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Original Article

Association Between Prolonged Maternal Smokeless Tobacco Use & Preterm Birth In A Tertiary Level Hospital

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ABSTRACT

Introduction: *Preterm birth is more likely to happen when a mother has a health problem; such as smoking or using smokeless tobacco. 250 million women including 22% in the developed world and 9% in the developing world smoke tobacco on daily basis. In Bangladesh, more than 28% of women have been found to use smokeless tobacco frequently. The study intended to examine the association between prolonged smokeless tobacco (ST) use for more than 5 years by mothers and pregnancy outcomes including preterm birth.* ***Methods and materials:*** *This descriptional retrospective cohort study was conducted at the Department of Paediatrics and Department of Gynecology and Obstetrics at Dhaka Medical College Hospital in Dhaka from January 2009 to December 2010. The study included a total of 300 mother-neonate pairs.* ***Result:*** *Most of the mothers in this study used shada, followed by jorda, shada+jorda, and gul. Preterm delivery was significantly associated with prolonged use of smokeless tobacco by mothers in the study group in comparison to the control group (P<0.001) and carries a risk of having preterm delivery 1.8 times more than non-users.* ***Conclusion:*** *In short,*

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smokeless tobacco is cheap and easily accessible to women around the world. Women who become daily users, like to increase their level of tobacco consumption either by increasing the amount or adding products and this happens continuously whether they are pregnant or not. Prolonged use of smokeless tobacco for more than 5 years is significantly associated with preterm birth.

Keywords: *Smokeless, Tobacco, Preterm-birth*

INTRODUCTION

The prevalence of smoking is considerably lessened among women compared to men in most of the developing and developed countries around the world, still, there are more than 200 million women, who smoke or use smokeless tobacco [1]. In general, more than 22% of women in developed countries and 9% of women in developing countries smoke or use smokeless tobacco and it is getting significantly higher in developing countries for two decades. Pregnant women experience a startlingly high concern for tobacco-related morbidity and mortality [2]. Tobacco is being used as both forms of smokeless tobacco (ST) and smoking tobacco, such as chewing tobacco, snuff, cigarettes, bidis, sticks, pipes, etc [3]. Chewing paan has emerged as a habit in the Indian region, especially in Bangladesh. Paan chewing became an extensively frequent mode of smokeless tobacco use in Bangladesh [4]. Tobacco in any form is enough for killing and sickening people, especially women during pregnancy. Around one in every five babies born to mothers who smoke or use smokeless tobacco during pregnancy has low birth weight [5]. Pregnancy is a crucial moment for the growth and evolution of a fetus. Many maternal as well as environmental factors play an essential role that may result in adverse pregnancy outcomes [6]. Adverse pregnancy results in ectopic pregnancy, spontaneous abortion, low birth weight infants, preterm birth, and intrauterine growth retardation. Pregnancy, as well as childbirth, portrays a crucial time when a woman can be reached under a diversity of mechanisms with interventions aimed at lessening her risk of preterm birth and enhancing her health and the health of her unborn baby [7]. A preterm baby means a live-born infant delivered before 37 completed weeks of gestation from beginning to last menstruation defined by WHO [8]. An essential but under-recognized issue for all countries is the inability of survivors of preterm birth [9]. It is well established that preterm infants also constitute a potential risk group for an impaired outcome. Some conflicting information regarding preterm birth, however, on the outlook for preterm babies about their size for gestation birth [10]. Worldwide, tobacco use is assumed as an essential threat to the health of pregnant women and their children. However, the extent of tobacco use in pregnant women in low-income and middle-income countries remains unclear [11]. The study intended to investigate the consequences of long-term(>5 years) use of smokeless tobacco on pregnancy outcomes and to identify the association with preterm birth.

METHODS AND MATERIALS

This descriptional retrospective cohort study was conducted at the Department of Paediatrics and Department of Gynecology

and Obstetrics at Dhaka Medical College Hospital in Dhaka from January 2009 to December 2010. The study included a total of 300 mother-neonate pairs. Among them, 150 mothers who had used smokeless tobacco (ST) for more than 5 years and their recently delivered neonates were enrolled as "cases" through purposive sampling. Another 150 mother-newborn pairs who matched with age, socio-economic status, BMI, paternal smoking, and educational status, but did not have a history of using smokeless tobacco, were enrolled as controls. Ethical consent was obtained from the Ethical Committee of Dhaka Medical College and Hospital, and the information collected was kept confidential and used solely for the study purpose.

Inclusion criteria:

- Mother used smokeless tobacco for more than 5 years and had delivered recently a newborn baby.
- The age of the newborn was <24 hours.
- The mother's age was between 20 to 40 years.
- The BMI of the mother was more than 18.5.
- The hemoglobin (Hb) level of the mother was more than 10gm/dl.

