Tobacco Consumption during Pregnancy in Bangladesh: Level and Burden among Slum Women in Dhaka District

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Abstract: The level of tobacco consumption has been increasing in Bangladesh, in particular the marginal class who are engaged in manual labour. Tobacco is responsible for more deaths than any other risk factors than high blood pressure. It also increases the burden of diseases during pregnancy and childbirth. A cross-sectional study of the 549 women from Dhaka district reveals that the use of tobacco *or tobacco products* during pregnancy was 10 percent, on an average. But there was significant difference of users *among* slum household*s*, older women with higher order of parity and illiterate women. There was significant difference in use of tobacco by settlement pattern. Forty percent women had tobacco habit from slum households compared to eight percent from the non-slum settlements. The multivariate analysis shows that the chance of complicated pregnancy including hemorrhage was higher for women who consumed tobacco during pregnancy or have tobacco chewing habit. *Utilization* of *medical* care during pregnancy had reduced the *likelihood* of tobacco consumption habit. Mothers with tobacco habits suffered multiple complications during pregnancy and delivery. The product limit method shows that the mean duration of illness during childbirth was higher for these women. To reduce the burden of tobacco, health education programme at the community level could be launched through preconception and prenatal care for the socially backward women in the slum areas.

Key words: Tobacco consumption, burden of pregnancy, hemorrhage.

1. Background:

The level of tobacco consumption is high and increasing in the developing world. Among the smokers, the majority are from developing world. Tobacco is responsible for more deaths than any other risk factors than high blood pressure. Tobacco undermines the well being of populations. Given its high ranking in terms of causes of disease and death, tobacco weighs heavily on the health care systems of countries (WHO, 2004).

Tobacco exposes to substances like nicotine and carbon monoxide, is associated with a number of serious complications during pregnancy. So, Women and smoking deserve special attention basically because of the negative and serious health impacts. In is found that deaths from all causes was found to be much higher among women who smoked and this was already apparent by the age of 35 –44 years. (WHO, 2005) There is a set of negative impacts of tobacco consumption on pregnancy as found in studies across countries. There are confirmed findings in various studies that the low birth weight of baby is linked to tobacco consumption/ smoking during pregnancy (Cowperthwaite, B. et

al., 2007; S.E.Vieiwerth et al., 2007, Sadja G.C.1979; Secker, RH et al., 20033). In fact, nicotine reduces the blood flow to the fetus and that resulted the slower growth of the child during pregnancy.

Smoking during pregnancy increases the risk of miscarriage or episode of bleeding (Okamoto, K et al, 2005); premature delivery or shortened gestational age (Raatikainen, K. et al., 2007); and Venous thromboembolism (Larden TL et al, 2007).

Other adverse effects of nicotine for women are fetal deaths (Raatikainen, K. et al., 2007), congenital abnormalities (Sadja G.C.1979) etc. Tobacco consumption affects not only during pregnancy but also at the postnatal stage (Garcia, RE et al., 2007). Even maternal smoking has significant effect on offspring smoking behaviour (Munafo, M.R., 2006) and maternal depression (Kiernan, K. et al, 2006).

Alike other South Asian countries, Bangladeshi women are usually consuming tobacco items with the betel leaf. But few female also smoke bidi or cigarette. In fact, smoking by woman is not socially acceptable in the semi-traditional and religious society like Bangladesh. Tobacco items consumed by women with betel leaf are as harmful as smoking. Few studies have been conducted to see the prevalence of tobacco consumption and consequent health hazards (BBS, 1995). This study focuses, however, only on pregnant women.

The paper aims to focus on the social groups (women) to whom priority based health intervention may be suggested for the cessation of tobacco consumption to reduce hazards during pregnancy and childbirth. In addition, it is also attempted to identify the risk factors and burden of maternal health due to tobacco consumption.

