

## SEASONAL DISTRIBUTION OF ABORTIONS

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At least one pregnancy in eight terminates in an abortion recognized as such and recalled by women when asked for a pregnancy history (McDonald, 1958; Warburton and Fraser, 1964). Some women have a greater tendency to abort than others (Warburton and Fraser, 1964) and a few abort repeatedly (Eastman and Hellman, 1961). Gross fetal malformation undoubtedly accounts for some spontaneous abortions, and recently chromosomal abnormalities, especially trisomy, have been demonstrated in a substantial proportion (Singh and Carr, 1967; Dhadiyal, Machin, and Tait, 1970). The association of fetal trisomy with advancing maternal age may partly explain the higher risk of abortion observed in older women (Warburton and Fraser, 1964).

The epidemiology of spontaneous abortions needs to be understood if we are to attempt to prevent the loss of normal fetuses in desired pregnancies, and the relationship between fetal defect and abortion makes it especially important. One of the main reasons for our ignorance is the difficulty in distinguishing spontaneous from procured abortions which are often concealed.

An association between febrile illnesses in the first 12 weeks of pregnancy and abortion was reported (McDonald, 1958) and was also found in another

and larger prospective survey of 12,000 pregnancies (McDonald, J. C., unpublished). In the latter study women whose last menstrual period (LMP) occurred during the months of December to May had higher rates of abortion than those whose LMP was between June and November (Fig. 1).

The present survey was undertaken to study seasonal distribution in a large number of abortions and to test the hypothesis that there is an excess in spring.

### MATERIALS AND METHODS

Seven hospitals with good recording systems serving populations in different areas of Montreal kindly agreed to take out for inspection by a nurse-investigator the case records of all patients admitted for abortion between 1 January 1961 and 31 December 1966. The following details were extracted in a standard manner: age, nationality, civil status, previous abortions, previous live and stillbirths, date of last menstrual period, dates of onset of abortion, fetal expulsion and curettage, and whether there was a history of interruption of the pregnancy. In all, 11,499 case records were studied.

The total admissions for abortion during the first four years of the study period were fairly constant at nearly 2,000, but in 1965 and 1966 they were lower by about 200 annually. In the same period total admissions for births in these hospitals were nearly 18,000 annually between 1961 and 1964 but they fell to 16,000 in 1965 and to 15,000 in 1966 mainly as a result of a declining birth rate.

Of the 11,499 case records extracted, 171 were found to contain serious omissions or inconsistencies. These were excluded and the remaining 11,328 were analysed.

### FINDINGS

In 1,398 women who were unmarried (single, widowed, divorced or separated) or of unknown civil status (26 in number) the abortion was considered as potentially induced. Among 9,930 married women there was no indication that it was other than spontaneous in 9,629. The remaining 301 abortions, consisting of 182 which were stated to have been induced,

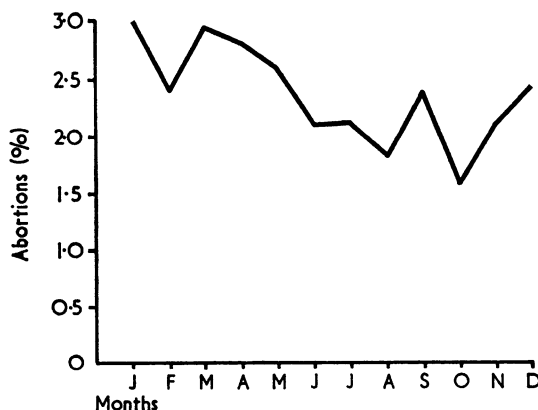


FIG. 1.—Abortions by month of LMP expressed as proportion % of all LMPs for 10,449 pregnancies in Britain, 1959-60 (McDonald, J. C., unpublished).

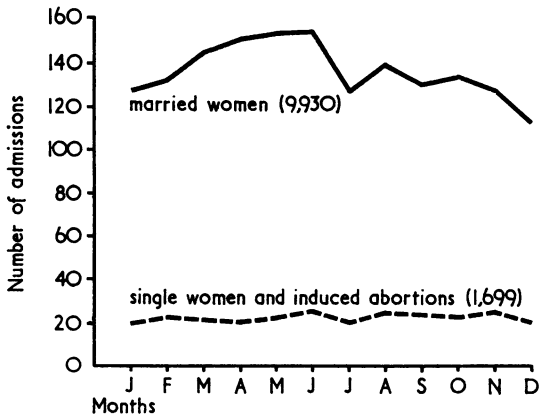


FIG. 2.—Mean monthly admissions for abortion 1961-66 (corrected for length of month and proportion of annual births six months later).

and 119 which were said to have followed a fall or accident, were grouped with induced abortions.

Figure 2 shows the mean monthly admissions for abortion corrected for length of month and for the proportion of annual births in Quebec that would have been at a three-month stage of gestation. In the potentially induced group of 1,699 admissions there was no evidence of any seasonal variation but there were seasonal fluctuations in the main group of married women with the highest rates from March to June and a smaller increase in August.

