

Influence of sociodemographic factors and environmental conditions on husbands' behavior toward maternal healthcare

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Background/aim

Improving maternal health depends on husband's behavior which is affected by certain socio-demographic factors and environmental conditions. The study aimed to assess the husband's behavior toward maternal healthcare and emergency first aid measures for pregnancy and obstetric risks that might put life of women at risk of maternal death. The study also determined the socio-demographic factors and environmental conditions that influenced husband's behavior and attitude toward antenatal care providers and providers of assisted delivery.

Methods

One thousand husbands of women in childbearing period were randomly selected through a community-based study that was conducted in 23 rural villages of four chosen districts of Benisuef and Al Fayoum governorates of Egypt. The study is a cross-sectional investigation conducted over a period of 8 months starting from July 2010 until February 2011. Data were collected from interviews of husbands on their sociodemographic characteristics, environmental conditions, and their knowledge, attitudes, intention, and practices toward maternal healthcare and services provided as well as toward providers of maternal healthcare.

Results

The study revealed that husbands who were younger than 20 years at the time of marriage, had a lower middle environmental score, and an upper middle income were nearly two or more times as likely of being unaware of the risk symptoms during pregnancy [odds ratio (OR) = 2.73, 1.37, and 1.59, respectively], during delivery (OR = 1.93, 1.31, and 1.76, respectively), and during the postnatal period (OR = 2.42, 1.36, and 1.77, respectively) compared with those older than 20 at the time of marriage, who had an upper middle environmental score, and a lower middle income.

Conclusion and recommendations

It is recommended to target husbands as an influential factor among high-risk wives by educating them on maternal health risks and by increasing their accessibility to maternal and obstetric health services, with special emphasis on younger men and those living under poor environmental conditions irrespective of their economic status.

Keywords:

environmental conditions, husbands' behavior, maternal mortality, sociodemographic factors

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Introduction

Men play important and often dominant roles in making decisions that are crucial to women's reproductive health (RH). Women still have to depend on their husbands for obtaining appropriate and adequate healthcare for their illnesses. Men are often those who decide when a woman's condition is serious enough to seek medical care [1,2].

Nowadays, men's participation in maternal healthcare is considered a strategy for decreasing maternal mortality; however, men are not present in maternal health centers and do not have access to the information necessary for making informed decisions on protection and improvement of maternal health [3,4]. Participation of husbands in maternal health promotion programs that

increase awareness will have long-term positive effects on maternal healthcare utilization [5]. Education about the role of men in perinatal care led to improvement in the participants' knowledge, attitudes, and practices toward RH [4,6]. Empowering male partners with knowledge about maternal healthcare services may increase their antenatal care (ANC) participation and in turn increase skilled delivery and postnatal care (PNC) [7,8].

Although the WHO has recognized the role of male involvement in maternal health, its uptake is still low. Unfortunately, single 'facilitative' roles of men, such as escorting a wife to a health facility, have been mistaken for male involvement [9]. The reason for the low-level involvement of husbands is their low awareness and knowledge of RH issues. This in turn

limits their participation in maternal healthcare at modern healthcare services. Socioeconomic factors (like income status and exposure to modern healthcare facilities) and cultural factors (like traditional attitudes and beliefs) still play an important role in shaping husbands' experiences in maternal healthcare [10,11].

The United Nations Population Fund has actively promoted male participation as a key to achievement of maternal health goals and standards of care [12]. Propagating male involvement in maternal healthcare was thus a welcome note in the International Conference on Population and Development in Cairo in 1994, which affirmed that special efforts should be made to give importance to husbands' shared responsibility and promote their active involvement in responsible parenthood and reproductive behavior [11].

Aim of the work

The aim of the study was to assess husbands' behavior toward maternal healthcare and emergency first aid measures for pregnancy and obstetric risks that might put women at risk of maternal death. The study also determined the sociodemographic factors and environmental conditions that influenced the husband's behavior and attitude toward ANC providers and to providers of assisted delivery.

