SOME EFFECTS OF CIGARETTE SMOKING ON PREGNANCY OUTCOME
Case Study: Newborn Birth weight in Omdurman Maternity Hospital

Batoul Mahdi Masoud El Hilo
King Saud University, Department of Psychology - Kingdom of Saudi Arabia

Nadia Kamal Khalifa Mahgoub
(Masters of Science/ Nutrition)
Ahfad University
School of Family Sciences

Abstract

The present study were an attempt to investigate the impacts of cigarette smoking on the newborn babies' birth-weight, and pregnancy outcome.

During May 1997-May 1998, 93 smoking and 93 non-smoking mothers at Omdurman Maternity Hospital were selected by a purposive procedure from the outpatients record files. Responses by four smoking mothers were excluded because they had abortion before data analysis. Structured interview using a questionnaire and the Beam-Balance Scale were the study instrument.

Results showed that (51.6%) of the respondents smoked 7-12 cigarettes/day during pregnancy.(9.7%) smoked 13-17 cigarettes/ day during pregnancy. (49.4%) had babies with 1.700-2.400 (gm) compared to (15.73%) who had babies with 3.300-4.000(gm). Of the newborn babies of smoking mothers (44.95%) were having health problems, of them (23.60%) were having low birth weigh. (4.49%) of the smoking mothers who smoke 13-17 cigarettes/day during pregnancy had abortion.

The mean birth-weight of the newborn babies of smoking mothers was less than the mean birth-weight of the newborn babies of non-smoking mothers in Sudan. Accordingly, the calculated t-value was found to be higher than the tabulated t-value. The 2-tail probability was found to be significant at 0.05. From the above mentioned results it could be stated that cigarette smoking does affect the birth-weight of the newborn babies of the smoking mothers.

SOME EFFECTS OF CIGARETTE SMOKING ON PREGNANCY OUTCOME
Case Study: Newborn Birth weight in Omdurman Maternity Hospital

Batoul Mahdi Masoud El Hilo
King Saud University, Department of Psychology - Kingdom of Saudi Arabia

Nadia Kamal Khalifa Mahgoub
(Masters of Science/ Nutrition)
Ahfad University
School of Family Sciences

Introduction

Not long ago it was shameful for a woman to smoke. Now a day this habit seems to be normal among females. Cigarette smoking has dangerous effects on the human health. The most affected group is infants whose mothers smoke cigarette during pregnancy. Cigarettes contain nicotine, which is a poisonous material that has no color, but when influenced by air it has a brown color. It is a drug with complex effects on brain activity, and other organs (e.g. lung, heart, placenta), (Wilson, 1993). Eventually it affects the birth weight of the newborn babies. Of these effects are low birth weight, damage of placenta and mental retardation which leads to disabilities of children. So it is very important to explore the effects of cigarette smoking on this vulnerable group. Nevertheless, the present study is an attempt to investigate the effects of cigarette smoking on pregnancy outcome (weight of the newborn babies) and to find if there is a relationship between cigarette smoking and abortion.

HISTORICAL BACKGROUND OF TOBACCO SMOKING

The Spanish transported tobacco seeds to Europe where Jean Nicot gave the plant its generic name, Nicotiniana, (Tucker, 1991). Tucker (1991) stated that tobacco is native to the Americas, and the practice of inhaling the smoke of the dried plant material has been documented in the Mayan culture more than 2000 years ago. Glantz (1992) stated that American Indians smoked pipes, and European explorers had introduced the practice into the Old World by the early 16th century. By the late 19th century, tobacco use was widespread, but people use only

small amounts. This began to change around the turn of the century with the invention of the cigarette-manufacturing machine, enabling the tobacco industry to make cigarette widely available at an inexpensive price. Consequently, the industry used advertisement to create specific images for cigarette smokers to follow. The first target of tobacco advertisement was male smokers. The industry did not target women until the 1930s (Glantz, 1992). According to Arkin (1972), the first cigarette factories were set up in London in 1850, in America in 1860 and in Cuba in 1953.

In Sudan, tobacco smoking started during the Turkish era, but during Mahdia using tobacco was completely prohibited. During the British Rule in Sudan smoking of tobacco spreaded all over the country (A/ Rahman et al. 1993). However, there were many forms of tobacco use especially in Western Sudan (e.g. Tombacc)

BIRTH WEIGHT OF NEWBORN BABIES:

An adequate birth weight of a newborn baby is important because it determines the ability to adapt to new environmental and healthy life. It is important to mention here that the average weight of a newborn at term is a proximately 3.400 g (Schaffer & Avery, 1960). Birth-weight of the healthy newborn varies from community to another (Modawi, 1963). It is concluded that birth weight is closely correlated with maternal status (Montague, 1965). In most developing countries, the average birth weight is much less than in developed countries except in very few who enjoy a good standard of living (Ibrahim, 1978).

