


# Assessing Awareness of Maternity Danger Signs and its Associated Factors among Women Benefited from Antenatal Care Services in the Gaza Strip, Palestine 2020: Clinic-Based Cross-Sectional Study

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## Abstract

**Background:** Causes of maternal deaths could be prevented if women are aware of maternity danger signs. We aimed to examine women's awareness about obstetric danger signs and associated factors among females attending primary health facilities in Gaza strip, Palestine.

**Methods:** A cross-sectional clinic-based study was employed. An interview-based questionnaire, prepared after a review of literature, comprises two parts: socio-demographic and Obst/Gyn information and second awareness about obstetric danger signs during pregnancy, delivery, and after delivery was administered to 185 women between September and mid of November, 2020. Descriptive analysis (mean, percentage, mean, and standard deviation) was employed. Moreover, bivariate and multivariate logistic regression were applied to determine independent factors related to women knowledge.

**Results:** One hundred thirty-eight (138) women participated. The mean age was 26.3±6.1 years and 76.1% were married for less than 10 years. Women had adequate knowledge about obstetric danger signs during pregnancy, childbirth, and post-partum (82.6%, 71%, and 68.1% respectively). Common danger signs reported were blurred vision, severe headache, convulsion, and severe vaginal bleeding. One third of women relied on more than two sources of information regarding danger signs and 90.6% thought that danger signs lead to death. Independent factors related to the knowledge about obstetric danger signs are being literate (OR: 2.46; CI95%: 1.77–6.23), previous maternal health problem (OR: 2.4; CI95%: 1.67–5.93), utilization of ante-natal care services (OR 2.21; CI95%: 1.72–4.02), and parity (OR: 3.6; CI95%: 1.48–5.64).

**Conclusion:** Women have an adequate level of awareness about obstetric danger signs; however, it is quite less in post-partum. Efforts should be made to target knowledge deficit about danger signs in post-partum and to reduce the stress resulted from these danger signs.

**Keywords:** Obstetric danger signs, Knowledge, Assessment, Pregnancy, Childbirth

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## 1. Introduction

Maternal Health is a significant indicator to any health system performance. It deals with the health of women during the perinatal stages (pregnancy, labor, and post-natal) (1). Pregnancy is usually a major event in a family life. It is a joyful time for most families as they expect the coming of a new life to earth. Pregnancy is a normal physiologic process with many physiological changes that require support, explanation, and reassurance to help pregnant women to adapt and overcome such bad consequences, namely nausea, vomiting, shortness of breath, heartburn, dizziness, edema, and backache. These physiological changes are normal body adaptation and are named 'minor complaints' of pregnancy; however, they lead to

significant distress and anxiety.

Maternal mortality measures the quality of maternal health care in healthcare institutions. Most of maternal deaths, developing during pregnancy, childbirth, or post-partum are avoidable and treatable. Meanwhile, they are still high especially in low- and very low-income countries (2). Worldwide, hundreds of women lose their daily life as a result of complications during labor. Furthermore, women' health could be worsened during a phase of pregnancy if the pre-existing comorbidities are not properly managed (3).

Many factors contribute to development of maternal complications. Kazaura and colleagues (4) reported that the number of deliveries, age, race, smoking, fetal

weight, gestation age, labor complication, antenatal care (ANC), history of unfavorable pregnancy outcomes, such as stillbirth, neonatal deaths, maternal morbidity, and poor socio-economic conditions are the most important risk factors influencing maternal mortality. More than 20% of women worldwide have been reported to have high-risk pregnancies. Furthermore, 50% of them are expected to die (5). Teenagers have a two to three times higher risk for mortality compared to younger mothers, because they are physically and mentally not fit in this regard (6).

In Palestine, maternal mortality ratio (MMR) has shown fluctuations over the last five years, specifically during the COVID-19 pandemic. The MMR was 18.9/100,000 live births in 2016 then declined to 10.2/100,000 live births in 2017; however, it increased again to 19/100,000 live births in 2019. During the COVID-19 pandemic, the MMR was 30.8 and 24.2/100,000 live births, respectively. Common causes reported for the MMR are bleeding, sepsis, and COVID-19 (7). According to international medical studies, 69% of maternal deaths in Gaza are avoidable. One of every fourth pregnant woman in Palestine is considered high-risk and requires specialized health care during pregnancy (8). Maternal mortality ratio has dramatically increased between years. It was 30.8/100,000 live births in 2019 compared to 19.1/100,000 live births in 2018 with an increasing rate of 54.5% (9). Most causes of deaths were pulmonary embolism (23.55%) and septicemia (17.6%) whereas 5.9% died at home.

