

ORIGINAL RESEARCH ARTICLE

Knowledge, attitude, and practice of Iraqi pregnant women about maternal risk factors

DOI: 10.29063/ajrh2024/v28i10.8

Ruqaya A. Salih*, Waleed G. Ahmad and Anmar B. Al-Dewachi

Department of Family and Community medicine, College of Medicine, University of Mosul, Mosul, Iraq

*For Correspondence: Email: rruqayya@yahoo.com; Phone: +9647712762281

Abstract

Maternal risk factors can lead to adverse pregnancy outcomes. These include extreme maternal age, short inter-pregnancy intervals, lack or inadequate prenatal care, smoking, and obesity. Good knowledge, positive attitude, and safe practice of women about these risk factors are important in improving pregnancy outcomes. To assess knowledge, attitude, and practice of pregnant mothers attending primary health centres, a cross-sectional study was conducted with 200 randomly selected pregnant women attending the Al-Qudus Family Medicine Primary Health Centre for antenatal care during the period June 2022 to February 2023. Direct interviews of the participants was carried out to obtain data using a structured questionnaire, and the data were tabulated and analyzed using SPSS software. The mean age was 22.5 years, 78% of whom knew pregnancy beyond 35 years increases complication; 77% agreed that low maternal educational level has bad effect on pregnancy; 63% were aware of the bad effects of short interpregnancy intervals; while almost all women agreed that smoking has bad effect on pregnancy. About 82% had attitude of planning for pregnancy and frequent antenatal care visits; more than half had regular doctor visits with folic acid supplementation; while three quarters of the women took information from their families and relatives and half from doctors. We conclude that pregnant women in Al-Qudus Family Medicine Health centre, Iraq, have moderately to good knowledge of maternal risk factors. (*Afr J Reprod Health* 2024; 28 [10]: 81-87).

Keywords: knowledge, attitude, practice, pregnancy, risk factor

Résumé

Les facteurs de risque maternels peuvent entraîner des issues défavorables de la grossesse. Il s'agit notamment de l'âge maternel extrême, des intervalles inter-grossesse courts, du manque ou de l'insuffisance de soins prénatals, du tabagisme et de l'obésité. Une bonne connaissance, une attitude positive et une pratique sûre des femmes concernant ces facteurs de risque sont importantes pour améliorer les issues de la grossesse. Pour évaluer les connaissances, l'attitude et la pratique des mères enceintes fréquentant les centres de santé primaires, une étude transversale a été menée auprès de 200 femmes enceintes sélectionnées au hasard fréquentant le centre de santé primaire de médecine familiale Al-Qudus pour des soins prénatals pendant la période de juin 2022 à février 2023. Des entretiens directs avec les participantes ont été réalisés pour obtenir des données à l'aide d'un questionnaire structuré, et les données ont été tabulées et analysées à l'aide du logiciel SPSS. L'âge moyen était de 22,5 ans, dont 78 % savaient qu'une grossesse au-delà de 35 ans augmente les complications ; 77 % ont convenu que le faible niveau d'éducation de la mère a un effet négatif sur la grossesse ; 63 % étaient conscientes des effets néfastes des intervalles inter-grossesse courts ; tandis que presque toutes les femmes ont convenu que fumer a un effet négatif sur la grossesse. Environ 82 % des femmes avaient une attitude de planification de la grossesse et des visites fréquentes de soins prénatals ; plus de la moitié avaient des visites régulières chez le médecin avec supplémentation en acide folique ; tandis que les trois quarts des femmes se sont informées auprès de leur famille et de leurs proches et la moitié auprès de leur médecin. Nous concluons que les femmes enceintes du centre de médecine familiale Al-Qudus, en Irak, ont une connaissance moyenne à bonne des facteurs de risque maternels. (*Afr J Reprod Health* 2024; 28 [9]: 81-87).

