

Alcohol and Tobacco Use During Pregnancy

P. Bronowski*, A. Piotrowski*, J. Stelmachów**

* Institute of Psychiatry and Neurology, IV Department of Psychiatry,
Bródnowski General Hospital, Warsaw, Poland

** Academy of Medicine, II Medical Faculty, II Department of Obstetrics
and Gynecology, Bródnowski General Hospital, Warsaw, Poland

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Abstract: Maternal smoking and alcohol consumption are considered a significant factor having negative effects on both pregnancy itself and the condition of the newborn at birth. The purpose of the prospective study was to find out whether alcohol drinking, cigarettes smoking is continued during pregnancy and whether such behaviour is conditioned by stressful family situation of pregnant women. The data were collected by a group of trained midwives working in maternal clinics. By means of a special questionnaire the pregnant women were investigated during their first visit to a maternal clinic. Three months later the interview was repeated. The first investigation embraced 609 women, the second 553 women, which constitutes 91,5% of the first group.

As regards alcohol and tobacco there is a distinct tendency to reduce their use after the first trimester of pregnancy. 22% of women under examination stopped drinking any alcohol in the period of three months from the first investigation. The percentage of nonsmokers increased from 68,2% at the beginning of pregnancy to 80,7% after the first trimester.

Cigarettes smoking during the first trimester was connected with the level of education, civic status and stressful situation in the family. Alcohol was used more frequently by women with elementary school education. Alcohol drinking combined with cigarettes smoking was more frequent in the group of unmarried women and those with elementary school education. Women who had not planned their pregnancy were in the group of those who smoked cigarettes more frequently. This fact was not statistically significant for alcohol consumption.

Zusammenfassung: *Alkohol- und Tabakkonsum während der Schwangerschaft.* Rauchen und Alkoholkonsum der Mutter gelten als wichtiges Merkmal mit negativen Auswirkungen auf die Schwangerschaft selbst und die Verfassung des Neugeborenen bei der Geburt. Das Ziel dieser prospektiven Studie war es, herauszufinden, ob das Trinken von Alkohol und das Rauchen von Zigaretten während der Schwangerschaft fortgesetzt werden, und ob dieses Verhalten durch belastende Familiensituationen der schwangeren Frauen ausgelöst wird. Die Daten wurden von einer Gruppe von ausgebildeten Hebammen gesammelt, die in klinischen Abteilungen für Mütter arbeiteten. Mit einem speziellen Fragebogen wurden die Schwangeren bei ihrem ersten Kontakt mit der Abteilung befragt. Drei Monate später wurde das Interview wiederholt. Die erste Befragung umfaßte 609 Frauen, die zweite 553 Frauen, was 91,5% der ersten Gruppe entspricht.

Was den Alkohol und das Rauchen betrifft, so gibt es eine klare Tendenz, beides nach dem ersten Trimester der Schwangerschaft zu reduzieren. 22% der untersuchten Frauen hörten mit dem Trinken innerhalb der drei Monate nach der Erstbefragung ganz auf. Der Prozentsatz der Nichtraucher stieg von 68,2% am Anfang der Schwangerschaft auf 80,7% nach dem ersten Trimester.

Das Rauchen von Zigaretten während des ersten Trimesters korrelierte mit dem Niveau der Ausbildung, dem bürgerlichen Stand und Belastungen in der Familie. Alkohol trinken war bei Frauen mit Grundschulbildung häufiger. Alkohol trinken in Verbindung mit Rauchen war bei der Gruppe der unverheirateten Frauen und der mit Grundschulbildung häufiger. Frauen mit einer ungeplanten Schwangerschaft waren in der Gruppe der Raucher am häufigsten. Dies war in bezug auf Alkoholkonsum nicht statistisch signifikant.

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Introduction

Maternal smoking and alcohol consumption are considered a significant factor having negative effects on both pregnancy itself and the condition of the newborn at birth.

Cigarettes smoking increases the risk of spontaneous abortion, premature birth, ablation of the placenta, and congenital malformations in newborns (heart diseases, cleft palade, strabismus) (Annath et al. 1996; Anders et al. 1996). A considerable influence of maternal smoking on the newborn's weight was emphasized in numerous studies (Fox et al. 1994; Alexander, Korenbrot 1995; Spinillo et al. 1995).

Sudden death syndrome investigation has proved that cigarettes smoking during pregnancy and an inadequate after-birth care are the two basic factors that may cause the syndrome. Smoking during pregnancy doubles the risk of this syndrome (Schlaud et al. 1996).