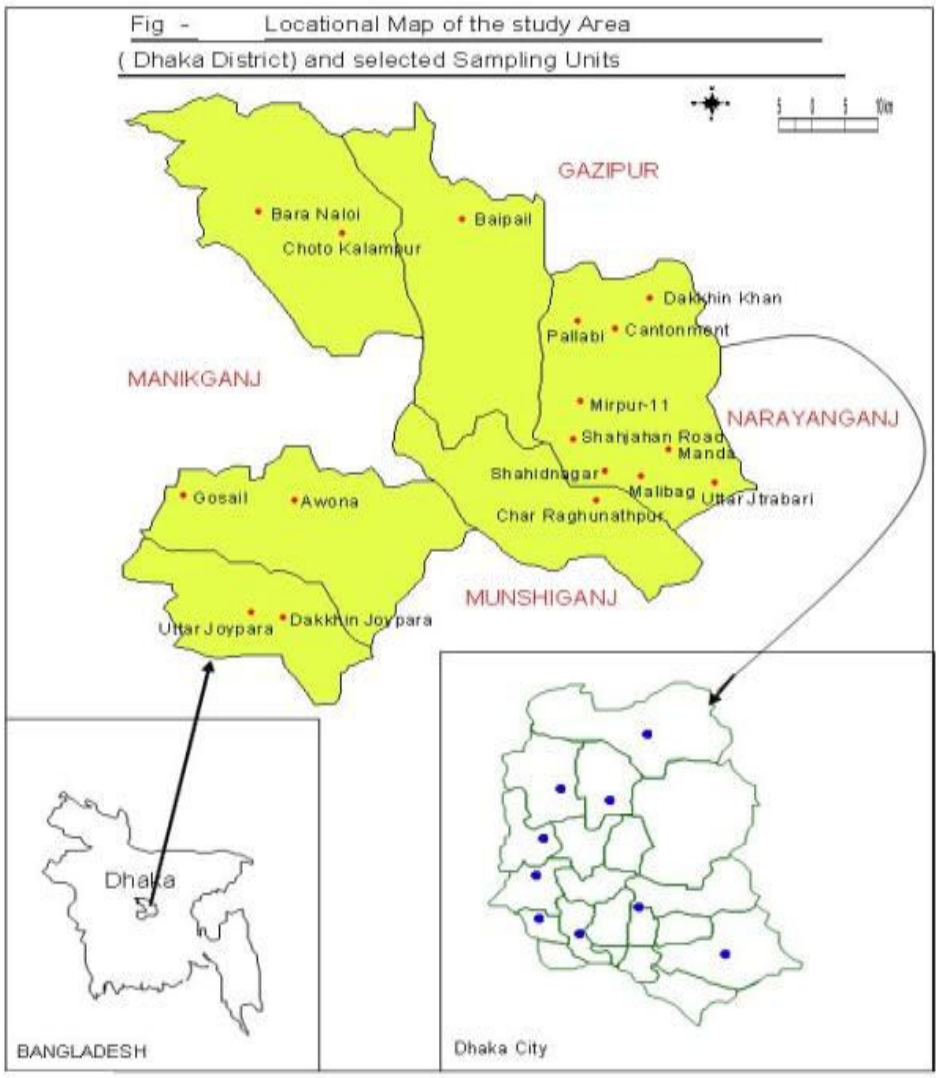
2. Methods and Materials

The survey was conducted in Dhaka district in Bangladesh in 2009. Households were the basic sample units in this study. To get the sample households from the study area, Integrated Multipurpose Sample (IMPS) design was used. This is a national level sample design that has been used by the Bangladesh Bureau of Statistics (BBS) for the State Level Surveys. Dhaka district contains thirty-four sampling units. Among the 34 sampling units, 22 are in the Dhaka City areas, 4 are in other urban areas, and 8 are in the rural areas (The name of the settlements are in Annexture-I). Each sample unit

contains around 250 households. Seventeen sampling units are selected from thirty-four sampling units on the random basis for the present study.

Forty households from each of the 17 sampling units were selected (Map-1) on random basis based on the criterion that each household should have at least one woman who gave birth during the last three years or presently should be pregnant. Total 680 households (40 X 17) are covered for this study.

