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Impact of Smoking Exposure on Pregnancy and Perinatal Outcome Among Saudi Women: A Cross-Sectional Study

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RESEARCH

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ABSTRACT

Objective

To assess the impact of smoking exposure on pregnancy and perinatal outcomes among Saudi women.

Methods

This research will employ a cross-sectional study design to assess the impact of smoking exposure on pregnancy and perinatal outcomes among Saudi women. Cross-sectional studies are particularly suitable for examining associations and prevalence within a defined population at a specific point in time. In this case, the study aims to collect data on smoking behavior, pregnancy history, and perinatal outcomes among a representative sample of Saudi women in healthcare facilities across different regions of the country. The cross-sectional design allows for the efficient collection of data from a diverse population, providing insights into the relationship between smoking and perinatal outcomes without the need for long-term follow-up.

Results

The study included 450 participants. The most frequent age among them was 35 and more years (n= 309, 68.7Per Cent) followed by 30-34 (n= 94, 20.9Per Cent). The most frequent educational level among study participants was the university (n= 408, 90.7Per Cent) followed by the school (n= 39, 8.7Per Cent). The most frequent job among study participants was a Governmental job (n= 159, 35.3Per Cent) followed by a housewife (n= 135, 30Per Cent). Number of previous births among study participants with most of them having a previous birth (n= 396, 88Per Cent) followed by this is the first birth (n= 54, 12Per Cent). Number of previous pregnancies among study participants with most of them having a previous pregnancy (n= 408, 90.7Per Cent) followed by this is the first pregnancy (n= 42, 9.3Per Cent). Number of abortions among study participants with most of them nothing (n= 234, 52Per Cent) followed by there is (n= 216, 48Per Cent). Participants were asked about smoking. The most frequent were don't smoke (n= 315, 70Per Cent) followed by smoking (n= 135, 30Per Cent). The most

frequent exposure to smoking among them was yes (n= 333, 74Per Cent) followed by no (n= 117, 26Per Cent).

Conclusion

Study results showed that most of the study participants are the university according to their educational level. Most frequencies of participants had a previous birth. Most of them don't smoke in another hand most of them were exposed to smoking. In addition, most of the study participants had good social connection.

Key Words

Cigarette smoking

Introduction

Cigarette smoking is associated with a number of serious health problems in adults, including cardiovascular disease, lung disease, cancer, and other long-term conditions [1]. As a result, the long-term risks associated with smoking are not often a pressing enough worry, particularly among younger people[2]. Smoking is predicted to cause 7.69 million deaths and 200 million DALYs (Disability Adjusted Life Years) in 2019, with a global population of 1.14 billion. In comparison to males, women have a substantially lower smoking prevalence worldwide (6.62Per Cent). Overall, 32.7Per Cent of adults worldwide are smokers. In high-income nations, 26.9Per Cent of males and 17.6Per Cent of women smoke[3]. However, among women, the percentage is much higher.

Pregnant women have a higher propensity to give up smoking, according to research[4]. It is estimated that 1.7Per Cent of women worldwide smoke while pregnant[5]. This percentage was also calculated in 2018, and it was found to be much higher in high-income nations, such as the United States (7.2Per Cent) and Europe (8.1Per Cent) . One-quarter to one-half of pregnant women who smoked before pregnancy falsely reported that they had quit smoking during pregnancy[6,7]. Smoking during pregnancy is more common among women with less education and among those who find themselves pregnant unexpectedly [8, 9].

Many negative perinatal outcomes have been linked to maternal smoking, which has been the focus of many research. It has been shown that there is a dose-response relationship between active tobacco exposure and negative outcomes like premature birth (birth before 37 weeks of pregnancy) [10-12], low birth weight [13, 14], and the reduction in fetal measurements after the first trimester [15,16]. The risk of fetal mortality during pregnancy has also been linked to smoking, and this link seems to be dose-dependent [17–20]. Smoking has been shown to be protective against pre-eclampsia [21,22], in contrast to the aforementioned negative consequences. Concerning the neonatal effect, fetal lung development might be altered and lead to respiratory difficulties if the mother smokes [23,24]. Increased risk of developing gastrointestinal diseases in later life has been linked to prenatal tobacco exposure [25].

