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Level of knowledge on preeclampsia symptoms, complications, and risk factors among women in Saudi Arabia: A cross sectional study

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ABSTRACT

Background: Preeclampsia (PET) is a pregnancy complication that causes high blood pressure. It is still a major cause of maternal and fetal morbidity and mortality. In order to improve health outcomes, there is a greater need to improve PET education among women. This study determines the state of knowledge of preeclampsia among women who live in Makkah, Saudi Arabia. *Methods:* A cross sectional study was conducted among all eligible women who meet the inclusion criteria. The study took place from June to July 2022. A validated online questionnaire was used to collect data about participants' socio demographic characteristics, history of PET, and knowledge of PET, including signs and symptoms, risk factors, complications, timing, and severity. *Results:* A total of 378 women participated in the study. Almost half of the study population (51.9%) aged >35 years, and 73.3% were married. The mean knowledge score was 11.46 ± 2.54, and only 4% of the participants had good knowledge about preeclampsia. Participants who had >4 previous pregnancies had a significantly higher percentage than those who had a good Knowledge level about preeclampsia (p=< 0.05). Also, we found that participants with an age range from 26-35 years, who had a PET family history, had a significantly higher level of knowledge and those who had previously heard about preeclampsia (p=< 0.05*). Conclusion:* The knowledge of PET among women in Makkah, Saudi Arabia, is remarkably low. Our findings demonstrated the need for an effective health education program that focuses on improving PET knowledge.

Keywords: knowledge, preeclampsia, symptoms, complications, risk factors, PET, preeclampsia toxemia

1. INTRODUCTION

Preeclampsia (PET) is one of the hypertensive diseases associated with pregnancy. One of the most severe pregnancy specific medical disorders of

rising incidence, it affects 2 to 8 percent of pregnancies globally and causes significant maternal and perinatal morbidity and mortality. It is also becoming a more common diagnosis in the developed world (Ives et al., 2020). PET manifests as new on set hypertension after 20 weeks of pregnancy, with one or more of the following characteristics: Proteinuria, renal insufficiency, liver, neurological or hematological involvement, and fetal growth restriction (Brown et al., 2018). Unfortunately, the only successful and long lasting treatment for PET is delivery of the infant and placenta; the timing of this procedure depends on the severity of the condition and the gestational age (Dymara Konopka et al., 2018). Preeclampsia's underlying cause is currently being investigated. It is believed to happen in two stages, though. The first stage includes the impairment of local placental hypoxia and fetal trophoblastic invasion of the decidua. The second stage involves abnormal production of pro inflammatory, anti angiogenic, and angiogenic factors, as well as the release of placental blood related substances into the maternal circulation (Fondjo et al., 2019). In the industrialized world, postponing child is a ring contributes to the risk factors for preeclampsia, such as advanced maternal age, obesity, and/or vascular disorders. The persistently high prevalence in under developed countries is largely explained by inadequate prenatal care (Phipps et al., 2016).

Acute kidney injury, liver damage and malfunction, hemorrhagic or ischemic stroke, acute respiratory distress syndrome, premature delivery, and cesarean sections (CS) are all possible complications of preeclampsia (Fondjo et al., 2019). Additionally, preterm birth and placental abruption can result from high blood pressure. Obstacles to fetal growth and perhaps fetal and prenatal death are among the health issues that affect fetuses (Fondjo et al., 2019). The prevalence of preeclampsia in Saudi Arabia is 5.37 per 10,000 females (Alrowaili et al., 2020). Being aware of this risk may make it possible to identify at risk women and offer them the chance for early intervention or prevention (Dijkhuis et al., 2020). To our knowledge, there is limited data regarding preeclampsia knowledge among women in Saudi Arabia. Therefore, this study determines the state of knowledge of preeclampsia and its symptoms, complications, and risk factors among women in Makkah, Saudi Arabia.

