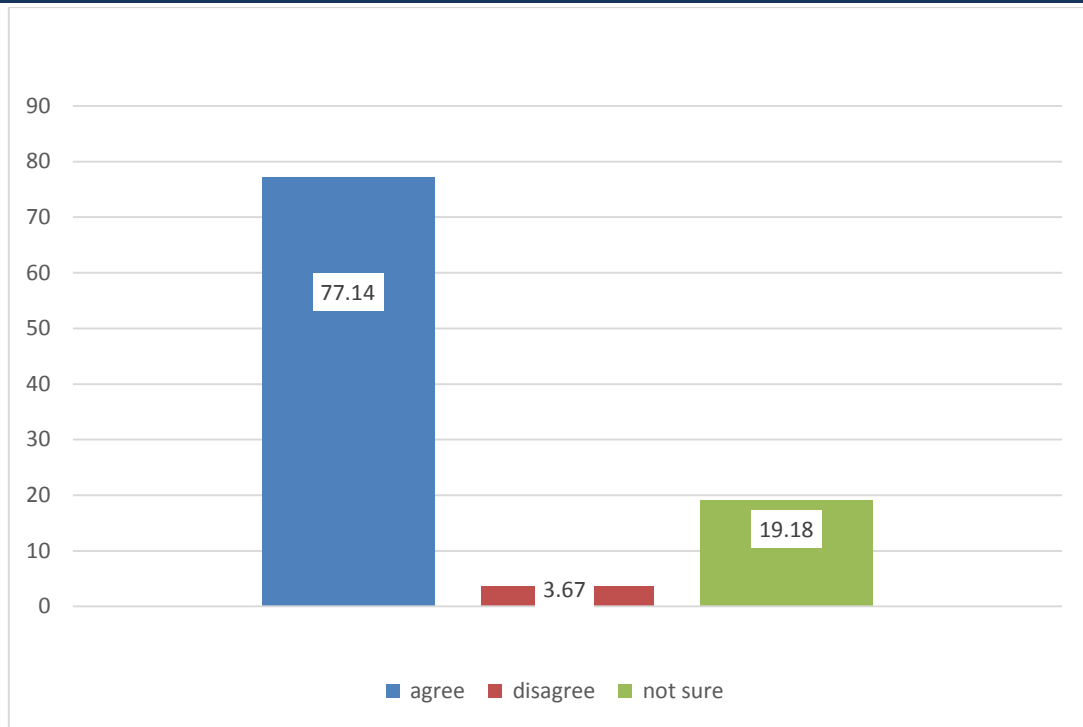
Figure (3.2): the use of folic acid decreases the birth defect.

Figure (3.3) demonstrate the response of the participant to folic acid usage before pregnancy and the responses were as the following :

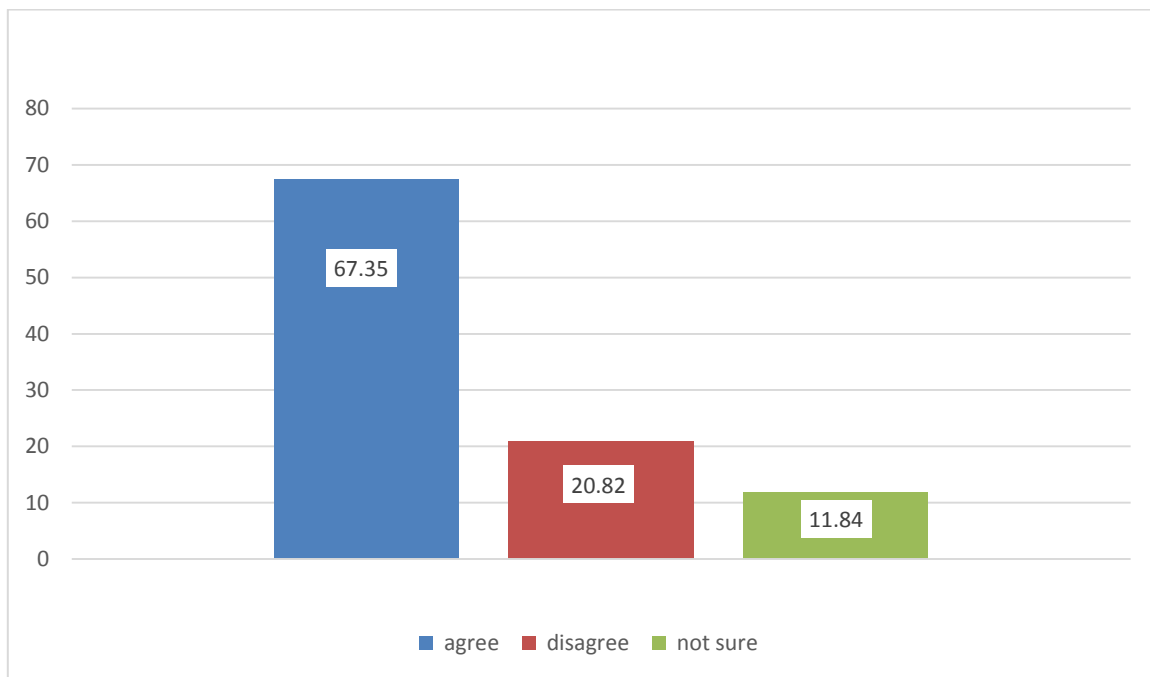51(20.82%) , 29 (11.84%) and 165(67.35%) for disagree , not sure and agree respectively.

