

Pattern, Knowledge, and Attitude of Pregnant Women towards Smoking in Saudi Arabia

Duaa M. Bahkali, MD* Ghaida A. Eissa, MD** Abdullah A. Bayazed, MD** Zakeiah Alsulaimani*** Kholoud A. Ghamri, MD**** Nedaa M. Bahkali, MD*

ABSTRACT

Aims: To evaluate knowledge about the risks of tobacco use during pregnancy, attitudes towards preventive measures, and smoking patterns among pregnant women in Saudi Arabia.

Methods: This cross-sectional questionnaire study was conducted in Saudi Arabia from February to May 2023 on 571 pregnant women. The knowledge level was considered as fair if 50% to 75% of the questions were answered correctly, and as good if >75% of the questions were answered correctly. A Likert-type scale was used to assess their attitudes towards smoking prevention measures.

Results: Of the participants, 9.3% were current smokers (79.16% smoked both shisha and cigarettes), and 87.5% were exposed to secondhand smoke. Most current smokers (66.1%) had tried to quit smoking, and 86.8% had been advised by their doctors to quit smoking during pregnancy. The mean knowledge score was 7.67 of studied females, indicating good knowledge. The mean attitude score was 42.65 ± 6.31 , and 81.6% had a positive attitude towards smoking preventive measures. Participants with bachelor's degrees, a parity of 1–3, health problems during pregnancy, and chronic diseases were more likely to have a good knowledge level. However, a non-significant relationship was found between participants' attitude and their demographic and obstetric data.

Conclusions: Most of the women had fair knowledge regarding the risks of smoking during pregnancy and a positive attitude towards smoking preventive measures. Further, pregnant women need to be educated about protecting their health and the health of their fetuses from secondhand smoke during pregnancy.

Keywords: cigarette smoking, pregnancy outcomes, secondhand smoke, smoking pattern, smoking risks, waterpipe smoking

INTRODUCTION

Pregnant women undergo several physiological and psychological changes in the normal course of pregnancy, which is a uniquely feminine experience. However, a typical pregnancy may carry several challenges that could be fatal to the mother and/or the fetus.¹ In addition, certain practices, such as smoking and alcohol consumption, during pregnancy can further complicate the course and outcomes of pregnancy. In particular, smoking during pregnancy is a significant modifiable risk factor linked to perinatal morbidity, death, and maternal complications². The World Health Organization statistics show that smoking among women remains a significant public health concern³.

Exposure to secondhand smoke from either maternal or paternal smoking is also associated with postnatal health consequences in children, including an increased risk of sudden infant death syndrome, decrease in physical development, cognitive and behavioral decline, and an increased risk of childhood cancers^{4,5}. According to a study

conducted in India, pregnant women with smoking husbands had poor knowledge of secondhand smoke exposure; moreover, the majority of women felt powerless to stop their husbands from smoking despite having a positive attitude and behavior towards avoiding smoke exposure⁶. In the developed world, the prevalence of smoking during pregnancy has declined in most nations. For example, in the United Kingdom, cigarette smoking rates at the time of delivery dropped from 15% in 2007 to 12% in 2014⁷. Moreover, the rates of smoking during pregnancy are comparable (at around 10%) in Australia⁸, Canada⁹, and the United States¹⁰. However, in Ireland, Uruguay, and Bulgaria, the rates range from 29% to 38%, which represents a considerable increase of over 1.7% in relation to the current global average¹¹. Based on Saudi Arabia's most recent national survey, 1% of women and 24% of men claim to smoke cigarettes frequently¹². In an effort to reduce this prevalence, the Saudi Ministry of Health has implemented a national tobacco control program based on the WHO framework proposed in the Convention for Tobacco Control¹².