Map:1



The target population consists of all women in the sample households (549 women) who had delivered birth during the last three years at the time of interview in

2005. The information collected was on illness relating to pregnancy and delivery on the one hand, and, on the other, tobacco consumption habit. It is observed that, in Bangladesh, women are usually consuming tobacco items with betel leaf in the form of *zarda, ala-pata* (raw tobacco) or smoking through *bidi* (indigenous cigarette). During the household level interview, women were asked if they had consumed tobacco during last pregnancy or had habit to consume tobacco. The prevalence of tobacco consumption thus includes women who had consumed tobacco during pregnancy or/ as well, who had common habit of tobacco consumption.

In order to find the differentials and the burden of tobacco, the bivariate distributions of complications during pregnancy, delivery and post-partum period is presented. Chi-square tests have been used to see the statistical differences among the factors and these were selected as covariates in logistic regression analyses. To find the significant risk factors of tobacco consumption, multivariate logistic regression has been employed. Hence 10 percent level was allowed to accept the statistically significant variables. Earlier all independent variables were categorized as follows.

Fig-1 : Definition of variables for binary Logistic Regression.

Variables	Definitions
1.Dependent variables Tobacco Consumption Habit	**Dichotomous variable:** Yes=1, No =0
2.Covariates	
Place of Residence	Rural =1 , Urban =2
Household Type [3]	Slum=1, Non-Slum=2
Age of Women	15-24 Years=1, 25-34 Years=2, 35 Years and more=3
Level of education	No education=1, Less than H.S.C=2, Graduate and More=3
Occupation	Non-working=1, Working=2
Standard of Living	Low=1, Medium=2, High=3
Parity	One=1, two- three=2, Four or more=3
Received Care	Only ANC=1, Preconception and ANC=2, No Care=3
Decision Making Autonomy	No Decision=1, Take decision in Household=2
Family Pattern	Nuclear =1, Joint=2
Pre-existing diseases	No=1, Yes=2
Hemorrhage during childbirth	No=1, Yes=2
Retained Placenta	No=1, Yes=2

[3] **Slum:** Settlements, which are with poor housing, poor environmental services and very low Socioeconomic status. These are may be squatter settlements on public land.

To get the effect of tobacco on mean duration of diseases and time spent in bed the **Kaplan-Meier survival method** (Product-Limit method) has been employed. Here, the partially censored data arising from the women who were suffering from the maternal diseases at the time of survey, were used. Let us consider that T denotes the duration of morbidity or duration of time spent in bed. So, the values of T for n individuals would comprise both censored and uncensored observations. The estimates of T (mean duration) are obtained from different segment of morbid women. Hence **Log-Rank** tests have been performed to test the equality of the survival function of those segments of population.

3. Results

a. Pattern of Tobacco Consumption during Pregnancy

The distribution of women who consumed tobacco in any form during pregnancy by place of residence in Dhaka district (2009) is presented in Table-1. The result shows five significant differentials for tobacco consumption: Household type, Age, Education, Parity and type of care received during pregnancy. Ten percent women (out of 549) consumed tobacco during pregnancy and delivery. But there is no significant difference in tobacco consumption among rural and urban women.

There is a significant difference in tobacco consumption of women between slum and non-slum households. Forty percent women of the sample consumed tobacco from slum households compared to eight percent of the same from the non-slum settlements. Similarly, one in every five women from the unorganized settlements (slum) had tobacco consumption habit compared to one in every 12 women from the non-slum households in the urban areas.

There is a significant increase in tobacco use among older women i.e. women with age more than thirty-four years. About one-third women, having age 35 years+, had this habit compared to less than 10 percent of the same having age less than 35 years in the urban areas. Education is also a significant factor. Women with no formal education had significantly higher prevalence of tobacco consumption than the women having formal education. Twenty three percent women with no formal education had tobacco

consumption habit compared to only three percent women at graduate level among the urban women. Analogous variation is found for total women by the level of education in district.