Subjects and methods

Study setting

This study was community based and was conducted in 21 rural villages of four chosen districts of Benisuef and Fayoum governorates of Egypt (ranked as the second and third poorest governorates in Egypt, respectively).

Study design

This is a cross-sectional investigation for assessing husbands' attitude, accessibility, and satisfaction toward the maternal healthcare services within governmental health facilities, their accessibility to health education sessions, and their knowledge of complications in obstetrics and how to deal with them. The study was conducted over a period of 8 months starting from July 2010 until February 2011. It was conducted through a project that was supported financially by the Science and Technology Development Fund, Egypt, Grant No 358.

Sample size

Basis for the sample size are as follows: the proportion of awareness among husbands had to vary from 18.1

to 23.6%, as per the study conducted by Awasthi *et al.* [13]; the two-sided significance level ($1-\alpha$) had to be 95%; power ($1-\beta$, % chance of detecting) had to be 80; and confidence limit (the absolute precision required) had to be 5% (out of the average). The sample size was calculated using epi Info-Statcalc version 7 [14]. Accordingly, at 95% the number would have to be 888. With 10% nonparticipation and 5% nonresponse to any question, the total number of husbands required had to be around 1000 [15].

Sampling technique

One thousand husbands of pregnant women were randomly selected and were targeted for assessing their knowledge, attitude, and practices toward maternal healthcare services provided in the governmental health facilities in El Fayoum and Benisuef governorates. The men were selected randomly from 11 villages and 76 satellites belonging to Senores and Youssef El Sedeek districts of Al Fayoum governorate and from 10 villages and 43 satellites belonging to El Fashen and Somosta districts of Benisuef governorate.

Selection of the targeted husbands was done after obtaining the map of each village. First we determined the four directions surrounded the catchment areas of the targeted rural health units. Then, the number of streets, areas, and boundaries in each direction and a list of the houses and village promoters in each area who targeted these houses were determined. The targeted houses were divided per village promoter. The involved husbands were those whose wives were targeted during the implementation of the project titled 'Approaching Community Based Determinants for Maternal Health as Contribution in Maternal Mortality Reduction within the Governorates of El Fayoum and Benisuef', Grant No 358.

Data collection types and tools

A standardized questionnaire that was modified according to centers for disease control and prevention was used for the quantitative analysis [16]. The questionnaire was constructed to assess husbands' knowledge, attitudes, intention, and practices related to maternal healthcare and emergency first aid management for pregnancy and obstetric risks that might put women at risk of maternal death. The questionnaire focused on assessing husbands' attitude, accessibility, and satisfaction toward the provided services within the governmental health facilities and their accessibility to health education sessions. The questionnaire also focused on husbands' knowledge about the risks during pregnancy and delivery and during the postnatal period and how to

deal with them. The risks included complications of pregnancy such as anemia, abortion, ectopic pregnancy, bleeding, preeclampsia, and eclampsia, complications during delivery such as prolonged labor, bleeding, abnormal fetal presentation, and premature rupture of membranes, and postnatal complications such as postpartum hemorrhage and puerperal sepsis. The questionnaire also determined the sociodemographic factors and environmental conditions that influenced the husbands' behavior and husbands' attitude toward ANC providers and to providers of assisted delivery such as male/female doctors, trained nurses or midwives. The sociodemographic factors included husbands' age at the time of marriage, type of employment, and type of residence after marriage. The environmental conditions included type of house, number of rooms, number of bedrooms, type of floor of the house, the source of water in the house (for drinking, cooking, washing of hands, etc), garbage disposal, the source of light, type of water closet, and type of sewage disposal. Staff members of community medicine research department in the National Research Center conducted the interviews with husbands in collaboration with physicians of the Maternity and Childhood Care Department in El Fayoum and Benisuief Governorates, while health promoters served as a guide for the team.

Ethical considerations

The study complied with the International Ethical Guidelines for Biomedical Research Involving Human Subjects [17].