In Sudan, the mean birth weight was 2.972g in Juba Hospital, and 3.045g in Khartoum Hospital (Modawi, 1963). In both Omdurman and Khartoum Hospitals (Ahmed et al., 1967) found the mean birth weight of newborn babies was 3.468g. The Sudan National Formulary (1974) reported that the mean birth-weight according to local standards is 3.400g. Consequently, El Hadi (1992) found that the mean birth-weight for Sudanese newborns is 3.300 g , that is nearly similar to the international standards.

It is clear that there is difference between the findings by

Modawi (1963) and by El Hadi (1992) with regard to the difference between the two studies, we suggest that the difference of weights may be due to the change of life-style, or socioeconomic status.

SOME EFFECTS OF TOBACCO

A pregnant woman who smokes passes the toxic chemicals she takes in to the developing fetus, where the chemicals can cause the baby to have a lower birth weight or birth defects or can cause a spontaneous abortion. The lighted cigarette generates about 4,000 different compounds. Since a number of these are injurious to adult health, it should not be surprising that the fetus is also affected. Accordingly, the most common problem remains "small for-date" are babies (Gueguen et al.,1995). Goldstein (1977) estimated that about 4600 infants in the United States born with low birth weight every year because their mothers smoke. Wright et al. (1984) mentioned that cigarette smoking was a risk factor for low birth weight. Johnson et al. (1994) cited that "Both cigarette smoking and drug use were associated with significantly lower mean birth weight". Cunningham et al. (1993) and Mahatat (1996:a) mentioned that mothers who smoke during pregnancy have infants whose birth weights less than non-smokers do. Birth weight is reduced by about 200 gm in infants of smoking mothers. Reeb et al. (1987), Allan et al. (1994) and Abdin (1996) stated that the amount of reduction is related to the number of cigarettes smoked per day. They added that an increased incidence of low birth weight infants was due to heavy cigarette smoking by pregnant women. According to O'campo et al. (1995) "Low birth weight, pregnancy complications, and infant morbidity are but a few of the adverse outcomes experienced by pregnant and postpartum women and infants of cigarette smoking mothers. Iffy et al. (1981) stated that the result of smoking by mothers during pregnancy, showed a relationship between the fetus growth and number of cigarettes smoked. Mathai et al. (1990) stated that active maternal smoking was associated with a decrease in birth-weight of 12 gm for every cigarette smoked in a day. Infants born to heavy smokers are lighter by an average of 200 gm.

Geoffrey (1995) who stated that a woman who smokes 20 or more cigarettes per day is (30%) more likely to have a preterm or growth retarded baby than a woman who does not smoke. He added that smoking as few as 10 cigarettes daily during pregnancy has been shown to cause about a 200 gm decrease in the infants' birth weight as compared to infants of women who do not smoke. This was supported by Richey et al. (1994) who cited that the most common risk factor for adverse outcome of pregnancy is current smoking of more than 10 cigarettes per day. El Ghusaymi (1984) and Newnham et al. (1991) stated that it is well known that smoking nicotine decreases the birth weight and it is one of the main reasons of abortion, early delivery and other complications. Rush (1994) and Daries (1976) have contented that lower birth weight of infants whose mothers smoke is primarily the consequence of lower pregnancy weight gain by smoking mothers. Cundy et al. (1993) concluded that birth-weight in Maori (Old New Zealand) women was lower than expected, probably because of their high prevalence of smoking. Daily cigarette consumption was negatively correlated with birth-weight. Wen (1990) and Hobson (1979) analyzed the effects of smoking on birth weight and they found that fetal growth retardation and prematurely is over 17000 pregnancies per year. They also found that smoking lowered birth weight both by decreasing fetal growth and by gestational age at delivery. In addition, McCormick et al. (1990) stated that cigarette smoking has emerged as an important predictor of low birth weight due to intrauterine growth retardation and pre-term delivery.

