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AWARENESS OF THE IMPACT OF MATERNAL SMOKING ON PREGNANCY AND THE NEONATE SIDS

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Summary

Background: Prenatal maternal tobacco use has long been identified as a risk factor, although the precise etiology of this relationship is unknown. Maternal smoking during pregnancy contributes to a variety of infant health problems present at birth as well as long-lasting behavioral and neurodevelopmental impairments and remains arguably one of the most important modifiable risk behaviors for child and long-term health and human capital.

Aim: This study analyzed the awareness of pregnant women in the relationship between prenatal maternal smoking and sudden infant death syndrome (SIDS).

Methods: A cross-sectional study conducted on 460 Pregnant and Postpartum women in Primary care centers and antenatal clinics of Maternity and Children, King Abdul-Aziz University Hospital, Saudi Arabia. In the duration between 1st January and 30th March 2019 to study the awareness of the effect of exposure to tobacco smoke during pregnancy and the first year of life. Mothers completed a questionnaire about smoking habits.

Results: 60.0% of women were reported to be exposed to passive smoking at home. a significant pregnant women percentage knew that smoking (88.1%), and (63.3%) knew that passive smoke during pregnancy could affect the fetus health severely. However, only 42% of the respondents correctly knew all the principal maternal risk factors in pregnancy.

Conclusion: the reason why pregnant women lack knowledge regarding the main maternal risk factors is related to receiving little information during gynecological examinations and, therefore, some continue to smoke and/or exposed to a smoker during pregnancy.

Keywords: Sudden infant death syndrome (SIDS) - Maternal smoking – Risk factors - Awareness



INTRODUCTION

On a global scale, tobacco use among males is estimated to be about four times that of females (42% vs. 12%) respectively. [1] Nevertheless, the females' number who smoke is increasing at alarming rates especially among young cohorts, which raises the side effects issue of tobacco use affecting women of reproductive age. [2] The average estimated prevalence of tobacco use in the Eastern Mediterranean Region (EMR) is 50% in men and 10% in women. [3] In women, it ranges from a reported low of 0.7% in Egypt to a high of 33.7% in Lebanon. [3] Reports on tobacco use in the Kingdom of Saudi Arabia (KSA) ranges from 13% to 38% in males and 1-16% in females. [4]

Smoking in pregnancy was first associated with sudden infant death syndrome (SIDS) in 1966. *Steele and Langworth* conducted the first epidemiological study examining the association between maternal smoking and SIDS and reported an odds ratio of (2.4), which was not significantly reduced when low birth weight was taken into consideration. [5]

Sudden infant death syndrome (SIDS) is the unexpected death of an infant aged younger than one year that prevails unexplained after a thorough investigation of the case that includes a death scene investigation, an autopsy, and a clinical history review of the parents and the infant. [6] Known risk factors for SIDS include sleeping in the prone position, being exposed to smoke pre- and postnatal, sharing a bed with a mother who smokes, hyperthermia, lack of breastfeeding, and sleeping on soft surfaces. [7]

Heavy smoking is connected with a dose-dependent adverse impact on birth weight. [8] Since the “Back to Sleep” campaign, it has become known that cigarette smoke exposure is the leading independent risk factor for the occurrence of SIDS. [9-10] Although in some areas in the UK the overall SIDS rate is reduced, the proportion of SIDS victims whose mothers smoked during pregnancy has increased from 57% in the 1980s to 86% in 2003. [11]

Smoking, both antenatal and post-natal, is considered to provide a physiological explanation for death due to effect on serotonin [12-13], which affects arousal, recovery from hypercapnia, hypoxia, and thermoregulation.



There is strong evidence of the effect of a dose-dependent of SIDS and smoking in combination with bed sharing, particularly in maternal post-natal smoking [14]. Prenatal smoking is associated with deficient awakening responses of hypoxia and attenuated recovery from hypoxemic challenges [15]. Antenatal smoking also increases preterm birth risk [16]. The risk of tobacco smoke for young children is often interpreted as harmful to the development of the unborn child when the mother smokes during pregnancy. [17-19]

This study aimed to assess the awareness of postnatal women of smoking and its harmful effects on pregnancy outcomes and identify the factors linked to the knowledge and attitudes of women towards the main maternal pregnancy risk factors and to profile women who smoke during pregnancy at King Abdul-Aziz University Hospital, Saudi Arabia.