Figure (3.3): The percentage of women take folic acid before pregnancy.

DISCUSSION

Preconception care is an important part of the health care services provided to couples whom are intended to conceive in the future, it include the period before pregnancy occurred and through pregnancy and in the postpartum period [W.H.O.

2013]. Since the PCC is relatively modern concept and underestimated globally in both developed and underdeveloped countries many studied had been done through the past years and till nowadays for proving the importance of the PCC and the limitation to its application in the health care

system provided to the targeted population [Global Consensus on Preconception]. In the current study which took place in Hilla city in Iraq with a sample size of 245 female attending the PHCC to assess their KAP level about the PCC this study considered the 1ST study to assess this subject in both single and married women in Iraq. In the current study it was found that 53.88% of the participant had heard about PCC and 46.13 % not heard about the PCC, this percentage is similar to study conducted in Nigeria (54%), and higher than a study conducted in Ethiopia in which (31.8%) of women have heard about PCC. [Ayalew, Y. *et al.,* 2017] In the current study it was found that 139 (56.73 %) of the participant had good knowledge and 80 (32.65 %) had fair knowledge and 26 (10.61%) had poor knowledge this results is higher than study carried out in Saudi Arabia [Mousa, O. *et al.,* 2021]and in Nepal in which (43%) had good knowledge and (48.2%) had fair knowledge and (8.8%) had poor knowledge on PCC in the Saudi study, and 46.9% had good knowledge, unlike previous study done in Erbil 2017 in which only 3% of the participants found to have good knowledge and 76.7% had fair knowledge 20% had poor knowledge [Mirkhan Ahmed, H. & Jamil Piro, T. 2017]. This difference may be attributed to the sample size was taken in which the educational level of the participant in this study was higher than that in Erbil study (15%) of higher education compared to (51.8 %) in the current study. On the other hand the knowledge level is against the finding of study in Egypt 2021 and Ethiopia 2018 in which 20% of the participant had poor knowledge , but good knowledge level which was 23% in Egypt and % 26in Ethiopia [Fekene, D. B. *et al.,* 2020]his may be attributed to the increase in the availability of information via online sources during the past few years and the educational level in the participant of the study listed above in which few participant only had a higher education.Regarding the attitude the current study revealed that (77.96 %) of the participant had good attitude with (20%) had fair attitude and (2.04%) had poor attitude this results is consistent with the study carried out in Erbil with 84.7% good attitude and 1 % poor attitude and study carried out in Iran. [Jafari, F. *et al.,* 2017] This is against the result in the Egyptian study in which 21% were poor and 0% had good attitude. this may be attributed to cultural differences between Iraqi an Egyptian communities (Nabil Aboushady, R. M. et al./, 2021).The practice level in this study was found to be (59.18 %) of the participant had good practice compared with (33%) had fair practice and (7.76%) had poor practice , this is consistent with the result from Erbil study in which (2.1%) poor practice (64.4%) had fair practice and (33.3%) had good practice[25], this is against the result of study carried out in Malaysia 2016 in which the results showed that 45.2% had poor practice [Kasim, R. *et al.,* 2016]. The current study explored the association between the sociodemographic characteristics and the knowledge, attitude and practice levels, this can be presented as the following: The association between the age of the participants, the educational level and their marital status with the knowledge level was found to be significant this is consistent with studies carried out in Iran, Sudan, and in Erbil study in contrast to Saudi study which find no association between age and knowledge level. [Jafari, F. *et al.,* 2017; Mousa, O. *et al.,* 2021] The association between the educational level with the knowledge level was found to be significant this is consistent with studies carried out in Egypt, Saudi Arabia, Iran, Nepal and this results approved by Ethiopian meta-analysis study which conclude that the that educational status (college and above) were strongly associated with PCC knowledge [Mousa, O. *et al.,* 2021; Jafari, F. *et al.,* 2017; Ayele, A. D. *et al.,* 2021.] In contrast to Erbil study which find no association between age and knowledge level which may be explained by the study setting in a rural area with most of the participants were with no formal education [Mirkhan Ahmed, H. & Jamil Piro, T. 2017] Regarding the parity and number of children there was a significant association which is consistent with study carried out in Nepal, Ethiopia [Lemma, T. *et al.,* 2022] in contrast to studies in Erbil and Iran and Sudan. Ayele, A. D. *et al.,* 2021,19] Regarding the female occupation there was no significant association which consist with Egypt study and Nepal study, this may be explained that the female occupation is not crucial determinant to the knowledge level. [Fekene, D. B. *et al.,* 2020] Regarding the husband's education and occupation there was significant association with the level of education this might related that the higher educational level the more access to the information sources and more confident in decision making which affect their partners, unfortunately no study was found to compare with. The marital status found to be of significant association with knowledge level this can be explained that due to cultural concepts and community traits that consider seeking of preconception care is culturally acceptable for married female rather than single ones, but this