Women's awareness about maternal danger signs, during pregnancy, childbirth, and after delivery is crucial for preventing such complications. Lack of awareness of most common threatening signs and obstetric complications in pregnancy is a significant and important factor for low healthcare seeking behavior as women fail to reach emergency care before severe and irreversible obstetric complications are developed (10). There is a lack of studies investigating women's knowledge of obstetric danger signs in Palestine. Therefore, the study was directed to evaluate women's knowledge of maternal danger signs during pregnancy, childbirth, and post-partum in an area of Gaza strip, Palestine.

## 2. Methods

### 2.1. Study Design

The study is a clinic-based cross-sectional design

performed between September and mid of November, 2020.

### 2.2. Study setting

The study was conducted at primary health centers (PHCs) located in Gaza city and north Gaza governorates. There are 24 PHCs from which we randomly selected three PHCs; Al-Zaitoon, Al-Qoba, and Abo Shbak PHC.

### 2.3. Study population, Sample Size, and Sampling

The study population was the women who attended the governmental primary health centers (PHCs) and had benefited from ANC services. The participants had to be married for at least one year preceding the study and aged from 18-45 years old. Number of beneficent women from the three mentioned clinics was 677, 468, and 505 women, respectively. Numerous studies have been carried out in the Arabic region (11-14) and adequate knowledge about maternal danger signs range between 12% and 26.3%. No single study is available on women's level of knowledge in Palestine, however, we assumed that awareness is high for many reasons; access to health centers is very much high and average ante-natal visits for pregnant women is at least 6. During ante-natal visits, women are delivered with information that helps her to seek healthcare whenever she feels a need for it. Moreover, maternal mortality has dramatically and substantially improved due to huge investment in the maternal and reproductive health services (15).

Sample size was calculated using the formula for cross-sectional studies [ $n = (Z_{1-\alpha})^2 * p * (1-p) / d^2$ ], in which "n" is the required sample size and Z is the standard normal deviate equal to 1.96 at 5% significance level. One hundred forty-seven (174) women were determined and then we added a 10% response rate, giving a total of 185 women as sample size. However, 138 women accepted to participate giving a response rate of 74.6%. A convenient sampling method was approached and women were selected and interviewed based on principle of the "first come, first served".

### 2.4. Measurement

An interview-based questionnaire was developed after reviewing relevant literature (16-18). The questionnaire comprised of two sections: the first part enclosed socio-demographic and pregnancy characteristics (age, duration of marriage, level of

education, gravida, and para), in addition to the information related to the health care facility. The second part consisted of two questions on the knowledge of maternal danger signs during pregnancy (Are there any dangers during pregnancy and if so, select among the 11 choices stating yes or no), childbirth (Are there any dangers during delivery and if so, select among the seven choices stating yes or no), and post-partum (Are there any dangers after delivery and if so, select among the nine choices stating yes or no). Moreover, there was also one question about source of information and perception of death from obstetric danger signs. The questionnaire demonstrated adequate reliability measured via alpha Cronbach ( $\alpha=0.86$ ), and validity (I-CVI>0.89 and S-CVI=0.90)

### 2.5. Data Analysis

In the first step, accuracy, missing values, and outliers of the data were explored and determined. Descriptive analysis was employed using SPSS version 21. Analysis of continuous variables (age and duration of marriage) were presented in forms of mean and standard deviation whereas frequency and percentage were provided for

categorical variables (level of education). Knowledge level was categorized as adequate or inadequate if they answered at least three correct danger signs in each period and the percentage of correct answers was calculated accordingly. We applied bivariate analysis between independent variables and the level of women's knowledge and association was considered significant at 95% CI,  $P<0.05$ . Accordingly, any variable with  $P<0.25$  was selected for multivariate logistic regression analysis in which independent factors or determinants of knowledge of maternal danger signs were identified.

