

Pregnant Women's Knowledge of Prenatal Care and Perceived Barriers Women Face to Attending Prenatal Care Units at El-Suki Locality, Sudan.

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Abstract:

Background/Objective: In the opinion of the World Health Organization [WHO], society's true assets are healthy mothers and children. First, a woman's life will change significantly during her pregnancy, making it a difficult period. Having a child means undergoing a significant self-reconstruction. This study aimed to assess pregnant mothers' knowledge about prenatal care, and Barriers Women Face to attending antenatal care units. **Methods:** This is a descriptive cross-sectional Community-based study, which was conducted in the El-Suki Locality (Tirara village), Sennar state, Sudan among seventy-two (72) pregnant mothers who were selected by using simple random sampling. Data was collected using a face-to-face self-administered questionnaire. **Results:** This study's findings indicated that the knowledge level concerning prenatal care among the vast majority of participating mothers was Fair knowledge (54.2%) with all items included in this study. In comparison, few of the study group (12.5%) had good knowledge regarding Prenatal care. The study reported a highly significant correlation (p -value =0.00). between mothers' level of education with their level of knowledge and two-thirds of participants said the main barrier faced them to reach the prenatal care units was the distance between centers and their homes. **Conclusion:** The study concludes that participants have a fair knowledge regarding prenatal care, and the majority of participants explained that the obstacles and barriers they face in not going to pregnancy care centers are that, centers are so far from their homes, so the researcher recommended that prenatal care centers should be available in all villages and health education programs should be established.

Keywords: Prenatal Care, Knowledge, barriers, prenatal care centers.

Introduction:

Maternal Mortality Worldwide: Approximately 6 million women fall pregnant each year, with 5 million of those pregnancies ending in childbirth. Improved maternal and neonatal health status is linked to the appropriate use of prenatal healthcare services. Pregnancy care is anticipated to have an impact on the mother's and the baby's development. Every day, about 810 women worldwide pass away from pregnancy- and childbirth-related preventable causes. An estimated 295,000 women worldwide passed away during and after pregnancy and childbirth. 94% of these deaths took place in low-resource environments, and the majority of them were avoidable. Approximately two-thirds (196,000) of maternal deaths occurred in Sub-Saharan Africa alone (Mohamoud, et al., 2022).

Pregnancy-related complications during pregnancy, childbirth, and puberty are thought to

be prevented in part by prenatal care. (Hollowell et al., 2011).

In 2020, pregnancy- and childbirth-related preventable causes claimed the lives of nearly 800 women every day, and there was a maternal death almost every two minutes. Maternal mortality ratios, or the number of maternal deaths per 100,000 live births, decreased by roughly 34% globally between 2000 and 2020, and nearly 95% of maternal deaths take place in lower-middle-income and low-income nations. Women's and newborns' lives can be saved by receiving care from qualified medical professionals before, during, and after childbirth. In 2020 Maternal mortality was too high, 287,000 women lost their lives during and following pregnancy and childbirth. Nearly 95% of maternal deaths occurred in low- and lower-middle-income countries; most of these deaths were preventable. The Sustainable Development Goals (SDGs) and their regions and sub-regions are used here. Of the estimated 253,000 maternal deaths worldwide in 2020, 87% happened in Sub-

Saharan Africa and Southern Asia. Sub-Saharan Africa accounted for about 70% of maternal deaths (202,000), with Southern Asia accounting for about 16% (47,000). (Shakoor, Begum, Sikander & Khan, 2016).

The World Health Organization [WHO] states that Pregnancy is not an illness; rather, it is a state of profound physiological change in the mother to support the survival and development of the fetus. However, disorders like morning sickness, heartburn, and constipation may also result from these changes. Pregnancy-related dietary and lifestyle modifications are essential for the development of a healthy baby and may improve the long-term health of the offspring. Prenatal care, safe childbirth, treatment of minor illnesses during pregnancy, and other pregnancy-related complications are all covered in detail in the classical Unani literature. Scholars from Unani concluded that maintaining a healthy diet and way of living is crucial for safe childbearing during the antenatal period (ANP). (Barclay, et al., 1997, & Laishram, et al., 2022).

According to estimates from the World Health Organization, approximately 810 people die every day as a result of complications during pregnancy and childbirth (Barclay, et al., 1997). The Common causes include asthma, obstructed labor, hemorrhage, and other conditions. Prenatal care is extremely significant and needs particular consideration. Reproductive health services have never been easy to provide in Sudan for a variety of reasons, such as a lack of qualified medical professionals, a lack of funding, and occasionally a lack of awareness among women of the significance of the services. Pregnant women are among the victims of the decline in rights and health services that occurs during times of political unrest and conflict. Sudan's birth rate in 2022 was 31.049 births per 1000 people, a 1.05% decline from 2021, in the year 2021 birth rate was 31.377 births per 1000 people, a 1.03% decline from 2020, and regarding MMR Sudan has significantly decreased From 636 deaths per 100,000 live births in 2001 to an estimated 295 deaths per 10,000 live births in 2020— but still among the highest rates in the world (Abdelmola, 2023). Approximately 25% of births occur without the presence of trained medical personnel. Thus, prenatal care is essential to international public health initiatives aimed at lowering the

morbidity and mortality rates of mothers and newborns. Routine checkups, counseling on a healthy diet, treatment for pregnancy-related preterm labor, anemia, and poor maternal health. The WHO's 2010–2016 recommendation that expectant mothers should have at least four visits is followed by 62% of expectant mothers worldwide (Abdelmola, 2023).

