Letters to the Editor

Is Malnutrition Associated with Prolonged Breastfeeding?

From KÅRE MØLBAK, MARIANNE JAKOBSEN, MORTEN SODEMANN AND PETER AABY

Sir—The impact of breastfeeding beyond 12 months of age is a topic of some controversy. Several studies from developing countries have associated prolonged breastfeeding with reduced food intake and malnutrition, whereas others have found no such association. A possible association between malnutrition and prolonged breastfeeding may be explained in several ways. Weaning is a complex social and cultural process and a number of confounding factors and selection mechanisms may explain the findings as well as some of the variations between different studies. The possibility that the finding of a negative association between prolonged breastfeeding and nutritional status is due to ‘reverse causality’, i.e. that poorly growing children continue to be breastfed, is strong.

In a recent edition of this Journal, Caulfield et al. analyse cross-sectional data from 19 demographic surveys to examine the association between breastfeeding beyond 12 months of age and malnutrition. It is concluded that there are important differences in nutritional status associated with breastfeeding throughout the developing world and that these differences are not likely to be due to confounding factors. Eight of the surveys were from sub-Saharan Africa (SSA), and in five of these datasets, still breastfed children at about 12–18 months of age were significantly shorter and lighter than those no longer breastfed, but the differences were largely diminished among older children. Due to the cross-sectional nature of the data, it was difficult to identify the causal direction between prolonged breastfeeding and nutritional status. The authors propose, however, that there is a relation between child size and the decision to continue breastfeeding, i.e. ‘reverse causality’. In SSA, the first children to be weaned are among the tallest and the heaviest for their age; as more children are weaned, many of them are lighter and shorter, thus diminishing over time the difference between breastfed and weaned children. The authors emphasize, furthermore, that longitudinal studies are needed to investigate the relationship between child size and weaning decision making.

In Guinea-Bissau, a cohort of 945 children were followed from birth until weaning. Only 57 (6%) of the children were weaned before 12 months of age, and in these cases, termination of breastfeeding was largely associated with illness of the mother or the child, or a new pregnancy. Thus, in Bissau, the children who were among the first to be weaned was a highly selected group among whom a large proportion had suffered recent illness or were vulnerable in other respects. Our results confirm that the mothers’ reasons for weaning are an important parameter, although the direction of the effect is ambiguous.

A longitudinal study of children above one year of age sheds further light on the issue of prolonged breastfeeding. In an open cohort of 849 children, we analysed weight-for-age data in children aged 18–29 months, i.e. the age range during which most children are weaned. Throughout this age range, there was a tendency of lower weight-for-age among breastfed children. However, in 96 children weaned during the study, there was no change in nutritional status following weaning. Furthermore, children with very low weight-for-age (i.e. ≤–2.5 Z scores of the NCHS standard) at one year of age were breastfed for a median of 24 months compared with 22 months for children >–2.5 Z scores (P = 0.04). In a time-to-failure analysis of 294 children this relationship was found to be independent of gender, maternal age, education, and ethnic group (P = 0.02). Finally, the study suggested that weaned children, independent of age, had higher diarrhoeal and mortality rates. It is conceivable that a higher mortality among weaned malnourished children than breastfed malnourished children may result in an additional selection, leading to more malnourished children in the breastfed group. Such an interaction has been observed in Bangladesh.

In a yet unpublished study of 1116 children followed for 761 child-years we investigated the weight change
following weaning. Ponderal and linear growth rates were modelled in variance component models\(^{11}\) for longitudinal data, adjusting for age, sex, longitudinal diarrhoeal prevalence prior to measurement, and seasonal patterns. Independent of these factors, weaned children had lower weight than breastfed children\((P = 0.0002)\).

This effect was particularly strong in infancy where the estimate for weaned infants was \(-319\) g (95\% confidence interval [CI] \(-636\) to \(-3\)), whereas the effect was \(-137\) g (95\% CI : \(-210\) to \(-65\)) and \(-33\) g (95\% CI : \(-112\) to \(-45\)) respectively, in children aged one year and \(\geq 2\) years. The apparent contradiction with our earlier results quoted above, suggesting lower weight in breastfed children, is related to the longitudinal analysis. The random effects model enabled an assessment of the change in weight following weaning, rather than focusing on the difference between different weaned and breastfed children. Weaning had no immediate effect on linear growth\((P = 0.41)\).