Parity wise distribution shows that the incidence of tobacco consumption among women increases as the number of children increases both in rural and urban areas. No single-child women had consumed tobacco, while forty-three percent women with four or more children had consumed tobacco in the rural setting. Likewise five percent single child women had consumed tobacco compared to 22 percent women with four or more children in the urban areas. Status of care received during prenatal period was also an important factor differentiating tobacco consumption. In fact, during antenatal care, women are advised what to do and what not to do. 'Avoid Tobacco consumption' would be one of the advice which pregnant women must follow. The analysis shows that around five percent women, who received both preconception and antenatal care before and during pregnancy, had consumed tobacco items compared to twenty two percent of the women who had not received care during pregnancy in the urban areas. Similar pattern is found among the women who received only antenatal care and the women who received no care.

There were differences of tobacco consumption due to other factors like decision making autonomy, standard of living, occupation of women but these differences were not significant.

b. Burden of Tobacco Consumption during Pregnancy and Delivery

The burden of tobacco consumption habit during pregnancy has been shown in Table-2. The result shows that the incidence of complicated pregnancy history (earlier pregnancy has ended with miscarriage/abortion, still birth etc.) was higher for the women who had tobacco chewing habit. Likewise, the pre-existing medical condition (hypertension, diabetes, thyroid problem etc.) was proportionally higher ($p=0.04$) for the women, who were tobacco habituated compared to the women who had no tobacco consumption habit during index pregnancy. Some of the risky obstetric complications i.e. complication during pregnancy, delivery and post-partum period were more prevalent among the women with the habit of tobacco consumption. Hemorrhage during

pregnancy or delivery is one of the high-risk complications and the case-fatality ratio is also very high for this symptom. The Health and Demographic Survey, 2000 mentioned that 23 percent maternal deaths were due to hemorrhage in Bangladesh. The result shows that tobacco consumption habit was a significant differential (p=0.10) for hemorrhage during childbirth. 18 percent women with tobacco consumption habit had this complication and the rate became 11 percent for women with no such habit. Similarly, Retained Placenta during delivery was also an alarming complication during delivery. Nine percent women, who had tobacco consumption habit, had suffered from this complication compared to 3 percent of the same among the women with no tobacco consumption habit. Hence, nicotine was a significant parameter of retained placenta. The data also shows that the incidences of premature delivery, post-partum morbidity along with post partum blues (depression) were also higher for the women who had used tobacco during pregnancy.

The multivariate logistic regression shows that type of household (slum, non-slum), age, parity, preexisting health status, utilization of care during pregnancy, and hemorrhage during childbirth were the significant determinants of tobacco consumption. Women from slum households were more likely (OR= 1.7) to consume tobacco items during pregnancy than the women from the non-slum households. Likewise, older women with age more than 34 years had significantly higher probability to consume tobacco items than that of women with age less than 25 years. Women with more than one living children had significantly higher chance of taking tobacco than the single parity women. Women with preexisting medical condition (i.e. have symptoms of other risky diseases like hypertension, diabetes, thyroid problems etc.) had higher probability to take tobacco than the women with absence of these symptoms. Utilisation of care during and before pregnancy was a significant determinant. Women who had received preconception and delivery care earlier, had significantly lower chance of consuming tobacco (OR=.04) than the women who had received one antenatal care. On the contrary, women who had not utilized any care during pregnancy were more likely to have tobacco compared to women who received only antenatal care. Again, Women, who consumed tobacco, had significantly higher chance (OR=1.4) of suffering from hemorrhage during childbirth compared to women who had not consumed tobacco during pregnancy.

c. Severity of Complications for Tobacco consuming mother

The data also shows that women suffered not only from risky diseases due to tobacco consumption but the severity was also high for them during childbirth. The Figure-2 shows that the incidence of multiple complications (more than one) during pregnancy was higher for the women who consumed tobacco. Forty five percent women had two pregnancy-related complications who consumed tobacco compared to 38 percent of the same with no tobacco habit. Similar trend is found for the delivery-related complications [Figure-3]. Thirty nine percent tobacco-consuming women had two delivery-related complications on an average compared to 24 percent of the same who had no tobacco habit. The similar pattern is observed for more than 2 delivery-related complications.