The spontaneous abortion rate is up to twice that of non-smokers, was supported by Pattinson et al. (1991) who stated that the incidence of spontaneous abortion was higher among smokers (42.1%) than among non-smokers (18.9%). Abortion is associated with maternal smoking to have a high percentage of normal karyotype. Kline et al. (1980) related the spontaneous abortion to smoking during pregnancy. They found increased abortion rates in smokers independent of maternal age and

alcohol consumption. Dunnihoo (1992) cited that there is also a slightly increased spontaneous abortion rate and perinatal mortality rate among infants of smoking mothers. Allan et al. (1994) reported that smoking increases the risk of fetal death or damaging in the utero. Smoking similarly increases the risk of abruptio placenta, which increases the fetal risk as well as the maternal risk of death or damage. Meyer and Tonascia (1992) reported that non-smokers experience PROM (Premature Rupture Of the Membrane) before 34 weeks gestations. Steven et al. (1991) mentioned that discontinuing of smoking during pregnancy could reduce the risk of complications and of perinatal mortality. This is supported by Chomitz et al. (1995) stating that approximately (20%) of all low birth weight could be avoided if women did not smoke during pregnancy. Interestingly, Elliman (1996) stated that quitting smoking must be synchronized with convenient persuasion to give up the habit. According to the above-mentioned findings it may be beneficial for women to give up smoking.

OBJECTIVES

The general objective of the study is to find out the impact of cigarette smoking on the newborn babies' birth weight. To achieve this goal the following specific objectives were formulated:

1- To find out if there is a relationship between cigarette smoking and low-birth weight.
2- To find out if there is a relationship between cigarette smoking and abortion.

METHODOLOGY

The Population:

The population from which the samples were selected was the smoking and non-smoking mothers of newborns in Omdurman Maternity Hospital. To collect the data necessary for the study:-

Ninety-three smoking mothers were selected (from Omdurman Maternity Hospital) by a purposive procedure during January - May 1998. Birth weigh of the newborn babies was recorded. It was taken from the babies "health-history card" provided by the mothers and hospitals. A point should be made

here that the birth weights of all newborns delivered at Omdurman Maternity Hospital during the period May 1997-May 1998, were recorded to the nearest 0.1kg.

Selection of the study sample:

The initial sample of the study from which the data were collected consisted of 89 new born babies of the smoking mothers in Khartoum State (experimental group) and 93 new born babies of non-smoking mothers (control group) Omdurman Maternity Hospital. As mentioned above the sample was selected by a purposive selection. The assumption behind using purposive selection procedure "is that with good judgment and an appropriate strategy one can handpick the cases to be included and thus develop samples that are satisfactory in relation to one's needs. A common strategy of purposive sampling is to pick cases that are judged to be typical of the population in which one is interested, assuming that errors of judgment in the selection will tend to counterbalance each other". (Kidder & Judd, 1987:154). Interestingly, the researchers themselves weighed the newborn immediately after delivery, using the Beam Balance Scale. Weight is measured to the nearest 0.1 kg.

The Instruments:

The instruments administered to the sample for the collection of data are:

1. Structured interview using a questionnaire. 2. Beam Balance Scale.

Questionnaire:

The questionnaire was the research instrument developed for collecting the respondents' demographic variables, and some other information necessary for the study. It was developed by utilizing surveys from other studies as well as incorporating questions unique to the objectives and hypothesis of this study. Thus, a variety of (social and demographic information relative to risk factors of cigarette smoking during pregnancy) questions were developed. Most of the questions were closed ended so that analysis of the results be carried out efficiently (Appendix 2).

Validity of the Questionnaire:

The questionnaire was pre-tested by two specialists in the field of Nutrition to test its content validity, and to an Arabic language specialist to test its language. As an attempt to test the validity of the items the questionnaire was administered to ten smoking and ten non-smoking mothers from the target population. A space was provided for the respondents to make comments about the questionnaire itself so they may indicate; whether some questions seem unclear to them, whether provisions should be made for certain responses that are not included in the questionnaire, other points that can lead to improving the instrument. Comments by respondents concerning the questionnaire were checked. As a result, appropriate modifications to the questionnaire were done. No sharp disagreements were found in the responses to particular items of the questionnaire. After the preceding procedure has been completed and all improvements were made, then items were used in the original study.

Procedures

Selection (1) The Newborn Babies of smoking Mothers (Experimental sample)

The following are the procedures followed during the data collection necessary for the study:

Ninety three smoking mothers who were selected purposively (from their homes and hospitals) in Khartoum state were interviewed face to face using the questionnaire. Before the recording of their newborn babies weight mothers were asked whether they are cigarette smokers or not. Of the 93 smoking mothers, responses of four mothers were excluded because they had abortion. Accordingly, weights of 89 newborn babies of smoking mother have gone into analysis. After the delivery of the baby, the weight was recorded to the nearest 0.1kg. Regression.