* Assistant Professor
Department of Obstetrics and Gynecology
Faculty of Medicine
King Abdul-Aziz University, Jeddah, Kingdom of Saudi Arabia.
E-mail: nmbahkali@kau.edu.sa

** Medical Intern, Faculty of Medicine
King Abdul-Aziz University, Jeddah, Saudi Arabia

*** Medical Student
Faculty of Medicine

**** Associate Professor
Department of Internal Medicine

Research suggests that pregnancy is an ideal time to promote smoking cessation⁴. To reduce the prevalence of smoking during pregnancy, it is important to understand the factors that influence this practice¹³. According to recent research, the main risk factors associated with smoking during pregnancy are younger maternal age [14–16], low socioeconomic characteristics^{17–19}, lower levels of education¹⁵, shift work, and unemployment²⁰. According to a study published in 2013 in Taiwan, it might be challenging for pregnant women with a smoking history to quit, as it has been reported that pregnant smokers have a more extended history of smoking than recent quitters²¹. Furthermore, women who smoked before their pregnancies typically came from smoking families, had partners who smoked, or lived with relatives who smoked²¹. Another interesting finding of this study was that although women who smoked could not quit smoking during their pregnancy, their smoking volume significantly decreased²¹. Regarding passive smoking, the study concluded that only smoke-free settings can effectively reduce the risks of passive smoking exposure²¹. The authors recommended that the health risks of active and passive smoking to both the newborn and the mother be made clear to pregnant women, their partners, and any close family members, as smokers who are planning pregnancy may continue to smoke and expose themselves to passive tobacco smoke if they are unaware of the health risks associated with smoking²¹. In the context of Saudi Arabia, there is a lack of studies assessing the risk factors of smoking during pregnancy.

The present study aimed to assess the knowledge and attitudes about the maternal and fetal risks associated with tobacco use during pregnancy and smoking patterns among pregnant women in Saudi Arabia.

METHODS

Study design, setting, and time: This is a cross-sectional study that was conducted across all regions of Saudi Arabia between February and May 2023.

Study participants: This study included 571 women who were pregnant for the duration of the study. The exclusion criteria were refusal to participate in the study and the presence of mental illness.

Data collection: Data were collected through a pre-designed questionnaire in a Google form that was sent to every pregnant woman who present to the clinic in all regions in the country. The first section of the questionnaire included questions about the participants' demographic characteristics and BMI. The second section included questions about obstetric data and chronic diseases. The third section contained questions about their smoking status and pattern of smoking. The fourth section included questions on participants' knowledge about having a healthy baby, the effect of smoking on pregnancy, prevention of smoking, and their attitude towards preventive measures.

Knowledge was assessed with 12 questions: a score of 1 was assigned for each correct answer, and a score of 0 was assigned for each incorrect answer or unsure answer (total score = 0 to 12). The participant was considered as having poor knowledge if they answered less than 50% of the questions correctly, fair knowledge if they answered between 50% and 75% of the questions accurately, and good knowledge if answered > 75% of the questions correctly¹. There were 10 questions related to attitude that were scored on a 6-point Likert-type scale ranging from 0 to 5. The same was applied to attitude questions, with negative attitude with a score < 50%, fair from 50%-75% and positive attitude > 75%²³.

Data analysis: Data were analyzed by the SPSS program, version 26. Qualitative data were expressed as numbers and percentages, and the chi-squared test (χ^2) was used for analysis. Quantitative data were

expressed as mean and standard deviation (mean \pm SD). A p-value of less than 0.05 was considered to indicate statistical significance.

Ethical considerations: The consent of the participants was obtained electronically through the Google survey form. Ethical approval for the study was obtained from the research ethics committee of King Abdul-Aziz University, Jeddah, Saudi Arabia. Ref no. (415-22).

RESULTS

Participants' characteristics: Out of a total of 571 pregnant women were enrolled in this study, 57.8% had 1–3 pregnancies, 50.1% had a parity of 1–3, 68.3% had a planned pregnancy, and 37.8% were in the second trimester (Table 1). Pregnancy-related issues were reported by 25.9% of the participants, with gestational diabetes mellitus (68.8%) being the most common health problem. Further, 23% had a history of chronic diseases, with diabetes and thyroid disorders being the most common comorbidities (42.9%).