2. MATERIALS AND METHODS

Study design, population, and time frame: A cross sectional study was carried out in Makkah, Saudi Arabia, between February to July 2022. The inclusion criteria include any woman who consented after being explained the study's purpose and objectives and is eligible to participate in the study. The exclusion criteria were women working in the medical field (physicians, nurses, technicians etc).

The minimal sample size for the study was estimated by reviewing the literature on similar objectives (Fondjo et al., 2019; Savage and Hoho, 2016; Wilkinson and Cole, 2018) with an average of 275 participants. However, a total of 378 participants were required in the study, aiming to enhance accurate statistical results. The sample size was calculated using Open Epi version 3.0. A confidence interval of 95%, anticipated % of frequencies considered to be 50%, and design effects as 1.

Data were collected through an online questionnaire that included two sections. The first section included items to collect data about participants' socio demographic characteristics (age, pregnancy status, marital status, employment status, residence, educational status, parity, as well as personal and family history of preeclampsia). The second part included items about participants' knowledge about preeclampsia (signs, symptoms, complications, timing and severity). Respondents received electronic links accompanied by the objectives of the survey, the target population, and a request to participate voluntarily. Before collecting data, Ethical approval was obtained from the Biomedical Ethics Committee of the Faculty of Medicine at Umm Al Qura University (No. HAPO-02-K-012-2022-04-1042).

Data analysis

The statistical software IBM SPSS version 26 was used to analyze the data. Chi squared test ($\chi 2$) was used to evaluate the association between qualitative data reported as numbers and percentages. Non parametric variables were assessed using the Mann Whitney test, and quantitative data were presented as mean and standard deviation (Mean ± SD). A p-value of less than 0.05 was considered statistically significant. To determine the level of knowledge, multiple choice questions were used, and the right answers were given a score of "1", while the wrong answer or "I don't know" answers were given a score of "0", leaving a total score of 18. Participants who correctly answered ≥ 80% of the choices were classified as having good knowledge, and those who had <80% of the correct answers were classified as having poor knowledge (Bhagavathula et al., 2022; Kasemy et al., 2020).

3. RESULTS

A total of 378 women included in the study. Table 1 show that 51.9% of the participants' age >35 years, and 73.3% were married. Among those, 45.2% were employed, 85.4% had an urban residence, and 72.2% had a university education. Only 11.1% were

pregnant with a mean Gestational age of 21.98 ± 13.31 weeks. For 28.5%, it was their 1st pregnancy, and for 25.7%, they had 3-4 previous pregnancies. Only 5.3% had experienced preeclampsia before, and 11.1% had a family history of preeclampsia.

Table 1 Distribution of participants based on socio demographic characteristics, obstetric and preeclampsia history

Variable	Category	No (%)
Demographical data		
Age (years)	<20	7 (1.9)
	20-25	75 (19.8)
	26-35	100 (26.5)
	>35	196 (51.9)
Marital status	Widowed	5 (1.3)
	Single	65 (17.2)
	Married	277 (73.3)
	Divorced	31 (8.2)
Employment	No	207 (54.8)
	Yes	171 (45.2)
Residence	Rural	55 (14.6)
	Urban	323 (85.4)
Educational level	Illiterate	7 (1.9)
	Secondary school or lower	85 (22.5)
	High school	273 (72.2)
	Bachelor degree and above	13 (3.4)
Conceptional history		
Are you currently pregnant?	No	226 (88.9)
	Yes	42 (11.1)
	Gestationalage, mean ± SD (weeks)	21.98 ± 13.31
Is this your first time becoming pregnant? (N=42)	No	30 (71.5)
	Yes	12 (28.5)
Number of previous pregnancies	None	94 (24.9)
	1-2	92 (24.3)
	3-4	97 (25.7)
	>4	95 (25.1)
Experienced preeclampsia before	No	327 (86.5)
	I don't know	31 (8.2)
	Yes	20 (5.3)
Family history of preeclampsia	No	244 (64.6)
	I don't know	92 (24.3)
	Yes	42 (11.1)
Heard of preeclampsia before	No	84 (22.2)
	I don't know	14 (3.7)
	Yes	280 (74.1)