## 3. Results

### 3.1. Characteristics of Participated Women

One hundred thirty-eight (138) women participated with a response rate reaching 74.6%. Majority were between 24-32 years old (48.5%), married  $\leq 10$  years (76.1%), and nearly one fourth (26.8%) had a university degree. Moreover, 86.2% had at least history of two pregnancies and 79% received anti-natal care (ANC) services and 68.8% claimed that they received health education (Table 1).

**Table 1:** Baseline characteristics of participated women (n=138)

Variables		n (%)
Age (M±SD: 26.3±6.1)	<24 yrs	52 (37.07)
	24-32 yrs	67 (48.05)
	$\geq 33$ yrs	19 (13.08)
Duration of marriage (M±SD: 8±6.4)	$\leq 10$ yrs	105 (6.01)
	$\geq 10$ yrs	33 (23.09)
Working status	Yes	2 (1.04)
	No	136 (98.06)
Education level	Primary	12 (8.07)
	Up to secondary	89 (64.05)
	>University	37 (26.08)
Living status	with family	46 (33.03)
	Alone	92 (66.07)
Have you received information about maternity danger signs?	Yes	95 (68.08)
	No	43 (31.02)
Gravida	Primigravida	19 (13.08)
	Multigravida	119 (86.02)
Parity	Nulliporous	7 (5.01)
	Primipara	29 (21.0)
	Multipara	102 (73.09)
Received ANC services?	Yes	109 (79.0)
	No	29 (21.0)
Previous health problem	Yes	79 (57.02)
	No	59 (42.08)
Distance from health center (M±SD: 16.7±10.9)	$\leq 15$ min	84 (60.09)
	>15 min	54 (39.01)
Do you think obstetric danger signs lead to death?	Yes	125 (90.06)
	No	13 (9.04)

### 3.2. Awareness about Maternal Danger Signs During Pregnancy

Majority of women had adequate knowledge (114/138, 82.6%) and 17.4% (24/138) were inadequately aware. Common maternal danger signs reported were vaginal bleeding (71.4%), severe abdominal pain (71.4%), and severe headache (69.6%) (Table 2).

### 3.3. Awareness about Danger Signs During Labor

Most of the participants (98/138, 71%) had adequate knowledge about danger signs during labor. In return,

29% (40/138) had inadequate knowledge. Common danger signs reported were severe vaginal bleeding (87.1%), prolong labor >12 hrs (63.2%), and high-grade fever (60.7%) (Table 3).

### 3.4. Knowledge about Danger Signs Post-partum:

Almost two thirds (94/138, 68.1%) had adequate knowledge about danger signs. Meanwhile, 31.9% (44/138) showed to have inadequate knowledge. Common danger signs reported were severe vaginal bleeding (96.6%) and high-grade fever (77.1%) (Table 4).

**Table 2:** Common danger signs during pregnancy among participant (n=138)

	Yes n (%)	No n (%)
Vaginal bleeding	85 (71.04)	34 (28.06)
Severe headache	71 (69.06)	48 (30.04)
Blurred vision	57 (47.09)	62 (52.01)
Convulsion	31 (26)	88 (74)
Face & peripheral edema	60 (50.04)	59 (49.06)
High fever	67 (56.03)	52 (43.07)
Difficulty in breathing	51 (42.08)	68 (57.02)
Loss of conscious	42 (35.03)	77 (64.07)
Severe abdominal pain	85 (71.04)	34 (28.06)
Lower rapid fuels movement	35 (29.04)	84 (70.06)
Rupture of membrane without labor signs	43 (36.01)	76 (63.09)

**Table 3:** Common danger signs reported during delivery (n=138)

	Yes n (%)	No n (%)
Sever Vaginal Bleeding	102 (87.01)	15 (12.09)
Severe Headache	48 (41)	69 (59)
Convulsion	39 (33.03)	78 (66.07)
High Grade Fever	71 (60.07)	46 (39.03)
Loss of Consciousness	48 (41)	69 (59)
Prolong labor (>12h)	74 (63.02)	43 (36.08)
Placenta is not out (after 30 min from delivery)	51 (43.06)	66 (56.04)