The Research and Ethical Committee of the National Research Centre cleared the study protocol. Informed consent was obtained from all participants involved in the study and the information obtained at the individual level was kept strictly confidential.

Data processing and management analysis

All completed questionnaires were entered into a computer and statistically analyzed with statistical package for social science software program, version 16. Descriptive statistics such as frequency and percentage were used for data summarization. The analysis was carried out using the χ^2 -test and odds ratio [OR = $(a/c)/(b/d)$] [18].

Each parameter of the environmental conditions (nine parameters) was classified as follows: 1 = bad; 2 = good; and 3 = excellent. All of these nine parameters were then added together. These environmental conditions were scored as follows: low score = 0–9; lower middle score = 10–18; and upper middle score = 19–27.

Results

Husbands had a mean age of 25.6 ± 4.9 and about 80% had married between the ages of 20 and 29 years. Most of the husbands (92.3%) had a positive attitude toward ANC. Around one-third of husbands knew the risks involved during pregnancy, during delivery, and during the postnatal period (29.9, 31, and 27.1, respectively), but about half of them knew how to deal with these risks (49.7, 49.4, and 44.7%, respectively).

The influence of the socio-demographic factors and environmental conditions on husbands' attitude and intention for ANC is shown in Table 1. Husbands with upper middle income carry significantly about one and a half fold for having negative attitude (OR = 1.47) and two folds for having negative intention (OR = 1.77) toward ANC than husbands with lower middle income. Husbands with lower middle environmental score carry significantly nearly one and a half fold for having negative attitude (OR = 1.31) and intention (OR = 1.36) toward ANC than husbands with upper middle environmental score.

There was no influence of sociodemographic factors and environmental conditions on accessibility to health education sessions in the governmental health facilities, nor on the satisfaction of husbands with respect to the ANC services provided in the governmental health facilities, which was more or less than 1 as revealed in Table 2.

Tables 3–5 show the relation between sociodemographic factors and environmental conditions and husbands' awareness of the risks during pregnancy, delivery, and the postnatal period. It was found that husbands who were younger than 20 years at the time of marriage were nearly three- and two-fold as likely to be unaware of the risks during pregnancy [with significant difference (OR = 2.73)], delivery (OR = 1.93), and the postnatal period (OR = 2.42) compared with those whose age at the time of marriage was more than 20. Further, husbands whose age at the time of marriage was less than 20 were nearly twice and 1.5 times as likely to be unaware of dealing with the risks during pregnancy (OR = 1.78), delivery (OR = 1.57), and the postnatal period (OR = 1.46) compared with those who were older than 20 years at the time of marriage. Husbands with upper middle income were about two- and 1.5-fold more likely to be unaware of the risks during pregnancy and how to deal with them (OR = 1.72 and 1.59, respectively) compared with husbands with lower middle income. They were also about two-fold more likely to be unaware of the risks during delivery and how to deal with them (OR = 1.76 for both) and about 1.5-fold more likely to be unaware of the risks during the postnatal period and how to deal with them (OR = 1.48 and 1.51, respectively) compared with husbands with lower middle income.

Table 1 Husbands' attitude and intention for ANC services in relation to sociodemographic factors and environmental conditions