Negative obstetric and newborn outcomes have been the subject of several investigations [26,27].Not all of them, however, used a large sample from a single institution or controlled for possible confounding variables. Furthermore, several research have narrowed their attention to only one undesirable result. Prematurity was the major emphasis of Soneji, et al. whereas birth weight was the primary focus of Larsen, et al. In contrast to the majority of research in the literature, Ratnasiri, et al.[28] did not examine newborn outcomes or explore the possibility of a dose-response. Last but not least, Li et al.'s meticulous study didn't look into the possible dose-response or examine the risk of preeclampsia or newborn infections, pulmonary pathologies, or gastrointestinal pathologies [29-30].

The research problem at the heart of this study concerns the impact of smoking exposure on pregnancy and perinatal outcomes among Saudi women. Smoking is a significant public health concern worldwide, with detrimental effects on maternal and fetal health. However, the specific consequences of smoking during pregnancy on Saudi women and their newborns have not been extensively studied. This research aims to fill this knowledge gap and provide valuable insights into the extent of the problem and potential areas for intervention.

Smoking during pregnancy is associated with various adverse outcomes, such as preterm birth, low birth weight, and congenital anomalies. These outcomes can have lifelong implications for the health and well-being of both the mother and the child. Furthermore, the cultural and societal context in Saudi Arabia may influence smoking behavior during pregnancy, as well as the access to and effectiveness of smoking cessation interventions. Therefore, it is essential to investigate the prevalence and patterns of smoking among pregnant Saudi women and understand how it impacts perinatal outcomes in the Saudi context.

By conducting a cross-sectional study, this research aims to provide a comprehensive understanding of the relationship between smoking exposure during pregnancy and perinatal outcomes among Saudi women. The findings will be

instrumental in informing public health policies and interventions tailored to the specific needs of this population, potentially leading to improved maternal and child health outcomes in Saudi Arabia.

Methods

Study design

This research will employ a cross-sectional study design to assess the impact of smoking exposure on pregnancy and perinatal outcomes among Saudi women. Cross-sectional studies are particularly suitable for examining associations and prevalence within a defined population at a specific point in time. In this case, the study aims to collect data on smoking behavior, pregnancy history, and perinatal outcomes among a representative sample of Saudi women in healthcare facilities across different regions of the country. The cross-sectional design allows for the efficient collection of data from a diverse population, providing insights into the relationship between smoking and perinatal outcomes without the need for long-term follow-up.

Study approach

The research will be conducted in various healthcare facilities across different regions of Saudi Arabia to ensure a representative sample of the population.

Study population

The population of interest comprises Saudi women who are currently pregnant or have recently given birth. This includes both smokers and non-smokers.

Study sample

A sample size will be determined using appropriate statistical calculations to ensure adequate representation of the population. It will include pregnant or recently postpartum Saudi women who have consented to participate in the study.

Study tool

For the current study, a questionnaire was adopted for data collection, which was also categorized as a study tool.

Data collection

Data will be collected through an online Google form. Trained research personnel will design the data collection tool to obtain information on smoking habits, pregnancy history, and perinatal outcomes. Additionally, medical records will be reviewed to verify the collected data and gather specific clinical information.

Data analysis

Data will be analyzed using appropriate statistical software. Descriptive statistics will be used to summarize the data, and inferential statistics, such as chi-square tests and logistic regression, will be employed to assess associations between smoking exposure and perinatal outcomes. Multivariate analysis will be conducted to control for potential confounders. A p-value of <0.05 will be considered statistically significant.

Ethical considerations

The study will adhere to ethical principles, ensuring the privacy and confidentiality of participants. Informed consent will be obtained from all participants, and they will have the option to withdraw from the study at any point. The research will also seek ethical approval from a relevant institutional review board or ethics committee to ensure the study's compliance with ethical standards and regulations. Additionally, the research will be conducted with the utmost respect for cultural and social norms in Saudi Arabia.

Results

The study included 450 participants. The most frequent age among them was 35 and more years (n= 309, 68.7Per Cent) followed by 30-34 (n= 94, 20.9Per Cent). Figure 1 shows the age distribution among study participants. The most frequent educational level among study participants was the university (n= 408, 90.7Per Cent) followed by the school (n= 39, 8.7Per Cent). Figure 2 shows the educational level distribution among study participants. The most frequent job among study participants was a Governmental job (n= 159, 35.3Per Cent) followed by a housewife (n= 135, 30Per Cent). Figure 3 shows the distribution of jobs among study participants.

Number of previous births among study participants with most of them having a previous birth (n= 396, 88Per Cent) followed by this is the first birth (n= 54, 12Per Cent).