Mots-clés: connaissances, attitude, pratique, grossesse, facteur de risque

Introduction

During pregnancy, many women could have serious complications that affect pregnancy outcomes, especially if they have had certain risk factors¹. Annually, around 300 thousand women die from pregnancy related complication as declared by WHO, UNFPA, and UNICEF^{1,2,3}.

Maternal risk factors which can be associated with adverse pregnancy outcomes include extreme maternal age (under 15 years, over 35 years), short inter-pregnancy intervals, lack or inadequate prenatal care, smoking, overweight, and obesity^{1,4}. Younger woman may lack the knowledge of the importance and relevance of antenatal care, while advanced maternal age increase the possibility of

maternal medical complications such as gestational diabetes mellitus (GDM), gestational hypertension (HTN), and cesarean delivery^{4,5,6}. Good knowledge with good attitudes and safe practices of women about maternal risk factors are important to improve pregnancy outcomes. In contrast, the lack of adequate knowledge and poor attitude towards the prevention of adverse pregnancy outcomes can lead to serious complications and adverse pregnancy outcomes^{7,8}. Assessment of knowledge, attitude, and practice of woman about maternal risk factors can help in planning educational policies and programme to women to increase their awareness about these risk factors and follow a preventive measure to decrease their effect on pregnancy in the future⁹. The current study aimed to assess the knowledge, attitude, and practice of pregnant women in Iraq about maternal risk factors.

Methods

This cross-sectional study was conducted on 200 pregnant mothers attending Al-Qudus Family Medicine primary health care center for antenatal care. The following formula had been used to calculate the required adequate sample size $n = Z^2 * P(1-P) / d^2$ where n represent the sample size, Z is the statistic corresponding to level of confidence, P is expected prevalence and d is precision (corresponding to effect size) the prevalence of pregnant women attending Al-Qudus Family Medicine primary health care center is estimated to be 20%; accordingly the calculated sample size was 200. A simple random sampling was collected during the period extending from June 2022 to February 2023.

The objectives of the study was explained to the participants, and informed consent to participate in the study was obtained from them. Data collection was done using a structured questionnaire form. The questionnaire consisted of four parts. Section I concerned with socio-demographic data of the participants including age, residency, occupation, education, and number of children the mother had before. Section 2 (knowledge section) of the questionnaire contained questions on whether or not the women thought that certain maternal risk factors has a bad effect on pregnancy outcomes such as age less than 15 years or older than 35 years, low educational level,

obesity, anemia, lack of folic acid supplementation, being hypertensive or diabetic, and lack of antenatal care during pregnancy.

Part III consisted of questions on attitude of pregnant women toward maternal risk factors such as pre-pregnancy planning, short inter-pregnancy interval, healthy food intake, simple sports during pregnancy, and good antenatal visit during pregnancy. The response of mother was labeled as "agree" and "disagree".

Part IV contained information about practices and involved five questions about pregnancy practice such as antenatal clinic visits, intake of folic acid during pregnancy, and practices of walking and exercising during pregnancy. The scale for response included "frequently", "sometimes", and "rarely".

Collected data were tabulated and analyzed into numbers and frequencies using Excel 2010 and (SPSS) Version 24.0 program. Frequency and percentage of different parameters have been calculated, in addition to calculation of total knowledge score and using χ^2 Chi-Square test for comparing awareness level between different age group and finding out P. value.

Ethical Consideration

The study has been approved to be performed by the scientific committee of the family and community medicine department and by Mosul Medical College Ethical Committee.

Results

A total sample of 200 pregnant women participated in the study with a mean age of 22.5 years. As shown in Table 1, 30% of the women were aged 20 to 25 years, They were mostly housewives, while 36% of them had higher education.

Table 2 shows the knowledge of the participating women about maternal risk factors. About 78% of participants agree that pregnancy at older ages can lead to increase in complications such as hypertension and diabetes, while 77% of the participants agree that low maternal educational level has poor effects on pregnancy outcomes. Similarly, almost all the participants agreed that smoking has bad effects on pregnancy.