Sudan and Efforts to improve Maternal and Infants health:

Sudan is working hard to improve maternity and newborn health services, despite numerous obstacles. To improve the provision of high-quality maternal health services, UNFPA works to strengthen Sudan's healthcare system also and helps the Sudanese government strengthen its social and political commitment to maternal health. National health policies, such as the 5-year National Strategy for Reproductive Health and the Road Map for Maternal and Neonatal Mortality Reduction, have specifically addressed maternal health issues. Additionally, UNFPA supports information systems that monitor maternal deaths, such as state-level Maternal Death Reviews, household health surveys, and population censuses. The Maternal Health Road Map's costing at the federal and state levels has also received support from UNFPA. In addition to improving child survival, this exercise demonstrates precisely what investments in infrastructure, human resources, training, and equipment are needed to meet the goals of maternal and neonatal survival. Prenatal care is therefore essential to public health to prevent morbidity and mortality among mothers and newborns worldwide (Hollowell et al., 2011).

Importance of the study:

In Sudan overall, and in villages particularly, maternal mortality rates are still high. Increasing prenatal awareness can help avoid problems and educate women about crucial precautions to take to safeguard their fetuses and guarantee a safe pregnancy. Since many cases resulted in the mother's death while she was pregnant, it is important to look into the obstacles that mothers face when trying to get them to visit prenatal care units. Also, there was no study done in this village to evaluate the mothers' knowledge of prenatal care

Research questions:

Q1: What is the mothers' knowledge about prenatal care among mothers at Tirara village, El-Suki Locality?

Q2: What barriers do mothers face to Attending Prenatal Care Units at Tirara village, El-Suki Locality?

Q3: Is there a presence of a relationship among mothers' knowledge, concerning the prenatal and socio-demographic characteristics?

Material and methods:

Study Design: This descriptive cross-sectional community-based study aims to examine the mothers' knowledge of prenatal care and investigate the barriers that mothers face to reach prenatal care services. **Setting:** This study was conducted in the Tirara village, El-Suki Locality, Sennar state- Sudan, Sennar is one of the 18 states of Sudan. It has an area of 37,844 km² and had a population of approximately 1,918,692 in 2018.

Tirara village is a small village in El-Suki Locality, which is located on the bank of the Blue Nile River, It has an area of 9, km² and had a population of approximately 10,000 in 2018. Tirara has many popular attractions, perfect for a trip. The main economic activity is agriculture, with the irrigated scheme of El-Suki, the number of fruit growers (including bananas and mangoes).

Study Populations: Pregnant women from the Essuki Locality (Tirara village), Sennar state were invited to the meeting, during the meeting the Purpose of the study was explained. A random sampling technique was used and sample size was obtained (72 mothers out of 100 pregnant women in h the study area during the study period) based on the inclusion and exclusion criteria, which were mothers who agreed to participate in the study, they were approached, and given a questionnaire to fill out. The study participants' confidentiality and privacy were maintained at all times.

Inclusion and Exclusion Criteria: Pregnant women from Tirara village who were available during the study period and agreed to participate were included in the study, while pregnant women from other area outside the Tirara village or who weren't available during the study period and who refused to participate in the study were excluded from the study.

Sampling Technique and Sample Size: A random sampling technique was used in this study, and the sample size was calculated according to the following equation: $n = N/1+N(d/2)$, where n = sample size, N = population size, d = degree of accuracy desired (the accepted margin of error was 0.05).

$n = 100/1+100(0.05)^2 = 100/1.25 = 80$ mothers. Thus, the sample size should be 80 mothers, but 72 mothers completed the questionnaire and only eight (8) mothers refused to participate.

Data Collection Technique: The participating mothers were invited to participate in the study, the questionnaire was distributed during the meeting after explaining the study's purpose and was provided to the participants before enrollment. data was collected from September to October 2022.

Data Collection Tool: Data was collected by disseminating a pre-tested well-designed questionnaire containing (12) questions to select the appropriate option/s that fit the participants' knowledge after explaining the study purpose and considering confidentiality. The questionnaire includes four (4) sections. The first section is for mothers' socio-demographic characteristics such as age, level of education, and occupation, the second section is for obstetrical histories such as Parity, Para, Gravida, and abortion, the third section is about mothers' knowledge concerning prenatal care and the fourth section is about barriers faced the mothers to attend prenatal care units. The validity used the Likert-type scale with twelve (12) items, and the participants ranked their knowledge for each of the 12 listed answers (36). The Likert scale used in the questionnaire was a 3-point scale ranging from known to Do not Know or Neutral, with response options for each item presented in Table (1) of the manuscript.