Number of previous pregnancies among study participants with most of them having a previous pregnancy (n= 408, 90.7Per Cent) followed by this is the first pregnancy (n= 42, 9.3Per Cent).

Number of abortions among study participants with most of them nothing (n= 234, 52Per Cent) followed by there is (n= 216, 48Per Cent).

Participants were asked about smoking. The most frequent were don’t smoke (n= 315, 70Per Cent) followed by smoking (n= 135, 30Per Cent). Figure 4 shows the smoker distribution among study participants. The most frequent

exposure to smoking among them was yes (n= 333, 74Per Cent) followed by no (n= 117, 26Per Cent).

Participants were asked to assess the effects of smoking on pregnancy. Their responses and results are presented in Table 1.

Discussion

Miscarriage, low birth weight (LBW), premature delivery, and asthma are only a few of the many negative consequences associated with Smoking During Pregnancy (SDP)[31-34]. SDP is more common in low- and middle-income countries (LMICs) (3Per Cent) than in high-income nations (10Per Cent) [35-37].

According to a recent review of the literature [38,39], the yearly cost of smoking-related pregnancy problems in the United Kingdom ranges from £8 million to £64 million. It was also estimated that between £12 and £23 million will be spent on the baby's healthcare in the first year of life. In the United States, the expenditures associated with premature birth due to smoking were projected to be close to $228 million[40]. The true numbers are certainly greater when considering the effects on the baby over time. Therefore, it is important to assess the data on the overall health implications for women and babies over the longer term in order to get a thorough evaluation of the health and cost impacts of SDP to influence policy choices and ensure that precious health resources are used appropriately.

Health and cost outcomes linked with SDP were outlined in a scoping review and a review of reviews by Godfrey and colleagues and a scoping review by Jones [41], and other narrative reviews regarding the health outcomes have been published [42-45]. But none of these articles took a really broad and methodical approach. This comprehensive evaluation of the available research is important since several new systematic studies have been published on the effect of maternal SDP on various health outcomes.

Impacts of smoking during pregnancy on mothers

Only two papers did not undertake a meta-analysis of the effects of smoking on mothers. The evaluations showed similar results, all pointing to a strong association between smoking and seven different diseases. Among the complications associated with assisted reproduction, spontaneous miscarriage had the greatest odds (OR = 2.65; 95Per Cent CI, 1.33-5.30; 28) and ectopic pregnancy had the second highest odds (OR = 2.30; 95Per Cent CI, 2.02-2.80; 30). Preeclampsia and hyperemesis gravidarum were discovered to have a detrimental impact on SDP. Therefore, pregnant women who smoked had a lower risk of developing any of these illnesses.

Impacts of smoking during pregnancy on infants

Twenty different diseases and conditions have been linked to smoking, with the greatest effect seen in SIDS (OR = 2.98, 95Per Cent CI, 2.51-3.54), followed by asthma (OR = 1.85, 95Per Cent CI, 1.35-2.53), low birth weight (LBW) (OR = 1.75, 95Per Cent CI, 1.42-2.10) [46], stillbirth (OR = 1.55, 95Per Cent CI, 1.36-1.78) [46], and obesity (OR = 1. Fifteen illnesses, including autism, brain tumors, breast cancer in females, and testicular cancer in males, have not been shown to have a significant correlation with SDP. However, one research found that it had a protective effect on skin malformations.

Conclusion

Study results showed that most of the study participants are the university according to their educational level. Most frequencies of participants had a previous birth. Most of them don’t smoke in another hand most of them were exposed to smoking. In addition, most of the study participants had good social connection.participants had good and effective communication.

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ANNEX 1: Data Collection Tool

Age								
Age group	<20		20-24		25-29	30-34		35 or more
educational level	Uneducated	the school	the university	the job	housewife	Governmental job	A job in the private sector	free work
number of previous births	this is the first birth	there are previous birth		Number of previous pregnancies		This is my first pregnancy		There is a previous pregnancy
Number of abortions	nothing	there is		Smoker		Yes		No
High blood pressure pregnancy	Yes	No		exposed to smoking		Yes		No
CS for the current pregnancy	Yes	No		Premature birth		Yes		No
Fetal weight loss during pregnancy	Yes	No		Fetal death during pregnancy		Yes		No
Fetal death during birth	Yes	No		Yellowing of the fetus		Yes		No
Transmission of infection to the fetus	Yes	No		Pregnancy anemia		Yes		No
The newborn suffers from a respiratory crisis	Yes	No		The need to transfer the newborn to intensive care		Yes		No