The studies from Guinea-Bissau, when taken together, suggest a slightly more complex pattern than suggested by Caulfield et al. The data corroborate their main suggestion, namely that there is a relationship between child size and the decision—whether maternal or child-driven—to continue breastfeeding. However, early weaning may often be connected with illness of the mother or the infant, and these children are not among the heaviest, as suggested by Caulfield. Among older children, the relation between child size and decision to continue breastfeeding may be different: After the age of 12 months, malnourished children are breastfed for a long time, until the mother perceives the child as ‘healthy enough’.\(^9\)

Although cross-sectional data suggested that breastfed children were lighter than weaned children, we could not detect any negative impact of prolonged breastfeeding on nutritional status in a longitudinal analysis. Rather, weaning up to the age of 24 months was associated with a decrease in weight, in line with findings from China.\(^7\) The significant impact of breastfeeding on diarrhoeal morbidity and survival suggests that prolonged breastfeeding is essential to keep malnourished children alive under the prevailing conditions in most African countries south of Sahara.

### REFERENCES


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**Inguinal Hernia Repair: Incidence of Elective and Emergency Surgery, Readmission and Mortality**

**From C M CHEEK**

Sir—I read with great interest the article by Primatesta and Goldacre.\(^1\) This provides valuable information on the readmissions and deaths after inguinal hernia surgery, but appears to have some limitations. I do not feel their conclusion that the lifetime risk for a male, living to the age of 85, of having an inguinal hernia repair of 27.2\% is correct. I obtained a similar figure of 26.8\%, using a cumulative incidence method, when using
National Health Service (NHS) operation data from Avon and Somerset. This, however, is inaccurate as it does not take into account three very important factors.

1. Firstly, not all inguinal hernia repairs are performed by the NHS: In 1986 19% of all operations for inguinal hernias were performed privately. Did their study include private patients?

2. Secondly, inguinal hernias can recur after surgery. It is unclear whether this was taken into account. Recurrence rates are variable. According to Hospital Episode Statistics (HES) for NHS data in 1993, in England 7% of all operations were for recurrent hernias.

3. Thirdly, a patient can have bilateral hernias (that is, one hernia on each side at the same time), or he may have a unilateral hernia at one time and may then develop another hernia on the other side at a later date.

Thus if they did not take into account private operations they would have underestimated the risk of having an inguinal hernia operation by 19% and, if they did not consider the fact that some men have more hernias than others, they would have overestimated the risk for individual patients by a factor much greater than 7%.

In their discussion they state that the proportion of cases done on a day-case basis has probably not increased much since the period covered by their study and the publication of Hospital Inpatient Enquiry. They quoted figures of 4% for England and 6% for Oxford in the 1979–1986 period. However the proportion of operations for inguinal hernias performed as day cases in England was 21.7% for 1993 (the latest available figures) and for Oxford 20.9%. It is likely that this proportion will continue to increase.

Despite discussing the mortality after emergency and elective surgery, and stating that those patients undergoing emergency surgery are probably at a higher risk of serious illness, they conclude that elective repair of inguinal hernia should be undertaken soon after the diagnosis is made to minimize the risk of adverse reactions. In 1977 Neuhauser examined whether elective inguinal hernia repair in patients over 65 years of age might increase quantity of life, by preventing the mortality and morbidity associated with obstruction and strangulation. He applied current mortality rates for elective and emergency repairs and the risk of strangulation to the prevailing life expectancy of 13.3 years for 65 year old patients, he concluded that there was little difference in quantity of life saved in choosing between immediate elective repair of the hernia and non-operative treatment by the use of a truss. He asserted that the choice of surgery or truss usage should be influenced by improvements in the patient’s quality of life and that further research was needed on this subject. Since this time the death rate has decreased markedly according to OPCS figures by 29% for inguinal hernia and by 50% for femoral hernia between 1975 and 1992.

They state that ‘the extent to which health services are able to reduce emergency surgery, by scheduling operations as close to the time of diagnosis as possible may be regarded as a good indication of their performance’. Although it is desirable that patients with inguinal hernias are treated promptly, only a small percentage of hernias that strangulate are on the waiting list.

In the series of strangulated hernias by McEntee et al., only 4% of patients were on the waiting list for elective repair. They found that the hernia strangulated in 40% prior to the family doctor being notified, and 23% failed to notify their doctor even after the hernia had been present for a month. Many of the patients (24%) were known by medical personnel to have a hernia but a surgical consultation had not been arranged. A study in Birmingham on patients, over the age of 65, who had survived emergency groin hernia surgery found that of 25 responders 20 knew they had a hernia, of these 18 (90%) had consulted their GP, but only five had been referred for surgery. None of the patients were actually on the waiting list for surgery. Davies et al. in their article on inguinal hernias and waiting lists found that of patients presenting as emergencies, over a 2-year period, 15% of them were actually on the waiting list. They did, however, demonstrate that treating patients as emergencies rather than electively has important implications both financially and medically. Therefore although an efficient unit may operate soon after referral, this may have little effect on the number of emergency operations and their morbidity and mortality.