The validity and reliability of the used questionnaire were assessed, and the Cronbach's Alpha scale was 0.82. **Data analysis:** Data was analyzed using the Statistical Package for Social Sciences (SPSS) version 22. Descriptive statistics were used to calculate the frequencies and percentages of variables, and the results were presented in tables and figures. The relationships between the demographic characteristics and the level of participants' knowledge using an independent t-test. A p-value of <0.05 was considered statistically significant. It is important to note that no inferential statistics were employed in this study.

Results: Tables and Figures:

Table (1): Shows the Sociodemographic characteristics among seventy-two (72) mothers as participants concerning prenatal care, from the study findings, nearly half of their ages ranged between 15- 25 years old 35(48.6%), and 28(38.9%) of the study group their levels of

education was basic education and few of them with university level or above 14(19.6%), most of the study group were housewives 59(81.9%), Labor 3(4.2%),9(12.5%) with others (private) jobs and only one 1(1.4%) were Employees. The main Source of information about prenatal care was from Radio /Television 33(45.8%),21(29.2%) participants were from friends/family,14 (19.4%) from social media, and only 4 (5.6%) their source of information from the Magazine.

Table (2): Displays the participants' obstetrical backgrounds among the 72 participants, The results revealed that 26 (36.1%) of mothers were Primigravida 46(63.9%) were multigravida, 28(38.9%) were para (0-2), 19(26.4%) were para (3-5),25 (34.7%) was para more than 5. 57 (79.2%) participants had no history of abortion and 15(20.8%) had a history of abortion, and regarding, moods of previous deliveries 55(76.4%) delivered by normal vaginal delivery, 16(22.2%) and only 1(1.4%) forceps delivery .and when we asked participants about the Ideal methods of Diagnosing Pregnancy,34(47.2%) said by Routine investigation (pregnancy test), 11(15.3%), by Drowsiness

14 (19.4%) said by Amenorrhea, 8(11.1%) and 5(6.9%) another method.

Table (3) Explains the knowledge about prenatal care among 72 participants, the study revealed that near two-third 45(62.5%) of mothers knew the benefits of prenatal Care , 29(40.3%) aware about the proper Methods of confirming the pregnancy, more than half of study group 48 (66.8%) understand the right component of prenatal care , only one-third 25 (34.7%) of study group understood the ideal Number of visits during prenatal period, only 21(29.5%) knew the Ideal sources of Medicine taken by participants during pregnancy ,26(36.1%) knew the areas of health education during pregnancy, two-third 54(75.0%) of participants

knew the Risks /problems facing mothers and fetus when prenatal care is absent, the vast majority of participants 44(61.1%) were aware about the common health problems faced mothers During Pregnancy, only 21(29.2%) aware of the danger signs of pregnancy, 20 (27.8) mentioned the only vaccines should be given during pregnancy, fortunately 57(79.2%), knew the special diet and nutrition should be taken during pregnancy and one third knew 25(34.7%) there are many habits that should be controlled during pregnancy.

Table (4) Explains the statistical Differences between Participants' Knowledge and socio-demographic characteristics. The results of the study showed that most of the variables did not affect the participants' knowledge and only there was a highly significant relationship between participants' level of knowledge and their education levels. (P. V- .000).

Figure (1) Shows how participants knew and confirmed their pregnancy, 44(61.1%) of the participants said through amenorrhea, whereas 17(23.6%) said through routine investigation, and only (5.6%) of participants said when feeling Drowsiness or had Morning vomiting.

Figure (2) Explores the Levels of Knowledge. Concerning Prenatal Care among Participants, the study revealed that more than half (54.2%) of the participants had fair knowledge, (33.3%) had poor knowledge, and only (12.5%) had good knowledge. **Figure (3)** Shows the barriers and obstacles that faced the mothers and prevented them from attending prenatal care units, the results of this study indicate that more than a third (37.2%) of participants said that the hospitals that provided pre-natal care were so far from their homes, (25.6%) said they felt okay and no need to go for checkup and prenatal care, (20.9%) had financial problems,(4.7%) explained that they were not satisfied with the care providers and (11.6%) showed other barriers.