Total knowledge score among younger age group 15-20 years showed non- significant p value of

Table 1: Socio-demographic characteristics of the participants. (n=200)

Parameters	Numbers	%
Age		
15-20	24	12%
20-25	60	30%
25-30	52	26%
30-35	20	10%
35-40	28	14%
40-45	16	8%
Education:		
Read & write.	24	12%
Primary	44	22%
Secondary	60	30%
Higher education	72	36%
Occupation		
Employed	64	32%
Housewife	136	68%
Parity:		
1-4	168	84%
5& more	32	16%
This pregnancy was planned:		
Yes	136	68%
No	64	32%

0.4326 when compare with that of older age group 20-45 years about maternal risk factors, (Table 3).

Regarding the attitude of pregnant women on maternal risk factors, 84% of the participants agree that ANC visits are important even for multiparas (Table 4). Most of the participants (82%) agree that pregnancies should be planned and that women must have ANC visit with urgent attendance at ANC clinics when there is any complication in pregnancy. Nearly 77% of the participants agree that healthy food and simple exercising are important in avoiding obesity during pregnancy. Table 5 shows the practice of pregnant mothers towards maternal risk factors indicating that 74% of participant pregnant women always have regular ANC clinic visits, and 42% of them attend educational lectures in Primary Health Centres (PHCs) while 12% of them rarely attend these lectures. With regards to taking of folic acid before and during pregnancy, 86% of the women reported that they always took folic acid, while 90% of the women avoid taking medication during pregnancy without medical consultation.

The above figure 1 indicates that 74% of women get information from family members including mothers, sisters, and close relatives; 54% obtain information from doctors; while only 14% of the

participants take their information from social networks.

Discussion

The World Health Organization (WHO) estimates that more than 800 women die each day from pregnancy related complication all over the world. Several maternal risk factors increase the odds for adverse pregnancy outcomes. These include older age of pregnancy, short inter-pregnancy interval, etc. Knowledge of such risk factors is of great importance in minimizing maternal and fetal complications.

The current study shows that 30% of the interviewed women were aged 20-25 years with average age of 22 years. They were mostly housewife and had higher level education. Nearly 84% of the women had parity ranging from 1 to 4. While 68% of the women pre-planned their pregnancies.

A good total knowledge score of the women about maternal risk factors has been found among participants (74% of the participants had a correct answer); however, age of participants showed no much effect on their knowledge. This may be due to that collected sample were mainly above 20 years old and of higher education level, and about two third of participant woman had secondary or higher education level.

Regarding knowledge of the effects of mother's age on pregnancy outcomes, 62% of the women agreed that pregnancy below 15 years has negative effects on pregnancy outcomes. Studies from elsewhere suggest that only about one third of participant women agree with this fact^{10,11}. This may be due to variations in participants' culture, beliefs, and norms where there is the practice of early marriage at younger age and getting pregnant below 15 years. By contrast, 78% of the participants were aware about adverse effect of pregnancy beyond 35 years can increase the risk of hypertension and diabetes. This is in contrast with result of another study that show 40% of women disagree that pregnancy beyond 35 years result in complications¹¹.

A privoious study found that about 50% of women know that pregnancy beyond 35 years is associated with congenital anomalies of the fetus and that being pregnant at ages of 15 years or less carry adverse effects on both mother and the fetus¹².

Table 2: Knowledge of the participants women about maternal risk factors(n=200)

