

## Some comments on the effects on the development child of maternal smoking during pregnancy.

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### Introduction

Until the late 1960's the most popular advice literature for expectant mothers did not concern itself with advice on smoking. However, since the turn of the decade there have been increasing exhortations against smoking during pregnancy. For example, the Health Education Council (U.K.) has produced a pamphlet which commences: "When a pregnant woman smokes she puts her unborn baby's life at risk. Every time she inhales, she poisons her baby's bloodstream with nicotine

and carbon monoxide." Why have there been these increasing exhortations, and what is the evidence?

The basic issues are those of the effects of smoking during pregnancy on the baby's birthweight and on perinatal mortality. To quote again from the Health Education Council pamphlet: "Smoking can restrict your baby's growth inside the womb. It can make him underdeveloped and underweight at birth.

It can even kill him."



### Lowered Birth Weight

The first report of a lowering of birthweight among offspring of mothers who smoked during pregnancy was by Simpson (1957). Since that time a large number of studies have confirmed this effect, showing mean reductions in birthweight usually varying between 150 and 250 grams (See e.g. Butler and Alberman, 1969; Murphy *et al* 1977; Niswander and Gordon, 1972) birthweight was reduced by 170 grams in the offspring of smokers. Murphy *et al* (1977) report an earlier study in which the mean birthweight for babies of non-smoking mothers was 3.83 kg compared to 3.43 kg for the babies of mothers who smoked 10 or more cigarettes a day throughout pregnancy.

### Increased Perinatal Mortality

The British Perinatal Mortality Survey also showed that the perinatal mortality rate was nearly 30% higher for mothers who smoked regularly after the fourth month of pregnancy than for non-smokers. The same difference was still present after allowance had been made for the age, parity, and social class differences between smokers and non-smokers. Similar results have been obtained in other studies (see Table 1), although it should be noted from the table that there have been some studies, e.g. Rantakallio (1969) and Yerushalmy (1971), that do not show a significantly higher perinatal mortality rate for the offspring of smokers as compared to those of non-smokers.

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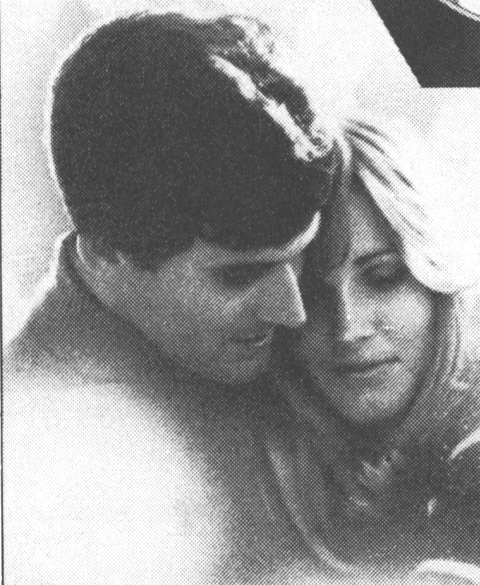
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TABLE 1 Proportion of low birthweight children and ratio of perinatal mortality in smokers and non-smokers

Study	Year	Low birth weight		Mortality Rate	
		Smokers	Non-smokers	Smokers	Non-smokers
Rantallio	1969	6.1	3.5	1.01	
Yerushalmy	1971	6.4	3.2	1.03	
Ontario Canada	1967	8.9	4.5	1.27	
Butler et al	1972	9.3	5.4	1.28	
Comstock et al	1971	11.1	5.9	1.40	

(Based on Goldstein, 1977, p. 14)

### Low birthweight and increased perinatal mortality — some comments

The Health Education Council pamphlet claims: "If you give up smoking when you're pregnant your baby will be as healthy as if you'd never smoked."

If smoking does act as a causal agent during pregnancy, then those women who give up smoking in the early part of pregnancy ought to have babies with an average birthweight between that of babies of smokers and non-smokers. In a number of studies (e.g. Lowe 1959; Butler et al, 1972; Schwartz et al, 1972) those mothers who stated that they had given up smoking in the fourth month of pregnancy had babies whose birthweight distribution was virtually indistinguishable from that of non-smokers.

### Second half

This finding might lead one to the conclusion that it is the second half of the pregnancy which is the vulnerable period. For example, Baric et al (1976) suggest that this finding means that a woman has

plenty of time to give up smoking after she becomes pregnant. Goldstein (1977) however warns that such an interpretation should be made very cautiously as information gained about changes in smoking habits is usually obtained retrospectively and may not be accurate concerning timing. Donovan (1977) also suggests caution when pointing out that the belief that retardation of fetal growth caused by maternal smoking occurs in late pregnancy is not well founded.

### Higher parity

The British Perinatal Mortality Study indicated that mothers who smoked during pregnancy tended to come from poorer socioeconomic backgrounds, were older, and were of higher parity than non-smokers. This raised the possibility that smoking 'caused' neither the decrease in birthweight nor the increase in perinatal mortality, but was rather an index of the particular type of mother. This is basically the viewpoint advanced by Yerushalmy (1964, 1971, 1972) in a series of papers criticising the proposed link between increased perinatal mortality

rates and smoking during pregnancy. Alvear and Brooke (1977), who found no significant differences in anthropometric measures between a small group of babies of mothers who smoked during pregnancy compared to those of non-smokers, also suggest that observed lower birthweight in babies of mothers who smoke is a reflection of lower social class.