Characteristics	Total husbands (N = 1000) [n (%)]			
	Negative attitude toward ANC (387)	Positive attitude toward ANC (613)	Negative intention toward ANC (303)	Positive intention toward ANC (697)
Age of husband at marriage ^a				
<20 (n = 36)	12 (33.3)	24 (66.7)	8 (22.2)	28 (77.8)
≥20 (n = 943)	368 (39.0)	575 (61.0)	289 (30.6)	654 (69.4)
OR	0.78 (0.36–1.65)		0.65 (0.27–1.51)	
The type of residence immediately after marriage				
In a house with families or relatives (n = 685)	259 (37.8)	426 (62.2)	211 (30.8)	474 (69.2)
In a house only with his wife (n = 315)	128 (40.6)	187 (59.4)	92 (29.2)	223 (70.8)
OR	0.89 (0.67–1.18)		1.08 (0.80–1.46)	
Husband's employment				
Upper middle income: employee, professional, employer, or dealer (n = 753)	308 (40.9)	445 (59.1)	249 (33.1)	504 (66.9)
Lower middle income: unemployed, day by day worker, farmer and laborer (n = 247)	79 (32.0)	168 (68.0)	54 (21.9)	193 (78.1)
OR	1.47 (1.07–2.02), significant		1.77 (1.24–2.51), significant	
Environmental score ^a				
Lower middle (n = 514)	216 (42.0)	298 (58.0)	171 (33.3)	343 (66.7)
Upper middle (n = 455)	162 (35.6)	293 (64.4)	122 (26.8)	333 (73.2)
OR	1.31 (1.00–1.71), significant		1.36 (1.02–1.81), significant	

ANC, antenatal care; OR, odds ratio; ^aMissed cases excluded from the analysis.**Table 2 Husbands' accessibility and satisfaction for ANC services in relation to sociodemographic factors and environmental conditions**

Characteristics	Total husbands (N = 1000) [n (%)]			
	No accessibility to health education sessions in the governmental health facilities (804)	Accessibility to health education sessions in the governmental health facilities (196)	Negative satisfaction toward the ANC services provided in the governmental health facilities (520)	Positive satisfaction toward the ANC services provided in the governmental health facilities (480)
Age of husband at marriage ^a				
<20 (n = 36)	30 (83.3)	6 (16.7)	20 (55.6)	16 (44.4)
≥20 (n = 943)	756 (80.2)	187 (19.8)	493 (52.3)	450 (47.7)
OR	1.24 (0.48–3.36)		1.14 (0.56–2.34)	
The type of residence immediately after marriage				
In a house with families or relatives (n = 685)	551 (80.4)	134 (19.6)	366 (53.4)	319 (46.6)
In a house only with his wife (n = 315)	253 (80.3)	62 (19.7)	154 (48.9)	161 (51.1)
OR	1.01 (0.71–1.43)		1.20 (0.91–1.58)	
Husband's employment				
Upper middle income: employee, professional, employer, or dealer (n = 753)	613 (81.4)	140 (18.6)	401 (53.3)	352 (46.7)
Lower middle income: unemployed, day by day worker, farmer and laborer (n = 247)	191 (77.3)	56 (22.7)	119 (48.2)	128 (51.8)
OR	1.28 (0.89–1.85)		1.23 (0.91–1.65)	
Environmental score ^a				
Lower middle (n = 514)	422 (82.1)	92 (17.9)	279 (54.3)	235 (45.7)
Upper middle (n = 455)	361 (79.3)	94 (20.7)	229 (50.3)	226 (49.7)
OR	1.19 (0.86–1.67)		1.17 (0.90–1.52)	

ANC, antenatal care; OR, odds ratio; ^aMissed cases excluded from the analysis.

Table 3 Husbands' awareness of pregnancy danger symptoms and how to deal with them in relation to sociodemographic factors and environmental conditions