Parameters	Agree No (%)	Disagree. No (%)
**Pregnancy at age below 15 years don't affect pregnancy outcome	76 (38%)	124 (62%)
*Being a pregnant at age older than 35 years can lead to complication like hypertension and diabetes.	156 (78%)	44 (22%)
*Low educational level of mother has a bad effect on pregnancy	154 (77 %)	46 (23%)
**Numbers and types of previous pregnancy and delivery has no effect on current pregnancy	84 (42%)	116 (58%)
**Short inter-pregnancy interval has no bad effect on pregnancy	74 (37%)	126 (63%)
*Poor nutrition of pregnant mother may lead to abortion or low birth weight	188 (94%)	12 (6%)
*Obesity and overweight of pregnant mother have bad effect on pregnancy	172 (86%)	28 (14%)
*Smoking during pregnancy has bad effect on birth weight	200 (100%)	0 (0%)
*Folic acid supplementation protects from congenital abnormalities.	195 (97.5%)	5 (2.5%)
*Anemia during pregnancy has bad effect on baby.	192 (96%)	8 (4%)
*Bleeding during pregnancy may lead to loss of baby or mother	194 (97%)	6 (3%)
*Lack of antenatal care has bad effect on pregnancy	184 (92%)	16 (8%)
**Twin pregnancy has no bad effect on mother or baby	62 (31%)	138 (69%)

*Agree is correct answer, ** disagree is correct answer.

Table 3: Comparison between total pregnant women knowledge score among 15-20 years age group and 20-45 years age group about maternal risk factors.

Maternal risk factors total knowledge score	Total true answer in in 20-45 years age group .	Total true answer in 15-20 years age group	X ²	P-value
1947	1717	230	0.6156	0.4326

Table 4: Attitudes of pregnant mother on maternal risk factors(n=200)

Variables	Agree No (%)	Disagree. No (%)
**I don't think I should have ANC visit as I have many previous pregnancies all of which was normal	32 (16%)	168 (84%)
*I think each pregnancy should be planned before	164 (82%)	36 (18%)
*I believe that it should be as fast as possible in seeing a doctors whenever there is some complication in pregnancy	178 (89%)	22 (11%)
*I think it is important for planning a place of delivery in house or in hospital	170 (85%)	30 (15%)
**I don't think any problem for being pregnant each year	66 (32%)	134 (67%)
*I will agree on cesarean delivery if doctor decide it for me	148 (74%)	52 (26%)
**In our locality it is not wrong for being pregnant at age 15 years	118 (59%)	82 (41%)
*I believe that healthy food and simple exercise during pregnancy is important in avoiding obesity during pregnancy	154 (77%)	46 (23%)

*agree is correct answer, **disagree is correct answer

Table 5: Practice of pregnant mother towards maternal risk factors (n=200)

Parameters	frequently No (%)	Sometimes No (%)	Rarely No ((%)
I visit ANC clinic regularly	148 (74%)	28 (14%)	24 (12%)
I attend educational lectures in PHC to increase health awareness	84 (42%)	92 (46%)	24 (12%)
I avoid any medication during pregnancy without medical consultation	180 (90%)	16 (8%)	4 (2%)
I'm accustom on taking folic acid before and during pregnancy	172 (86%)	25 (12.5%)	3 (1.5%)
I always play simple exercise and walking during pregnancy	140 (70%)	32 (16%)	28 (14%)

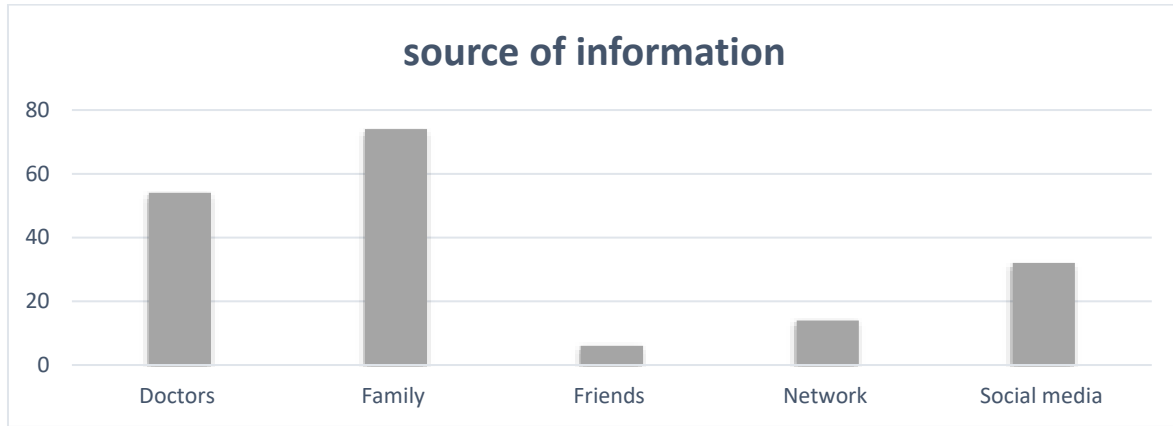


Figure 1: shows the sources of information of maternal risk factors, with some reporting multiple sources of information.