We found that 74.1% of the participants had heard about preeclampsia previously (Table 2). Only 13% correctly knew that one is likely to experience preeclampsia ≥ 20 weeks of pregnancy, and 20.6% knew that sometimes preeclampsia necessitates CS. About 46% (46.8%) knew that preeclampsia had grades (mild, severe), and 29.6% knew that preeclampsia is a severe disease. Of the participants, 49.5%, 29.9%, and 22.5% correctly knew that high blood pressure while pregnancy, persistent headache, and blurred vision were symptoms of preeclampsia, respectively, while 10.8%, 40.5%, and 13.5% knew that chest pain, nausea and vomiting and

convulsions are symptoms of PET. Among the participants, 38.1% and 14.6% knew that a family history of preeclampsia and a history of clotting problems were risk factors. While 31.2% and 27% correctly knew that having prior preeclampsia and DM are risk factors. In regard to the complications, only 2.4%, 28.6%, and 7.9% knew that maternal death, fetal death, and kidney dysfunction were known complications of PET. Most of the participants (65.9%) were careful about preeclampsia (Figure 1). The mean knowledge score was 11.46 ± 2.54. (Figure 2) illustrated that only 4% of the participants had good knowledge about preeclampsia.

Table 2 Distribution of the participants according to their response to knowledge questions about preeclampsia and their attitude about the disease.

Questions	No (%)
General knowledge about preeclampsia	
When is one likely to experience preeclampsia?(≥ 20 weeks of pregnancy)	109 (28.8)
Dose preeclampsia necessitates CS?(Sometimes)	78 (20.6)
Dose preeclampsia had grades (mild, severe)? (Yes)	177 (46.8)
How severe is preeclampsia? (Severe)	112 (29.6)
Knowledge about signs/symptoms of preeclampsia	
High blood pressure while pregnancy(correct answer)	178 (49.5)
Persistent headache (correct answer)	113 (29.9)
Blurred vision (correct answer)	85 (22.5)
Chest pain (correct answer)	41 (10.8)
Abdominal pain	78 (20.6)
Nausea and vomiting (correct answer)	53 (40.5)
Back pain	43 (11.4)
Urinary retention	15 (30.4)
Convulsions (correct answer)	51 (13.5)
Knowledge about risk factors for preeclampsia	
Family history of preeclampsia (correct answer)	144 (38.1)
History of clotting problems (correct answer)	55 (14.6)
Having prior preeclampsia (correct answer)	118 (31.2)
Obesity	63 (16.7)
Diabetes (correct answer)	102 (27)
Unhealthy lifestyle	106 (28)
Multiple births	35 (9.3)
Knowledge about complications of preeclampsia	
Maternal death (correct answer)	9 (2.4)
Fetal death (correct answer)	108 (28.6)
Both maternal and fetal death	157 (41.5)
Kidney disfunction (correct answer)	30 (7.9)
Heart diseases	24 (6.4)

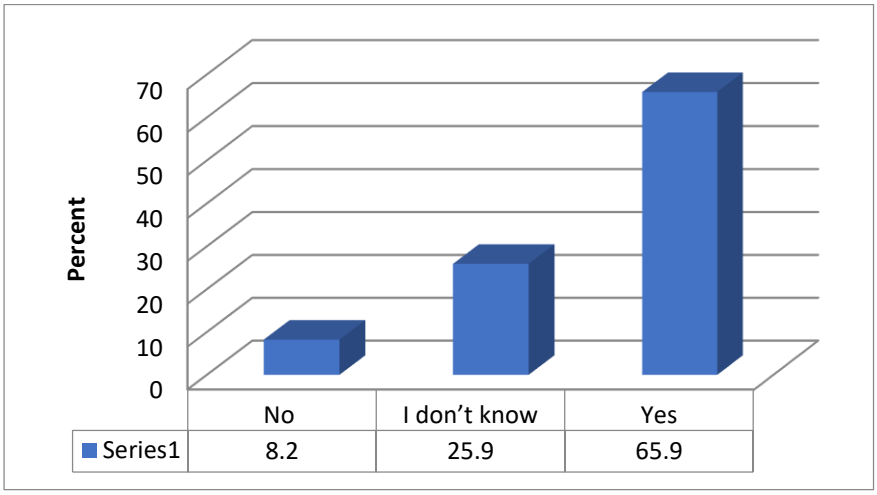

Figure 1 Participants' attitudes toward preeclampsia based on their responses to the question "Are you concerned about preeclampsia?"