Selection (1) The Newborn Babies of Non-smoking Mothers(Controlled sample)

Ninety-three non-smoking mothers who delivered their babies at Omdurman Maternity Hospital during the period January-May

1998 were selected. Before the recording of their newborn babies weight mothers were asked whether they are cigarette smokers or not. Ideally, all the selected mothers were non-smokers. After the delivery of the baby, the weight was recorded to the nearest 0.1kg. Regression, t test and descriptive statistics were used. Weight of the 89 newborn babies of smoking mothers, and Weight of 93 newborn babies of non-smoking mothers ere analyzed.

RESULTS

Table (1) Distribution Of Newborn Babies Of Smoking Mothers By Birth-Weights (g)

Weight (g)	Frequency	Percentage %	Cumulative %
1.500 – 2.500	44	49.5	49.5
2.600 – 3.200	31	34.8	84.3
3.300 – 4.000	14	15.7	100
Total	89	100	

Table (1) revealed that (49.5%) of the respondents had newborn babies with birth-weight =1,500-2,500 g, (34.8%) of the respondents had newborn babies with birth-weight = 2,600-3,200 g and (15.7%) respondents had babies with birth-weight = 3,300-4,000 g. The mean weight is 2.632 g and S.D is 0.737. It is clear that the majority were having babies low birth-weight.

Table (2) Distribution Of Newborn Babies Of Non-Smoking Mothers By Birth-Weight (g)

Weight (g)	Frequency	Percentage %	Cumulative %
2.300 - 3.200	32	34.4	34.4
3.300 - 4.200	56	60.2	94.6
4.300 - 5.200	05	05.4	100
Total	93	100	

Table (2) revealed that (34.4%) of the respondents had newborn babies with birth-weight = 3.300-4.200 g, (60.2%) of them have newborn babies with birth-weight=3.300-4200g, and only (5.4 %) respondents had newborn babies with birth-weight=4.300-5.200 g. The mean weight is 3.391, S.D. 0.577.

Table (3) T-Test, Standard Deviation And Level Of Significance Of Newborn Babies' Birth Weights Of smoking & Non-smoking Mothers

Variable	Group	N	Mean	S.D.	Diff of means	T Value	2.tail Sig.
Birth -Weight	Newborn babies of non-smoking mothers	93	3.3909	.577	-.7594	-8.49	.0000
Birth -Weight	Newborn babies of smoking mothers	89	2.6315	.737			

Level of significance = .05 , Tabulated t= 1.658

Table (3) shows the difference of means between the birth-weight of newborn babies of the smoking and non-smoking mothers at significant level of 0.05. It is found that there is a significant difference between the two means.

CHARACTERISTICS OF THE SMOKING MOTHERS:

Figure (1) shows that in sample I (59.1%) of respondents are from the age group (26 – 30), (22.6 %) are from the age group (31-35) and the rest (18.3%) are from the age group (21 - 27). The mean age of the respondents is 28.2, SD= 2.74.

Figure 1: Distribution Of Respondents By Age Years).

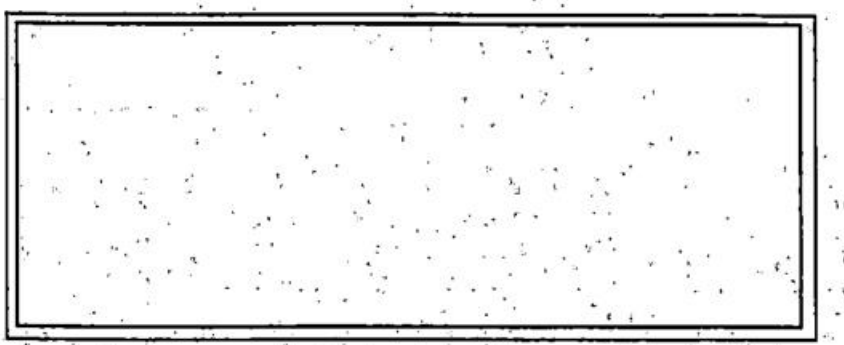

Figure 2: Distribution Of Mothers By Normal Weight During Pregnancy

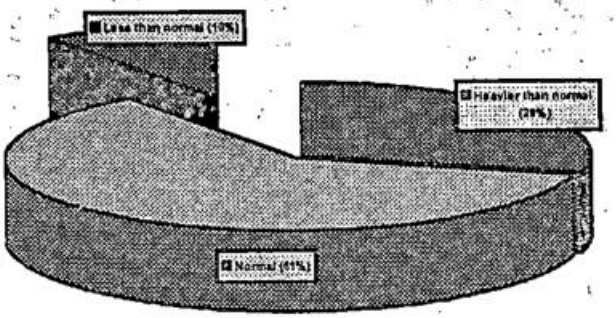

Figure (2) shows the distribution of mothers who mentioned that they have their weight normal, (29%) mentioned that they had their weight increased than their normal weight and (10 %) mentioned that their weight is less than their normal weight.

