

# Smoking in pregnancy — a health education problem

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**SUMMARY.** *The smoking habits and knowledge and demographic characteristics of 380 pregnant patients in Belfast were investigated. Over half of the women smoked but only 11.5% stopped smoking after becoming pregnant in spite of the fact that almost 65% of them knew that smoking could have an effect on the baby. The study showed that some smokers changed their attitude to smoking before and after delivery and that little effort is being made by general practitioners to dissuade their antenatal patients from smoking. More emphasis on health education for school children is required and also more individual effort on the part of health professionals to dissuade women from smoking, especially when they are pregnant.*

## Introduction

It is generally accepted that smoking by pregnant women constitutes a hazard to the fetus and that the babies of mothers who smoke during pregnancy have lower birthweight, even after allowance has been made for differences in age, parity and social class between smokers and non-smokers.<sup>1,2</sup> It has also been shown that the children of mothers who smoked 10 or more cigarettes a day after the fourth month of gestation had subsequent differences in development compared with the children of non-smokers.<sup>3</sup> As smoking is an avoidable risk factor in pregnancy, all the members of the health team should therefore advise mothers to stop or at least cut down their smoking in pregnancy. These facts have been known for over 20 years but even with additional information about the risk to maternal health from smoking there has been little response, particularly from mothers in social classes 4 and 5, the group at greatest risk.

The purpose of this study was to look at the demographic characteristics and smoking habits and knowledge of pregnant women attending 11 health centres in Belfast, to assess how much effort was being made by health professionals to stop women smoking during pregnancy and to what extent patients were making use of any information received. The outcome of pregnancy was examined to support the statement that smoking constitutes a hazard in pregnancy.

## Method

The study took place between July 1982 and May 1984. The patients were selected from 11 health centres in Belfast and its suburbs and represented all social classes. From previous birth records the likely number of pregnancies to occur in the given time was estimated and 70% of the patients attending each of these 11 health centres were selected using a random number generator computer programme in order to obtain an initial sam-

ple of 500 women. The general practitioners and midwives at the health centres requested each women's permission before including them in the study.

The research health visitor interviewed each patient in her own home and completed questionnaires at approximately 12–14 weeks gestation, following hospital booking, and again approximately 8–10 weeks after delivery. A historical search of the hospital obstetric records was made 2–3 weeks after delivery.

Of the initial sample of 500 patients, 380 completed questionnaires, 29 miscarried and 12 had moved away from Belfast during the study period. Seventy-nine patients (15.8%) were unwilling to be interviewed — 46 of these patients came from two health centres situated in a particularly poor area of the city and the remaining 33 were evenly distributed among the other nine health centres. Thus a substantial response bias was possible.

The questionnaires were designed to include patients' demographic characteristics and smoking habits; their knowledge about the possible effect of smoking on the baby; which members of the health team had discussed smoking with them; and their intentions with regard to future smoking patterns. Patients' attitudes to and expectations of antenatal classes and health education literature were also recorded.

All data processing and statistical analyses were performed using the Statistical Package for the Social Sciences on the Queen's University of Belfast ICL 2900 computer. The conventional level of significance ( $P < 0.05$ ) was used for all statistical comparisons. The chi-square test was used to compare smokers and non-smokers.

## Results

Of the 380 patients who completed questionnaires, 191 (50.3%) were smokers. Of the smokers 67 (35.1%) smoked as many as 10 cigarettes per day, 97 (50.8%) smoked 11–20, 17 (8.9%) smoked 21–30 and 10 (5.2%) smoked over 30. The birthweights of the babies of smokers and non-smokers are shown in Table 1. The numbers of neonatal complications, which include prematurity, jaundice and congenital anomalies, for babies of mothers in both groups are also shown in Table 1.

**Table 1.** Comparison of the birthweights of babies of smokers ( $n=191$ ) and non-smokers ( $n=189$ ) and the neonatal complications among these babies.

	Number (%) of smokers	Number (%) of non-smokers
<i>Birthweight (g)</i>		
<2500	19 ( 9.9)	7 ( 3.7)
2500–3500	120 (62.8)	80 (42.3)
>3500	52 (27.3)	102 (54.0)
	$\chi^2 = 29.76$ , 2 df, $P<0.001$	
<i>Neonatal complications</i>		
Neonatal complications present	27 (14.2)	13 ( 6.9)
No neonatal complications	162 (84.8)	174 (92.1)
Stillbirths	2 ( 1.0)	2 ( 1.0)
	$\chi^2 = 4.57$ , 1 df, $0.05>P>0.02$ , stillbirths omitted from calculation	

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Of the 380 patients in the survey 31 were 20 years of age or younger. Of these 18 (58.1%) were smokers. The majority of patients, that is 326, were aged between 21 and 34 years and of these 160 (49.2%) were smokers. Only 23 patients were aged 35 years or over and 12 of these patients (52.2%) were smokers.