Characteristics	Total husbands (N = 1000) [n (%)]			
	Unaware of the risks during pregnancy (701)	Aware of the risks during pregnancy (299)	Cannot manage the risks during pregnancy (504)	Know how to deal with the risks during pregnancy (496)
Age of husband at the time of marriage ^a				
<20 (n = 36)	31 (86.1)	5 (13.9)	23 (63.9)	13 (36.1)
≥20 (n = 943)	655 (69.5)	288 (30.5)	470 (49.8)	473 (50.2)
OR	2.73 (1.00–8.06), significant		1.78 (0.85–3.76)	
Type of residence immediately after marriage				
In a house with families or relatives (n = 685)	489 (71.4)	196 (28.6)	363 (53.0)	322 (47.0)
In a house only with his wife (n = 315)	212 (67.3)	103 (32.7)	141 (44.8)	174 (55.2)
OR	1.21 (0.90–1.63)		1.39 (1.05–1.84), significant	
Husband's employment				
Upper middle income: employee, professional, employer, or dealer (n = 753)	550 (73.0)	203 (27.0)	401 (53.3)	352 (46.7)
Lower middle income: unemployed, day by day worker, farmer and laborer (n = 247)	151 (61.1)	96 (38.9)	103 (41.7)	144 (58.3)
OR	1.72 (1.26–2.36), significant		1.59 (1.18–2.15), significant	
Environmental score ^a				
Lower middle (n = 514)	361 (70.2)	153 (29.8)	275 (53.5)	239 (46.5)
Upper middle (n = 455)	318 (69.9)	137 (30.1)	208 (45.7)	247 (54.3)
OR	1.02 (0.76–1.35)		1.37 (1.05–1.77), significant	

OR, odds ratio; ^aMissed cases excluded from the analysis.**Table 4 Husbands' knowledge of delivery danger symptoms and how to deal with them in relation to sociodemographic factors and environmental conditions**

Characteristics	Total husbands (N = 1000) [n (%)]			
	Unaware of the risks during delivery (690)	Aware of the risks during delivery (310)	Cannot manage the risks during delivery (508)	Know how to deal with the risks during delivery (494)
Age of husband at the time of marriage ^a				
<20 (n = 36)	29 (80.6)	7 (19.4)	22 (61.1)	14 (38.9)
≥20 (n = 943)	643 (68.2)	300 (31.8)	471 (49.9)	472 (50.1)
OR	1.93 (0.80–4.90)		1.57 (0.76–3.29)	
Type of residence immediately after marriage				
In a house with families or relatives (n = 685)	484 (70.7)	201 (29.3)	358 (52.3)	327 (47.7)
In a house only with his wife (n = 315)	206 (65.4)	109 (34.6)	148 (47.0)	167 (53.0)
OR	1.27 (0.95–1.71)		1.24 (0.94–1.63)	
Husband's employment				
Upper middle income: employee, professional, employer, or dealer (n = 753)	543 (72.1)	210 (27.9)	407 (54.1)	346 (45.9)
Lower middle income: unemployed, day by day worker, farmer and laborer (n = 247)	147 (59.5)	100 (40.5)	99 (40.1)	148 (59.9)
OR	1.76 (1.29–2.40), significant		1.76 (1.30–2.38), significant	
Environmental score ^a				
Lower middle (n = 514)	359 (69.8)	155 (30.2)	275 (53.5)	239 (46.5)
Upper middle (n = 455)	309 (67.9)	146 (32.1)	213 (46.8)	242 (53.2)
OR	1.09 (0.83–1.45)		1.31 (1.01–1.70), significant	

OR, odds ratio; ^aMissed cases excluded from the analysis.

Tables 3–5 also reveal that husbands who live with their wives and families or relatives after marriage are about 1.5-fold more likely to be unaware of how to deal with the risks during pregnancy, with significant difference (OR = 1.39), compared with husbands who live only with their wives. Husbands with a lower middle environmental score are nearly 1.5-fold more likely of being unaware of how to deal with the risks associated with pregnancy (OR = 1.37) and delivery (OR = 1.31) compared with husbands with upper middle environmental scores.

Table 6 shows the relation between sociodemographic factors and environmental conditions and husbands' attitude toward ANC providers and providers of assisted delivery. It can be seen that more than one-third of the husbands prefer female doctors for ANC services and to assist in the delivery of their wives irrespective of their sociodemographic characteristics and environmental conditions.