**Table 4:** Common danger signs reported after delivery (n=138)

	Yes n (%)	No n (%)
Severe Vaginal Bleeding	114 (96.06)	4 (3.04)
Severe Headache	47 (40)	71 (60)
Blurred Vision	39 (33)	79 (67)
Convulsions	24 (20.03)	94 (79.07)
Face & Hands Edema	31 (26.03)	87 (73.07)
High Grade Fever	91 (77.01)	27 (22.09)
Loss of Consciousness	43 (36.04)	75 (63.06)
Difficulty in Breathing	30 (25.04)	88 (74.06)
Bad Odor of Vaginal Secretion	48 (40.07)	70 (59.03)

### 3.5. Source of Information

The participants relied on various sources for information regarding pregnancy and childbirth. One third (32%) received information about danger signs from at least three sources (self-reading, education from health centers, and family specifically mother and mother-in-law). Self-reading (15.9%) was the most common source of information.

### 3.6. Perception about Danger Signs

Majority (125/138, 90%) believed that death would occur with obstetric danger signs whereas 13/138 (9.4%) did not.

### 3.7. Predictors of Knowledge of Maternity Danger Signs

Findings of the multivariate logistic regression revealed that being literate (OR: 2.46; CI95%: 1.77–6.23), previous maternal health problem (OR: 2.4;

CI95%: 1.67–5.93), utilization of ANC services (OR 2.21; CI95%: 1.72–4.02), and parity (OR: 3.6; CI95%: 1.48–5.64) are predictors for knowledge of danger signs. Meanwhile, distance from health care services, number of pregnancies (gravida), duration of marriage, and maternal age were statistically not significant ( $P>0.05$ ) (Table 5).

## 4. Discussion

In the current study, women's level of knowledge was found to be adequate during pregnancy, childbirth, and postpartum; however, awareness decreased in the post-partum phase. The most prevalent danger signs reported were severe vaginal bleeding, severe headache, blurred vision, and convulsion. Moreover, being literate, previous maternal health problem, utilization of ANC services, and parity were independent factors associated with the knowledge. Additionally, the vast majority of the women believed that danger signs result in death. Out findings are comparable with the existing

**Table 5:** Independent factors associated with knowledge of maternity danger signs (n=138)

Variables	Knowledge of obstetric danger signs		COR, 95 % CI	AOR, 95 % CI	P value
	Inadequate n=40	Adequate n=98			
<b>Age in years</b>					
< 24	16 (40.0)	36 (36.07)	1.00	1.00	
24-32	22 (55.0)	45 (45.09)	1.67 (1.21 - 2.58)	1.53 (1.10-2.38)	0.341
>33	2 (5.0)	17 (17.04)	2.97 (1.87 - 2.27)	2.69 (1.62 – 2.12)	0.520
<b>Duration of marriage</b>					
≤10	34 (85.0)	71 (72.04)	1.00	1.00	
≥10	6 (15.0)	27 (27.06)	0.64 (0.34 - 1.37)	0.58 (0.28 – 1.21)	0.175
<b>Education level</b>					
Primary	3 (7.05)	9 (9.02)	1.00	1.00	
Up to secondary	29 (72.05)	60 (61.02)	2.13 (1.24 – 5.42)	1.97 (1.13 – 4.87)	0.031*
University	8 (20.0)	29 (29.06)	2.46 (1.77 – 6.23)	2.34 (1.52 – 5.84)	0.03*
<b>Gravida</b>					
Multigravida	34 (85.0)	85 (86.07)	0.75 (0.14 – 1.36)	0.52 (0.09 – 1.25)	0.402
Primigravida	6 (15.0)	13 ( 13.03)	1.00	1.00	
<b>Receive ANC services</b>					
Yes	30 (75.0)	79 (80.06)	2.21 (1.72 – 4.02)	1.98 (1.62 – 3.91)	
No	10 (25.0)	19 (19.04)	1.00	1.00	0.025*
<b>Receive health education</b>					
Yes	11 (27.5)	82 (83.06)	1.60 (0.7 – 3.57)	1.49 (0.58 – 3.15)	
No	29 (72.5)	16 (16.04)	1.00	1.00	0.384
<b>Parity</b>					
Multipara	2 (5.0)	66 (67.04)	3.6 (1.48 – 5.64)	3.51 (1.39 – 5.47)	<0.001**
Primipara	16 (40 .0)	23 (23.05)	2.5 (1.18 – 5.23)	2.39 (1.07 – 5.11)	0.029*
Nullipara	22 (55.0)	9 (9.1)	1.00	1.00	
<b>Distance from health center</b>					
≤15 min	11 (27.05)	73 (74.05)	1.09 (0.33 – 1.85)	0.94 (0.25 – 1.67)	
>15 min	29 (72.05)	25 (25.05)	1.00	1.00	0.356
<b>Previous maternal health problem</b>					
Yes	12 (30.0)	77 (78.05)	2.4 (1.67 – 5.93)	1.99 (1.48 – 5.26)	
No	28 (70.0)	21 (21.05)	1.00	1.00	<0.001**