Goldstein (1972, 1977) and Donovan (1977) suggest that Yerushalmy's criticisms are based on analyses that are methodologically unsound. Goldstein (1977) explains the difference in perinatal mortality rates in the studies shown in Table 1 by drawing attention to the incidence of low birthweight in the various studies. The last three studies listed (Ontario, 1967; Butler et al, 1962; Comstock et al, 1972), the ones which show a higher incidence of low birthweight, are also the ones that show a significantly higher perinatal mortality rate for the children of smokers. Goldstein argues that if smoking during pregnancy leads to a loss of about 200 grams this is

more serious for the low birthweight child than it is for the normal or high birthweight child. Consequently, the more low birthweight babies there are in the population, the greater can be the expected increase in the perinatal mortality rate associated with smoking.

Alberman, *et al.* (1977) suggest that Alvear and Brooke's (1977) suggestion that observed lower birthweight in babies of mothers who smoke is a reflection of lower social class, is very much open to question. Alberman *et al.* have shown, with an exceptionally narrow band within one social class, who are very homogeneous with regard to income and education (*viz.* women medical practitioners on the United Kingdom Medical Register in 1975 who had qualified in England or Wales in 1950 or later) a highly significant fall in mean birthweight associated with smoking.

### **Subsequent child development**

Very few studies have followed up a large enough sample of babies to compare adequately the subsequent development of those born to smokers as compared with those born to non-smokers. Butler and Goldstein (1973) show a 1.6 cm difference in height at age 11 between children of heavy smokers (defined as 10 plus a day) and children of non-smokers during pregnancy. However, unlike birthweight, 40% of this difference is reduced when account is taken of mediating factors such as social class, family size, and maternal height. This suggests that the association may not be wholly causal, and that if further mediatory factors are taken into consideration the major part of the difference may be explained.

### **Educational Allowment**

The same seems to apply to educational attainment. Davie *et al.* (1972) found that at age seven children of smokers during the second half of pregnancy were three months behind in reading attain-

ment, whilst Butler and Goldstein (1973) report the difference to be about nine months at age 11. However, when mediating factors such as social class and family size are introduced the difference drops quite markedly. Hardy and Mellits (1972) failed in their study to find any intellectual impairment in the children of mothers who smoked during pregnancy.

### **Concluding remarks**

It is argued that smoking is an important and 'preventable' perinatal influence (Goldstein, 1973) and that we should be especially concerned to discourage smoking among women already known to be at a high risk of producing a low birthweight baby.

### **Reduction**

However, there is some evidence to suggest that if a woman feels she cannot stop smoking during pregnancy a reduction in the number of cigarettes smoked could be beneficial. The United States Department of Health, Education and Welfare (1973) found a dose-response relationship, whilst Butler *et al.* (1972) found that the perinatal mortality rate was lowest for non-smokers, intermediate for those who smoked one to four per day, and highest for women smoking any number over five per day. All the same, what number of cigarettes the pregnant woman should reduce to is not yet clear. Schwartz *et al.* (1972) found that the effects of smoking during pregnancy are reduced if the smoke is not inhaled. This may be a partial solution for women who cannot stop completely.

### **Important Issue**

One important issue is the effectiveness of health education programmes in convincing women to

stop smoking during pregnancy. It has been argued that the style and content of anti-smoking programmes and literature should not necessarily be based on the assumption that expectant mothers who continue to smoke are ignorant of the facts and/or are irresponsible with respect to their smoking behaviour. Graham (1976) suggests that whether a woman continues to smoke during pregnancy or gives up smoking depends very much on her assessment of the validity of the case against continuing to smoke (which in turn relates to her attitude to scientific knowledge in general), and to the role and meaning she ascribes to smoking in facilitating the fulfilment of her everyday obligations and responsibilities. Baric *et al.* (1976) claim that the task for health education is not to increase the level of knowledge about smoking and pregnancy but to increase the credibility of the existing knowledge among women. They also warn about the dangers of either creating or increasing the anxiety in those women who do not find it possible to stop smoking.

### **Evidence**

The evidence for a link between smoking during pregnancy and birthweight and perinatal mortality appears to be quite clear. What is not clear is what is the most effective way of having this link accepted by the general public, especially by those who are most at risk of producing low birthweight babies.



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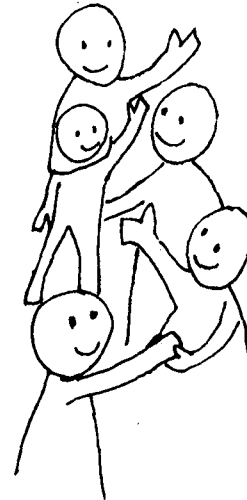
# Effective Parenting

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**Effective parenting has nothing to do with ideal families that have no problems. No! Strains and irregularities are part of life. Effective parenting is not helped when parents are totally immersed in the care of their children. Parents need to be aware of their own needs. Effective parenting is when parents do for children what they cannot do for themselves, while encouraging them to do what they can for themselves, so that they move from complete dependence to independence to inter-dependence when they can themselves accept responsibility.**

The National Marriage and Family Week Council represents many community organizations, including all major religious denominations. Churches and other organizations, individuals and families, are invited to use issues raised in this leaflet for worship services, discussions, group work, both during the Week, or later in the year.



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