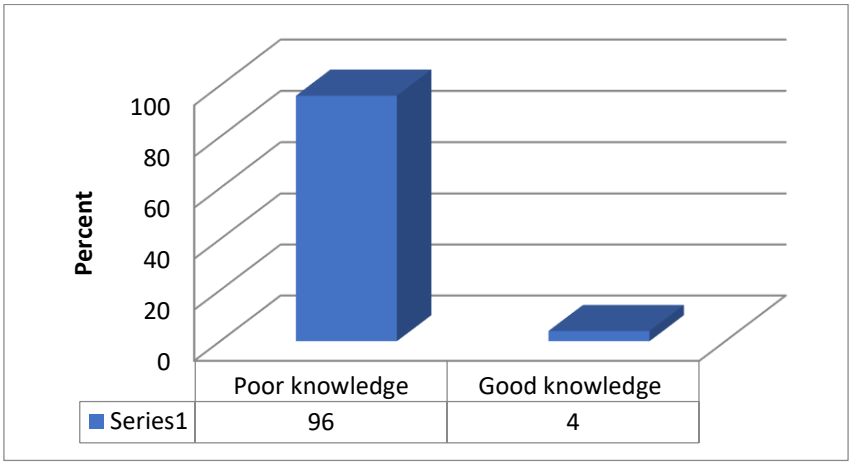

Figure 2 The percentage distribution of participants based on their level of preeclampsia knowledge.

Table 3 shows that participants who had >4 previous pregnancies had a significantly higher percentage than those who had a good Knowledge level about preeclampsia (p=< 0.05). While a non-significant relationship was found between participant's knowledge level and their socio demographic characteristics, preeclampsia history, or other obstetric data (p=> 0.05). Table 4 demonstrated that participants with an age range from 26-35 years, who had more than 2 previous pregnancies, and who had PET family history had a significantly higher level of knowledge and those who had previously heard about preeclampsia (p=< 0.05).

Table 3 Relationship between participants' knowledge level and their socio demographic characteristics, obstetric and preeclampsia history (No: 378).

Variable	Knowledge level		$\chi 2$	p-value
	Poor knowledge No. (%)	Good knowledge No. (%)		
Age (years) <20 20-25 26-35 >35	 7 (100) 72 (96) 97 (97) 187 (95.4)	 0 (0.0) 3 (4) 3 (3) 9 (4.6)	0.73	0.865
Marital status? Widowed Single	 5 (100) 64 (98.4)	 0 (0.0) 1 (1.5)	1.81	0.612

Married Divorced	265 (95.7) 29 (93.5)	12 (4.3) 2 (6.5)		
Employment No Yes	 200 (96.6) 163 (95.3)	 7 (3.4) 8 (4.7)	0.41	0.52
Residence Rural Urban	 54 (98.2) 309 (95.7)	 1 (1.8) 14 (4.3)	0.78	0.377
Educational level Secondary school or lower University postgraduate Illiterate	 83 (97.6) 261 (95.6) 12 (92.3) 7 (100)	 2 (2.4) 12 (4.4) 1 (7.7) 0 (0.0)	1.47	0.688
Conceptional history				
Are you pregnant? No Yes	 321 (95.5) 42 (100)	 15 (4.5) 0 (0.0)	1.95	0.162
Gestational age (weeks)	21.98 ± 13.31	22.13 ± 11.24	0.88*	0.921
Is this your first time becoming pregnant? (No.:42) No Yes	 30 (100) 12 (100)	 0 (0.0) 0 (0.0)	1.95	0.377
Number of previous pregnancies 1-2 3-4 >4 None	 87 (94.6) 96 (99) 87 (91.6) 93 (98.9)	 5 (5.4) 1 (1) 8 (8.4) 1 (1.1)	9.73	0.021
Experienced preeclampsia before No I don't know Yes	 316 (96.6) 28 (90.3) 19 (95)	 11 (3.4) 3 (9.70 1 (5)	3.02	0.221
Family history of preeclampsia No I don't know Yes	 235 (96.3) 89 (96.7) 39 (92.9)	 9 (3.7) 3 (3.3) 3 (7.1)	1.28	0.527