COR: Crude Odds Ratio; 1.00: Reference Group; CI: Confidence Interval; \*P value Significant<0.05; \*\*P values<0.001



studies and discussion and possible explanation are highlighted for each point.

Women's health remains at the top priority of any health sector strategy and the challenge is keeping maternal mortality at a low level. Reproductive health is mainly about maternal health and mortality. Many maternal deaths are preventable given that women are aware about maternal danger signs that could threaten their lives. Indeed, if women lack the information about maternal danger signs during pregnancy, labor, and after childbirth, they would delay the decision to seek healthcare when needed. This study was directed to examine women's awareness about maternal danger signs during pregnancy, labor, and after delivery along with its associated factors. Women believed that changes and complications associated with pregnancy are normal physiological responses of the body to pregnancy. Such belief would definitely lead to a low utilization of medical services, threat in the women's lives, occurrence of irreversible complications, and eventually death, thereby raising the maternal mortality ratio.

Our findings revealed that women have adequate awareness regarding danger signs during pregnancy, labor, and post-delivery. This end result is much higher than the findings from Africa, including Ethiopia, Tanzania, and Somali state region of Ethiopia, and Egypt (19-21) and then those of Asia, including Jordan (13). Differences could be attributed to many points: firstly, adequate knowledge was different. In the present work, we considered at least three danger signs whereas other studies considered at least two. Secondly, high coverage and utilization of antenatal care services in which majority of the women in the Gaza strip, Palestine have an average of four times follow-up during their pregnancies. The ministry of health and its partners of health sector have put much effort in improving maternal health. The ministry and the stakeholders had commitment to achieve the sustainable development goals of maternal health. High resources were invested in this field, including capacity building of physicians, midwives, and nurses' competencies, development of national protocols and guidelines, reinforcing monitoring and evaluation system, infrastructure development at primary and secondary care facilities, and promoting health awareness and education programs. As a result, the MMR had dramatically declined from 55 maternal deaths /100,000 live births in 1999 to around 23 maternal deaths /100,000 live births in 2014 (22) and continued to decline until 10.2/100,000 live births in 2017. Unfortunately, it raised again in the

era of the COVID-19 pandemic to reach 30.8/100,000 live births.

Existence of health education programs at certain health facilities was also an assist. However, women revealed that the first source of information was self-learning and utilization of internet website. This is quite dangerous, unless provided by health facilities, because the content of many internet sites could be invalid information and may provide fake information. Therefore, there is a need to strengthen health education programs for women at the reproductive age and enclose it as main point in the reproductive health strategy.

Vaginal bleeding was the most common mentioned danger sign during pregnancy, labor, and post-partum. This is consistent with findings from many countries worldwide (20, 23-25). High levels of awareness could be attributed to many factors, such as literacy of participating women in which 90% have at least finished high secondary school education, utilization of antenatal care and presence of education program at health facilities, and easy access to internet. Another factor that must be taken into consideration is contribution of mother and/or mother-in-law in highlighting the alarms from complications of pregnancy. Some studies matched between the frequency of follow-up during antenatal period and facility delivery which is interpreted via increased obstetric awareness (26, 27).