Materials and Methods

In the duration between 1st January and 30th March 2019, a cross-sectional survey was conducted in a sample of 460 Pregnant and Postpartum women of all ages and any week of pregnancy. They were randomly selected from Primary care centers and antenatal clinics of Maternity and Children, King Abdul-Aziz University Hospital, Saudi Arabia. The survey was conducted through a self-administered questionnaire. Pregnant and Postpartum women had received the questionnaire in the waiting room and 20 minutes was given to perform the questionnaire and deliver it to the researcher.

The questionnaire was outlined to obtain the following information:

- (1) Women socio-demographic characteristics,
- (2) Knowledge and attitudes about the main maternal risk factors in pregnancy,
- (3) Perception of the Pregnant and Postpartum women about causing harm to the fetus or newborn baby because of their behavior,
- (4) Women Behavior in the past 30 days of pregnancy and the three months before/after pregnancy
- (5) Source of information on risk factors



A five-point Likert-type scale with answers varying from 1 (very bad) to 5 (very good) was employed to evaluate self-rated health. In Knowledge test, the format used was closed-end questions with (yes or no) responses for every risk factor. A respondent's attitude was evaluated with an open format "agree," "uncertain" and "disagree."

Self-rated anxiety was evaluated on a five-point Likert-type scale with responses ranging from 1 (not worried at all) to 5 (very worried). In the Behaviours test, the format used was closed-end questions with (yes or no) and open-ended responses. Finally, in the question concerning sources of information, respondents could indicate more than one source of information regarding the main risk factors in pregnancy. This was measured on a five-point Likert-type scale with responses ranging from 1 (not helpful) to 5 (very helpful). Data were managed and analyzed using Statistical Package for the Social Sciences, version 18.0 (SPSS Inc., Chicago, IL, USA).

Descriptive statistics were computed to explore the characteristics of the respondents.

Participants were asked for their permission to involve them in the study; they were provided with an explanation of the research. The expectations of the research, as well as the confidentiality of the findings, were explained. To receive written informed consent all participants were given a letter of information concerning the design and the objectives of the study that showed that participation was voluntary in the survey and that the confidentiality and privacy would be guaranteed. They were at liberty to terminate their participation at any time with no penalty. No one was pressurized to continue with the research.

Results and Discussion

In total, 460 questionnaires were distributed, and 419 women agreed to participate in the study (response rate 91%). The respondents' characteristics are summarized (Table 1). The mean age was 28.5 years, and approximately two-thirds had completed at least high school education (68%). Moreover, approximately one-quarter of the respondents (8.6%) had undergone at least one abortion, only 27.45% had more than one child, and 43.37% of the sample had completed the first trimester of pregnancy. When assessing the levels of knowledge, a significant pregnant women percentage knew that smoking (88.1%),



and (63.3%) knew that passive smoke during pregnancy could affect the fetus health severely. However, only 42% of the respondents correctly knew all the principal maternal risk factors in pregnancy. The multiple logistic regression results of the analysis revealed that three variables were significantly associated with knowledge of the main maternal risk factors (Table 2).

Older Respondents (OR = 1.05; CI 95% = 1.02–1.09), those who were very concerned about inducing harm to the fetus or newborn baby (OR = 1.69; CI 95% = 1.04–2.74) were more likely to acknowledge the main maternal risk factors in pregnancy. Besides, women with a middle school or lower educational level were significantly less likely than women with a bachelor degree/graduate degree to know the main maternal risk factors in pregnancy (OR = 0.64; 95% CI = 0.43–0.95). Only 21.7% of women were anxious about causing harm to the fetus or the child with their risk behaviors.