Three hundred and forty-nine patients were married or cohabiting and of these 168 (48.1%) were smokers — 117 of their partners (69.6%) also smoked. Thirty-one patients had no partner, and 23 (74.2%) of these patients were smokers. Of the 181 patients who were non-smokers and who were married or cohabiting 61 (33.7%) had partners who were smokers.

The total sample of 380 patients was made up of 112 primigravidae, 49 (43.7%) of whom smoked and 268 multiparous patients of whom 142 (53.0%) smoked.

The social class, educational achievements and employment status of the patients are shown in Table 2. The social class was determined according to the Registrar General's classification using the husband's occupation for a married woman, the father's occupation for a single woman living at home or her own occupation if she lived alone. If the husband or father was unemployed, his previous occupation was used.

**Table 2.** Social class, educational achievements and employment status of smokers ( $n=191$ ) and non-smokers ( $n=189$ ).

	Number (%) of smokers	Number (%) of non-smokers
<i>Social class</i>		
1 and 2	18 ( 9.4)	60 (31.7)
3	93 (48.7)	91 (48.1)
4 and 5	80 (41.9)	38 (20.2)
	$\chi^2 = 37.58$ , 2 df, $P<0.001$	
<i>Qualifications obtained</i>		
'A' and 'O' levels	35 (18.3)	79 (41.8)
CSE and other qualifications	41 (21.5)	39 (20.6)
None	115 (60.2)	71 (37.6)
	$\chi^2 = 27.43$ , 2 df, $P<0.001$	
<i>Employment status</i>		
Full-time employment	32 (16.8)	64 (33.9)
Part-time employment	23 (12.0)	31 (16.4)
Full-time housewife	109 (57.1)	76 (40.2)
Casual employment (4 patients), unemployed (34), students (4), medically unfit (3)	27 (14.1)	18 ( 9.5)
	$\chi^2 = 19.53$ , 3 df, $P<0.001$	

After standardization for social class there were still significant differences between the birthweights of babies born to smokers and non-smokers ( $\chi^2 = 24.14$ , 2 degrees of freedom,  $P<0.001$ ). However, after standardization for smoking, there was no significant difference in the birthweight distribution between the social classes ( $\chi^2 = 6.619$ , 6 df,  $0.50>P>0.30$ ).

After the patients had attended hospital for their booking visit they were given their first interview and were asked if they thought that smoking during pregnancy could have an effect on the baby and if so what that effect might be. Similar questions were put at the second interview about 8–10 weeks after delivery. The results are shown in Tables 3 and 4.

These figures show that the majority of pregnant women have heard that smoking can affect unborn babies and many of them knew that the effect might be a reduction in birthweight. Tables 3 and 4 show that many women, especially those who smoked,

**Table 3.** Response by smokers and non-smokers to the question 'Do you think smoking in pregnancy can have an effect on the baby?'

	Number (%) of responses			
Postnatal interview	Antenatal interview			Total
	Yes	No	Don't know	
<i>Smokers</i>				
Yes	76	9	7	92 (48.2)
No	25	31	8	64 (33.5)
Don't know	22	6	7	35 (18.3)
Total	123 (64.4)	46 (24.1)	22 (11.6)	191
<i>Non-smokers</i>				
Yes	162	1	4	167 (88.4)
No	7	2	0	9 ( 4.8)
Don't know	9	0	4	13 ( 6.9)
Total	178 (94.2)	3 ( 1.6)	8 ( 4.2)	189

Comparing total responses for smokers and non-smokers:

Antenatal interview  $\chi^2 = 52.93$ , 2 df,  $P<0.001$ .

Postnatal interview  $\chi^2 = 71.64$ , 2 df,  $P<0.001$ .

**Table 4.** Response to 'What type of effect?' given by those who thought that smoking in pregnancy could have an effect on the baby.

Effect	Number (%) of smokers		Number (%) of non-smokers	
	Antenatal interview	Postnatal interview	Antenatal interview	Postnatal interview
Small baby	94 (76.5)	54 (58.7)	119 (66.9)	96 (57.5)
Other — including prematurity, miscarriage, handicap	18 (14.6)	28 (30.4)	34 (19.1)	54 (32.3)
Don't know	11 (8.9)	10 (10.9)	25 (14.0)	17 (10.2)
Total	123	92	178	167

Antenatal interview:  $\chi^2 = 3.36$ , 2 df,  $0.20>P>0.10$ .