Smoking-related characteristics: In the study cohort, 9.3% were current smokers and 8.4% were former smokers who did not smoke currently. Among the current smokers, the mean duration of smoking was 5.91 ± 4.28 years, and the frequency of use of cigarettes/shisha/vapes was 7.65 ± 12.19 daily (Table 2), with 79.16% reporting that they smoked both shisha and cigarettes. Most participants (75.5%) had a husband who smoked, and 87.5% reported that their husbands smoked in the same area (room) that they were in. Most current smokers (66.1%) reported that they had tried to quit smoking; further, 86.8% had been advised to quit smoking during pregnancy by their doctors. During their pregnancy, 28.6% had the same smoking pattern, and 79.3% reported that they intended to continue smoking after they gave birth. The percentage of current smokers was significantly higher among participants with 1–3 pregnancies, those in the first or the second trimester, and those with no chronic diseases ($p \leq 0.05$). The smoking pattern of ex-smokers is illustrated in Table 3.

Knowledge about the effects of smoking during pregnancy: As shown in Table 4, the statement which the highest percentage of participants agreed with was "Stopping smoking increases the chance of having a healthy baby" (79.9%), and the statement which the lowest percentage of participants agreed with was "It's good to have a smaller baby" (19.8%). These findings indicate a good knowledge level among the participants. Further, 28.5% agreed that light smoking does not cause harm to the fetus and that quitting smoking is too hard and not worth the effort. More than half (55.3%) reported that quitting smoking during pregnancy is more challenging because of the stress involved. On average, 76.7% of the questions were answered correctly. The percentages of participants with poor, fair, and good knowledge about having a healthy baby, the effects of smoking on pregnancy, and preventive measures are depicted in the pie chart in Figure 2. With regard to the associated factors, the results showed that participants with a bachelor's degree, those with a parity of 1–3, those experiencing pregnancy-related problems, and those with chronic diseases ($p \leq 0.05$) were more likely to have a good level of knowledge (Table 5).

Attitudes towards smoking preventive measures: Figure 1 illustrates the percentage distribution of participants' attitudes towards smoking preventive measures. The mean attitude score was 42.65 ± 6.31 . Overall, 18.4% had a negative attitude towards smoking preventive measures, while 81.6% had a positive attitude. Regarding the associated factors, positive attitudes towards smoking prevention measures were significantly higher among participants who had planned their pregnancy ($p \leq 0.05$). On the other hand, a non-significant relationship was found between participants' attitudes and their demographic data,

presence of chronic disease, and other obstetric data ($p \geq 0.05$).

Table 1: Demographic characteristics of the participants (N = 571)

Variable	Number (%)
<i>Age (y)</i>	
<25	95 (16.6)
25–35	253 (44.3)
35–44	176 (30.8)
45–54	47 (8.2)
<i>Education level</i>	
Illiterate	25 (4.4)
Primary	11 (1.9)
Middle	23 (4)
High school	170 (29.8)
Bachelor’s degree	294 (51.5)
Higher degree	48 (8.4)
<i>Occupation</i>	
Employee	250 (43.8)
Housewife	252 (44.1)
Student	69 (12.1)
<i>BMI categories</i>	
Underweight	30 (5.3)
Normal weight	242 (42.4)
Overweight	177 (31)
Obese	122 (21.4)
BMI (mean ± SD) (kg/m ²)	26.27 ± 6.4

Table 2: Distribution of participants according to their smoking status and pattern of smoking (N = 571)

Variable	Number (%)
<i>Smoking pattern</i>	
I have never smoked	470 (82.3)
I’m an ex-smoker; I never smoke now	48 (8.4)
I smoke occasionally (not every day)	34 (6)
I smoke every day	19 (3.3)
<i>Current smoking status</i>	
Not a current smoker	518 (90.7)
Current smoker	53 (9.3)

Table 3: Smoking patterns and characteristics of ex-smokers (n = 48)