In this study, three quarters of the participant women agreed that low maternal educational level has bad effects on pregnancy outcome, while 63% know that short interpregnancy interval is a risk factor for adverse pregnancy outcome. A similar result was obtained by other studies conducted in Saudi Arabia, Iraq, and Australia^{11,12,13}. There was also a high maternal knowledge (above 90%) of the bad effects of poor nutrition of mother, anemia, and bleeding on pregnancy outcomes, together with around 98% of women agreeing that folic acid supplementation during pregnancy protect from congenital abnormalities. For obesity and being overweight, 86% of women agree that it has bad effects on pregnancy, with 100% of women knowing that smoking has bad effect on pregnancy outcome. Additionally, about 70% of the women reported that twin pregnancy is a risk for pregnancy complications. Similar results have been obtained by studies conducted in Saudi Arabia, Iraq, Australia, Nigeria, and Libya¹¹⁻²⁰.

The attitudes of pregnant mother for maternal risk factors was good, as the current study

showed that 84% of the women had positive attitude for ANC. They did not agree with the notion that there would be no need for ANC if the mother has had many normal previous pregnancies. More than 80% of the women believed that pregnancies should be planned in the pre-pregnancy period. This finding is in accordance with finding of other studies conducted to assess women’s attitudes towards ANC^{21,22}. About 75% of participants had positive attitude and agreement with cesarean section if doctor decide it. A similar result was obtained by other study²³; which suggest that women are in favour of caesarean sections when requested by a doctor.

This positive attitude will help save the lives of mothers and their babies. Up to 77% of the women agreed that healthy foods and simple exercises during pregnancy are important for avoiding obesity in pregnancy. This is in agreement with a study conducted in Ethiopia which assessed the knowledge, attitude, and practice of antenatal exercise among pregnant women²⁴.

The results of this study revealed that 74% of women had regular ANC visits; however, this mean still there is one quarter of women have infrequent visit. ANC is a good opportunity for follow up pregnancy and for discussing with mother about important risk factors that required immediate referral to hospital or seeing her health-care provider. Thus, it is vital to highlight ANC schedule importance to all women at reproductive age, this may be achieved through educational lectures to women attending primary health centers.

Similarly, 90% of the women reported avoiding taking any medications without medical consultation, while 86% of women often took folic acid before and during pregnancy on regular basis. And 70% of the women often play simple exercise and walk during pregnancy, which is in accordance with results of many other studies^{16,24,25,26}. Folic acid supplementation during pregnancy is important to avoid neural tube defect in their fetuses. Simple regular exercise help mother to avoid obesity during pregnancy as well as improve circulation of mother and fetus.

About three quarters (74%) of women reported that they obtain information on pregnancy from family members - mothers or sister, while 54% obtained information from doctors. Source of woman's information on pregnancy should be trusted and precise as the woman trusted her mother she takes their instruction in addition to their doctors, however 32% take their information from social media and 14% from network. The network page should be scientific web-site and trusted.

Implications for policies and programs: Assessment of women knowledge about maternal risk factors helps constructing policy for increasing awareness for these risk factors as well as conducting a national Iraqi program to decrease adverse pregnancy outcome from maternal disease or complication.