In this study, the majority of respondents had adequate knowledge of the leading smoking risk factors in pregnancy. The results show that the majority of women knew that smoking and passive smoking was maternal risk factors during pregnancy. Almost all women (94%) indicated that throughout ambulatory gynecological examinations, they had acquired information about possible damage to the newborn baby resulting from cigarette smoking intake during pregnancy from the physician.

Few studies [20,21] have reported on the poor knowledge of the adverse effects of the use of tobacco on pregnancy outcomes. Majority of the studied women recognized smoking to be harmful to women's health, but only a small proportion could identify the exact type of effects. A Survey was carried out on 145 pregnant women in the third pregnancy trimester to assess motivators to stop tobacco smoking and assess the knowledge of women of the fetal and maternal risk of smoking. Besides, the survey was to assess the acceptability of nicotine replacement products uses in pregnancy. The survey findings showed that pregnant women tend to know about maternal smoking risks; however, their knowledge about fetal risks is deficient.



The knowledge regarding the association of cot death risk and tobacco smoking emerges to be the most excellent motivator to quit smoking. Overall, 74% wanted to quit smoking in pregnancy, and 68% would accept a nicotine replacement product. [22]

This study revealed that less than half of the participants were aware of the association of smoking with maternal risk factors such as infertility and abortion. This is an important finding as infertility and abortion are significant health problems prevalent in this part of the world and smoking is well known preventable cause for these conditions. This finding is concordant with a US study on hospital employees which found a significantly high proportion of women being unaware of the association between cigarette smoking with infertility and osteoporosis, the latter population being educated (all of them could read) and worked as a staff of a hospital [23].

A cross-sectional survey was conducted on 388 female hospital employees revealed that most women are aware that smoking causes respiratory disease, lung cancer, heart disease, and pregnancy complications. Few women are aware of the smoking health risks that are specific to women, such as infertility, osteoporosis, early menopause, spontaneous abortion, ectopic pregnancy, and cervical cancer. Knowledge of these health risks was not predicted by age, education, or smoking status. The study recommended that further public health measures were necessary to increase knowledge of smoking risks that may be particularly relevant to women to reduce smoking-related illnesses significantly in women. [21]

Smoking during pregnancy may cause preterm delivery, and sudden infant death syndrome [13]. Majority of studied women identified the link between smoking and poor fetal outcomes, but the specific effects were vaguely described and reported. *Sven Cnattingius* stated that Randomized controlled trials have revealed that smoking interventions have had limited success during pregnancy. Smoking throughout pregnancy is recognized as the most important preventable risk factor for an unsuccessful pregnancy outcome in many countries. Smoking is causally accompanied by fetal growth restriction, and increasing evidence suggests that smoking may cause stillbirth, preterm birth, placental abruption, and possibly sudden infant death syndrome. [24]



A small proportion of women could identify the specific effects of passive smoking on the fetus. This is consistent with another study on pregnant women who also were unaware of the fetal risks associated with passive smoking [25]. *Rintahaka* [26] attributed the increased risk of SIDS associated with smoking to fetal hypoxaemia during pregnancy. In subsequent studies, it has been a general finding that smoking increases the risk of cot death. Moreover, it is not fully established whether the risk is highest for smoking during [5,8-11,26] or after pregnancy. [27]

Maternal smoking during pregnancy is a significant risk factor for sudden infant death syndrome (SIDS), with nicotine likely as the active agent [28]. The cause of the SIDS majority of deaths is unknown. The most substantial clues for the SIDS pathogenesis arise from receptor binding studies conducted on the infants' brainstems who have died of SIDS. Neurons in these infants' ventral medulla show abnormalities for muscarinic, kainate, and serotonergic receptor binding [29]. Current emphasis is placed on abnormalities in the "medullary serotonergic system," which involves medullary regions involved in "protective" reflexes such as the cardiovascular, ventilator, and arousal responses to hypoxia [29].