Table 1: Socio-demographic Characteristics of Participants, n=72

Item	N	%
Age (Years)		
▪ 15- 25	35	48.6
▪ 26 – 35	29	40.3
▪ 36 – 45 and above	8	11.1
Mean ± SD	1.6±.68	
Total	72	100.0
Level of education		
▪ Illiterate	8	11.1
▪ Basic	28	38.9
▪ Secondary	22	30.6
▪ University/ above	14	19.6
Total	72	100.0
Occupations:		
▪ Housewife	59	81.9
▪ Worker	3	4.2
▪ Employee	1	1.4
▪ Others(private)	9	12.5
Total	72	100.0
Source of information about prenatal care		
▪ Radio /Television	33	45.8
▪ Magazine	4	5.6
▪ Friend/Family	21	29.2
▪ Social media	14	19.4
Total	72	100.0

Table (2) Obstetrical History of Mothers, Essuki Locality -Sennar State – Sudan, n=72

Parity:	N	%
▪ Primigravida	26	36.1
▪ Multigravida	46	63.9
Para:		
▪ 0-2	28	38.9
▪ 3-5	19	26.4
▪ More than 5	25	34.7
Gravida:		
▪ 0-2	26	36.1
▪ 3-5	27	37.5
▪ More than 5	19	26.4
History of Abortion:		
▪ Yes	15	20.8
▪ No	57	79.2
Moods of Previous Deliveries:		
▪ Normal vaginal Delivery	55	76.4
▪ Caesarean section C/S	16	22.2
▪ Forceps Delivery	1	1.4
Ideal Methods of Diagnosing Pregnancy:		
▪ Amenorrhea	14	19.4
▪ Drowsiness	11	15.3
▪ Morning vomiting	8	11.1
▪ Routine investigation (pregnancy test)	34	47.2
▪ Others	5	6.9

Table (3) Knowledge of Participants Regarding prenatal period, n=72

Items	Know	Do Not Know	Neutral	Mean ± SD
	N (%)	N (%)	N (%)	
These are the benefits of ANC	45(62.5)	22(30.6)	5(6.9)	1.44±0.625
Method of confirming the pregnancy	29(40.3)	34(47.2)	9(12.5)	2.36±1.292
These are the components of the ANC	48 (66.8)	22 (30.6)	2(2.8)	1.36±0.538
The Ideal Number of visits during the AN period	25 (34.7)	39 (54.2)	8 (11.1)	1.76±0.638
Ideal sources of Medicine taken by participants during pregnancy	21(29.5)	41(56.9)	10(13.9)	1.84±0.642
These are Areas of Health education during pregnancy	26(36.1)	37(51.4)	9 (12.5)	1.76±0.660
Risks /problems facing mothers and fetuses when ANC is absent	54(75.0)	17(23.6)	1 (1.4)	1.26±0.474
common Health Problems faced mothers During Pregnancy	44(61.1)	25(34.7)	2(2.8)	1.40±0.547
These are the danger signs of pregnancy	21(29.2)	35(48.6)	16(22.2)	1.93±0.718
These are the only vaccines that should be given during pregnancy	20 (27.8)	36(50.0)	16(22.2)	1.94±0.709
During pregnancy, mothers have special diet and nutrition	57(79.2)	14(19.4)	1(1.4)	1.22±0.451
During pregnancy, many habits should be controlled	25(34.7)	35(48.6)	12(16.7)	1.81±0.698
The total mean score regarding knowledge concerning prenatal care is:				1.45 ±0.483

Figure (1) Knowledge of participants about how they confirm their pregnancy, n=72