Figure 3: Distribution of Respondents By Number Of Cigarettes Smoked/day During Pregnancy

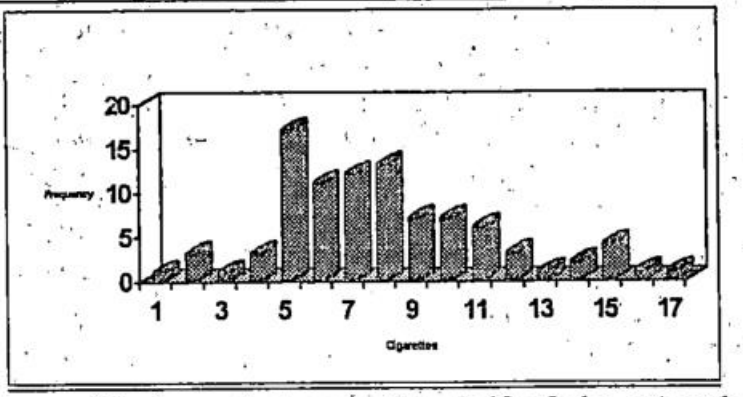

Figure (3) shows that more than half of the respondents (51.6%) smoked 7-12 cigarettes/day during pregnancy, (38.7%) smoked 1-6 cigarettes/day during pregnancy, (9.7%) smoked 13-17 cigarettes/day during pregnancy, only one respondent mentioned that she smoked 17 cigarettes during pregnancy. The mean number of cigarettes smoked by respondents during pregnancy is 8.01, and the SD. is 3.31.

Figure 4: Regression Between The Number Of Cigarettes Smoked/Day By Smoking Mothers During Pregnancy And Their Newborn Babies Birth-Weights (kg)

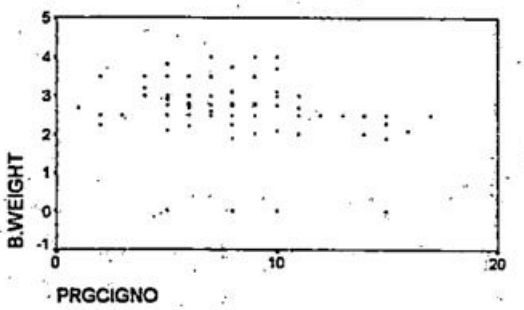

Figure (4) showed no significant relationship between the number of cigarettes smoked by smoking mothers/day during pregnancy and their newborn' birth-weight.

Table (4) Number Of Cigarettes Smoked By Smoking Mothers/Day During Pregnancy And Their Newborn Babies Birth-Weights (gm)

Birth-weight of newborns (gm)	Number of cigarette smoked/day during pregnancy			
	1 - 6	7 - 12	13 - 17	Total
1.700-2.400	29	08	7	44
2.500-3.200	02	28	1	31
3.300-4.000	13	0	1	14
Total	44	36	9	89

Table (4) shows an indication of the relationship between the number of cigarettes smoked during pregnancy and incidence of low birth-weight of the newborn babies of smoking mothers. In spite of the insignificant result drawn in Figure (4)

Table (5) Prevalence of Health Problems Among Smoker and None-smoker Mothers

Responses	Smoking Mothers	Non-smoking mothers
Having no problems	67 (72.04%)	93(100%)
Having problems	30(32. 26%)	0
Total	93	93

Table (5) shows that (72.04%) of the the smokers did not suffer any health problem during pregnancy, (32.26%) did suffer some health problems during pregnancy. Of those who suffered health problems during pregnancy (21.51%) had "weakness", (6.45%) had hypertension and (4.30%) were anaemic. On the other hand all non-smokers did not mentioned any sort of health problems that they have during pregnancy other than their morning thickness

Table (6) Prevalence of health Problems Among Newborn Babies of Smoker & non-smoker Mothers

Responses	Smokers	Non-smokers
Having no problems	49 (55.06%)	90 (96.77%)
Having problems	40 (44.94%)	3 (3.23%)
Total	89 (100%)	93 (100%)

Table (6) shows that (44.94%) of the new born babies of smoker mothers are having health problems compared to (3.23%) babies of the non-smoker mothers. This result may show an indication of the smoking tobacco outcome on babies health.