Study strengths and limitations: The study was conducted on women that they are currently pregnant, this help to identify their attitude and practice towards maternal risk factors and decrease need for memory recall if they were non-pregnant, on other hand these pregnant women are visitors of one primary health care center, and this may give limitation to study result

Conclusion

A general moderately good level of knowledge, practice and attitude had been found among study participants towards maternal risk factors that can lead to serious complication to mother and fetus, three quarter of women take their information from their families and relatives and half from doctors, with lesser extend from other source like social media and friends. However still there is a need to increase awareness of Iraqi women about maternal risk factors and how to manage it through conducting educational program and lectures in the primary health care centers.

Conflict of interest

None.

Funding

self-funded

Contribution of authors

Ruqaya Adnan Salih conceived and designing the study, Waleed Ghanium Ahmad collect data, Ruqaya Adnan salih analyze data, Anmar B. al-Dweachi, Ruqaya Adnan Salih, Waleed Ghanium Ahmad prepare and write the manuscript. All the authors mentioned in the article approved the manuscript.

References

1. Eni-Olorunda T, Akinbode OO, and Akinbode AO. Knowledge and attitude of mothers on risk factors influencing pregnancy outcomes in Abeokuta South Local Government Area, Ogun State. *European Scientific Journal*. 2015 Apr 1;11(11).
2. Sujindra E, Bupathy A, Suganya A, and Praveena R. Knowledge, attitude, and practice of exercise during pregnancy among antenatal mothers. *International Journal of Educational and Psychological Research*. 2015 Jul 1;1(3):234.
3. Girmaye E, Mamo K, Ejara B, Wondimu F, and Mossisa M. Assessment of knowledge, attitude, and practice of skilled assistance seeking maternal healthcare services and associated factors among women in West Shoa Zone, Oromia region, Ethiopia. *Nursing Research and Practice*. 2021 Aug 10;2021:1-1.
4. Glick I, Kadish E, and Rottenstreich M. Management of Pregnancy in Women of Advanced Maternal Age: Improving Outcomes for Mother and Baby [Corrigendum]. *International Journal of Women's Health*. 2023 Oct 25;15:1621-2.

