THE INCIDENCE OF RICKETS in a London Hospital Out-patient Department

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There is wide difference of opinion as to the prevalence of rickets among the urban child population of Great Britain. This is, in part, attributable to the divergent standards of diagnosis accepted by various clinicians; on the one hand rickets is frequently diagnosed because the child has sweating of the head or flabby muscles or is backward without any evidence of pathological change in the bones, and on the other, some practitioners are not prepared to diagnose rickets until there is gross bone deformity.

Nature of the Investigation.

At the request of the Medical Research Council a systematic examination of children under two years of age was undertaken at the Queen's Hospital for Children in April, 1925, with a view to ascertaining the frequency of rickets among children of the out-patient class in the East End of London. The incidence of rickets is at its height at this season. It should be borne in mind that this hospital serves a large district, parts of which are among the poorest in London. In order to obtain uniformity, the findings were based on radiographic evidence, which is much less subjective than clinical signs. The wrist only was photographed for economy of time and material. Radiographic changes appear early in this situation, but it was recognised that by taking only the lower ends of the ulna and radius, the earliest signs of rickets might sometimes be missed, since the rapidly growing lower end of the femur may show changes before the radius and ulna. Radiographic diagnosis was based on fraying or blurring of the epiphysial margin, with or without cupping and evidence of osteoporosis.

The Children Examined.

During April, 1925, 169 children, aged from one week to two years, were examined at the Queen's Hospital for Children. The majority were new patients attending for the first time. No child who had attended for more than two to three weeks at the time of examination was included, on the ground that any case already diagnosed as rickets would have been treated, and there is no doubt that with treatment all radiographic signs rapidly disappear in the mildest cases. The children examined came from different departments of the hospital. Under 30 cases were medical out-patients. Over 100 were so-called casualty patients, *i.e.*, patients attending for treatment by the resident medical officers, many of them to be referred later to other hospital departments. Of these roughly rather more than half attended with "medical" complaints, for the most part minor

ailments such as constipation, "indigestion," bronchitis, etc., and the rest for surgical complaints or conditions affecting the skin, ears or eyes. About 30 more were either brothers or sisters of patients or were unselected children attending a neighbouring Welfare Centre who were included in order to increase the total number, since the investigation had to be completed within about three weeks and the work was simplified if the children were taken in batches. None of the Welfare Centre cases and only one of the relations of patients examined had radiographic evidence of rickets, so that among the hospital patients proper, the incidence was higher than the figures given below indicate.

The Incidence of Rickets as shown Radiographically.

The cases were unselected, except that two of the 169 children examined were sent to the hospital by practitioners for rickets. Excluding these, we have 167 cases, of which 13 showed definite evidence of rickets in the X-ray plate of the bones of the wrist, i.e., approximately 8% or 1 in 12. The total number of cases is much too small to determine age distribution, but it may be of interest to note that the youngest case radiographically diagnosed was four months old, and of the 13 cases of rickets (excluding the two sent to the hospital for rickets), six were under nine months of age, and 11 were under 13 months. Thus, if all children under four months or over 13 months are excluded from the total of 167, there are left 72 with 11 cases of rickets, or approximately 15%. It is, however, obvious that the numbers are insufficient to establish the percentage incidence at different ages. The majority were cases of very slight rickets—only one, a child of 18 months, could be classed as severe.

The belief appears to be general among clinicians that the incidence of rickets in London has greatly diminished during the last decade, and probably was steadily diminishing before that time. These figures, however, based on radiographic findings, are sufficient, in spite of the relatively small total numbers, to show that in poor districts it is still a formidable complaint. It must be remembered that rickets causes increased susceptibility to respiratory infections, and that these account every winter for a large seasonal rise in the infantile death rate, so that even slight cases of rickets cannot be dismissed lightly. Due allowance should be made for the fact that the majority of these cases were new hospital out-patients, and it is obvious that the incidence among the total population and even among those who have attended hospital for some months would be much lower. Even among out-patients, it has been demonstrated by another group of workers that the incidence is much less in patients drawn from a neighbourhood where the standard of living is higher than it is around the Queen's Hospital for Children, which draws its patients largely from poor and over-crowded boroughs such as Shoreditch, Bethnal Green and Hackney.

The Clinical Findings.

Each child was examined clinically by one of three observers before it was sent for radiographic examination. The standards adopted differed widely, in spite of an attempt at the outset to co-ordinate the scheme of notation of rachitic signs, and showed the futility of attempting to combine the clinical findings of observers who had not had ample time and opportunity to correlate their system of notation.

The clinical diagnosis is discussed separately.

The Eruption of Teeth.

The date of eruption of teeth in the 15 rachitic children was not noticeably delayed as compared with the non-rachitic ones. Cases of late dentition occurred in both groups, and the number of rachitic children is not sufficiently large for any valuable comparison to be made.

The Influence of Feeding.

As regards feeding: of the six rachitic children under nine months of age, four were at the time of examination artificially fed, one was entirely, and one partially, breast fed—findings which agree with the well known fact that artificially fed infants are more liable to rickets than breast fed. Of the children under nine months of age without radiographic evidence of rickets more than two-thirds were breast fed.

Summary.

One hundred and sixty-nine children were examined radiographically and clinically for evidence of rickets at the Queen's Hospital for Children in April, 1925. The hospital serves poor districts in the East End of London. The differing standards of the investigators invalidated the clinical findings in spite of an attempt at the outset to establish a common standard. The findings are, therefore, entirely based on the much less subjective radiographic diagnoses. Two rachitic children were excluded since they were sent to the hospital for that disease. Of the 167 remaining, 13 had radiographic evidence of rickets (*i.e.*, 8%), but if only infants between the ages of four and 13 months are considered, 72 cases are left, 11 of whom had rickets (*i.e.*, an incidence of about 15%). It should be remembered that the seasonal incidence of rickets is probably at its highest in April—the month chosen for the investigation—but the incidence is sufficiently high to indicate the necessity of a more vigorous effort on the part of the medical profession and the public to eliminate this disease—a result within our power if full use were made of the knowledge already in our possession. The vast majority of mothers are now aware of the desirability of an addition of fruit juice to the diet of an artificially fed infant. They require education in the necessity of as much outdoor life as possible, even when the weather is inclement, and the need of regular administration of cod liver oil all through the winter. It seems a pity that, when a valuable anti-rachitic such as cod liver oil is available, the public should spend such vast sums yearly on widely advertised substitutes—proprietary preparations of much less anti-rachitic value.

The cost to the hospital of the X-ray films was defrayed by the Medical Research Council at whose request the investigation was undertaken. The taking of the X-ray photographs was done by Sister F. Francis, to whom we are greatly indebted for undertaking this exacting piece of work in addition to all her routine work.