Motherhood and infant health in Khartoum

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The results of an analysis of the growth and illness experience of a group of infants in Khartoum townships illustrate the remarkable benefits of being the infant of a "housewife" rather than the infant of a mother who works. These benefits occurred despite the poorer domestic environments of the housewives.

Introduction

A path analysis of the interrelationships between the social, biological, and medical factors affecting mothers and their infants in poor Khartoum townships has highlighted the powerful effect exerted by the occupational status of the mother. In particular, the infants of women classified as housewives seemed to have substantially less illness and, independently of this, better first-year increases in weight and length than infants whose mothers had jobs (7). The data collected focused primarily on the infants rather than the mothers; however, since the study was longitudinal over the first year of life, a more detailed analysis of the "housewife effect" was possible than that undertaken in the path analysis, and in this article we report our results.

Materials and methods

Full details of the sample and the methods used in the study have been published previously (3, 4). Briefly, information on the following was collected: maternal occupation, income and environmental circumstances; the processes of weaning; the number of days on which a child was ill with fever, diarrhoea, cough or vomiting in each 2-week period throughout the first year of life; and body weight and supine length at birth as well as at monthly intervals over the same period. The present analysis is based on data for 120 mother–infant pairs for whom complete information was available on length increase and weaning, and nearly complete information on monthly illness experiences. The number of mother–infant pairs in the weight analysis varied between 102 and 118. A total of 36 of the mothers were classified as housewives, while 84 had jobs.

Results

Fig. 1 shows the mean number of days each month on which children were reported to be ill, according to the occupational status of the mothers. Illness was uncommon during the first two months for both groups. It remained so for the infants of housewives, with the duration of average monthly episodes rarely exceeding 1 day; however, for the infants of mothers with jobs, the mean duration of illness per month gradually rose to as high as 4 days at 7 months of age and usually remained above 3 days thereafter. These monthly values are largely statistically independent of one another (except where a single illness experience overlapped a "measuring" time) and provide evidence for the advantage of having a mother who was a housewife.

Fig. 1. Mean duration of illness among infants of housewives and non-housewives.

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As indicated by the results of the path analysis, variation in illness experience is only partly due to the timing of weaning, with late weaning being protective. If weaning age is taken to be the time in days when breast-feeding begins to be regularly supplemented with solid food, there was a substantial difference in the behaviour of the two categories of mother. The average age at which the infants of housewives were weaned was 156.8 ± 61.5 days and for non-housewives, 133.3 ± 69.7 days. Notwithstanding the large standard deviations associated with these ages, which are accentuated by positive skewing of the distributions, the difference approaches statistical significance at the P = 0.5% level.

The comparative growth curves for body weight and supine length are shown in Fig. 2 and 3, respectively. For weight there was little difference between the two groups of infants during the early growth period, but about halfway through the first year of life the mean growth curves began to diverge, with the children of housewives becoming heavier. By 12 months of age the difference in mean weight amounted to 2.1 kg and was statistically highly significant.

For length the situation was more complicated because the children of non-housewives were notably longer and remained so for the first 3 months of life. The growth curves then converged and there was no difference by 5–6 months of age. In the latter half of the year the housewives' infants became longer and by 1 year of age the difference was 3.8 cm.

This pattern is reinforced by the monthly increments in weight and length (Fig. 4 and 5, resp.). These increments are largely independent of one another and for weight were always greater for the children of housewives after 3 months of age and for length after 2 months of age.
It has been maintained that the comparative magnitude of variability in growth measures is helpful in assessing environmental quality (2). The coefficients of variation for weight and length in the two groups of children are shown in Fig. 6 and 7, respectively. For length variation there was nothing to distinguish the two groups, but the weight variation was less at all ages for the infants of housewives.

The coefficients of variation of the monthly increments in weight and length provide clear evidence for a distinction between the two groups of children. For weight the difference that began to appear by 3 months of age was maintained thereafter, and mainly developed through an increase in weight variability from 3 to 9 months of age among the housewives’ children (Fig. 8). The housewives’ children exhibited less variation in length at every age interval except 11–12 months (Fig. 9). This phenomenon was not due to the greater increments of the infants of housewives since it was apparent also in the plots of the coefficients of accumulated increment against mean increment (see Fig. 10 for the plots for length).