Discussion

Men play a vital role in the safety of their female partners during pregnancy and childbirth [19]. Husbands

whose wives utilized professional maternal healthcare services provided social, emotional, instrumental, and informational support to their wives [20]. Strategies for involving men in maternal healthcare services should aim at raising their awareness about emergency obstetric conditions, and engaging them in activities that will prepare them for the birth of their baby and for potential complications [21]. The involvement of men in pregnancy and childbirth was restricted by socioeconomic and cultural factors including men's limited knowledge on danger symptoms, as well as health service and structural factors and finally by lack of advocates for men's education on their reproductive responsibilities [22].

This study focused on determining husbands' behavior toward maternal healthcare and emergency first aid measures during pregnancy and obstetric risks that might put women at risk of maternal death. The study also determined the sociodemographic factors and environmental conditions that influenced husbands' behavior and husbands' attitude toward ANC providers and providers of assisted delivery. One thousand husbands of pregnant women were randomly selected from villages of Benisuef and Al Fayoum governorates of Egypt. Data were collected through interviews

Table 5 Husbands' knowledge of postnatal danger symptoms and how to deal with them in relation to sociodemographic factors and environmental conditions

Characteristics	Total husbands (N = 1000) [n (%)]			
	Unaware of the risks during the postnatal period (729)	Aware of the risks during the postnatal period (271)	Cannot manage the risks during the postnatal period (555)	Know how to deal with the risks during the postnatal period (445)
Age of husband at the time of marriage ^a				
<20 (n = 36)	31 (86.1)	5 (13.9)	23 (63.9)	13 (36.1)
≥20 (n = 943)	678 (71.9)	265 (28.1)	517 (54.8)	426 (45.2)
OR	2.42 (0.89–7.17)		1.46 (0.70–3.08)	
The type of residence immediately after marriage				
In a house with families or relatives (n = 685)	507 (74.0)	178 (26.0)	390 (56.9)	295 (43.1)
In a house only with his wife (n = 315)	222 (70.5)	93 (29.5)	165 (52.4)	150 (47.6)
OR	1.19 (0.88–1.62)		1.20 (0.91–1.59)	
Husband's employment				
Upper middle income: employee, professional, employer, or dealer (n = 753)	564 (74.9)	189 (25.1)	437 (58.0)	316 (42.0)
Lower middle income: unemployed, day by day worker, farmer, and laborer (n = 247)	165 (66.8)	82 (33.2)	118 (47.8)	129 (52.2)
OR	1.48 (1.07–2.05), significant		1.51 (1.12–2.04), significant	
Environmental score ^a				
Lower middle (n = 514)	377 (73.3)	137 (26.7)	292 (56.8)	222 (43.2)
Upper middle (n = 455)	330 (72.5)	125 (27.5)	243 (53.4)	212 (46.6)
OR	1.04 (0.78–1.40)		1.15 (0.88–1.49)	

OR, odds ratio; ^aMissed cases excluded from the analysis.

Table 6 Husbands' attitude towards ANC providers and providers of assisted delivery in relation to sociodemographic factors and environmental conditions