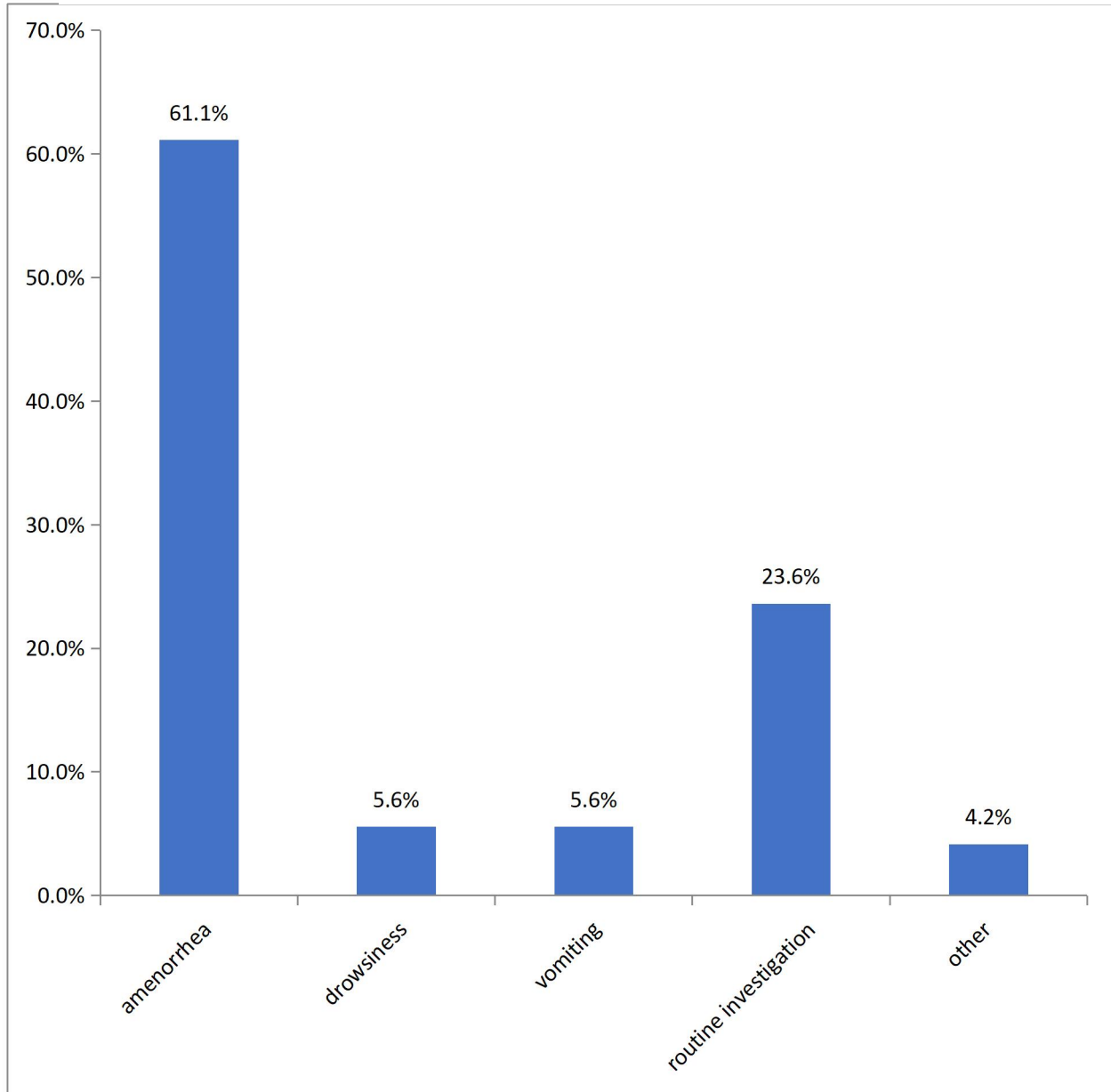


Figure (2) Levels of Perception and Knowledge Concerning Prenatal Care among Participants, n=72