Moreover, smoking during pregnancy is believed to increase the risk of Attention Deficit Hyperactivity Disorder (ADHD) in infants (Milberger et al. 1996) and also to cause behaviour disorder in children (Wakschlag et al. 1997).

The incidence of cigarettes smoking among pregnant women is estimated at 12 to 39% of overall population (Isohami et al. 1995; Nelson et al. 1995; Mc Farlan et al. 1996).

A high alcohol consumption during pregnancy can result in Fetal Alcohol Syndrome (FAS) which may cause intrauterine growth retardation, neurological disorders and microcephalia (Jones et al. 1973, 1973b). In case of an incomplete manifestation of FAS, Fetal Alcohol Effect (FAE) is recognized (Russel et al. 1991).

It is estimated that 22,7% to 57% of pregnant women drink alcohol while 0,2% to 1,7% of women abuse alcohol during pregnancy (Hungold et al. 1996; Russell et al. 1994; Stewart, Steiner 1994).

In 1991, the Institute of Psychiatry and Neurology IV Department of Psychiatry together with the Second Department of Obstetrics and Gynaecology of the Second Medical Faculty of the Medical Academy of Warsaw carried out an investigation of 495 women after delivery. The purpose of this retrospective study was to examine the effect of maternal alcohol drinking, cigarettes smoking and use of

analgetics, hypnotics and tranquilizers on the parameters of the newborns. The results of the investigation were published in 1993 (Zaluska et al. 1993).

The purpose of the prospective study presented here was to find out whether alcohol drinking, cigarettes smoking and the use of analgetics, hypnotics and tranquilisers is continued during pregnancy and whether such behaviour is conditioned by stressful family situation of pregnant women.

Material and Methods

The data was collected by a group of trained midwives working in maternal clinics. By means of a special questionnaire the pregnant women were investigated during their first visit to a maternal clinic. Three months later the interview was repeated. The data was gathered from January 1996 to October 1997. Two questionnaires included the following information:

- age, education, marital status,
- alcohol drinking, cigarettes smoking and use of analgetics, hypnotics and tranquilisers at the beginning and after the first three months of pregnancy,
- psychological state and stressful factors.

For statistical elaboration of the data obtained Pearson's correlation coefficient r was used. The first investigation embraced 609 women, the second 553 women, which constitutes 91,5% of the first group. The data concerning the age of the women under examination is shown in the Table 1.

Table 1. Age of the women investigated.

Years	Number	Percentage
16-24	260	43,0
25-34	291	48,2
35-43	53	8,8

The mean age in the study group was 26 years. The youngest woman was 16 and the oldest 43 years of age. Education level of the women in the study group was as follows:

Elementary, basic vocational school	237 women (39,2%)
Secondary school	234 women (38,7%)
Higher than secondary school	67 women (11,1%)
University	66 women (10,9%)

The data concerning marital status is shown in Table 2.

Table 2. Marital status.

Marital status	Number	Percentage
married	407	67,4
single	179	29,6
divorced	14	2,3
widowed	3	0,2

The Results Obtained

Cigarettes Smoking and Alcohol Use in the Study Group

The data concerning the use of psychoactive substances is presented separately for the first investigation (pregnancy verified) and the second investigation (after the first trimester).

- Cigarettes smoking.

The intensity of maternal smoking was measured by the number of cigarettes smoked daily:

- up to 5 cigarettes a day,
- from 5 to 15 cigarettes a day,
- more than 15 cigarettes a day.

The data concerning cigarettes smoking is shown in Table 3.

Table 3. Cigarettes smoking.

	Investigation I		Investigation II	
	Number	Percentage	Number	Percentage
Nonsmokers	412	68,2	446	80,7
Up to 5 cigarettes per day	92	15,2	61	11,0
From 5 to 15 cigarettes per day	86	14,2	37	6,7
More than 15 cigarettes per day	14	2,3	5	0,9
No data	0	0,0	4	0,7

The table shows that the women under study reduced smoking as their pregnancy proceeded. The percentage of nonsmokers increased from 68,2 at the beginning of pregnancy to 80,7 after the first trimester. As regards the number of cigarettes smoked, the highest reduction took place in the group smoking from 5 to 15 cigarettes per day (from 14,2% to 6,7%) and in the group smoking more than 15 cigarettes per day (from 2,3% to 0,9%). A relatively small decrease was observed in the group smoking up to 5 cigarettes a day (from over 15% to 11%). Table 4 contains the data concerning cigarettes smoking during the whole period under examination.

Table 4. Cigarettes smoking in investigations I and II.