Exclusion criteria:

- Mothers having hypertension, pre-eclampsia, diabetes mellitus & chronic renal disease.
- Multiple gestations.
- Both smoker and alcoholic mother.
- Babies having STORCH infection and congenital anomalies.

Control: The neonates whose age was not more than 24 hours and mothers who neither smoked nor took ST were selected as controls.

Evaluation: Specified records of mothers were taken which included age, parity, socioeconomic status, smoking status, paternal smoking status, and frequency of taking ST. Mothers were asked about the signs of eclampsia or preeclampsia. Mothers' physical examinations were done entirely which included height, weight BMI, blood pressure, signs of any systematic disease, or any infection, and hypertension. Estimation of Hb, blood urea, serum creatinine, and the blood sugar of each mother was done. The neonatal was assessed for birth weight, OFC, supine length, any stigmata of chromosomal disorders, and signs of congenital infection. Karyotyping and screening were done when required. The baby's supine length was taken in centimeters by an infantometer. The babies were weighed in grams using a baby scale. OFC was calculated in centimeters by using a measuring tape. The gestational age of the newborn was examined by LRMP and New Ballard Scoring System. In case of any discrepancy of more than two weeks, the latter was accepted.

RESULTS

Table I depicts the maternal mean age of patients 28 ±SD who were recruited as cases. The mean BMI and the Hb status of the patients enrolled as cases were 19.9±SD and 10.9±SD respectively. More than half of the study population (60.00%) studied at the secondary level, around 13.3% of patients were illiterate, and about one-sixth (25,16.7%) completed primary schooling respectively enrolled as cases.

About three-forth (110,73.3%) of the study population were poor and enrolled as cases. Passive smoking was found in about 73.3% of the study population (case). The mean age in hours of the neonate was 12.0±SD and half of the neonates recruited as cases were female. In the case of controls, the maternal mean age of patients was 27.6±±SD. The mean BMI and the Hb status of the patients enrolled as control were 20.1±SD and 11±SD respectively. Most of the study population (controls) completed a secondary level of education (100,66.7%) and about one-tenth (15,10.0%) of them were illiterate. More than half of the study population (66.7%) were poor and passive smoking was found in about 75.3% of patients who were enrolled as controls. The mean age in hours of neonatal was 11.6±SD. More than half of the neonates enrolled as controls were female. Most of the mothers used shada 105(70%) followed by jorda 30 (20%), shada+jorda 10 (7%) &gul 5(3%) [**Figure 1**]. **Table II** shows that a maximum of mothers (67.6%) used ST 5-10 times per day with a minimum of once and a maximum of 15 times per day. Table III explains the frequency of preterm delivery among ST users was 42.0% (63) and among non-ST users was 15% (42) and the odds ratio was 1.8.

Table I : Baseline characteristics of the cases (N=150) and controls (N=150)

	Characteristics	**Cases (N,%)**	**Controls(N,%)**	**P-value**
Maternal	Age in years(Mean±SD)	28±SD	27.6±SD	>.10 *
	BMI(Mean±SD)	19.9± SD	20.1± SD	>.10 *
	Hb status in gm/dl(Mean±SD)	10.9± SD	11± SD	>.10 *
	Educational status Illiterate • Class1-V • Class VI-X • SSC and	 20(13.3%) 25(16.7%) 90(60.0%) 15(10.0%)	 15(10.0%) 20(13.3%) 100(66.7%) 15(10.0%)	 >.50 # >.10 # >.50 # >.10 #
	Socio-economic status • Poor • Middle class	 110(73.3%%) 40(26.7%)	 100(66.7%) 50(33.3%)	 >.50 # >.50 #
	Husbands smoking • Yes • No	 110(73.3%) 40(26.7%)	 113(75.3%) 37(24.7%)	 >.50 #
Neonatal	Age in hours	12.0±SD	11.6±SD	>.50 #

	Sex • Male • Female	 70(45.7%) 80(53.3%)	 72(48.0%) 78(52%)	 >.50 #

* = by Z test
#= by λ^2 test

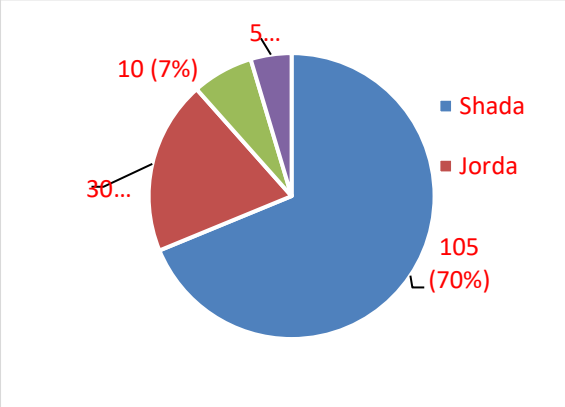

Figure 1: Types of Smokeless Tobacco Used by Mothers (N=150)