Conclusion

These study results indicate that the reason why pregnant women lack knowledge regarding the main maternal risk factors is related to receiving little information during gynecological examinations and, therefore, some continue to smoke and/or exposed to a smoker during pregnancy. Our results suggest an indispensable necessity to design and apply interventions to enhance education levels and appropriate behaviors concerning the significant risk factors in pregnant women.

Table 1: Socio-demographic characteristics (n=419)

Socio-demographic characteristics	Total (n = 419)	
	N	%
Age (years) 28.5±5.7(17- 45)		



<20	55	13.12%
21-25	142	33.90%
26-30	156	37.23%
>30	66	15.75%
Educational level		
Primary school or less	55	13.13%
Middle school	79	18.85%
High school	165	39.38%
Bachelor/graduate degree	120	28.64%
Employment Status		
Unemployed/housewife	270	64.44%
Employed	149	35.56%
Number of children		
0	174	41.53%
1	130	31.02%
>1	115	27.45%
Number of abortions		
0	383	91.41%
1	29	6.92%
>1	7	1.67%
Pregnancy status		
Pregnant	279	66.59%
Postpartum	140	33.41%
Weeks of pregnancy		
0-11	121	43.37%
12-27	99	35.48%
28-40	59	21.15%



Table 2: Profile of women who smoke during pregnancy (n=419)

Variable	OR	SE	95% CI	P value
Knowledge of the principal risk factors in pregnancy				
Age	1.05	0.02	1.02–1.09	0.004
Educational level				
Baccalaureate/graduate degree	1*			
Middle school or less	0.64	0.13	0.43–0.95	0.027
Being worried about causing harm to the fetus or newborn	1.69	0.42	1.04–2.74	0.036
Physician as a source of information	1.32	0.33	0.81–2.17	0.263
Variable	OR	SE	95% CI	P value
The belief that smoking and passive smoke can cause harm to the fetus or newborn				
Knowledge of the leading pregnancy risk factors	4.13	1.02	2.54–6.71	<0.001
Educational level				
Baccalaureate/graduate degree	1*			
Middle school or less	0.45	0.16	0.22–0.91	0.026
High school	0.62	0.22	0.31–1.24	0.180
The need for additional information toward the main risk factors in pregnancy	1.54	0.37	0.96–2.46	0.073



Physician as a source of information	1.65	0.52	0.88–3.08	0.115
Employment status	0.68	0.17	0.42–1.11	0.129
Self-rated worry	1.46	0.41	0.84–2.54	0.175
Variable	OR	SE	95% CI	p-value
Profile of women who smoke during pregnancy				
Having at least one abortion	1.84	0.49	1.09–3.12	0.023
Educational level				
Baccalaureate/graduate degree	1*			
Middle school or less	2.89	1.49	1.05–7.94	0.039
High school	1.67	0.88	0.59–4.72	0.326
Consider beneficial information received about risk factors in pregnancy	0.99	0.01	0.99–1.01	0.069
Awareness of smoking as a risk factor in pregnancy	0.67	0.17	0.41–1.08	0.104
Number of children	1.45	0.38	0.87–2.43	0.154
Age	0.97	0.02	0.92–1.01	0.163
Physician as a source of information	0.71	0.19	0.41–1.21	0.206
Attitudes to smoking in pregnancy	0.89	0.11	0.69–1.14	0.360
Self-rated health status	0.79	0.19	0.49–1.29	0.361
Weeks of pregnancy				
0–11	1*			



28–41	0.8	0.19	0.5–1.3	0.375
Variable	OR	SE	95% CI	p-value
Profile of women who received information by physicians during gynecological examinations about main risk factors				
Need for additional information on the main risk factors in pregnancy	0.41	0.08	0.28–0.62	<0.001
Age	1.07	0.02	1.03–1.11	0.001
Very anxious about inducing harm to the fetus or child with risky behaviors	1.6	0.39	0.99–2.57	0.051
Number of children	0.7	0.15	0.46–1.06	0.094
Weeks of pregnancy				
0–11	1*			
28–41	0.79	0.16	0.53–1.17	0.247

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