	Number	Percentage
Smokers in I and II investigations	97	17,5
Nonsmokers	369	66,7

Table 5 contains the data concerning women who smoked more than 5 cigarettes a day in the period between I and II investigation.

As results from Tables 4 and 5, among pregnant women smoking cigarettes during the whole period under study, the largest group consisted of those smoking less than 5 cigarettes per day. Table 6 contains the data concerning cigarettes smoking in the period between investigation I and II.

Table 5. Women smoking five or more cigarettes a day in Investigation I and II.

	Number	Percentage
Smoking >5 cigarettes a day	34	6,1
Nonsmoking	369	66,7

Table 6. Cigarettes smoking in the period between the first and second investigation.

	Number	Percentage
Nonsmoking	369	66,7
Smoking less	32	5,8
Smoking as many cigarettes as before	58	10,5
Smoking more	10	1,8
Started smoking	5	0,9
Stopped smoking	75	13,6
No data	4	0,7

The data in Table 6 shows that about 19% of women stopped smoking or reduced the number of cigarettes per day while a little over 12% smoked as many cigarettes as before or even more.

- Alcohol use. To present incidence of alcohol use the measure of frequency and quantity was applied. Frequency of alcohol consumption was defined as follows:
 - drinking alcohol less frequently than once a month
 - drinking alcohol once a month or more frequently
 Quantities of alcohol used were defined as follows:
 - beer: up to 500 ml, 500–1000 ml, over 1000 ml
 - wine: up to 250 ml, 250–500 ml, over 500 ml
 - vodka: up to 50 ml, 50–100 ml, over 100 ml
 Tables 7–9 contain the data concerning frequency of alcohol consumption.

Table 7. Frequency of beer consumption.

	Investigation I		Investigation II	
	Number	Percentage	Number	Percentage
Didn't drink	345	57,1	433	78,3
Less frequently than once in month	201	33,3	95	17,2
Once in month or more frequently	58	9,6	21	3,8
No data	0	0,0	4	0,7

As results from the data contained in the tables above, in the period between the first and second investigation the number of women who didn't drink alcohol increased considerably. The number of women drinking beer decreased by 21%, wine –8% and vodka –12%.

Tables 10–12 contain the data concerning quantities of alcohol consumed.

Table 8. Frequency of wine consumption.

	Investigation I		Investigation II	
	Number	Percentage	Number	Percentage
Didn't drink	441	73,0	449	81,2
Less frequently than once in the month	147	24,3	89	16,1
Once in the month or more frequently	16	2,6	11	2,0
No data	0	0,0	4	0,7

Table 9. Frequency of vodka consumption.

	Investigation I		Investigation II	
	Number	Percentage	Number	Percentage
Didn't drink	518	85,8	541	97,8
Less frequently than once in month	79	13,1	8	1,4
Once in month or more frequently	6	1,0	0	0,0
No data	1	0,2	4	0,7

Table 10. Beer consumption – quantities.

	Investigation I		Investigation II	
	Number	Percentage	Number	Percentage
Didn't drink	345	57,1	433	78,3
Up to 500 ml	243	40,2	116	21,0
500 – 1000 ml	10	1,7	0	0,0
Over 1000	3	0,5	0	0,0
No data	3	0,5	4	0,7

Table 11. Wine consumption – quantities.

	Investigation I		Investigation II	
	Number	Percentage	Number	Percentage
Didn't drink	441	73,0	449	81,2
Up to 250 ml	159	26,3	100	18,1
250- 500 ml	2	0,3	0	0,0
No data	2	0,3	4	0,7

The data included in Tables 10–12 shows a considerable decrease in the quantities of alcohol consumed. In the second investigation none of the pregnant women declared drinking more than minimum amounts of beer, wine or vodka. Changes in alcohol consumption in the whole period between the first and second investigation are shown in Table 13.

As results from the data above, a considerable percentage (22%) of women under examination stopped drinking any alcohol in the period of three months from the first investigation.

Table 12. Vodka consumption – quantities.

	Investigation I		Investigation II	
	Number	Percentage	Number	Percentage
Didn't drink	518	85,8	541	97,8
Up to 50 ml	78	12,9	8	1,4
50 – 100 ml	4	0,7	0	0,0
Over 100 ml	1	0,2	0	0,0
No data	3	0,5	4	0,7

Table 13. Changes in alcohol consumption between Investigation I and II.