Table II- Frequency of Smokeless Tobacco use by Mothers During Pregnancy (Cases, N=150)

Times per Day	N (%)	Mean (±SD)
<5	36 (23.8%)	6.7 (±2.7)
5-10	102 (67.6%)	
>10	13 (8.6%)	

Table III- Frequency of Preterm Delivery in women Who Did Not Use Smokeless Tobacco During Pregnancy (Cases, N=150, Controls, N=150)

Characteristics	Yes (N, %)	No (N, %)	*p*-value	Odds Ratio
ST Users	63 (42.0 %)	87 (58%)	<0.001	1.8
Non-ST Users	42 (15.0 %)	108 (85.0 %)		

DISCUSSION

Tobacco smoking during pregnancy has been linked to several harmful health consequences for both the developing fetus and the mother [12]. Maternal smoking refers to the adverse behavior of women who tend to smoke or use smokeless tobacco before or during the gestation of a child. The purpose of this study was to determine the association between prolonged(>5 years) maternal smokeless tobacco use during pregnancy and the delivery of preterm babies. This present retrospective cohort study revealed that among newborn ST user mothers, the possibility of preterm babies is 1.8 times(42%) higher than non-ST users(15%). A case-control study was carried out in Mumbai, India, and it was found that the mothers who use smokeless tobacco more than 5 times a day were more likely to have preterm babies in

contrast with the mother who was non-users [13]. In Pakistan, the author described that mothers who use smokeless tobacco or who are exposed to ST give birth to preterm babies [14]. A further case-control research carried out in Bangladesh revealed that maternal use of smokeless tobacco (ST) during pregnancy was substantially (46%) related to the delivery of preterm newborns (p0.001) and poses a risk that is 2.7 times higher than that of non-ST users [15]. In this current analysis, the author described a lesser proportion of preterm babies in the control group. Related results were found for case-control studies locally [16],[17]. In this present study, for divert mood, most of the mothers used Shada, jorda, shada+jorda, and gul during pregnancy and the percentage is about 70%, 20%, 7%, and 3% respectively. Similar findings were conducted in Maharastra, Mumbai [18]. Women in Bangladesh are deprived of sorts of recreation, so they start this sort of habit to divert their monotony but end up continuing it throughout their life [4]. An analysis conducted at Harvard University assumed that most women especially during pregnancy chew tobacco or snuff to divert their mood [19]. Analyses conducted in India also revealed the same sorts of ways of ST consumption among mothers of preterm babies. The study observed that moms utilized ST for over 5 years. The leading direct cause of newborn fatalities is preterm birth complications, which account for 35% of the 3.1 million deaths worldwide each year [20]. The application of ST is also associated with the delivery of preterm infants in many reports conducted in south Asia [21]. Maternal snuff use was allied with a 1.8 times higher risk of having preterm infants [22]. Analysis which was carried out in Bangladesh demonstrated that there was a higher risk of preterm babies for women who used ST than non-ST users [23]. More analyses done in India and middle-income countries support the findings of recent outcomes [24]. Tobacco smoking during pregnancy abridges the gestational period and increases the number of early deliveries. This study showed that the risk of preterm deliveries among ST-user mothers is 1.8 times higher than that of the non-ST user. A prospective cohort study directed in India found that 0.19 million preterm births occurring annually in India could be attributed to maternal SLT use [25]. Another study conducted in Bangladesh revealed that moms who use ST during pregnancy run a significant risk of preterm births—4.6 times greater than mothers who do not use ST [26].

Limitations of the study:

The study has limitations including the inability to validate preterm birth of previous babies, confusion among some mothers regarding their tobacco use, and a small sample size.

CONCLUSION

In short, smokeless tobacco is cheap and easily accessible to women around the world. Women who become daily users, like to increase their level of tobacco consumption either by increasing the amount or adding products and this happens continuously whether they are pregnant or not. Prolonged use of smokeless tobacco for more than 5 years is significantly associated with preterm birth.

RECOMMENDATION

The use of smokeless tobacco during the reproductive period can have detrimental effects on the health of both the mother and the child. Therefore, women of childbearing age are advised to avoid using smokeless tobacco. Public awareness regarding the risks associated with smokeless tobacco use during this period should be increased through mass media campaigns, such as public service announcements and advertisements. Educating the public about the harmful effects of smokeless tobacco use can encourage people to avoid it and improve reproductive health outcomes.

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