finding contradicted the Saudi study which consider the marital status of no significant association. In the current study no association was found with the income this is similar to study conducted in Ethiopai (Lemma, T. *et al.,* 2022). Regarding the association between the attitude level and the sociodemogrsghic characteristic this study showed significant association between the participant's age and parity (number of children) , the female education, husband's occupation and marital status this is similar to Iranian study regarding the age and educational level but inconsistent with the parity [Jafari, F. *et al.,* 2017] no study was found to compare regarding the significance of the husband's occupation but it may be attributed that husband's employment ensure stability to the family income which encourage seeking healthy prospective in the family.The occupation of the participant, husband's education and income were found of no significant association with attitude level this is similar to the Iranian study regarding the participant's occupation. [Jafari, F. *et al.,* 2017] The practice level found to of significant association with of all sociodemographic characteristics with exception to the participant's occupation which is consistent with Egyptian study, on the other hand this disagreed with Erbil study with exception to the participant's age which found significant with practice [Nabil Aboushady, R. M. *et al.,* 2021; Mirkhan Ahmed, H. & Jamil Piro, T. 2017]. The current study showed significant association between the knowledge level and the attitude and practice level this is consistent with the studies carried out in Erbil, Iran, Sudan, Saudi Arabia and Nepal; on the other hand the Egyptian study showed no significant association between the knowledge level and the attitude and practice despite this results is against the evidence from the literature [Jafari, F. *et al.,* 2017,19, Mousa, O. *et al.,* 2021.**]** One of the most crucial part in PCC is the use of folic acid it's dosing and timing with pregnancy in this study 189 (77.14%) agreed that folic acid usage decrease birth defects, which is higher than what found in an Iraqi study conducted in Babylon (67.5 %) ,this coincide with 165(67.35%) actually agreed to take folic acid before pregnancy, compared with (36.2%) agree to use folic acid before pregnancy in Babylon study, this clarified the practical aspect of the PCC; nevertheless 51 (20.82%) of the participant disagreed with the use of folic acid before pregnancy which highlight the importance of increasing the awareness about the PCC in the future **[**Sadiq, Z. *et al.,* 2022].

LIMITATIONS:
1. The study conducted is cross-sectional design precludes establishing a cause-effect relationship between outcome variables and predictors
2. cultural beliefs that consider PCC is for married women only limited the incorporation of unmarried female in the study.

Strength of the Study:
It's the first study in Iraq that targeted both married and unmarried female in an age range involving the female in reproductive age group and in menapuase.

CONCLUSIONS:
1. Women in Al-Hilla have good knowledge, good attitude and good practice.
2. Women's age, educational level, marital status and number of children has significant impact on the women's knowledge, attitude and practice level regarding the PCC.
3. significant association between knowledge level with the attitude and practice.

RECOMMENDATIONS:
1. Young women need to be educated about importance, benefits, and components of preconceptions care especially those with no formal education.
2. Health care providers can play significant role in improving the concept of preconception care. Health policy makers need to concentrate on this subject to promote healthy pregnancies this can be done through regular educational meeting and informative posters targeting females in the reproductive age group.
3. Special attention need to be addressed to the education of young females about the PCC which can be part of school health program.
4. All women in reproductive age should offered preconception counseling before getting pregnant.
5. Further studies involving more health sectors need to be done in the future.

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