The Product-Limit estimation of mean duration (days) of pregnancy-related and delivery-related complications show that the mean number of days for pregnancy-related complication was significantly longer for the women who used to consume tobacco during pregnancy. A woman who consumes tobacco suffers 82 days, on an average, for pregnancy-related complications. On the contrary, the duration of pregnancy-related complications was 64 days for women who did not consume tobacco. The time spent in bed (days) for pregnancy related complications was more than two fold if women used to consume tobacco. For delivery-related complications, women also suffered for longer duration if there was any form of tobacco consumption during pregnancy.

4. Discussion and Conclusion

The present study in the Dhaka district is to identify the priority groups of females who are needed to be intervened for the health education for the cessation of tobacco consumption. In addition, it also examines the health hazards of pregnant women and their severity due to tobacco use.

The demographics of the sample show that the proportion of tobacco use was higher for the older women, in particular for the ages 35 years and above. In fact, tobacco items (*zarda, ala-pata*) are mostly consumed by women with the betel leaf and nut in Bangladesh and usually older women have this habit. This result is unlikely in the

developed nations where the smoking habit during pregnancy is higher among the younger women (Cowperthwaite, B. et al., 2007).

The prevalence of tobacco habit is also higher for the women from the unorganized settlements (slum) and women having no formal education both in rural and in urban areas. The women in the slum settlements are socially backward with less awareness. The unawareness leads them to consume more tobacco during pregnancy. There was a significant decline in tobacco consumption among the graduate women. This finding is consistent with other studies of maternal smoking (Cowperthwaite, B. et al., 2007). A nationwide study of Israel also found that the less no of years of education is a significant risk factor in smoking among pregnant women (Fisher, Nirash, 2005). Utilization of care before and during pregnancy has an immense impact on risky behaviour of mothers. In the process of utilization of health care services, women are advised many does and don'ts, which create more awareness among pregnant women. Women who utilized both preconception and antenatal care, had significantly lower chance to consume tobacco. So, the promotion of prenatal care would be a pragmatic way for reducing of the prevalence of tobacco.

The impact of tobacco consumption is also higher for women who take it during pregnancy. The bivariate and multivariate analysis show that hemorrhage is the significant disease for tobacco consuming mothers. The incidences of premature delivery, retained placenta, post-partum morbidity including depression are higher for these women also. Several studies suggest that the premature delivery is higher for the smoking women (Raatikainen, K. et al., 2007).

The data shows that multiple complications (severity) during pregnancy and delivery were also higher for tobacco consuming mothers. The duration of pregnancy-related complications and delivery-related complications was significantly longer for these women.

In epilogue, it can be concluded that the tobacco consumption during pregnancy in Dhaka district is higher for the socially backward women i.e. women from slum areas and women with no education. Utilisation of care before and during pregnancy, through preconception and antenatal care, have reduced the incidence of tobacco consumption significantly among pregnant women. The risky maternal morbidity like hemorrhage during childbirth is significantly higher for women who consume tobacco. The severity in terms of number of complications and duration of sufferings is higher for these women. The results suggest that the priority-based health education programme, through preconception care, along with antenatal care, for slum women may lower the use of tobacco items during pregnancy in Bangladesh. That would reduce the risk or health hazards (like hemorrhage, retained placenta) of maternal health during pregnancy and childbirth in the study areas.

Tables and Figures

Table- 1: Distribution of Women who Consumed Tobacco (any form) during Childbirth by Place of Residence in Dhaka District, 2005.

