similar exomphalos, used as a control for exogenous factors such as regional health referral and transport infrastructure changes, has shown a relatively constant rate of increase over the same period except for a sudden peak in 1995 and 1996. Socio-economic and political factors have changed and affected the health infrastructure in South Africa significantly over the past decade. It is therefore difficult to assess whether there has been a real increase in the incidence of gastroschisis, whether it is merely a sporadic and incidental finding such as the peak in exomphalos seen at KH in 1995 and 1996, or whether it is due to improved referral services in the hospital feeder areas. Further study looking at the wider South African picture and examining the demographics of abdominal wall defects, including maternal age distribution and possible aetiological factors, is necessary. Better epidemiological record-keeping, including an efficient national registry for birth defects, would significantly aid research on congenital abnormalities in South Africa and thus improve their management.

The author wishes to thank Professor J. H. R. Becker, Professor G. O. Ionescu and Dr C. Schoeman for their assistance in obtaining records and preparing this article.

REFERENCES
Worldwide, neonatal intestinal obstruction is commonly caused by anorectal malformation, and in developed countries it occurs more frequently in boys than girls. Reports from some centres in the tropics found anorectal malformation to be the second most common cause of neonatal intestinal obstruction. In a previous report from this centre anorectal malformation was found to be the third most common cause of intestinal obstruction in children, accounting for 10.8% of cases. Diagnostic difficulties as a result of its frequent association with other anomalies has made treatment of this condition difficult.

Poor understanding of this condition in our environment borders on ignorance. Mandatory visits to traditional healers result in late presentation to hospital, severe dehydration and poor clinical condition. To the best of the authors' knowledge, no comprehensive report on anorectal malformations in children in the region had been documented. This study was therefore undertaken to highlight the magnitude of the problem, clinical presentation and treatment outcome in our environment.

Patients and method

This was a prospective study of all patients who presented to the University of Calabar Teaching Hospital (UCTH) between January 1992 and December 2001. The UCTH is the only tertiary referral health institution serving the whole of the south-eastern axis of the country, with a population of about 7 million (1991 census). To qualify to be included in the study, patients had to fulfil the following criteria: (i) confirmed diagnosis of anorectal malformation; and (ii) insertion of a clinical thermometer into the anatomical anal canal was not possible, thus differentiating the condition from other forms of neonatal obstruction.

Relevant information pertaining to the antenatal record was obtained from the parents where possible. Sex, age at presentation, the state of nutrition and hydration, remedies used before presentation at UCTH and outcome of such remedies were all noted. Questions were also asked about the parents' age and their level of education, occupation and place of residence. Treatment offered at the UCTH, outcome of such treatment and complications (if any), were also noted. Relevant clinical and laboratory examinations included general clinical assessment of the patient, radiological examination, ultrasound of the chest and abdomen (where possible), haemogram and urinalysis. In all cases treatment started with fluid replacement therapy and antibiotics. Palliative colostomies were instituted for deflation, and the definitive abdominal perineal pull-through operation was deferred until adequate weight gain and general stabilisation of the patient's clinical condition was achieved.

Eleven patients with palliative colostomies were lost to follow-up and later confirmed dead, apparently due to neglect by their families.

Results

During the period of this study 54 children were diagnosed and treated for anorectal malformation. There were 32 girls and 22 boys, giving a female/male ratio of 1.5:1. The majority of patients presented after the first 24 hours of life, with some patients seen as long as 72 hours (Table I).

Results of the clinical evaluation showed that low abnormality was seen in 24 patients: covered anus (8 patients), ectopic anus (6 patients), stenosed anus (7 patients), and membranous stenosis (3 patients). High abnormality was seen in 30 patients, with anorectal agenesis occurring in 18 patients, rectal atresia in 10 patients, and cloaca in only 2 patients.

Most of the parents of these patients (95%) were of low socio-economic status (artisans, peasants or labourers), with 78% of them living in rural areas. The majority of the mothers (74%) were teenagers.

Dominant clinical features were abdominal distension, non-passage of meconium, and constipation. Vomiting was rarely seen and when present it was a late sign (Table II).