We found that 90% of the women perceived that danger signs result in death. This fear was found to be substantially high among women experiencing childbirth (28). As a source of speculation, many factors might contribute to this fear; more than 50% of the women had previous health problem related to pregnancy, increasing their sensitivity to any problem risen from pregnancy. We think that fear-based messages around obstetric danger signs might help women with high fear and anxiety levels. Women should be communicated with an accurate description about danger signs that help them to determine the signs in an emergency. Moreover, fear-based programs should focus on awareness and identifying danger signs as early as possible and provide reassurance that healthcare workers are in place to help women. Thus, women feel safe and comfortable and trust the healthcare system even if severe complications happen.

We found three independent factors or determinants for awareness of danger signs. Firstly, utilization of ANC services in which the mean ANC visit is reported

to be almost four per women during pregnancy. Women are exposed to education programs around pregnancy, including information on the danger signs. This finding is in line with that of the aforementioned studies around the world (21). Moreover, literate women who completed at least upper secondary school are seem to be more aware and knowledgeable than women who are illiterate or at most completed 15 years of education. Girum and Shimbire (29) from Ethiopia and Kabakyenga and colleagues (30) from Uganda reported a similar finding Literate woman are able to read, understand, and follow instructions provided at clinics or from elsewhere. However, the language of information should be delivered easier to women with low education level. Women with previous maternal complications are more knowledgeable about danger signs. This is logical because at time of complication they were educated at health facilities and warned about the consequences when danger signs are neglected. Therefore, they will be more cautious in their next pregnancy and will seek healthcare when needed.

#### 4.1. Limitations

This study has some limitations: Firstly, the cross-sectional design and its limitation for plausible cause effect link between independent and dependent variables. Secondly, we could not determine further independent variables or determinants for the awareness of maternal danger signs because of the small sample size; therefore, we do recommend the replication of the study on a larger sample size. This type of sampling may result in some sense of selection bias. One of the strengths of the present paper is that it is the first to be implemented and thus it gives a good insight on the effectiveness of educational program provided with primary health facilities.

#### 5. Conclusion

In conclusion, women's awareness about obstetric danger signs is substantially high and vaginal bleeding is the most frequently mentioned sign in the phases of pregnancy, childbirth, and postpartum. Much focus should be given to health education programs at healthcare facilities especially to women in the postpartum period. Perception about danger signs could be enhanced if information and communication, provided to women at reproductive age, focuses on the obstetric danger signs which in turn will help with a proper utilization of medical services when needed. Proper counseling giving to pregnant women to minimize fear associated with pregnancy complications within

a strategy to improve reproductive health and reduce maternal mortality would be necessary.

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#### Ethical Approval

This study was implemented to fulfill the requirement of the students' graduation from department of nursing, faculty of medical sciences, Israa University – Gaza. The ministry of health gained the permission to perform the study in the governmental PHC. The women were informed about study objectives and data collection was done in a private room at the selected PHC. Voluntary participation, confidentiality, and the right to withdraw were ensured and accordingly, a consent was obtained. Four well trained nursing students (fourth level) collected the data. The mean time for data collection was 20 minutes.

**Conflicts of Interest:** None declared.

#### References

1. Dean SV, Lassi ZS, Imam AM, Bhutta ZA. Preconception care: promoting reproductive planning. *Reprod Health*, 2014;11 (3):S2. doi: 10.1186/1742-4755-11-S3-S2. PubMed PMID: 25415259; PubMed Central PMCID: PMC4196558.
2. Goldenberg RL, McClure EM, Saleem S. Improving pregnancy outcomes in low- and middle-income countries. *Reprod health*. 2018;15 (Suppl 1):88. doi: 10.1186/s12978-018-0524-5. PubMed PMID: 29945628; PubMed Central PMCID: PMC6019988.
3. Neiger R. Long-Term Effects of Pregnancy Complications on Maternal Health: A Review. *J Clin Med*. 2017;6 (8):76. doi: 10.3390/jcm6080076. PubMed PMID: 28749442; PubMed Central PMCID: PMC5575578.
4. Kazaura M, Kidanto H, Massawe S. Levels trends and risk for early neonatal mortality at Muhimbili National Hospital Tanzania 1999 - 2005. *East African Journal of Public Health*. 2006;3:10-13.
5. Azizi A. The prevalence of the causes of high-risk pregnancies in pregnant women of Sonqor city, 2011. *The Iranian Journal of Obstetrics, Gynecology and Infertility*. 2015;18 (153):10-19. doi: 10.22038/ijogi.2015.4696. Persian.
6. WHO. Women's and Children's Health: Evidence of Impact of Human Rights. Library Cataloguing-