Variable	Number (%)
When did you stop smoking? (y)	3.88 ± 2.9
How many years have you been smoking?	6.29 ± 3.74
<i>What do you smoke</i> □	
Cigarettes	2 (4.16)
Shisha	4 (8.33)
Electronic cigarettes (vape)	4 (8.33)
Both (shisha and cigarettes)	38 (79.16)
How often do you use cigarettes/shisha/vape each day?	4.5 ± 4.32
<i>Why did you quit smoking? (Multiple choices can be selected)</i>	
Harmful for pregnancy	30 (62.5)
Health concerns	23 (47.8)
Sick relatives in the house	5 (10.4)
Smoking restrictions in public places	1 (2)
Cost of cigarettes/shisha/vape	3 (6.2)
Television and health warnings on packets	2 (4.1)
Family or friends asked me to quit	13 (27)
Children in the house with asthma	4 (8.3)
Advice from healthcare providers	16 (33.3)

Table 4: Distribution of participants according to their knowledge about the effects of smoking on pregnancy and preventive measures (N = 571)

Variable	Agree n (%)	Disagree n (%)	Not sure n (%)
It’s good to have a smaller baby.	113 (19.8)	335 (58.7)	123 (21.5)
I think my baby will be born healthy.	396 (69.4)	55 (9.6)	120 (21)
Light smoking does not cause harm to the fetus.	163 (28.5)	306 (53.6)	102 (17.9)
Stopping smoking increases the chances of having a healthy baby.	456 (79.9)	40 (7)	75 (13.1)
Quitting smoking is just too hard. It’s not worth the effort.	163 (28.5)	314 (550)	94 (16.5)
It’s harder to quit smoking during pregnancy because of all the worries.	316 (55.3)	118 (20.7)	137 (24)
Women will try to give up smoking for their children even if they won’t try for themselves.	426 (74.6)	55 (9.6)	90 (15.8)
Health care providers should tell pregnant women to quit smoking tobacco.	455 (79.7)	48 (8.4)	68 (11.9)
Smoking tobacco during pregnancy increases the chances of miscarriage.	404 (70.8)	29 (5.1)	138 (24.2)
Smoking tobacco during pregnancy increases the chances of low birth weight of the baby.	394 (69)	24 (4.2)	153 (26.8)
Smoking tobacco during pregnancy increases the chances of breathing problems and sickness in the infant.	423 (74.1)	21 (3.7)	127 (22.2)
Smoking tobacco during pregnancy increases the chances of behavioral problems in childhood.	356 (62.3)	41 (7.2)	174 (30.5)

Table 5: Relationship between participants’ knowledge about smoking risks and their demographics, obstetric data, and presence of chronic diseases

Variable	Knowledge level			χ^2	p-value
	Poor n (%)	Fair n (%)	Good n (%)		
<i>Age (y)</i>					
<25	20 (17.7)	48 (17.5)	27 (14.7)	3.55	0.736
25–35	53 (46.9)	123 (44.9)	77 (41.8)		
35–44	31 (27.4)	79 (28.8)	66 (35.9)		
45–54	9 (8)	24 (8.8)	14 (7.6)		
<i>Education level</i>					
Illiterate	7 (6.2)	10 (3.6)	8 (4.3)	30.53	0.001
Primary	4 (3.5)	5 (1.8)	2 (1.1)		
Middle	4 (3.5)	14 (5.1)	5 (2.7)		
High school	53 (46.9)	70 (25.5)	47 (25.5)		
Bachelor’s degree	37 (32.7)	155 (56.6)	102 (55.4)		
Higher degree	8 (7.1)	20 (7.3)	20 (10.9)		
<i>Occupation</i>					
Employee	42 (37.2)	129 (47.1)	79 (42.9)	4.35	0.36
Housewife	53 (46.9)	114 (41.6)	85 (46.2)		
Student	18 (15.9)	31 (11.3)	20 (10.9)		
<i>Number of pregnancies</i>					
1–3	67 (59.3)	152 (55.5)	111 (60.3)	6.18	0.186
4–6	32 (28.3)	92 (33.6)	63 (34.2)		
>6	14 (12.4)	30 (10.9)	10 (5.4)		