**Discussion**

For the study population our findings provide clear evidence for the health advantage to infants of having a mother who was a housewife. Such children exhibited strikingly better growth and less illness than their counterparts whose mothers were not housewives. The only ambiguous evidence was the shorter birth length of the housewives’ children, the reasons for which are not clear. Perhaps the housewife–mother status was generally disadvantageous for fetal growth, but if so it is surprising that it was not reflected in birth weight; a variation in gestation time, for example, is probably, a more likely explanation. This would be consistent with
Fig. 10. Coefficients of variation for the accumulated length increments of infants of housewives and non-housewives (bars show the 95% confidence intervals).

birth length variability being essentially the same in both groups of infants.

In a within-population context, the results of the analysis demonstrate how variability can reinforce the interpretation of growth magnitude as an indicator of environmental quality. Weight variability exhibits an earlier distinction than weight itself and for both weight and length increments high growth rate was associated with low coefficients of variation. The failure of length variability to distinguish the two groups of children may be due to “carry-over” dependencies as the housewives’ children grew from being shorter to being longer than their counterparts. This validates, in part, the use of variability measures for between-population comparisons, where growth may be influenced by genetic factors.

It is not clear from the data how this “housewife-effect” works. The present study focused on the health of the infants, and rather less is known about the mothers. Even the designation “housewife” is loose and indicates that the mother appeared to spend most of her time at home. Non-housewives might generally be expected to work outside the home, but it was not recorded whether this involved taking their infants with them. Information on maternal income (but not household income) was obtained. Some housewives did have an income, but in general not as much as non-housewives ($r = -0.41$). The path analysis also showed that maternal income was a mixed blessing, being significantly associated with early weaning. However, the results showed further that the “housewife-effect” on growth and illness experience existed independently of income.

Other data on the mothers show that the two groups were well matched in terms of the season of study, and their age and reproductive histories. However, the environmental circumstances of the housewives tended to be more adverse, with statistically significantly poorer housing, water supply, sewage systems, and general conditions of hygiene. The housewives also had statistically significantly lower haemoglobin levels ($70.8 \pm 8.42\%$ versus $74.77 \pm 7.57\%$).

The benefits for the infants of housewives therefore occurred against a background of greater environmental deprivation and probably resulted from maternal behaviour. With a mother constantly at home and in attendance, an infant is likely to receive much more care and attention in all manner of ways, from food preparation to physical affection.

In Khartoum, at least, the benefits to an infant of having a mother who is a housewife are enormous, and may well be in many other settings. This seems to be a possibility of such great importance that it should be investigated with some priority, especially in terms of documenting how mothers look after their babies.

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Résumé

Maternité et santé infantile à Khartoum

Afin d’examiner les effets du travail de la mère sur l’état de santé et la croissance des nourrissons de la naissance à l’âge d’un an, 120 couples mère-enfant ont été suivis à Khartoum, au Soudan. Pour évaluer l’état de santé, on a pris comme mesure le nombre de jours, au cours de la première année de la vie, où l’enfant a été malade: fièvre, diarrhée, toux ou vomissements. La croissance a été évaluée mensuellement par pesée et mensuration en décubitus. Les enfants dont la mère restait à la maison avaient sensiblement moins de jours de maladie que ceux dont la mère travaillait à l’extérieur. En ce qui concerne le poids, il y avait peu de différence entre les deux séries de nourrissons à la naissance, mais les enfants des femmes au foyer se développaient plus rapidement et avaient un poids plus élevé à l’âge d’un an. En ce qui concerne la taille, ils étaient plus petits à la naissance mais grandissaient plus vite pendant leur première année et étaient très significativement plus grands à l’âge d’un an que les enfants de mères travaillant à l’extérieur. La variabilité du poids et de la taille
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des enfants étaient nettement plus faibles chez les enfants de mères au foyer.

Le meilleur état de santé des enfants de mères au foyer s'explique en partie par le fait qu'ils sont sevrés plus tardivement, mais cette explication ne rend pas entièrement compte des observations. Les mères au foyer avaient par ailleurs un revenu plus faible et un environnement domestique sensiblement plus pauvre que les mères exerçant une profession; le bénéfice pour les enfants tient probablement à la présence physique constante de la mère.

References