Since the duration of gestation at which the abortion occurred varied, average monthly LMPs were also examined (Fig. 3). The date of the LMP was known for 10,886 of the 11,328 cases, but as the survey was based on admissions, the 9,183 abortions in the years 1961 to 1965 only were studied. In all there

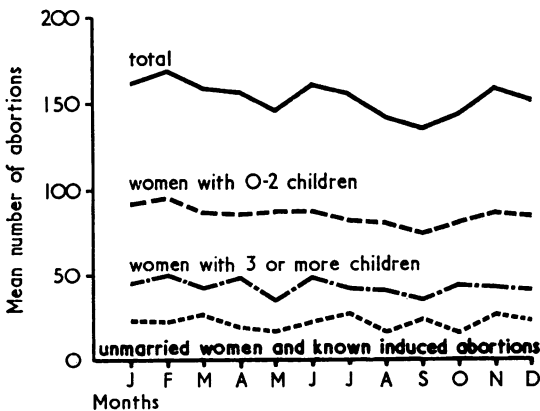


FIG. 3.—Abortions by month of LMP (corrected for Quebec births minus nine months and length of month).

were more LMPs between November and April and in June. The potentially induced abortions again showed no seasonal variation. The married women, for whom there was no information that the abortion was other than spontaneous, were divided into two groups—those with less than three children, who most probably wanted the pregnancy and those with three or more children, many of whom may not have wanted it and might therefore have tried to induce abortion. The numbers were rather small but the seasonal trend was more clearly present among the women least likely to have tried to induce abortion and less obvious in the other group.

Abortions for each month of LMP throughout the period January 1961 to June 1966 varied considerably because of small numbers but there appeared to be higher rates each winter and in 1962 a large peak in June-July, and suggestions of a July-August excess in the other years (Fig. 4).

The spring peak appeared more definite according to the time of admission and therefore of abortion than according to the month of conception. The excess in each of these four months was of the order

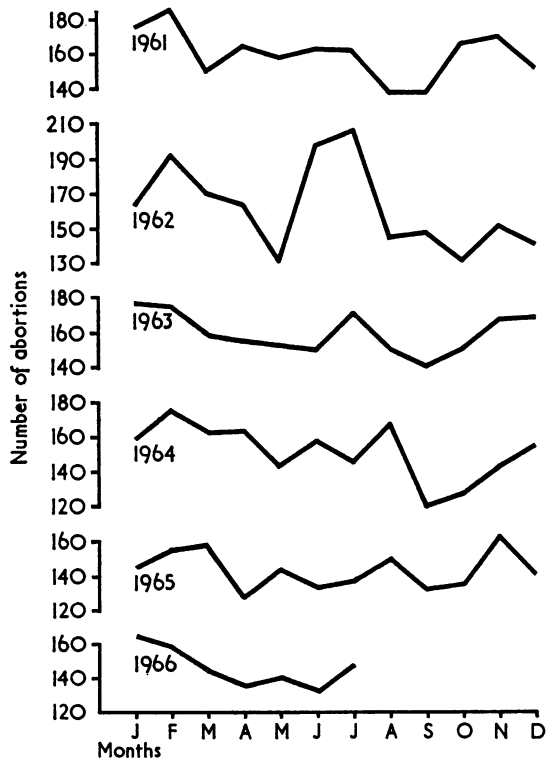


FIG. 4.—Mean number of abortions by month of LMP (corrected for length of month and proportion of births in Quebec nine months later).

of 10% compared with the annual average, or 17% compared with the average for the remaining eight months.

#### DISCUSSION

In the seven hospitals studied the ratio of admissions for abortion to admissions for delivery was over 1:10. This ratio is therefore of the same order as the proportion of all pregnancies that are reported to terminate in spontaneous abortion. However, little can be inferred because of the unknown number of abortions that are not admitted to hospital and because it is by no means sure that the populations from which abortions are derived in any one hospital correspond to those from which maternity cases come.

If a high proportion of unmarried women had procured their abortions and the information recorded regarding induction of abortion in married women was correct, the minimal proportion of such abortions in the series studied was 15%. Indirect and rather weak evidence derived from the nature of the graph of monthly abortions in married women with three or more children—being intermediate between that of women with no more than two children and that of women whose abortions were probably induced—suggests that the true figure was higher.

The results of this study confirm the hypothesis that there is an excess of abortions in the spring. A probable explanation for this is that infective agents epidemic in spring may be causally related to some abortions. The results further suggest that to a lesser extent other infections prevalent in summer may also play some part.

#### SUMMARY AND CONCLUSION

A study of 11,328 abortions admitted during a period of six years to seven hospitals in Montreal was undertaken to test the hypothesis that there is an excess of spontaneous abortions in the spring. No seasonal trend was found in mean monthly abortions

in 1,699 cases in which abortions may have been induced—unmarried women and those who stated that they had attempted to procure an abortion. In the remainder (9,930), there was an excess of abortions in the months of March to June, amounting to 10% of the monthly mean for the year or 17% of the monthly mean for the remaining eight months. The variation was most evident in women with less than three children in whom most abortions were probably spontaneous. Taking into consideration previous findings the spring excess is probably caused by infective agents.

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