	Number	Percentage
Abstained from alcohol	245	44,3
Used alcohol in investigation I and II	93	16,8
Stopped drinking alcohol	123	22,2
No data	4	0,7

Besides, it was found out that during the second investigation a small percentage of pregnant women declared taking hypnotics and analgetics. After the first trimester 99,1% of the women didn't take any hypnotics, and 77% – any analgetics. As was the case with alcohol consumption and cigarettes smoking, the use of sedatives and analgetics also dropped but not to the same extent. The largest decrease concerned the use of analgetics – the number of women who stopped taking them rose by over 15%.

Factors Connected with Alcohol Use and Cigarettes Smoking

The following factors were analyzed:

- age,
- education,
- stressful situation (psychological problems, conflicts and aggression in the family, partner's alcohol abuse and subsequent aggressive behaviour),
- current pregnancy planned or not. A statistical analysis concerned women who during the two investigations declared smoking or/and drinking in the following categories:
 - cigarettes smoking – tobacco use in any quantities and with any frequency,
 - heavy smoking – smoking more than 5 cigarettes a day,
 - alcohol drinking – drinking any amounts and any kinds of alcohol,
 - alcohol drinking and cigarettes smoking – the use of both in any quantities.

The table above shows that smoking cigarettes in the first trimester was more common in the group of women with elementary education. Statistically, those with secondary or university education smoked significantly less frequently. The marital status of the pregnant women proved also an important factor – in the group of women living without a partner cigarettes smoking was statistically more frequent. The same applies to those who declared they were in a stressful situation

Table 14. Cigarettes smoking.

Factor	Correlation coefficient	P
Elementary education	0,4183	0,0001
Secondary education	-0,1890	0,001
University education	-0,1890	0,001
Marital status	0,1680	0,001
Planning of pregnancy	-0,1277	0,006
Stability of family situation	-0,1618	0,001
Conflicts in the family	0,1534	0,001
Aggressive behaviour	0,1429	0,002

Table 15. Smoking more than 5 cigarettes a day.

Factor	Correlation coefficient	p
Marital status	0,1347	0,007
Elementary education	0,2241	0,0001
Secondary education	-0,2037	0,0001
University education	0,1343	0,007
Planning of pregnancy	0,1406	0,005
Conflicts in the family	0,1402	0,014

Table 16. Alcohol consumption.

Factor	Correlation coefficient	p
Age	0,1861	0,001
Elementary education	0,1578	0,004

Table 17. Alcohol drinking and cigarettes smoking.

Factor	Correlation coefficient	P
Marital status	0,2070	0,005
Elementary education	0,1873	0,012

(an unstable family situation, conflicts in the family and aggressive behaviour) – their use of tobacco was more frequent in the first trimester.

Women who were in an unplanned pregnancy admitted smoking cigarettes in both the first and the second investigation.

As regards women smoking more than five cigarettes a day, the factors connected with the level of education proved significant – women with elementary education declared smoking more than 5 cigarettes a day more frequently than those with secondary and university education. Here also planning of pregnancy and marital status were important factors – unmarried women and those in unplanned pregnancy smoked more than five cigarettes a day during the two investigations. The same applied to women who had conflicts in the family.

The use of alcohol at the beginning of pregnancy as well as after the first trimester was statistically more frequent in case of older women and those with elementary education.

Alcohol drinking and cigarettes smoking in the two investigations was statistically more frequent in the group of unmarried women and those with elementary education.

Discussion

Cigarettes smoking in the first trimester of pregnancy was declared by 19,3% of the study group. This data resembles the results of other studies on incidence of tobacco smoking among pregnant women. The Norwegian investigations (by means of a questionnaire) – carried out in the years 1987–1994 and embracing 21348 pregnant women – showed that cigarettes were smoked by 34% in 1987 and 22% of respondents in 1994 (Eriksson et al. 1996). The Canadian studies revealed that 16,3% of women smoked cigarettes every day in the second half of pregnancy while 7,9% of them smoked more than 10 cigarettes a day (Stewart and Streiner, 1995). An investigation carried out on the population of Warsaw women in 1991 showed a higher percentage of pregnant women who declared smoking cigarettes in a retrospective study (29,1%) (Zaluska et al. 1993) as compared to the results of the latest study presented here.

A small percentage of women – only 16,8% admitted alcohol consumption in the past three months during the second investigation.

The results obtained in other studies showed a higher percentage: it is estimated that from 22,7% to 57% of pregnant women drink alcohol and 0,2% to 1,7% are alcohol abusers (Hungold et al. 1996; Russell et al. 1994). In the research of 1991 concerning 495 pregnant women in Warsaw, 31,5% declared drinking alcohol during pregnancy (Zaluska et al. 1993).