	Rural		Urban		Total	
Characteristics	**Percent**	**p-value**	**Percent**	**p-value**	**Percent**	**p-value**
Household Type						
Slum HH	40.0	**.01**	18.8	**.00**	20.0	**.00**
Non-Slum HH	8.1		8.5		8.4	
Age of Women						
15-24 Years	4.3		6.0		5.6	
25 -34 Years	11.0	.28	10.0	**.00**	10.3	**.00**
35 Years and more	16.7		30.8		27.5	
Educational Attainment						
No Education	13.8		23.1		20.2	
Less than H.S.C	8.1	.61	8.6	**.00**	8.5	**.00**
Graduate and above	.0		3.3		3.2	
Occupation						
Non-Working	9.6	.47	10.2	.31	10.0	.31
Working	.0		16.7		13.8	
Standard of Living						
Low	10.8	**.03**	13.1	.33	13.3	.16
Medium	8.8		11.7		9.6	
High	5.3		7.7		7.2	
Parity						
1	.0	**.00**	4.9	**.00**	3.8	**.00**
2-3	9.6		14.2		13.0	
4 or more	42.9		22.2		29.3	
Received Care						
Only ANC	10.0	.33	10.9	**.00**	10.7	**.00**
Preconception and ANC	3.0		4.7		4.4	
No Care	13.2		22.7		19.2	
Decision Making Autonomy						
No Decision	10.6	.68	11.8	.64	11.4	.58
Take Decision in HH	8.5		10.2		9.8	
Family Pattern						
Nuclear	13.1	.16	10.8	.80	11.2	.38
Joint	6.3		9.9		8.4	
Total	**9.2**		**10.5**		**10.2**	

N.B: P-values are for chi-square test Source: Field Survey, 2005

Table- 2: Burden of Tobacco Consumption among Women during Childbirth in Dhaka District, 2005.				
Characteristics	**Consume Tobacco Items (Percent)**		**χ^2 value**	**p-value**
	Yes	**No**		
History of Complicated Pregnancy				
Yes	32.1	24.1	1.72	0.19
No	67.9	75.9		
Preexisting Medical Condition				
Yes	21.4	11.8	4.22	**0.04**
No	78.6	88.2		
Hemorrhage During Childbirth				
Yes	17.9	10.5	2.10	**0.10**
No	82.1	89.5		
Premature Delivery				
Yes	8.9	5.3	1.26	0.26
No	91.1	94.7		
Retained Placenta				
Yes	8.9	2.8	5.58	**0.01**
No	91.1	97.2		
Postpartum Morbidity				
Yes	37.5	32.1	0.66	0.41
No	62.5	67.9		
Postpartum Blues (Depression)				
Yes	17.9	13.6	0.75	0.39
No	82.1	86.4		

Source: Field Survey, 2005

Table - 3: Multivariate Logistic Regression of Tobacco Consumption during Childbirth, 2005.

Characteristic	Odd Ratios	95% CI	
		Lower	Upper
Residence			
Rural (reference)			
Other Urban	1.31	0.720	2.39
Dhaka City	1.05	.613	1.829
Whether Slum Household			
No (reference)			
Yes	1.65**	1.079	2.532
Age			
15-24 Years (Reference)			
25 -34 Years	0.81	0.523	1.263
35 Years and more	1.9**	1.068	3.379
Educational Attainment			
No Education (reference)			
HSC or Less	1.22	.546	2.735
Graduate and above	0.49	.109	2.161
Occupational Status			
Working (reference)			
Non-Working	1.50	.756	2.972
Standard of Living			
Low (reference)			
Medium	0.92	.579	1.454
High	0.924	.515	1.658
Parity			
One (reference)			
More than One	1.98**	1.245	3.135
Have Preexisting Medical Condition			
No (reference)			
Yes	1.44*	.974	2.126
Received Care			
Only ANC (Reference)			
Preconception and ANC	0.40**	.226	.713
No Care	1.60*	.974	2.624
Hemorrhage during Childbirth			
No (reference)			
Yes	1.56**	1.018	2.396
- 2 Log likelihood (Ngelkerke R^2)	**300.2**(R^2=0.22)**		