Clinical evaluation of the patients revealed that in 3 cases there was concomitant cardiac anomaly, while in 2 patients the anomaly was associated with deformities of the musculoskeletal system (syndactyly of the toes). However, 2 patients had associated gastrointestinal tract (GIT) anomaly, presenting as ileal atresia. Where patients with low abnormality had termination of the bowel below the pelvic floor, perineal cut-down procedures were instituted. In the high abnormality group (30 patients) with termination above the pelvic floor, palliative colostomies were instituted for deflation, and the definitive abdominal perineal pull-through operation was deferred until adequate weight gain and general stabilisation of the patient’s clinical condition was achieved.

Eleven patients with palliative colostomies were lost to follow-up and later confirmed dead, apparently due to neglect by their families.

### TABLE I. AGE AND SEX DISTRIBUTION IN 54 CHILDREN WITH ANORECTAL MALFORMATION AT UCTH, CALABAR

<table>
<thead>
<tr>
<th>Age (days)</th>
<th>Total no. of children</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 3</td>
<td>11</td>
</tr>
<tr>
<td>4 - 7</td>
<td>21</td>
</tr>
<tr>
<td>8 - 12</td>
<td>12</td>
</tr>
<tr>
<td>&gt; 12</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sex</th>
<th>No. of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>32</td>
</tr>
<tr>
<td>Female</td>
<td>22</td>
</tr>
</tbody>
</table>

### TABLE II. CLINICAL FEATURES IN 54 PATIENTS WITH ANORECTAL MALFORMATIONS AT UCTH, CALABAR

<table>
<thead>
<tr>
<th>Clinical feature*</th>
<th>No. of patients</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominal distension</td>
<td>54</td>
<td>100</td>
</tr>
<tr>
<td>Non-passage of meconium</td>
<td>41</td>
<td>76</td>
</tr>
<tr>
<td>Constipation</td>
<td>38</td>
<td>70</td>
</tr>
<tr>
<td>Fever</td>
<td>16</td>
<td>30</td>
</tr>
<tr>
<td>Vomiting</td>
<td>11</td>
<td>20</td>
</tr>
</tbody>
</table>

*Some patients had more than one clinical feature.
During a follow-up period of between 6 and 24 months, the following complications were noted: colostomy prolapse (3 patients), constipation (4 patients), anal stenosis (6 patients) and faecal incontinence (7 patients).

Discussion

It is difficult to determine the true incidence of any gastrointestinal anomaly in our environment since records of births in the community are not available. It is well known that the majority of Nigerian mothers deliver outside of orthodox medical facilities. Because of this we were unable to determine the incidence of congenital anorectal lesions in the present survey. The study is also unlikely to provide any accurate figure on what obtains in the community since, presumably as a result of the worsening economic situation in Nigeria, a number of affected infants might not have been brought for medical attention. Taking all these factors into consideration, our hospital figure is very likely to be an underestimation of the real situation. Nevertheless, since UCTH is the only referral centre for paediatric surgery in south-eastern Nigeria, it can be assumed that the hospital had pooled the bulk of Nigerian infants born with major GIT anomalies in the area. It is therefore hoped that the findings of this survey will provide a clue as to the pattern of congenital anorectal lesions in our environment.

The study revealed a female preponderance among the infants with congenital anorectal malformation, which contrasts with the experience in Europe where males predominate. Perhaps this may be explained by the observation that in the last head count (national census 1991) females in the region outnumbered males in the paediatric age group (< 18 years).

In our series the major types of anorectal anomaly afflicting infants were classified as high abnormality (55.6%) and low abnormality (44.4%). The high type was most prevalent, which is in consonance with global experience. Congenital defects have been associated with various harmful agents to which the mothers were exposed during the critical period of embryogenesis, thalidomide being a good example. In a previous study in our centre, Ekwere linked penile agenesis and congenital sacrococcygeal teratoma in the population with the frequent use of insecticides. The affected population in the present survey was largely of low socio-economic status and frequent use of insecticides. The affected population in the area.

The most common complications and perhaps allow for satisfactory sphincteric moulding. Colostomy is useful as it can reduce the rate of postoperative complications and perhaps allow for satisfactory sphincteric moulding. Nevertheless, some families detested the initial colostomy procedure. Wearing a colostomy bag is regarded as a stigma and a bad omen in our society. This superstition and negative attitude may have been responsible for the neglect, abandonment and subsequent death of 11 of the colostomy patients in this series. Nigerians therefore need effective health education in this regard.

REFERENCES