5. Diana S, Wahyuni CU, and Prasetyo B. Maternal complications and risk factors for mortality. *Journal of public health research*. 2020 Jul 3;9(2):jphr-2020.
6. Kahveci B, Melekoglu R, Evruke IC, and Cetin C. The effect of advanced maternal age on perinatal outcomes in nulliparous singleton pregnancies. *BMC pregnancy and childbirth*. 2018 Dec;18(1):1-7.
7. Hassen SS, and Lelisho ME. Determining factors associated with the prevalence of knowledge, attitude, and practice in seeking skilled maternal healthcare services among women in a remote area of Gesha district. *BMC Health Services Research*. 2022 Nov 4;22(1):1318.
8. Esposito G, Ambrosio R, Napolitano F, and Di Giuseppe G. Women's knowledge, attitudes and behavior about maternal risk factors in pregnancy. *PloS one*. 2015 Dec 29;10(12):e0145873.
9. Li D, Huang L, Yang W, Qi C, Shang L, Xin J, Zeng L, Zhang M, Song H, and Chung MC. Knowledge, attitude and practice level of women at the preconceptional period: a cross-sectional study in Shaanxi China. *BMC Pregnancy and Childbirth*. 2019 Dec;19(1):1-2.
10. Afolabi IB, Babatunde AA, Mujeeb S, Yahaya SS, Abaku A, and Muonagolu NJ. Knowledge, Attitude and Practice of Adverse Pregnancy Outcomes Prevention among Women of Reproductive Age in Nasarawa Local Government Area, Kano State, Nigeria. *Open Journal of Epidemiology*. 2021 Oct 11;11(4):501-16.
11. Alawaji NH, Alluhaida AA, Alharbi IM, Alharbi AF, AlHarbi SM, Alharbi HM, and AlHarbi TF. Knowledge and Attitude of Mothers on Risk Factors Influencing Pregnancy Outcomes in Qassim, Saudi Arabia: A Cross-Sectional Study. *The Egyptian Journal of Hospital Medicine*. 2018 Apr 1;71(7):3487-91.
12. Yahyaa BT, Altaha MA, Al-Samarrai MA, and Jadoo SA. knowledge and attitude of Iraqi women in reproductive age group about risk factors in pregnancy. *Journal of Ideas in Health*. 2022 May 15;5(2):673-8.
13. Yang JM, Cheney K, Taylor R, and Black K. Interpregnancy intervals and women's knowledge of the ideal timing between birth and conception. *BMJ Sexual & Reproductive Health*. 2019 Oct 1;45(4):249-54.
14. Chimezie EI, and Akuma I. Assessment of knowledge, attitude and practice of pregnant women regarding maternal nutrition: A cross-sectional study from Ebonyi State, Nigeria. *International Journal of Home Economics*. 2022 Dec 1;15(2):56-66.
15. Sadiq ZA, and Hussein HK. Assessment of Knowledge and Attitudes among Pregnant Women's Towards Folic Acid Intake During Pregnancy in a Sample of Women Attending Primary Health Care Centers in Babylon Province. *Medical Journal of Babylon*. 2022 Apr 1;19(2):142-51.
16. Abdulmalek L. Knowledge, attitude and practice regarding folic acid among pregnant women in Benghazi, Libya. *Ibnosina Journal of Medicine and Biomedical Sciences*. 2017 Jun;9(03):67-71.
17. Singh V, and Srivastava M. Associated risk factors with pregnancy-induced hypertension: A hospital-based KAP study. *International Journal of Medicine & Public Health*. 2015 Jan 1;5(1).
18. Shrestha M. Assessment of Risk Factors in Hypertensive Disorder During Pregnancy: Hospital Based (KAP) Knowledge, Attitude and Practice Survey. A Key for Preventive Approach. *Journal of Nepalgunj Medical College*. 2018 Dec 31;16(2):74-7.
19. Perumal N, Cole DC, Ouédraogo HZ, Sindi K, Loechl C, Low J, Levin C, Kiria C, Kurji J, and Oyunga M. Health and nutrition knowledge, attitudes and practices of pregnant women attending and not-attending ANC clinics in Western Kenya: a cross-sectional analysis. *BMC pregnancy and childbirth*. 2013 Dec;13:1-2.
20. Al-Sattam Z, Hassan S, Majeed B, and Al-Attar Z. Knowledge about anemia in pregnancy among females attending primary health care centers in Baghdad. *Open Access Macedonian Journal of Medical Sciences*. 2022 Feb 6;10(B):785-92.
21. Bashir S, Ansari AH, and Sultana A. Knowledge, Attitude, and Practice on Antenatal Care Among Pregnant Women and its Association with Sociodemographic Factors: A Hospital-Based Study. *Journal of Patient Experience*. 2023 Jun;10:23743735231183578.
22. Ch NS, Ashraf A, and Ghaffar A. KAP STUDY REGARDING ANTENATAL CARE AMONG PREGNANT WOMEN. *World Journal of Pharmaceutical and Medical Research*, wjpmr.2019,5(12),199-204.
23. Yahyaa BT, Altaha MA, Al-Samarrai MA, and Jadoo SA. knowledge and attitude of Iraqi women in reproductive age group about risk factors in pregnancy. *Journal of Ideas in Health*. 2022 May 15;5(2):673-8.
24. Janakiraman B, Gebreyesus T, Yihunie M, and Genet MG. Knowledge, attitude, and practice of antenatal exercises among pregnant women in Ethiopia: A cross-sectional study. *PloS one*. 2021 Feb 19;16(2):e0247533.
25. Bulabula AN, Dramowski A, and Mehtar S. Antibiotic use in pregnancy: knowledge, attitudes and practices among pregnant women in Cape Town, South Africa. *Journal of Antimicrobial Chemotherapy*. 2020 Feb 1;75(2):473-81.
- Devkota R, Khan GM, Alam K, Sapkota B, and Devkota D. Impacts of counseling on knowledge, attitude and practice of medication use during pregnancy. *BMC pregnancy and childbirth*. 2017 Dec; 17:1-7.