Parity					
0	22 (19.5)	50 (18.2)	46 (25)		
1–3	67 (59.3)	135 (49.3)	84 (45.7)	17.18	0.009
4–6	16 (14.2)	73 (26.6)	51 (27.7)		
>6	8 (7.1)	16 (5.8)	3 (1.6)		
Was the current pregnancy planned?					
No	30 (26.5)	95 (34.7)	56 (30.4)	2.63	0.267
Yes	83 (73.5)	179 (65.3)	128 (69.6)		
Gestational age					
First trimester (1–13 weeks)	40 (35.4)	94 (34.3)	52 (28.3)		
Second trimester (14–27 weeks)	46 (40.7)	97 (35.4)	73 (39.7)	4.08	0.395
Third trimester (28–40 weeks)	27 (23.9)	83 (30.3)	59 (32.1)		
Problems during pregnancy					
No	40 (35.4)	57 (20.8)	51 (27.7)	9.33	0.009
Yes	73 (64.6)	217 (79.2)	133 (72.3)		
Past history of chronic diseases					
No	37 (32.7)	53 (19.3)	45 (24.5)	8.05	0.018
Yes	76 (67.3)	221 (80.7)	139 (75.5)		

Authorship Contribution: All authors share equal effort contribution towards (1) substantial contributions to conception and design, acquisition, analysis and interpretation of data; (2) drafting the article and revising it critically for important intellectual content; and (3) final approval of the manuscript version to be published. Yes.