N.B: *Mann-Whitney test.

Table 4 Relationship between previous hearing about preeclampsia and participants' socio demographic characteristics, obstetric and preeclampsia history (No: 378).

Variable	Previous hearing about preeclampsia		$\chi 2$	p-value
	No No. (%)	Yes No. (%)		
Age (years) <20 20-25 26-35 >35	 4 (66.7) 19 (26.8) 18 (18.6) 43 (22.6)	 2 (33.3) 52 (73.2) 79 (81.4) 147 (77.4)	81.	0.044
Marital status Widowed	 1 (20)	 4 (80)	21.84	<0.001

Single Married Divorced	21 (35) 47 (17.5) 15 (50)	39 (65) 222 (52.5) 15 (50)		
Employment No Yes	 49 (24.6) 35 (21.2)	 150 (75.4) 130 (78.8)	0.59	0.442
Residence Rural Urban	 10 (19.6) 74 (23.6)	 41 (80.4) 239 (76.4)	0.4	0.526
Educational level Secondary school or lower University postgraduate Illiterate	 24 (30) 56 (21.1) 1 (8.3) 3 (42.9)	 56 (70) 209 (78.9) 11 (91.7) 4 (57.1)	5.73	0.125
Conceptional history				
Are you pregnant? No Yes	 73 (22.6) 11 (26.8)	 250 (77.4) 30 (73.2)	0.36	0.545
Gestational age (weeks)	22.55 ± 15.73	21.17 ± 12.38	0.29*	0.071
Is this your first time becoming pregnant? (No.:42) No Yes	 9 (31) 2 (16.7)	 20 (69) 10 (83.3)	1.35	0.508
Number of previous pregnancies 1-2 3-4 >4 None	 15 (17.4) 29 (30.2) 12 (12.9) 28 (31.5)	 71 (82.6) 67 (69.8) 81 (87.1) 61 (68.5)	13.23	0.004
Experienced preeclampsia before? No I don't know Yes	 69 (22) 9 (30) 6 (30)	 245 (78) 21 (70) 14 (70)	1.56	0.457
Do you have preeclampsia family history? No I don't know Yes	 59 (24.8) 22 (26.2) 3 (7.1)	 179 (75.2) 62 (73.8) 39 (92.9)	6.85	0.032

N.B: *Mann-Whitney test.

4. DISCUSSION

PET manifests as new-onset hypertension after 20 weeks of pregnancy, with one or more of the following characteristics: proteinuria, renal insufficiency, liver, neurological or hematological involvement, and fetal growth restriction (Brown et al., 2018). Depending on whether diagnosis is before or after 34 weeks of gestation, preeclampsia is typically classified as either early onset preeclampsia or late onset preeclampsia. The prognosis correlates directly with this classification since early onset PET is linked to more serious complications and poor maternal and neonatal outcomes (Lisonkova and Joseph, 2013). A study by (Lourenço et al., 2020) showed that the first trimester screening of PET, which combines maternal factors, obstetric and medical history, and biochemical and biophysical markers, is useful for predicting early onset PET in a routine care setting. Therefore, the first trimester combination test with maternal risk factors and biomarkers should be used as a one step procedure to screen all pregnant women for preterm PET during early pregnancy (Poon et al., 2019).