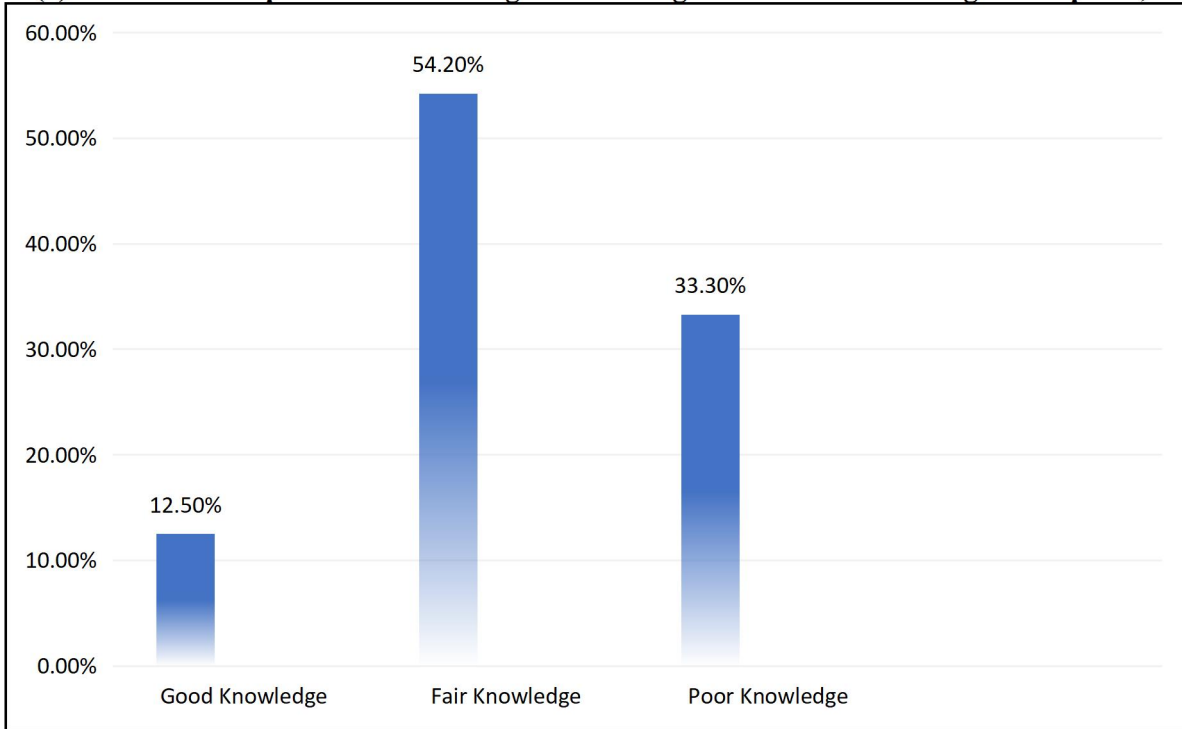


Figure (3) Barriers of Why didn't participants come to Prenatal visits, n=72

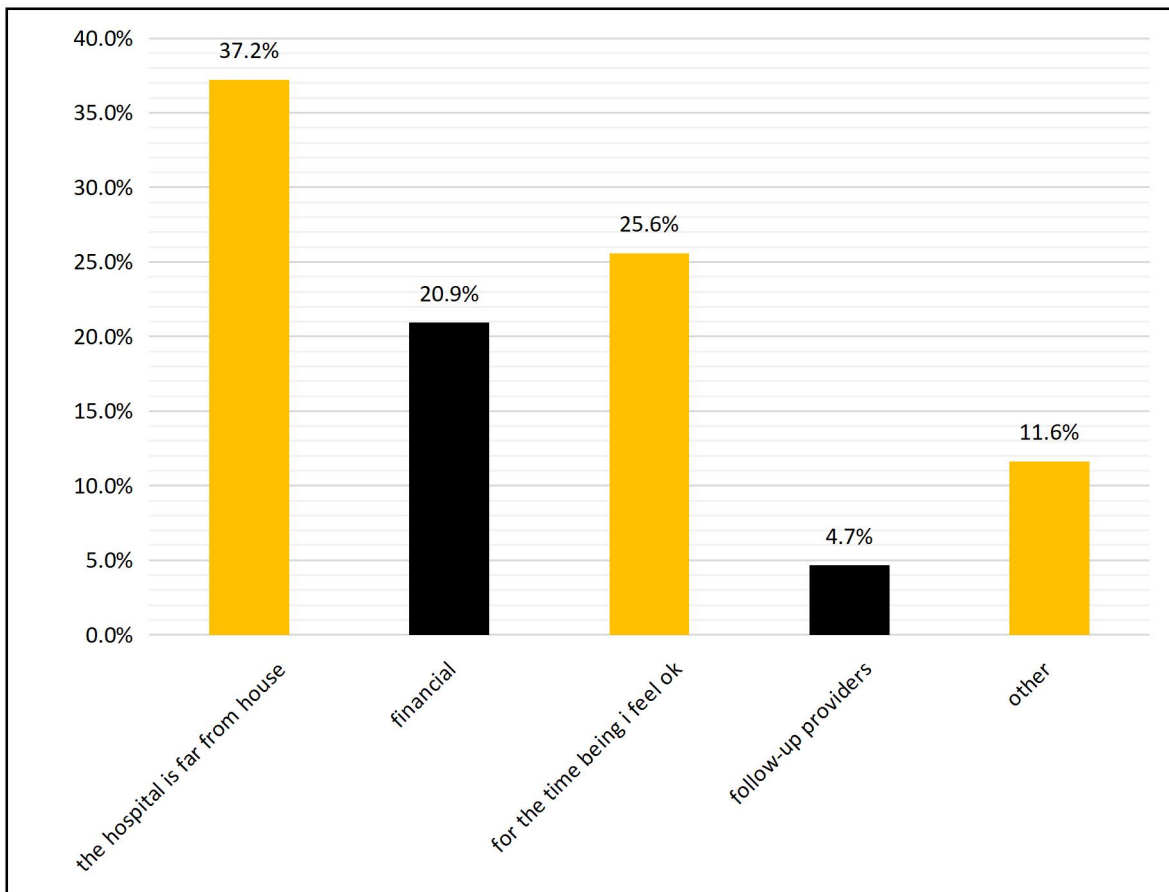


Table (4) Relationship between Sociodemographic Characteristics and Knowledge levels of Pregnant Mothers at Essuki Area (Tirara Village) Sennar State, (N=72)

Variable		(Mean \pm SD) of knowledge level		P-Value
Age	15 - 25 years old	1.6250	.68046	.294
	26 - 35 years old			
	36 -45 or above			
Education	Illiterate	2.5833	.93070	.000**
	Basic			
	Secondary			
	University/ above			
Occupations	Housewife	1.4444	1.01937	.323
	Labor			
	Employee			
	Others(private)			
Parity	Primigravida	1.6389	.48369	.323
	Multigravida			
Para	0-2	1.9444	.87031	.539
	3-5			
	More than 5			
Gravida	0-2	1.8889	.79710	.778
	3-5			
	More than 5			
Abortion	Yes	1.7917	.40897	.518
	No			
Levels of Knowledge	Good knowledge	2.2083	.64867	-
	Fair Knowledge			
	Poor Knowledge			

Discussion:

Every woman wants to cherish her pregnancy for the rest of her life because it is such an exciting time. Accordingly, pregnant women should also receive a great deal of support and care from their families, the community, and the healthcare system. Pregnancy is a natural state that can lead to several physiological and psychological changes in the expectant mothers, but it can also result in warning signs of pregnancy, which are a range of potentially fatal issues for both the expectant mother and the fetus. Pregnancy symptoms that pose a risk to a mother's health and raise the possibility of maternal death globally include excessive vomiting, severe abdominal pain, vaginal bleeding, facial, finger, and foot swelling, and blurred vision (**Zaki, & Fouad, (2021)**). This cross-sectional community-based study about prenatal care, aimed to explore pregnant women's knowledge of prenatal care in the Essuki locality (Tirara village), Sennar state-Sudan. Furthermore, investigates the Barriers women Face to Attending Prenatal Care Units. The study was conducted among seventy- two (72) pregnant women out of eighty (80), selected randomly using a systemic random sampling technique. All participants were met by the researcher herself through personal interviews using a pre-coded and pretested well-designed questionnaire for collecting the required data. The data collected was revised, then organized, tabulated, interpreted, and presented in the following sequence: the knowledge-related questions covered prenatal care comprehension, examinations, vaccinations, tests, studies, dietary supplements, pregnancy risk factors, contraception, and routine prenatal visits. For every parameter, the right response(know) received one mark, and the wrong (Don't know or Neutral) answers received zero. When expressed as a percentage, the total score was 36. The three categories for knowledge levels were poor knowledge (<50%), fair knowledge (50–75%), and good knowledge more than (75%). Expectant mothers were classified as having good knowledge if they scored over 75%, fair knowledge if they scored between 50% and 75%, and poor knowledge if they scored less than 50%. The present study mentioned that the majority of participants were between 15 and 25 years old. Their level of education was a Basic school, which was in line with a study conducted in the Obstetrics and Gynecology Department and Clinics at Mansoura Old General Hospital, Al Dakahlia Governorate, Egypt, which mentioned that the majority of participants' education level was intermediate level (**Shakoor, Begum, Sikander & Khan, 2016**). Concerning the

occupations, the present study pointed out that nearly two-thirds of the study group were housewives, while the results differed in Tanzania study where the vast majority of participants were Farmers. Regarding obstetrical history, the vast majority of participants were Multigravida, nearly two-thirds of them have no history of abortion and regarding previous moods of deliveries most of the study group delivered by normal vaginal deliveries, and only one mother delivered by forceps method. And few mothers knew the ideal method of confirming pregnancy. Pregnant women can receive helpful information and guidance from prenatal care providers to help them avoid the high death rates associated with inadequate knowledge about prenatal care. However, in this study, participants received health information about pregnancy from Radio and Television, which reflected that most of the participants couldn't go to prenatal care units. Regarding overall knowledge and perception, this study revealed that most of the participants had fair knowledge concerning Prenatal care which included all items like, benefits of prenatal care, components of the prenatal care, Method of confirming the pregnancy, Number of visits during the antenatal period, Areas of Health education during pregnancy, Risks /problems facing mothers and fetuses when prenatal care is absent, danger signs of pregnancy, vaccines that should be given during pregnancy, proper nutrition during pregnancy and some habits that should be controlled during pregnancy, and as over all the study's result revealed that only a few number of participants had good knowledge, more than half of them had fair knowledge and near one-third had poor knowledge ,this result was in line with the result of the study done at the National Institute of Unani Medicine, Bengaluru, Karnataka which explained that the majority of the pregnant women had fair knowledge concerning Prenatal care (**Shakoor, Begum, Sikander & Khan, 2016**), and different from the study done at Saudi Arabia-2022 which reported that the overall knowledge of participants was good (**Laishram, et al., 2022**). also, this result differed from the study done at SOS Hospital at Hiliwa District, Benadir Region, Somalia-2021, which concluded that the knowledge of most of the participants was good knowledge regarding prenatal care (**WHO, World Health,2021**), different from the previous studies conducted by Bashir, Ansari, and Sultan showed different results, which revealed that the mothers' knowledge was good (**Bashir, Ansari, & Sultana, 2023**). Healthcare units provide healthcare services that promote the health of

mothers and fetuses, mothers in Sudan find numerous barriers to attending maternal healthcare services. The results of this study indicate that more than one-third of participants said the hospitals that provided prenatal care were so far from their homes. This result was in line with a study done at two MCH centers from Assuit City, Egypt- in 2022 and three villages from Assuit district (**Abdelmola, 2023**). and in line with a Nigerian survey, women who were unable to pay for their care, lived far from the hospital or had transportation-related problems were not using prenatal services, and nearly one-third said they felt okay and had no need to go for a checkup and prenatal care because they perceived that being pregnant is a normal physical condition that doesn't need to be monitored by a medical professional; these women are less likely to receive appropriate maternal health services because they believe that it is unnecessary, some of the mothers had financial problems, and few of them explained that they were not satisfied with the care providers. This study's result was different from a study's results conducted in a local government area of Victoria, Australia in 2019, which explained that several women, had a combination of personal (e.g., emotions, knowledge), health service provision limited access to continuity of care provider and continuity of information, inflexible scheduling, difficulty), and broader social-contextual factors (e.g., language, cultural norms). The current study revealed no statistically significant difference in most variables, while there was a highly significant relationship between mothers' education and their knowledge (P.V-.000), This result with in line with a study done at the National Institute of Unani Medicine, Bengaluru, Karnataka 2021. (**Zaidi, Perveen, & Parveen, 2018**).