Table (7) Types Of Health Problems Among The Newborn Babies, and During Pregnancy Of Smokers and Non-smokers

Effect	Smokers	None-smokers
LBW	21 (23.60%)	0
Cardiac disease	7 (7.87%)	0
Chest infection	8 (8.99%)	3 (3.23%)
Total	40 (44.94%)	3 (3.23 %)

From the above table it is clear that from the (44.94%) newborns who suffered health problems, the majority (23.60%) had low birth-weight, (8.99 %) chest infections, (7.87%) cardiac disease. Only (3.23%) new born babies of non-smoker mothers had chest infection

Table (8) Number of Cigarette Smoked/ Day During Pregnancy And Abortion Cases

No. of Cigarettes Smoked/day	Distribution of Abortion Cases.		
	Frequency	%	Cumulative %
1 - 6	0	0	0
7 - 12	0	0	0
13 - 17	4	100	100
Total	4	100	

Table (8) explains the effect of cigarettes smoking on pregnancy. (19 %) of the respondents who smoke cigarettes during pregnancy had abortion. It is clear from the above table that all (100%) of the women who had abortion smoke more than (13 – 17) cigarettes/ day during pregnancy.

DISCUSSION

The present study is an attempt to investigate the impacts of cigarette smoking on the newborn babies' birth-weight, the relationship between cigarette smoking and low-birth weight, and to find out if there is a relationship between cigarette smoking and abortion. Results in table (3) showed that the mean birth-weight of the newborn babies of smoking mothers is less than the mean birth-weight of the newborn babies of non-smoking mothers in Sudan. T-test was used to justify the significance of this difference. Accordingly, the calculated t-value was found to be higher than the tabulated t-value. The 2-tail probability was found to be significant at 0.05. From the above mentioned results it could be stated that cigarette smoking does affect the birth-weight of the newborn babies of the smoking mothers. Interestingly, the present results coincides with Haworth (1986) who found that birth weights were lower for infants whose mothers smoked compared to those whose mothers did not smoke, and with El Ghusaymi (1994) who stated that smoking nicotine decreases the birth-weight. In addition, to Chomitz et al. (1995) who cited that cigarette smoking is the largest known risk factor for low birth-weight, and with Cundy et al. (1993) who also found that birth weight in Australian women was lower than expected because of their high

prevalence of cigarette smoking. From the above supportive findings it could be stated here that smoking during pregnancy affects the birth-weight of the newborn in Sudan and that there is a difference between birth-weights of the newborn babies of smoking mothers and the birth-weights of those of non-smoking mothers.

Simple regression (Figure, 4) shows no relationship between the increased number of cigarettes smoked/day during pregnancy and the low birth weight of the newborn babies. In spite of this negative finding, results (table, 4) shows that the majority of smoking mothers (77.4%) who smoke higher numbers of cigarettes (13 - 17) had babies with lower birth weight (1.700 - 2.400 g). This result is in line with a study done in Victoria (1985) showing that there was an increase in the proportion of low-birth weight (.less than 2,500g) among infants with increasing use of tobacco and with Richy et al. (1994) that a common risk factor for adverse outcome of pregnancy is current smoking of more than 10 cigarettes/day, and with Allan et al (1994) as he stated that increased incidence of low-birth weight infants was related to heavy cigarette smoking by pregnant women, and with Reeb (1987) who cited that infants of heavy smokers weigh an average of 1.560g and are less in weight than infants of non-smokers, and with Mathai et al. (1990) who concluded that maternal smoking was associated with a decrease in birth-weight of 12g every cigarette smoked in a day. Ideally, Gueguen et al. (1996) and Geoffrey (1995) are advocating the present result in that smoking 10 or more cigarettes/day before or after pregnancy was found to be associated with lower birth-weight babies.

According to the result (Table, 4) the number of cigarette smoked/ day during pregnancy increases the risk of low-birth weight. From the present results and available support of the literature reviewed, one could argue that as the number of cigarette smoked/ day during pregnancy increases the risk of low birth increases too. Results (Table, 5) shows that (32.26%) of the smoking mothers mentioned that they experienced health

problems during pregnancy. Among those who passed through these problems (21.51%) had "weakness" (6.45%) had hypertension and (4.30%) were anaemic. However, from the result presented (Table, 7) it is apparent that the incidents of abortion were reported by those who smoke (13-17) cigarettes/day during pregnancy (the highest number of cigarettes smoked by the respondents). Although the relationship between cigarette smoking and the risk of abortion during pregnancy did not confirmed statistically by the present study but it was confirmed by Kline et al. (1980) who related the spontaneous abortion to smoking during pregnancy, and by Pattinson et al. (1991) not only stated that the incidence of spontaneous abortion was higher in smokers than in non-smokers, but also emphasized that cigarette smoking has an adverse effect on pregnancy outcome by increasing spontaneous abortion. Nevertheless, the present study did not conclud that cigarette smoking increasess the risk of abortion during pregnacy. Accordingly, suggested studies on the effect of smoking cigarettes and the risk of abortion should be planned and encouraged for future studies.