Postnatal interview:  $\chi^2 = 0.11$ , 2 df,  $0.95>P>0.90$ .

changed their opinions between the antenatal interview and the postnatal interview. Of the 123 smokers who said at antenatal interview that smoking could have an effect on the baby, 47 had changed their minds at the postnatal interview; of the 178 non-smokers who had initially said that smoking could affect the baby, 16 had changed their minds between interviews (Table 3).

The topic of smoking is introduced at various stages during antenatal care — in the health centre, at the hospital antenatal clinic and from the many pamphlets given to pregnant women. The patients were asked at the first interview with whom they had discussed smoking. The results obtained from smokers are shown in Table 5. Only 14 patients (7.3%) had discussed smoking with a health visitor but as she is not usually involved with pregnant patients until the third trimester this low figure was not surprising. What is surprising is that so few patients had discussed smoking with their general practitioner. However, only 7.8% of smokers had not discussed smoking with any health professional.

**Table 5.** Reponse by smokers to the question 'Have you discussed smoking with any of the following people since you became pregnant?' at the first interview (*n* = 191).

	Number (%) of responses	
	Yes	No
GP	37 (19.4)	154 (80.6)
Midwife	163 (85.3)	28 (14.7)
Health visitor	14 ( 7.3)	177 (92.7)
Obstetrician	94 (49.2)	97 (50.8)

Only 101 smokers (52.9%) were invited to attend antenatal classes during their pregnancy; however, only 10 of the 90 smokers not invited said that they would have liked to attend if they had been invited. Of the invited smokers only 32 (31.7%) attended any classes. However, five of these patients stopped smoking and 18 cut down, that is, 71.9% changed their smoking habit, possibly as a result of what they heard at the classes, compared with 52.2% of these who did not attend classes. The figures were only slightly better for non-smokers; only half of those invited attended any classes. The patients who wished to attend classes were asked if they expected to hear about smoking at the classes. Only 48% of smokers and 47% of non-smokers answered in the affirmative. It is clear that advice about smoking is not thought to be a particularly important aspect of antenatal health education in comparison with other topics such as preparation for labour, care of the baby and nutrition. Of the 191 smokers, 143 (75.3%) were given health education literature which included advice about smoking during pregnancy and 108 of these patients said that they had read and understood the literature.

Smokers were asked at the first interview what their intentions were with regard to smoking for the rest of their pregnancy. They were asked at the postnatal interview what they had actually done. The results are shown in Table 6. Of the 106 patients who altered their smoking habit during their pregnancy only 35 (33.0%) retained their new habit. Seventy-one patients (67.0%) admitted at the postnatal interview that they had reverted to their former smoking pattern.

**Table 6.** Intention and action of smokers during pregnancy.

	Number (%) of smokers			
	Stopped	Cut down	No change	Total
Intention to stop	19 (33.3)	24 (42.1)	14 (24.6)	57
Intention to cut down	3 ( 2.8)	55 (51.4)	49 (45.8)	107
Intention to make no change	0 ( 0.0)	5 (18.5)	22 (81.5)	27
Total	22 (11.5)	84 (44.0)	85 (44.5)	191

## Discussion

A survey of smoking habits carried out in Northern Ireland in 1981 showed that 27% of women of all ages smoked, with the highest percentage (40%) among the 20–29 years age group.<sup>4</sup> This study of pregnant women in Belfast showed that 50.3% were smokers and only 11.5% of smokers stopped smoking after becoming pregnant. It also showed that many more smokers are

in the lower social classes, have fewer educational qualifications and are less likely to be in employment than non-smokers. The partners of smokers are also more likely to smoke than those of non-smokers.