Conclusion: The study's findings concluded that participants had fair knowledge about prenatal care Moreover, mothers faced many barriers to prenatal services. The study's findings emphasize how crucial it is for prenatal healthcare facilities to be accessible in every village since they can significantly improve the healthcare system's general performance and the quality of life for expectant mothers and their fetuses.

Recommendations:

- Improving the nation's healthcare accessibility will encourage the use of prenatal services.
- Give top priority to programs that will improve women's knowledge of pregnancy planning, healthcare-seeking behaviour, and prenatal care.
- Timely and more frequent prenatal care visits will help reduce maternal and neonatal mortality and morbidity.

Declarations:

Acknowledgment: I would like to acknowledge the mothers who participated in the study.

Ethics approval: Informed consent was obtained from the participating mothers after explaining the study's purposes and their agreement to fill out the questionnaire was considered informed consent to enroll in the study.

Competing interest: I confirm that I have no conflicts of interest related to the publication of this study.

Availability of data and materials: All data and materials related to this study are available upon request from the corresponding author.

Funding: I declare that there are no grants or funding received for this study.

Abbreviations:

ANC: Ante Natal care

SPSS: Statistical Package for Social Sciences

SDGs: The Sustainable Development Goals

MMR: Maternal Mortality rate

UNFPA: United Nations Population Fund

IFA: Iron and Folic Acid

References

- Abdelmola, A. (2023). Antenatal care services in Sudan before and during the 2023 war: A review article. *Cureus*, 15(12).
- Anonymous. (2021). World patient safety day 2021—WHO world health [Internet]. Retrieved September 18, 2021, from, <https://www.who.int/news-room/events/detail/2021/09/17/default-calendar/world-patient-safety-day-2021>
- Baranovskaya, E. I. (2022). Maternal mortality in the modern world. *Obstetrics, Gynecology and Reproduction*, 16(3), 296-305.
- Barclay, L., Everitt, L., Rogan, F., Schmied, V., & Wyllie, A. (1997). Becoming a mother—An analysis of women's experience of early motherhood. *Journal of Advanced Nursing*, 25(4), 719-728.
- Bashir, S., Ansari, A. H., & Sultana, A. (2023). Knowledge, attitude, and practice on antenatal care among pregnant women and its association with sociodemographic factors: A hospital-based study. *Journal of Patient Experience*, 10, 23743735231183578.
- Hollowell, J. O., Kurinczuk, J. J., Brocklehurst, P., & Ron, G. (2011). The effectiveness of antenatal care programmes to reduce infant mortality and preterm birth in socially disadvantaged and vulnerable women in high-income countries: A

- systematic review. *BMC Pregnancy and Childbirth*, 11(3). <https://doi.org/10.1186/1471-2393-11-13>
- Laishram, J., Mukhia, S., Thounaojam, U. D., Devi, H. S., & Panmei, J. (2013). Knowledge and practice of antenatal care in an urban area. *Indian Medical Gazette*, 24, 101-106.
- Macrotrends. (n.d.). Sudan birth rate 1950-2023. <https://www.macrotrends.net/global-metrics/countries/SDN/sudan/birth-rate>
- Mohamoud, A. M., Mohamed, S. M., Hussein, A. M., Omar, M. A., Ismail, B. M., Mohamed, R. A., ... & Ibrahim, S. D. (2022). Knowledge, attitude, and practice towards antenatal care among pregnant women attending for antenatal care in SOS hospital at Hiliwa district, Benadir region, Somalia. *Health*, 14(4), 377-391.
- Shakoor, F., Begum, W., & Khan, A. A. (2016). Antenatal care: An approach through the Unani system of medicine. *IJMPPR*, 4(5), 301-302.
- Yadav, L. (2017). Assessment of the knowledge regarding antenatal care among pregnant women to develop an information booklet at selected clinics of the district, Punjab. *IJSR*, 6(6), 1375. <https://www.ijsr.net/archive/v6i6/ART20174450.pdf>
- Zaidi, S. S., Perveen, A., & Parveen, S. (2018). An insight of antenatal care: A review. *EJPMR*, 5(5), 209-210.
- Zaki, A., & Fouad, S. (2021). Assessment of knowledge and practices of pregnant women toward danger signs of pregnancy. *Mansoura Nursing Journal*, 8(1), 13-32.