CONCLUSION

Cigarette smoking is very hazardous for the pregnant women and her unborn baby. It can result in low-birth weight baby and can cause abortion as well. The newborn can be born week enough to die few day after birth. Ideally, this study has reached the following conclusions:

Cigarette smoking is the main factor in reducing birth-weight among newborn babies of smoking mothers. Although there are other contributing factors but cigarette smoking remains the main one.

It was not proved statistically that as the number of cigarette smoked/ day increases the risk of low-birth weight increases, regardless of that whether this increase is during pregnancy or not.

The available results only showed that there is a relationship between the number of cigarettes smoked/ day by smoking mothers and their newborn babies reduced birth-weight.

There is no tangible evidence of a statistical relationship between cigarette smoking and abortion.

RECOMMENDATION

This study is an attempt to highlighten the topic of the effects of cigarette smoking on pregnancy outcome by smoking mothers in Sudan. It is the time to raise public awareness by means of mass media to take serious action to improve the existing situation.

Pregnant and non-pregnant mothers should be advised and encouraged to stop smoking during pregnancy. This could be done through the mass media, midwives. Doctors also could play an important role in the prevention of smoking of tobacco by mothers.

Reducing the number of cigarette smoked by pregnant mothers, at least during pregnancy could reduce the rate of low-birth weight babies in Sudan.

The rate of abortion as well could be reduced by reducing the rate of cigarette smoked/day during pregnancy.

For the coming future, as children are the generation of tomorrow, we should work hard and take serious actions to prevent women from cigarette smoking, at least during pregnancy.

REFERENCES

1- Abdin, A. (1996) "The Effects Of Cigarette Smoking On Health." Al Sudan Al Reyadi Al Ahilla Publishing Co.

2- Ahmed N. El Din and Abdalla L. (1967) Some Physical Studies In The Sudanese Newborns" Journal Of Tropical Medicine And Hygiene.

3- Allan, H. De Cherney and Martin, L. Pernoll. (1994) Current Obstetrics And Gynecological Diagnosis And Treatment (8th ed.) Appleton and Lange. Connecticut. USA.

4- A/Rahman, A. Ahmed and A/Rahman, H. Babiker (1993) Smoking Cigarette Among Young Females (15-

25 years) In Omdurman Unpublished B.A. Ahfad University, Omdurman, Sudan.

5- Arkin, A. Merki (1972). Choosing Good Health. Hoper and Row Ltd. USA.

6- Chomitz, VR; Cheung, LW and Lieberman, E "The Role of Lifestyle in Preventing Low Birth Weight". Future-Child. 1995, 5(1): 121-38.

7- Cundy, T; Gamble, G; Manual, A; and Roberts, "A Determinants Of Birth-Weight In Women With Gestational Diabetes". J-Obstet-Gynaecol 33(3):249-54,1993.

8- Daries, D. P; Gray, O. P; and Albernathy M. "Cigarette Smoking In Pregnancy: Association with maternal weight gain and fetal growth". Lancet 1:385, 1976.

9- Kidder J. and Judd C. (1987) Research Methods Brooks/Cole Publishing Company California, USA.

10- Dunihoo, Rale R. Fundamental Of Gynecology And Obstetrics. (1992) (2nd ed.) J. B. Lippincott Company.

11- Ghusaymi, Mohammed A/Allah. "These Medicines Are Restricted During Pregnancy". Syedate. Arab Family Magazine 13:192, 1984.

12- El Hadi, H. B. (1992). Birth-Weight And Length Of Newborn Infants Delivered At Omdurman Maternity Hospital. Unpublished B.Sc. in Nutrition.

13- Geoffrey, V. P. Chambertain (1995) Obstetrics. (16th ed.) Edward Arnold London, England.

14- Glantz, Stanton A. Tobacco: Biology and Politics (1992) "Environmental Tobacco Smoking and Cardiovascular Diseases" Circulation, 86. Department of Health and Human Services. US.

15- Goldstein, H. "Smoking In Pregnancy: Some roles on the statistical controversy". Br J Prevent Soc. Med. 31:13, 1977.