Education of patients, general practitioners and surgeons is required to ensure that patients seek and receive appropriate advice for this common condition.

REFERENCES


Authors’ Response
From PAOLA PRIMATESTA AND MICHAEL GOLDACRE

Sir—In the calculation of lifetime risk in our study, recurrences and bilateral inguinal hernias were taken into account (the analysis was based on patients, not episodes of care). As stated in our paper, only inpatients and day cases admitted to National Health Service hospitals in the Oxford region are recorded in the Oxford record linkage study (ORLS): we therefore agree that the lifetime risk is even higher than the figure we quoted.

We agree that patients with hernias which strangulate are not necessarily on the waiting list. However, as Miss Cheek says, they may nonetheless be known to their general practitioners without having been referred for a surgical consultation. We feel that our statement is still appropriate that ‘each patient should undergo operation when his or her risk of an adverse outcome such as readmission, recurrence or death is as low as possible’. In a large study which reviewed hernia repairs performed in US Army medical treatment facilities, the authors found that patients over 60 years of age with a complicated inguinal hernia had a 20-fold increased risk of dying from their repair than those who underwent elective surgery. Law and Trapnell stated that the benefit of a truss, when used instead of surgery, is often overstated and suggested that a surgical opinion should be obtained before a truss is prescribed. They examined 52 patients (median age 70) with inguinal hernia who wore a truss. In 69% of patients the truss did not control the hernia. It is therefore generally advisable that inguinal hernias be repaired, unless there are contraindications, to reduce the possibility of complications later.

REFERENCES

Validity of ICD Code 410 to Identify Hospital Admission for Myocardial Infarction
From HUGH TUNSTALL-PEDOE

Sir—Pladevall et al. contrast their own findings from Corpus Christi Texas with those of five other centres, on the sensitivity, specificity and positive and negative predictive values of different hospital ICD discharge codes for acute myocardial infarction validated by a gold standard. Whilst not detracting from their own findings, it is sad to find a discussion of this subject published towards the end of 1996 which makes no mention of the similar analyses published from the numerous WHO MONICA Collaborating Centre populations over 2 years previously. The introduction stresses the importance of the WHO MONICA Project, and their own Associate status, and similar diagnostic

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criteria and they quote two sets of earlier results from individual MONICA centres whilst stating in discussion ‘Few studies have been published in which the validity of using ICD codes to detect MI are examined’.

The omitted comparison (Table 2) shows that across 37 populations validated non-fatal definite myocardial infarction had the following source ICD (8 or 9) codes:

<table>
<thead>
<tr>
<th>ICD Code</th>
<th>Percentage</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>410</td>
<td>averaged 91%</td>
<td>(range 56–100%)</td>
</tr>
<tr>
<td>411</td>
<td>averaged 2%</td>
<td>(range 0–11%)</td>
</tr>
<tr>
<td>412–414</td>
<td>averaged 4%</td>
<td>(range 0–16%)</td>
</tr>
<tr>
<td>Others</td>
<td>averaged 3%</td>
<td>(range 0–43%)</td>
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although it should be remembered that in 14 populations registration was by ‘hot pursuit’ of admissions rather than ‘cold pursuit’ of discharges.

Conversely the MONICA ‘gold standard’ diagnostic categories allocated to the events registered because the hospital ICD code was 410 were:

definite myocardial infarction 74% (range 35–90%),
possible myocardial infarction 18% (range 8–60%) and
no myocardial infarction in almost all of the remainder excepting a small number of cases classified as ischaemic (resuscitated) cardiac arrest.

This analysis is of 28-day survivors but the ‘Special Report’ includes a similar one for ICD codes on death certificates in a separate table. As stated by the Corpus Christi authors, these findings are of importance at a time when increasing importance is attached to monitoring or surveillance of acute events in coronary disease for purposes of health service management as well as epidemiological research.

REFERENCES

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**Level Curves in Lexis Diagrams**

*From NIELS KEIDING*

Sir—I have recently come across the note from 1992 by Jolley and Giles who proposed the use of level curves (what they call ‘synoptic charts’) in (calendar time, age) diagrams of mortality rates.

Such diagrams were studied extensively in nineteenth century German population statistics, primarily by Knapp, Zeuner, and Lexis and are well-known nowadays as Lexis diagrams. When I used level curves in Lexis diagrams in 1989 and 1990 I assumed that this was an obvious and well-known representation.

REFERENCES

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