We found out a significant reduction in the use of tobacco, alcohol, analgetics and hypnotics during the first three months of pregnancy. The percentage of nonsmokers increased from 68,2% at the beginning of pregnancy to 80,7% after the first trimester. As regards quantities of cigarettes, the highest reduction was observed in the group smoking from 5 to 15 cigarettes a day (from 14,2% to 6,7%) and in the group of heavy smokers (from 2,3% to 0,9%). A relatively small change was noted in the group of women smoking up to 5 cigarettes a day (from over 15% to 11%). The Spanish research of 1989 showed that after having found out they were pregnant, 48% of the women quit smoking and 37% abstained from alcohol (Bolumar et al. 1994).

It is worth noting that the women examined in our study group declared alcohol drinking less frequently than in other investigations of this kind. It must be assumed that the women interviewed were reluctant to admit alcohol drinking since they probably knew about its negative effects on the course of pregnancy and the newborn. The interviews were made in maternal clinics by midwives which might have strengthened the women's tendency to conceal the fact of alcohol drinking. Such a tendency didn't appear (or appeared to a smaller extent) in relation to cigarettes smoking. The investigated women thought that smoking wasn't evaluated in society so negatively as alcohol drinking. The fact of falsifying the results of questionnaire studies concerning alcohol use by women in pregnancy has also been emphasized by other authors (Russell 1991b). Similar conclusions can be drawn from studies on the effectiveness of cigarettes smoking prevention programmes addressed to pregnant women. In an American research of 1994 the basic difficulty in gaining trustworthy information about stopping smoking or reducing the number of cigarettes smoked was pointed out. Since declarations of the women covered by the programme were not confirmed unambiguously in reality,

the authors of the research stated that the results obtained from questionnaires should be verified by biochemical tests (Kendrick et al. 1995; Walsh et al. 1996).

As regards our study group, the fact of cigarettes smoking was distinctly connected with the level of education, civic status, family difficulties as well as an unplanned pregnancy. Similar factors are enumerated in other studies on this subject. They prove that women with a lower level of education and consequently a low socio-economic status are the most frequent smokers in pregnancy (Wakefield et al. 1993; Frost et al. 1994; Zimmer-Gembeck, Helfand 1996; Gazmararian et al. 1996). Other important factors are: a weak social support, young age and unplanned pregnancy (Morales et al. 1997). The Scandinavian studies on psychosocial factors connected with intensive smoking in pregnancy (over 15 cigarettes a day) showed that such behaviour was noted more often among younger women and those without a steady partner. Emotional problems in childhood, growing up in an incomplete family and the family's lack of acceptance for pregnancy also influenced women's intensive smoking. Moreover, it was found out that women who smoked heavily in the third trimester had started smoking earlier than those who stopped smoking in pregnancy or reduced the number of cigarettes (Thue et al. 1995). The research carried out in Canada proved that women who smoked cigarettes in pregnancy were younger, less educated, unemployed and unmarried. They used alcohol and their pregnancy had not been planned. In the past they also had emotional problems. Authors of the research come to the conclusion that women who smoke cigarettes in pregnancy are more socially disorganized and demonstrate emotional difficulties (Stewart, Streiner, 1995).

The following factors are thought to facilitate quitting smoking in pregnancy: a long period of abstinence from smoking in the past, a nonsmoking partner and conviction that infants of smoking mothers are more likely to have health problems (Wakefield et al. 1993).

Conclusions

1. As regards alcohol, tobacco, analgetics and hypnotics, there is a distinct tendency to reduce their use after the first trimester of pregnancy.
2. This reduction applies particularly to alcohol – the largest group of women stopped drinking completely in the period after the first visit to a maternal clinic. Their number amounted to over 22%. A particularly high reduction concerned the amount of alcohol consumed on one occasion.
3. In relation to the use of tobacco the reduction is smaller – the number of women who quit smoking between the two investigations amounted to 13%.
4. As regards drugs (analgetics and hypnotics), the highest decrease was noted in the use of analgetics – 15% of women stopped using them.
5. Cigarettes smoking during the first trimester was connected with the level of education (women with elementary school education declared it statistically more often), civic status (unmarried women admitted it more frequently) and a stressful situation in the family (women who described their family situation as unstable, related conflicts and aggressive behaviour including physical aggression). Alcohol was used more frequently by older women and those with elementary school education. Alcohol drinking combined with cigarettes

smoking was more frequent in the group of unmarried women and those with elementary school education.

6. Women who had not planned their pregnancy were in the group of those who smoked cigarettes more frequently. This fact was not statistically significant for alcohol and drug consumption.

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