Characteristics	Total husbands (N = 1000) [n (%)]				
Toward ANC providers	Female doctor (373)	Male/female doctor (273)	Male/female doctor or trained nurse (131)	Midwife (24)	P value
Age of husband at the time of marriage ^a					
<20 (n = 36)	12 (33.3)	13 (36.1)	6 (16.7)	0 (0.0)	0.558
≥20 (n = 943)	353 (37.4)	257 (27.3)	123 (13.0)	23 (2.4)	
Type of residence immediately after marriage					
In a house with families or relatives (n = 685)	255 (37.2)	199 (29.1)	86 (12.6)	12 (1.8)	0.081
In a house only with his wife (n = 315)	118 (37.5)	74 (23.5)	45 (14.3)	12 (3.8)	
Husband's employment					
Lower middle income: unemployed, day by day worker, farmer, and laborer (n = 247)	111 (44.9)	69 (27.9)	42 (17.0)	11 (4.5)	0.120
Upper middle income: employee, professional, employer, or dealer (n = 753)	262 (34.8)	204 (27.1)	89 (11.8)	13 (1.7)	
Environmental score ^a					
Lower middle (n = 514)	175 (34.0)	122 (23.7)	60 (11.7)	12 (2.3)	0.886
Upper middle (n = 455)	186 (40.9)	144 (31.6)	68 (14.9)	11 (2.4)	
Toward providers of assisted delivery	Female doctor (361)	Male/female doctor (184)	Male/female doctor or trained nurse (47)	Midwife or cannot decide (81)	P value
Age of husband at the time of marriage					
<20 (n = 36)	11 (30.6)	9 (25.0)	1 (2.8)	5 (13.9)	0.696
≥20 (n = 943)	337 (35.7)	171 (18.1)	43 (4.6)	114 (12.1)	
Type of residence immediately after marriage					
In a house with families or relatives (n = 685)	251 (36.6)	118 (17.2)	33 (4.8)	74 (10.8)	0.106
In a house only with his wife (n = 315)	104 (33.0)	65 (20.6)	12 (3.8)	49 (15.6)	
Husband's employment					
Lower middle income: unemployed, day by day worker, farmer, and laborer (n = 247)	110 (44.5)	50 (20.2)	8 (3.2)	28 (11.3)	0.118
Upper middle income: employee, professional, employer, or dealer (n = 753)	245 (32.5)	134 (18.2)	38 (5.1)	95 (12.6)	
Environmental score					
Lower middle (n = 514)	183 (35.6)	86 (16.7)	15 (2.9)	65 (12.6)	0.072
Upper middle (n = 455)	161 (35.4)	92 (20.2)	29 (6.4)	53 (11.6)	

ANC, antenatal care; ^aMissed cases excluded from the analysis.

of husbands on their sociodemographic factors, environmental conditions, and their knowledge, attitude, intention, and practices toward maternal healthcare and services provided and providers of assisted delivery.

The husband's attitude was found to be strongly associated with ANC, skilled attendance at birth, and PNC. This study shows that most of the husbands (92.3%) had a positive attitude toward ANC. A study in Pakistan found that the majority (84.7%) of husbands had a positive attitude toward ANC and maternity care services [23]. Two studies in Ethiopia showed that women whose husbands had a positive attitude toward ANC were more than three times as likely to utilize ANC compared with women whose husbands had a negative attitude toward ANC [24,25]. Another study by Ohashi *et al.* [26] revealed that husbands in rural Upper Egypt had an important role in encouraging their wives to seek healthcare services.

In the current study husbands with upper middle income carry significantly about one and a half fold for having negative attitude (OR = 1.47) toward ANC and for being unaware of the risk symptoms and how to deal with them during pregnancy (OR = 1.72, OR = 1.59 respectively), delivery (OR = 1.76 for both) and postnatal period (OR = 1.48, OR = 1.51 respectively) than husbands with lower middle income. However, Tsegay *et al.* [27] study reported that Ethiopian women who classified their husbands' occupation as other than farming were more likely to use ANC services (OR = 2.26) and institutional delivery (OR = 3.84) than farmers' wives. Arua *et al.* study [28] in India; Dagne study [29] in Ethiopia and Srivastava *et al.* study [30] in India also revealed that women whose husbands were skilled workers or who work in business/ service tend to use the maternal health services more than wives of farmers and those husbands are more aware of possible problems during pregnancy, delivery and postpartum period and the need of their wives for care than

farmers/ labourers. Akanbiemu *et al.* study [31] found also that Nigerian women whose husbands were civil servants and farmers were about twice more likely and thrice less likely respectively to have good knowledge of ANC. In Nepal husbands with a formal-sector job such as teaching or civil servant (OR = 3.23) were more likely to have wives who attended postnatal care [32]. However, a study in Ghana [33] and another study in Turkey [34] showed that the employment of the husbands did not influence the use of skilled attendants and the choice of place for delivery ($p = 0.65$).