- in-Publication; 2013. Available from: <https://apps.who.int>.
7. Ministry of Health. Health indicators in Gaza Strip; 2020. Available from: <https://www.moh.gov.ps/portal/health-indicators-in-gaza-strip-2016-2020/>
  8. UNICEF. Mapping and Assessment of Maternal, Neonatal and Young Children Health Care Services in Gaza Strip, State of Palestine; 2019. Available from: <https://www.unicef.org/sop/media/1351/file/MNCH%20Gaza%20Mapping%20report.pdf>
  9. WHO. Health conditions in the occupied Palestinian territory, including east Jerusalem, and in the occupied Syrian Golan; 2020. Available from: [https://apps.who.int/gb/ebwha/pdf\\_files/WHA73/A73\\_15-en.pdf](https://apps.who.int/gb/ebwha/pdf_files/WHA73/A73_15-en.pdf)
  10. Killewo J, Anwar I, Bashir I, Yunus M, Chakraborty J. Perceived delay in healthcare-seeking for episodes of serious illness and its implications for safe motherhood interventions in rural Bangladesh. *J Health Popul Nutr.* 2006 Dec;24 (4):403-12. PMID: 17591337; PMCID: PMC3001144.
  11. Abu-Shaheen A, Heena H, Nofal A, Riaz M, AlFayyad I. Knowledge of obstetric danger signs among Saudi Arabian women. *BMC Public Health.* 2020;20 (1):939. doi: 10.1186/s12889-020-09075-9. PubMed PMID: 32539821; PubMed Central PMCID: PMC7296941.
  12. El-Nagar A, Ahmed M, Belal G. Knowledge and practices of pregnant women regarding danger signs of obstetric complications. *IOSR Journal of Nursing and Health Science.* 2017;6 (1):30–41. doi: 10.9790/1959-0601063041.
  13. Okour A, Alkhateeb M, Amarin A. Awareness of danger signs and symptoms of pregnancy complications among women in Jordan. *Int J Gynaecol Obstet.* 2012;118 (1):11-4. doi: 10.1016/j.ijgo.2012.01.020. PubMed PMID: 22503521.
  14. Zaki AS, Fouad S, Khedr N. Assessment of knowledge and practices of pregnant women toward danger signs of pregnancy. *Mansoura Nursing Journal.* 2021;8 (1):13-32. doi: 10.21608/MNJ.2021.179792.
  15. Unit of Health Information. Clinical computerization of reproductive health care at governmental primary health centers. Ministry of health, Gaza strip, Palestine; 2017. Available from: <https://www.google.com/amp/s/www.moh.gov.ps/portal/%25D9%2585%25D9%2586-%25D8%25A3%25D8%25AC%25D9%2584-%25D8%25AE%25D8%25AF%25D9%2585%25D8%25A9-%25D8%25A3%25D9%2581%25D8%25B6%25D9%2584-%25D8%25AF%25D8%25A7%25D8%25A6%25D8%25B1%25D8%25A9-%25D8%25B5%25D8%25AD%25D8%25A9-%25D8%25A7%25D9%2584%25D8%25A3%25D9%2585-%25D9%2588%25D8%25A7%25D9%2584%-25D8%25B7%25D9%2581%25D9%2584/%3famp=1>
  16. Hibstu DT, Siyoum YD. Knowledge of obstetric danger signs and associated factors among pregnant women attending antenatal care at health facilities of Yirgacheffe town, Gedeo zone, Southern Ethiopia. *Arch Public Health.* 2017;75:35. doi: 10.1186/s13690-017-0203-y. PubMed PMID: 28811893; PubMed Central PMCID: PMC5554969.
  17. Dessu S, Gedamu G, Tamiso A. Assessment of Knowledge on Danger Sign of Pregnancy and Associated Factors among ANC Attendant Pregnant Women in Arbaminch Town Governmental Institutions, Southern Ethiopia. *Ann Med Health Sci Res.* 2018;8:64–69.
  18. Demissie E, Dessie F, Tadele N. Level of awareness on danger signs of pregnancy among pregnant women attending Antenatal care in Mizan Aman general Hospital, Southwest, Ethiopia: Institution Based Cross-sectional Study. *J Women's Health Care.* 2015;4:8. doi: 10.4172/2167-0420.1000288.
  19. Dangura AD. Knowledge about child birth and postpartum obstetric danger signs and associated factors among mothers in Dale district, Southern Ethiopia. *BMC Pregnancy Childbirth.* 2020;20 (1):340. doi: 10.1186/s12884-020-02989-7. PubMed PMID: 32487092; PubMed Central PMCID: PMC7268669.
  20. Bililign N, Mulatu T. Knowledge of obstetric danger signs and associated factors among reproductive age women in Raya Kobo district of Ethiopia: A community based cross-sectional study. *BMC Pregnancy Childbirth.* 2017;17 (1):70. doi: 10.1186/s12884-017-1253-4. PubMed PMID: 28222694; PubMed Central PMCID: PMC5320700.
  21. Maseresha N, Woldemichael K, Dube L. Knowledge of obstetric danger signs and associated factors among pregnant women in Erer district, Somali region, Ethiopia. *BMC Womens Health.* 2016;16:30. doi: 10.1186/s12905-016-0309-3. PubMed PMID: 27265154; PubMed Central PMCID: PMC4893837.
  22. Unit of Health Information. (2021). Annual Health report 2020. Ministry of Health, Gaza strip, Palestine. Available from: [https://www.moh.gov.ps/file\\_api/assets/uploads/files/a6959-2020-1-.pdf](https://www.moh.gov.ps/file_api/assets/uploads/files/a6959-2020-1-.pdf)
  23. Karkee R, Bara OB, Khanal V, Lee AH. The role of obstetric knowledge in utilization of delivery service in Nepal. *Health Educ Res.* 2014;29 (6):1041-8. doi: 10.1093/her/cyu059. PubMed PMID: 25274718.