Smoking is considered to be an easily avoidable risk factor in pregnancy, whereas poverty and poor housing — more fundamental causes of infant morbidity or mortality — are considered less easy to solve in the present financial climate. As the effect of smoking during pregnancy has been found to persist even allowing for other factors<sup>2</sup> it would seem reasonable to encourage specific health education about smoking. Much effort has already gone into the campaign against smoking in pregnancy — the Health Education Council have produced posters and leaflets since 1973 and Action on Smoking and Health (Northern Ireland) have been campaigning in Northern Ireland for the past 15 years — but from this study it would appear that this health education is having little effect. The dissemination of knowledge is obviously insufficient to curtail the smoking habit in pregnancy. Nearly 65% of smokers in this study thought that their smoking could have an effect on their baby and 76.5% of these women knew that the effect might be a reduction in birthweight. A further 14.6% thought that smoking could cause some other problem, such as prematurity, miscarriage and handicap, yet only 11.5% of smokers actually stopped smoking. The non-smokers appeared to be more informed about the effect of smoking but it is difficult to be sure of this — many smokers may have denied knowledge of the effect of smoking because of feelings of guilt.

Many women changed their minds about smoking. Of the 64 smokers who said at the postnatal interview that smoking did not affect the baby, 25 of them had originally said that it did. Of the nine non-smokers who said that smoking did not affect the baby at the postnatal interview, seven had originally said that it did. However the number of women who changed their minds in both directions was considered to be too small for further analysis of their particular characteristics.

Personal experience plays an important part in determining what each woman believes. If she smoked or knew of someone who smoked during pregnancy, and had a normal or even heavy baby, then she is less likely to be influenced by health education. As Graham has pointed out, 'If a smoker's personal experience does not support the health education message, the motivation to change behaviour is not sufficient to overcome the addictive pleasures of smoking.'<sup>5</sup> Dalton and colleagues showed in their study in south-east London that patients who had received direct advice to stop smoking from their medical advisers were more likely to admit knowledge of the hazard and were also more likely to give up smoking during pregnancy. However they also found that 32% of the mothers who smoked claimed that no medical adviser had attempted to dissuade them from smoking.

The study described here which has the same limitations as all surveys based on a questionnaire in that the results depend on the truthfulness of the replies given, showed that only 7.8% of patients who smoked had not discussed smoking with any health professional and that in fact smoking had been mentioned to 85.3% of the smokers by the midwife. The extent of the advice given was not ascertained and patients may simply have been asked if they smoked in order to complete the required information in the medical chart and if the reply was yes there may have been only a brief indication that it would be advisable to stop.

What is more important is that only 19.4% of smokers claimed that their general practitioner had discussed smoking with them. The general practitioner is in the position of being able to offer

smoking advice before pregnancy and in its early stages. The women may indeed be more receptive at this stage because of a desire to do what is best for the baby or simply because they may be suffering from nausea and smoking has less appeal. Such an opportunity should not be wasted. Less than half of the smokers claimed that they had discussed their smoking habit with their obstetrician. The obstetrician can reinforce the general practitioner's advice at the first hospital visit. More emphasis on individual advice to patients and on teaching communication skills to health personnel might result in some reduction in smoking.

The influence of health education classes as part of antenatal care appears to be small. Many patients do not attend and do not see them as an integral part of the antenatal services. Even though the number of smokers in the study who attended classes was small, 71.9% of them changed their smoking habit, either stopping or cutting down, compared with 52.2% of those who did not attend classes. This suggests that attendance at the class had a beneficial effect. The enormous potential of the health visitor and midwife in this field is therefore not being fully utilized.

Pamphlets and posters also seem to have little influence. They are widely available at all antenatal clinics but patients pay little attention to them. This was also confirmed by Dalton and colleagues.<sup>6</sup> Knowledge alone does not produce a change in attitudes and behaviour. It is necessary to look at the role which smoking plays in everyday life and if a change is wanted women must be prevented from starting to smoke early in life when it is not a habit. This means more and better health education for children. It is the responsibility of the government to provide statutory health education in all primary and secondary schools, and the responsibility of health professionals to communicate the dangers of smoking to pregnant women on an individual basis and to offer individual help and support.

## References

1. Butler NR, Goldstein H, Ross EM. Cigarette smoking in pregnancy: its influence on birth weight and perinatal mortality. *Br Med J* 1972; 2: 127-130.
2. Sidle N. *Smoking in pregnancy — a review*. London: Spastics Society, Hera Unit, 1982.
3. Butler NR, Goldstein H. Smoking in pregnancy and subsequent child development. *Br Med J* 1973; 4: 573-575.
4. Department of Health and Social Security (Northern Ireland). *Survey of smoking in Northern Ireland*. Belfast: DHSS (NI), 1981.
5. Graham H. Smoking in pregnancy: the attitudes of expectant mothers. *Soc Sci Med* 1976; 10: 339-405.
6. Dalton WR, Hughes CA, Cogswell JJ. Cigarette smoking in pregnancy: a health education problem, *Public Health* 1981; 95: 207-214.

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