APPENDIX 2: Participants responses to scale items.

variable		Frequency	Percent
Age	less than 20 years	6	1.3Per Cent
	20-24	17	3.8Per Cent
	25-29	24	5.3Per Cent
	30-34	94	20.9Per Cent

	35 and more	309	68.7Per Cent
educational level	Uneducated	3	0.7Per Cent
	the school	39	8.7Per Cent
	the university	408	90.7Per Cent
job	housewife	135	30.0Per Cent
	Governmental job	159	35.3Per Cent
	A job in the private sector	105	23.3Per Cent
	free work	51	11.3Per Cent

number of previous birth	**frequency**	**percent**
this is the first birth	54	12.0Per Cent
there are previous birth	396	88.0Per Cent

Number of previous pregnancies	**Frequency**	**Percent**
This is the first pregnancy	42	9.3Per Cent
There are previous pregnancy	408	90.7Per Cent

Number of abortion	**Frequency**	**Percent**
Nothing	234	52.0Per Cent
There is	216	48.0Per Cent

	Yes	**No**
smoker	135	315
	30.0Per Cent	70.0Per Cent
exposed to smoking	333	117
	74.0Per Cent	26.0Per Cent

Table 1: Effects of smoking on pregnancy

survey item	**Yes**	**No**
High blood pressure pregnancy	147	303

	32.7Per Cent	67.3Per Cent
	150	300
CS for the current pregnancy	33.3Per Cent	66.7Per Cent
	147	303
Premature birth	32.7Per Cent	67.3Per Cent
	153	297
Fetal weight loss during pregnancy	34.0Per Cent	66.0Per Cent
	138	312
Fetal death during pregnancy	30.7Per Cent	69.3Per Cent
	78	372
Fetal death during birth	17.3Per Cent	82.7Per Cent
	216	234
Yellowing of the fetus	48.0Per Cent	52.0Per Cent
	87	363
Transmission of infection to the fetus	19.3Per Cent	80.7Per Cent
	141	309
Pregnancy anemia	31.3Per Cent	68.7Per Cent
	135	315
The newborn suffers from a respiratory crisis	30.0Per Cent	70.0Per Cent
	135	315
The need to transfer the newborn to intensive care	30.0Per Cent	70.0Per Cent

Ch-square

Smoker * number previous birth

Crosstab				
Count				
		Number previous birth		Total
		this is the first birth	there are previous birth	
smoker	yes	24	111	135
	no	30	285	315
Total		54	396	450

Chi-Square Tests					
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	6.097[a]	1	.014		
Continuity Correction[b]	5.340	1	.021		
Likelihood Ratio	5.741	1	.017		
Fisher's Exact Test				.017	.012
Linear-by-Linear Association	6.083	1	.014		
N of Valid Cases	450				

Smoker * Number previous pregnancies

Crosstab				
Count				
		Number previous pregnancies		Total
		This is my first pregnancy	There is a previous pregnancy	
smoker	yes	21	114	135
	no	21	294	315
Total		42	408	450

Chi-Square Tests					
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8.824[a]	1	.003		
Continuity Correction[b]	7.804	1	.005		
Likelihood Ratio	8.158	1	.004		
Fisher's Exact Test				.004	.003
Linear-by-Linear Association	8.804	1	.003		
N of Valid Cases	450				

Smoker * Number of abortion

Crosstab				
Count				
		Number of abortion		Total
		nothing	there is	
smoker	yes	63	72	135
	no	171	144	315
Total		234	216	450

Chi-Square Tests					
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.198[a]	1	0.138		
Continuity Correction[b]	1.903	1	0.168		
Likelihood Ratio	2.197	1	0.138		
Fisher’s Exact Test				0.150	0.084
Linear-by-Linear Association	2.193	1	0.139		
N of Valid Cases	450				

Exposed smoking * number previous birth

Crosstab				
Count				
		Number previous birth		Total
		this is the first birth	there are previous birth	
Exposed smoking	yes	39	294	333
	no	15	102	117
Total		54	396	450

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.101[a]	1	.751		
Continuity Correction[b]	.023	1	.879		
Likelihood Ratio	.100	1	.752		
Fisher's Exact Test				.743	.432
Linear-by-Linear Association	.101	1	.751		
N of Valid Cases	450				