16- Gueguen, C; Lagrue, G and Janse, MJ "Effects of Smoking on the Fetus and the Child During Pregnancy". J-Gunecol-Obstet-Biol-Repord-Paris. 1995 24(8): 853-9.

17- Haworth, J. C; Ellestad-Sayed, JJ; King, J; and Dilling, LA. "Fetal Growth Retardation In Cigarette Smoking Mothers Is Not Due To Maternal Food Intake". Am J. obstet Gynecol 137:719, 986.

18- Hobson, William. Theory And Practice Of Public Health (1979) (5th ed.). Burgess and Sons, Ltd. Great Britain.

19- Ibrahim, J. G. (1978) The Newborn Baby: Children in the tropics Macmillan Press, London, England.

20- Iffy, Leslie; Kaminetz, Y; and Harold, A. (1981) Principles And Prac- tice Of Obstetrics And Perentology. John Wiley and Sons, Inc. Canada.

21- Johnson, A. A; Knight, E. M; Edwards, C. H; Oyemade, U. J; Cole, O. J; Westney, O. E; Westney, Kline J; Shrout P. and Stein, ZA: "Drinking During Pregnancy And Spontaneous Abortion". Lancet 2:176, 1980.

22- Mahatat Tibbeya "The Danger of smoking On The Newborn" Al Mushahid Assiyasi 2:12, 1996:a.

23- Mathai, M; Skinner, A; Lawton, K and Weindling, A. M. "Maternal Smoking and Birth Weight". Aust-N-Z-J-Obstet-Gynecaol. 1990 Feb; 30(1): 33-6.

24- McCormick, M. C; Brooks, Gunn, J; Shorter, T; Holmes, J. H; Wallace, C. Y. And Heagarty, M. C. Factors Associated With Smoking in Low-Income Pregnant Women: Relationship to birth weight": J-Clin, Epidemiol. 1990, 43(5): 441-8.

25- Modawi, Osman "Birth-weight In Khartoum And Juba" Sudan Medical Journal. 2:2, 1963.

26- Montague, M. F. A. "Relationship Of Maternal Stature With Birth-Weight" American Journal Of

Obstetrician and Gynecology (4th ed.) University of Chicago Press, USA.

27- Newnham, J. P; Patterson, L; James, I. and Reid, S. E. "Effects of Maternal Cigarette Smoking on Ovarian Function and Early Pregnancy Outcome". Fertile-Steril. 1991 Apr; 55(4): 780-3.

28- O'campo, P; Davis, MV and Gielen, AC. "Smoking Cessation Interventions For Pregnant Women: Review and future directions". Semin-Perinatol. 1995, 19(4): 279-85.

29- Pattinson, H. A; Taylor, P. J; and Pattinson, M. H. "The Effect Of Cigarette Smoking On Ovarian Function And Early Pregnancy Outcome". Fertil-Steril. 55(4):780-3,1991.

30- Reeb, K. G; Graham, A. V; Zyzanski, S. J. And Kitson, G. C. "Predicting Low Birth Weight and Complicated Labour". Soc-Sci-Med. 1987; 25(12): 1321-7.

31- Richey, S. D; Robert, S. W; Ramin, K. D; Ramin, S. M. And Cuningham, F. G. "Pneumonia Complicating Pregnancy". Obstet-Gynecol. 1994 Oct; 84(4):525-8.

32- Rush, D; "Lower Weight Gain Among Smokers: Explains most of the effect of smoking on birth weight". Pediatr. Res 8:450, 1994.

33- Rush, D; Andrews, J. and Kristal, A. "Maternal Cigarette Smoking During Pregnancy, Social Class, and Perinatal Outcome". Am-J-Perinatol. 1990 Oct; 7(4): 319-26.

34- Schaffer, J. Elexander and Avery, Ellen Mary (1960) Fetal Growth & Neonatal Adaptation: Diseases of the newborn. 3rd ed. W.B. Saunders Company, Philadelphia, USA.

35- Tucker, D. Tobacco: An International Perspective (1991) WHO paper, Jordan, Oman.

36- Wen, SW; Goldberg, RL; Cutter, GC; Hoffman, HJ and Du Baid, MB: "Smoking Maternal Age At

37- Wilson, A. Browald (1993) Principles Of Internal Medicine. Mac Millan Press. London, England.

38- Wright, J. T; MacRae, K. D; Barrison, I. G. And Waterson, E. J. "Effects of Modivate Alcohol Consumption and Smoking on Fetal Outcome". Ciba-Found-Symp. 1984; 105: 240-53.