** p<0.05, * p<0.10 . Source: Field survey, 2005

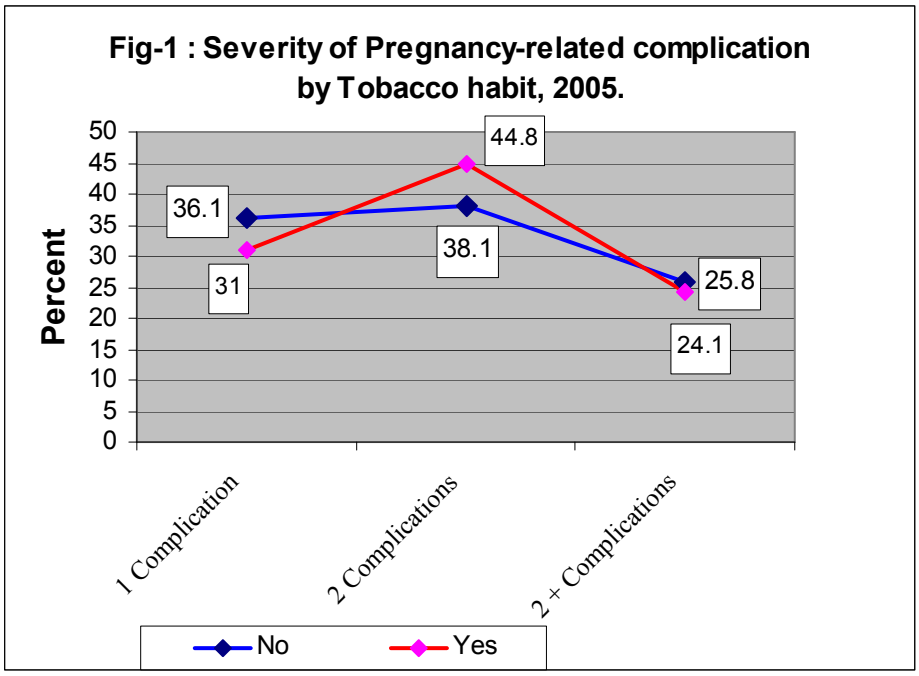


Fig-1 : Severity of Pregnancy-related complication by Tobacco habit, 2005.
Percent
50
45
40
35
30
25
20
15
10
5
0
36.1
31
44.8
38.1
25.8
24.1
1 Complication
2 Complications
2+ Complications
No
Yes

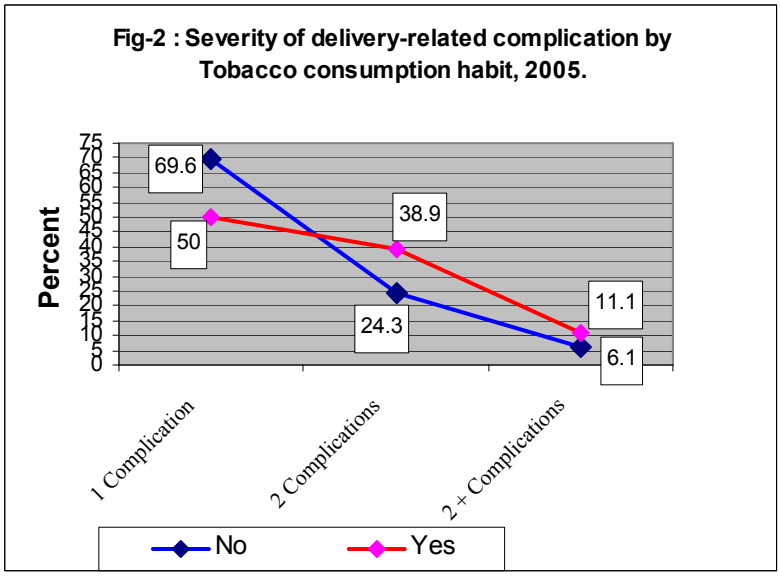


Fig-2 : Severity of delivery-related complication by Tobacco consumption habit, 2005.
Percent
69.6
50
38.9
24.3
11.1
6.1
1 Complication
2 Complications
2+ Complications
No
Yes

Table-4: P-L Estimate of Mean Duration (days) of Delivery-related Morbidity and Time Spent in Bed by Tobacco Consumption, 2005.			
		Mean Duration of Morbidity (Days)	Mean Duration of Bed (Days)
1. Complication during pregnancy	No Tobacco Habit	64	16
	Use to Consume Tobacco	82	35
	P-value (Log-rank) *	**0.05**	**0.01**
2. Complication during delivery	No Tobacco Habit	19	10
	Use to Consume Tobacco	41	18
	P-value (Log-rank) *	0.17	0.13

* P-value is for Log rank test. Source : Field survey, 2005

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