Potential Conflicts of Interest: None

Competing Interest: None

Acceptance Date: 09-08-2023

REFERENCES

- World Health Organization. Advancing safe motherhood through human rights. 2001.
- LeMasters K. Smoking Behaviors Among Pregnant Women: A Romanian Case Study. *Independent Study Project (ISP) Collection*. 2014;1880.
- WHO Global Report on Trends in Prevalence of Tobacco Use 2000-2025, Fourth Edition. World Health Organization 2021.
- Hamadneh J, Hamadneh S, Amarin Z, et al. Knowledge, attitude and smoking patterns among pregnant women: a Jordanian perspective. *Ann Glob Health* 2021;87(1):36.
- Samet, Jonathan M., Soon-Young Yoon, et al. Gender, women, and the tobacco epidemic. World Health Organization, 2010.
- Yavagal PC, Velangi CS, Desai JM, et al. Knowledge, attitude, and behavior related to secondhand smoke exposure among pregnant women with smoking spouses in Davangere City: A cross-sectional survey. *Journal of Indian Association of Public Health Dentistry*. 2021;19(1):37
- Curtin SC, Matthews TJ. Smoking prevalence and cessation before and during pregnancy: Data from the birth certificate, 2014. *Nat'l Vital Stat Rep*. 2016; 65(1):1-14.
- Health and Social Care Information Centre. Statistics on Women's Smoking Status at Time of Delivery: England, Quarter 4, April 2013 to March 2014. Health and Social Care Information Centre. 2014.
- AIHW. Australia's Mothers and Babies 2015 – in Brief. Canberra, Australia. 2016.
- Al-Sahab B, Saqib M, Hauser G, et al. Prevalence of smoking during pregnancy and associated risk factors among Canadian women: A national survey. *BMC Pregnancy Childbirth* 2010;10(24).
- Lange S, Probst C, Rehm J, et al. National, regional, and global prevalence of smoking during pregnancy in the general population: A systematic review and meta-analysis. *Lancet Glob Heal* 2018;6(7):e769-76.
- World Health Organization Report on the Global Tobacco Epidemic: Country Profile Saudi Arabia; 2011.
- Ortendahl, Monica, Per Näsman. Perception of Smoking-Related Health Consequences among Pregnant and Non-Pregnant Women. *Am J Addict* 2007 Nov-Dec;16(6):521-7.
- Phaswana-Mafuya N, Peltzer K, Pengpid S. Maternal Tobacco use during Pregnancy in South Africa: Results from a National Population-based Survey. *Int J Prev Med* 2019;10:99.
- Gould GS, Patten C, Glover M, et al. Smoking in Pregnancy Among Indigenous Women in High-Income Countries: A Narrative Review. *Nicotine Tob Res* 2017;19(5):506-17.
- Singh S, Mini GK, Thankappan KR. Tobacco use during pregnancy in rural Jharkhand, India. *Int J Gynaecol Obstet* 2015;131(2):170-3.
- Rumrich IK, Vähäkangas K, Viluksela M, et al. Smoking during pregnancy in Finland - Trends in the MATEX cohort. *Scand J Public Health* 2019;47(8):890-8.
- Ekblad M, Gissler M, Korkeila J, et al. Trends and risk groups for smoking during pregnancy in Finland and other Nordic countries. *Eur J Public Health* 2014;24(4):544-51.
- Yang I, Hall L. Factors related to prenatal smoking among socioeconomically disadvantaged women. *Women Health* 2019 59(9):1026-74.
- de Wolff MG, Backhausen MG, Iversen ML, et al. Prevalence and predictors of maternal smoking prior to and during pregnancy in a regional Danish population: A cross-sectional study. *Reprod Health* 2019;16(1):82.
- Lai MC, Chou FS, Yang YJ, et al. Tobacco use and environmental smoke exposure among Taiwanese pregnant smokers and recent quitters: risk perception, attitude, and avoidance behavior. *Int J environmental Res public health* 2013;10(9):4104-16.
- The World Health Organization: MPOWER. A policy Package to Reverse The Tobacco Epidemic. 2012.
- Bugis A, Ali A, Almaghrabi A, Alharbi A, et al. Knowledge and attitudes regarding eye donation and corneal transplants in Saudi Arabia: A cross-sectional study. *Ijmrp* 2018;4 (1):55.
- Rashid, Mumtaz, Haroon Rashid. Passive maternal smoking and pregnancy outcome in a Saudi population. *Saudi Med J* 2003;24.3:248-53.
- Chaaya, M., S. Jabbour, Z. El-roueiheb, et al. Knowledge, attitudes, and practices of argileh (water pipe or hubble-bubble) and cigarette smoking among pregnant women in Lebanon. *Addict Behav* 2004;29(9):1821-31.
- R Alsaleh, AK Alassiri, AF Hamad, et al. Knowledge and awareness of health practice during pregnancy among females of Jeddah City in Saudi Arabia. *Middle East J Family Med* 2019;7.10:27.
- Makhlouf, Madiha MM, IE Elrayah, et al. Knowledge of passive smoking among pregnant women and histological changes in their placenta in Al-Dawadmi, Saudi Arabia. *Int J Med Res Health Sci* 2019;8.5:1-11.
- Banoon S. Environmental tobacco smoke (ETS) among pregnant women visiting primary health care (PHC) in Makkah. *International Journal of Medical Science and Public Health* (2014).
- GV VQ, CQ Ngo, PT Phan, et al. Inadequate knowledge, attitude and practices about second-hand smoke among non-

- smoking pregnant women in urban Vietnam: the need for health literacy reinforcement. *Int J environmental Res Public Health* 2020;17.10:3744.
30. McEvoy, Cindy T, Eliot R. Spindel. Pulmonary effects of maternal smoking on the fetus and child: effects on lung development, respiratory morbidities, and life long lung health. *Paediatr Respir Rev* 2017; 21:27-33.
31. Kazemi A, Ehsanpour S, Nekoei-Zahraei NS. A randomized trial to promote health belief and to reduce environmental tobacco smoke exposure in pregnant women. *Health Educ Res* 2012;27(1):151-9.
32. RP Murray, JJ Johnston, JJ Dolce, et al. Social support for smoking cessation and abstinence: The Lung Health Study. *Addict Behav* 1995;20.2:159-170.
33. MA Khan, SS aga, AA Noorwali, et al. Knowledge, attitude, and practice regarding shisha smoking in Jeddah, Saudi Arabia. *J Nature* 2022;5.1:51]
34. J Slomian, O Bruyerem JY Regginster, et al. The internet as a source of information used by women after childbirth to meet their need for information: A web-based survey. *Midwifery* 2017;48: 46-52]