Exposed smoking * Number previous pregnancies

Crosstab				
Count				
		Number previous pregnancies		
		This is my first pregnancy	There is a previous pregnancy	Total
Exposed smoking	yes	33	300	333
	no	9	108	117
Total		42	408	450

Chi-Square Tests					
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	0.503[a]	1	0.478		
Continuity Correction[b]	0.275	1	0.600		
Likelihood Ratio	0.522	1	0.470		
Fisher's Exact Test				0.581	0.306
Linear-by-Linear Association	0.502	1	0.479		
N of Valid Cases	450				

Exposed smoking * Number of abortion

Crosstab				
Count				
		Number of abortion		
		nothing	there is	Total
Exposed smoking	yes	180	153	333
	no	54	63	117
Total		234	216	450

Chi-Square Tests					
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.165[a]	1	0.141		
Continuity Correction[b]	1.860	1	0.173		
Likelihood Ratio	2.164	1	0.141		
Fisher's Exact Test				0.162	0.086
Linear-by-Linear Association	2.160	1	0.142		

N of Valid Cases	450				

Logistic Regression

Case Processing Summary			
Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	450	100.0
	Missing Cases	0	.0
	Total	450	100.0
Unselected Cases		0	.0
Total		450	100.0

Dependent Variable Encoding	
Original Value	Internal Value
This is my first pregnancy	0
There is a previous pregnancy	1

Block 0: Beginning Block

Classification Table[a,b]					
			Predicted		
			Number.previous.pregnancies		
	Observed		This is my first pregnancy	There is a previous pregnancy	Percentage Correct
Step 0	Number.previous.pregnancies	This is my first pregnancy	0	42	.0
		There is a previous pregnancy	0	408	100.0
	Overall Percentage				90.7

Variables in the Equation							
		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	2.274	.162	196.845	1	.000	9.714

Variables not in the Equation					
			Score	df	Sig.
Step 0	Variables	smoker	8.824	1	0.003
		exposed.smoking	0.503	1	0.478
		High.blood.pressure.pregnancy	2.660	1	0.103
		CS.current.pregnancy	0.118	1	0.731
		Premature.birth	7.115	1	0.008
		Fetal.weight.loss.during.pregnancy	0.608	1	0.435
		Fetal.death.pregnancy	12.056	1	0.001
		Fetal.death.birth	9.713	1	0.002
		Yellowing.the.fetus	7.005	1	0.008
		Transmission.infection.the.fetus	4.414	1	0.036
		Pregnancy.anemia	12.599	1	0.000
		newborn.respiratory.crisis	11.525	1	0.001
		need.transfer.newborn.intensive.care	5.447	1	0.020
	Overall Statistics		53.639	13	0.000

Block 1: Method = Enter

Omnibus Tests of Model Coefficients				
		Chi-square	df	Sig.
Step 1	Step	67.315	13	0.000
	Block	67.315	13	0.000
	Model	67.315	13	0.000

Model Summary			
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	211.850[a]	0.139	0.301

Classification Table[a]					
			Predicted		
			Number.previous.pregnancies		
	Observed		This is my first pregnancy	There is a previous pregnancy	Percentage Correct
Step 1	Number.previous.pregnancies	This is my first pregnancy	3	39	7.1
		There is a previous pregnancy	3	405	99.3
	Overall Percentage				90.7

Variables in the Equation							
		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	smoker	1.390	0.430	10.430	1	0.001	4.015
	exposed.smoking	-0.713	0.502	2.020	1	0.155	0.490
	High.blood.pressure.pregnancy	0.213	0.568	.141	1	0.707	1.238
	CS.current.pregnancy	0.803	0.423	3.611	1	0.057	2.232
	Premature.birth	-1.978	0.717	7.619	1	0.006	0.138
	Fetal.weight.loss.during.pregnancy	2.628	0.656	16.060	1	0.000	13.850
	Fetal.death.pregnancy	-2.199	0.992	4.908	1	0.027	0.111
	Fetal.death.birth	-16.374	4228.692	.000	1	0.997	0.000
	Yellowing.the.fetus	-.641	.444	2.085	1	0.149	0.527
	Transmission.infection.the.fetus	2.017	1.182	2.910	1	0.088	7.514
	Pregnancy.anemia	-2.218	.780	8.086	1	0.004	0.109
	newborn.respiratory.crisis	-2.302	.830	7.696	1	0.006	0.100
	need.transfer.newborn.intensive.care	-.357	.735	.236	1	0.627	0.700
	Constant	41.180	8457.383	.000	1	0.996	766016341658278270.000

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