24. Mbalinda SN, Nakimuli A, Kakaire O, Osinde MO, Kakande N, Kaye DK. Does knowledge of danger signs of pregnancy predict birth preparedness? A critique of the evidence from women admitted with pregnancy complications. *Health Res Policy Syst.* 2014;12:60. doi: 10.1186/1478-4505-12-60. PubMed PMID: 25300499; PubMed Central PMCID: PMC4197291.
25. Okereke E, Aradeon S, Akerele A, Tanko M, Yisa I, Obonyo B. Knowledge of safe motherhood among women in rural communities in northern Nigeria: implications for maternal mortality reduction. *Reproductive Health.* 2013;10:57. doi: 10.1186/1742-4755-10-57.
26. Ensor T, Quigley P, Green C, Badru RA, Kaluba D, Siziya S. Knowledgeable antenatal care as a pathway to skilled delivery: modeling the interactions between use of services and knowledge in Zambia. *Health Policy Plan.* 2014;29 (5):580-8. doi: 10.1093/heapol/czt044. PubMed PMID: 23894074.
27. Greenaway ES, Leon J, Baker DP. Understanding the association between maternal education and use of health services in Ghana: exploring the role of Health knowledge. *J Biosoc Sci.* 2012;44 (6):733-47. doi: 10.1017/S0021932012000041. PubMed PMID: 22377424; PubMed Central PMCID: PMC3590019.
28. Kempe A, Theorell T, Alwazer FN, Taher SA, Christensson K. Exploring women's fear of childbirth in a high maternal mortality setting on the Arabian Peninsula. *Glob Ment Health.* 2015;2:e10. doi: 10.1017/gmh.2015.6. PubMed PMID: 28596858; PubMed Central PMCID: PMC5269624.
29. Girum T, Shimbire MS. Knowledge about Obstetric Danger Signs and Associated Factors among Antenatal Care Attendants. *International Journal of Public Health Science.* 2017;6 (1):21-26. doi: 10.11591/ijphs.v6i1.6528.
30. Kabakyenga JK, Östergren PO, Turyakira E, Pettersson KO. Knowledge of obstetric danger signs and birth preparedness practices among women in rural Uganda. *Reprod Health.* 2011;8:33. doi: 10.1186/1742-4755-8-33. PubMed PMID: 22087791; PubMed Central PMCID: PMC3231972.