In this study, husbands who lived with their wives and families or relatives after marriage were around 1.5 times more likely to be unaware of dealing with the risks during pregnancy [with significant difference (OR = 1.39)] compared with husbands who lived alone with their wives. Similarly, husbands who lived in nuclear families were also more aware of possible complications and the need for care compared with those who lived in joint/extended families [28]. It was also found in an Egyptian study conducted by Ohashi *et al.* [26] that women living in nuclear families who had better relationships with their husbands used ANC more frequently and had a higher percentage of institutional deliveries than did those living in extended families. The same study showed that women in extended families who had better relations with their husbands' relatives used ANC more frequently and received considerable support from their families and their husbands' families during pregnancy, delivery, and the postpartum period. In a study conducted in rural Egypt by Chiang *et al.* [35], residence in extended families was significantly associated with greater maternal health service usage, increase in regular ANC attendance, deliveries attended by skilled health professionals, and deliveries at health facilities. If the husband was living with the family, it improved maternal care [22,36].

This study also revealed that around one-third of husbands know the risks associated with pregnancy, delivery, and the postnatal period but about half of them knew how to deal with these risks. These results are similar to those of Awasthi *et al.* [13] in Agra district who reported that only 23.61% of husbands were aware of the possible complications during pregnancy of their wives ($P < 0.001$); 18.1% of them were aware of complications during delivery of their wives and the majority of men were not aware of postnatal complications experienced by their wives. The study also revealed that a majority of husbands had not been involved in maternal care because of a lack of positive attitude toward maternal care. Bhatta [37] in a study conducted in Chitwan district also showed that most of the husbands did not know about the dangers during pregnancy, and a very low level of knowledge was found

about birth preparedness and emergency obstetric conditions during delivery. Half of the respondents did not know about the possible complications during the postpartum period and the majority of husbands had low-level knowledge about the support required during pregnancy, delivery, and the postpartum period. Another Indian study by Chattopadhyay [11] revealed that husbands were found to be unaware of the care their wives should receive during pregnancy and delivery and were less knowledgeable about the warning symptoms of pregnancy and delivery complications.

In the current study husbands whose age at marriage was less than 20 years were nearly three times and twice as likely to be unaware of the risks during pregnancy [with significant difference (OR = 2.73)], during delivery (OR = 1.93), and during the postnatal period (OR = 2.42) compared with those who were older than 20 years at the time of marriage. The study by Arua *et al.* [28] is similar to the current study as it revealed that age at marriage of Indian husbands was positively associated with greater participation in their wives' maternal healthcare (ANC, delivery care, and PNC) and with their awareness of possible complications during pregnancy, delivery, and the postpartum period.

In this study husbands with a lower middle environmental score were nearly 1.5 times more likely to have a negative attitude (OR = 1.31) toward ANC compared with husbands with a upper middle environmental score. In Bangladesh the source of drinking water for rural women, which is one of the environmental conditions, significantly influenced the likelihood of ANC utilization [38]. This study revealed that more than one-third of husbands preferred female doctors to provide ANC services and to assist in the delivery of their wives, irrespective of sociodemographic factors and environmental conditions [32]. A study in Nepal showed that lack of skilled female healthcare workers may be a barrier to the uptake of ANC, delivery care, and PNC, as Nepalese husbands may not be willing to send their wives to male doctors for medical examinations.

Conclusion

The study concluded that husbands' knowledge, attitude, intention, and practices toward maternal healthcare are affected by their age at the time of marriage, type of employment, type of residence after marriage, and the environmental conditions in which they live.

Recommendations

It is recommended to target husbands as they are an influential factor in high-risk wives by increasing their

accessibility to maternal and obstetric health services, with special emphasis on younger men and those living under poor environmental conditions irrespective of their economic status.

Governments and local health authorities should develop strategies to empower men with knowledge about maternal healthcare. Program planners and policymakers need to focus on involving men in RH education interventions and assess the effectiveness of education strategies targeted at husbands.

Acknowledgements

Conflicts of interest

None declared.

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