This study demonstrated the level of knowledge of preeclampsia symptoms, complications, and risk factors among women in Makkah, Saudi Arabia. There was a high prevalence of insufficient Preeclampsia knowledge among our study population (96%). Only 4% had high knowledge of PET. Previous studies also reported low knowledge about PET. Based on study conducted in Ghana by (Fondjo et al., 2019) the study also investigated the variables that influence knowledge sufficiency in pregnant women

who attend antenatal care. And they found that 11.6% of women had adequate knowledge of PET and only 2.3% had advanced knowledge of PET. Another study that was conducted by (Akeju et al., 2016) showed how little people in the communities of Ogun State, Nigeria, know about preeclampsia and eclampsia. Results showed that preeclampsia was thought to be a stress induced syndrome, while eclampsia was thought to be the result of extended exposure to cold, demonstrating a lack of understanding of this condition. Another study was done by (Wother spoon et al., 2017) to explore the knowledge of preeclampsia and found that health care professionals need to increase awareness of preeclampsia in this high risk group. A study by (Teng and Keng, 2016) in Malaysia, reported that only 18.4% of women have sufficient knowledge of PET. So, overall poor knowledge about PET was reported in many reports.

Evidence indicates that patient's knowledge about their diseases beneficial impact on their adherence to treatment and abated complications associated with PET. Thus, assessing and improving patients' knowledge is important for the prevention, control, and management of disorders (You et al., 2012). An intervention study conducted in Jamaica by (Mac Gillivray et al., 2004) found that handing out cards describing PET symptoms resulted in fewer side effects for patients. This suggests a link between good PET knowledge and improved clinical results. Therefore, understanding and recognizing awareness and attitude regarding preeclampsia and its symptoms, complications, risk factors and reasons for low knowledge among women are the most significant in terms of preventing treatment delay. Our study found that about half of the participants identified high blood pressure as one of the symptoms/signs of PET, while other specific symptoms, such as persistent headache, blurred vision, chest pain, nausea/vomiting, and convulsions, were less likely to be identified or recognized by the women. This is in parallel with a study conducted in Tanzania, which found that knowledge about signs and symptoms of PET is the lowest (Savage and Hoho, 2016). This would delay seeking medical help. Less than half of the participating women recognized risk factors such as a family history of PET, thrombophilia, having a personal history of PET, and diabetes. Evidently, this result indicates that women are unfamiliar with PET related risk factors.

The present study also revealed several factors that contribute to a higher level of knowledge about preeclampsia, including a history of >2 pregnancies, age of 26 to 35 years and who had PET family history ($p=< 0.05$). It is expected that the highest educational level has a good impact on the knowledge of preeclampsia. Although the smallest portion of the selected population has a good knowledge of preeclampsia, it can be shown that the percentage was higher for participants with university educational levels (4.4%). Similarly, a previous study conducted in Ethiopia concluded that a higher educational level contributes to a proper knowledge of preeclampsia [AOR = 0.22, 95 % CI (0.06, 0.85)] (Mekie et al., 2021). Our findings indicate that organizing PET health education programs, campaigns, and media channels are critical for increasing women's knowledge level in order for early diagnosis and proper treatment of this serious disease in the hopes of improving results for both mother and child. Furthermore, the use of an effective method of educating women, possibly during antenatal visits, as our findings revealed, most of the knowledge gained about PET was from a variety of sources, including >2 pregnancies, family, and personal history of PET.

Our study has some limitations. First, this is a cross sectional study design. Thus, causal inferences may not be established. Second, Data were collected using a self-administered questionnaire, which may exhibit recall and desirability biases. Also, this survey used an online based survey method. It was restricted to those with internet access only, so people from older age groups or specific lower socioeconomic classes may miss it. Finally, this study was restricted to a specific population.

5. CONCLUSION

In conclusion, knowledge of PET among women in Makkah, Saudi Arabia, is low. Our results point to the necessity of efficient and specific health education program focused at enhancing PET knowledge, thus leading to preventing delays in seeking treatment and better health results for both mother and child.

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Data availability statement

All the data related to this study is available upon request.

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Conflict of interest

The authors declare that there is no conflict of interests

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