

PREVALENCE OF HYPOSPADIAS, ABDOMINAL AND PENO-SCROTAL ABNORMALITIES AMONG PRIMARY SCHOOL BOYS IN A NIGERIAN COMMUNITY

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Objectives To determine the prevalence of hypospadias, patent processus vaginalis, umbilical hernia, splenomegaly and cryptorchidism in primary school boys of a Nigerian community.

Patients and Methods A community-based observational study using the cluster-sampling method was done. One thousand and ninety-six primary school boys aged between 5 and 13 years from five randomly selected schools in the administrative district of the Ogbaru Local Government Area (LGA) of Eastern Nigeria participated in this study, while in only 1080 boys some specific information on umbilical hernia was available. Each participant underwent a general, abdominal, groin and peno-scrotal physical examination.

Results The prevalence of hypospadias was 1.1% and this was equivalent to the incidence. The prevalence of a patent processus vaginalis was 1.0% with an estimated

incidence of 1.3%. Cryptorchidism was present in 0.8% and retractile testis in 3.2%. The prevalence of umbilical hernia was 26% and the splenomegaly rate was 7%.

Conclusion The incidence and prevalence of simple hypospadias was higher than previously suggested by a tertiary hospital-based report from Western Nigeria. Umbilical hernia was very common but apparently only few patients needed treatment. The incidence of a patent processus vaginalis was similar to that reported in other parts of the world, although surgical correction was delayed. Splenomegaly was common, not only due to endemic malaria, but also due to sickle-cell disease, with implications for the management of childhood trauma in this part of the world.

Key Words hypospadias, umbilical hernia, splenomegaly, cryptorchidism, children

INTRODUCTION

Similar to other developing countries, healthcare infrastructure and personnel are inadequate in Nigeria. The country's economic problems (since the 1980s), and political instability have not helped the situation. The integration of primary with secondary and tertiary healthcare is underdeveloped. Access to health facilities is widely variable, and socioeconomic standing is a major determinant. The majority of babies are born outside a modern obstetric establishment¹. Most of these children never receive any routine postnatal medical evaluation, and pre-school health assessment is unavailable to the majority. These deficiencies compounded by poor education, give rise to the common experience whereby many congenital and acquired conditions often pre-

sent late or as emergencies with complications, and the true incidence and prevalence of such disorders remain unknown.

The primary objective of our community based observational study was to determine the prevalence of cryptorchidism. The results of this study were published in a previous report². Our secondary objective was to determine the prevalence of other clinically demonstrable abdominal, groin, penile and scrotal abnormalities in the same group of schoolboys. The common congenital and acquired conditions such as hypospadias, patent processus vaginalis, umbilical hernia, and splenomegaly which we found form the basis of this report. To our knowledge, little has been published on the epidemiology of these conditions in Nigerian children.

Table 1: Summary of Participants with Umbilical Hernia Grouped by Age (n=1080)

Age (years)	Group Total	No. with Umbilical Hernia	%	Mean Diameter (cm)	Range (cm)
5	21	7	33.3	3	2 – 4.5
6	71	21	29.6	2.2	0.8 - 4
7	124	30	24.2	2.6	0.8 – 6
8	222	68	30.6	2.4	1 – 6
9	218	58	26.6	2.0	1 – 5
10	250	60	24	2.3	1 – 5
11	65	14	21.5	2.6	1.5 – 4
12	81	15	18.5	2.5	1 – 4
13	28	6	21.4	3.0	1.5 – 5

PARTICIPANTS AND METHODS

This study was carried out in the Ogbaru Local Government Area (LGA) in Anambra State of Eastern Nigeria, which had a 1991 census population of 178,056³. The adult population is predominantly of lower socio-economic status consisting mainly of small farmers, unskilled workers and traders, most being of the Igbo ethnic group. At the time of the study, there were 35 primary schools with a total pupil population of 23,342 consisting of 11,275 girls and 11,967 boys³.

One thousand and ninety six primary school boys aged between 5 and 13 years participated in this study, however specific information on umbilical hernia was available in 1080 boys only. The cluster sampling technique was employed for logistic reasons. Five randomly selected schools were visited. For practical reasons, informed consent of the school head and class teachers was obtained on behalf of the parents, and all the boys participated voluntarily.

Physical examination of the participating pupils was performed by a senior registrar in surgery having experience in both paediatric surgery and urology. General, abdominal, groin, penile and scrotal examination was performed looking for any clinically demonstrable abnormalities. Bimanual palpation and squatting technique² were employed to evaluate participants with suspected cryptorchidism. When a high scrotal or inguinal testis could be manipulated to the bottom of the scrotum, a diagnosis of retractile testis was made. On the

other hand, when the testis was not able to reach the bottom of the scrotum, even with squatting, cryptorchidism was diagnosed. In the boys with cryptorchidism, the scrotum was usually also hypoplastic.

The data on each pupil were recorded in a proforma. Letters were written to the parents of the children with significant abnormalities informing them of the finding(s), and providing advice on the local availability of expertise for treatment.

RESULTS

Abdominal findings in the participants of our study included umbilical hernia in 279 out of 1080 boys (26%). The neck diameter of the hernias ranged from 0.8 to 6 cm. Only three scars of umbilical herniorrhaphy were seen. Other features of the umbilical hernias are summarized in Table 1. There were 14 (1.3%) participants with para-umbilical hernia. Fifty percent of these were associated with an umbilical hernia.

Palpable splenomegaly was found in 74 boys (7%). This ranged in size from just palpable at full inspiration in 12 boys to 8 cm below the left costal margin towards the right iliac fossa with a median of 2 cm. Four boys were found to have multiple scarification marks on the left side of the anterior abdominal wall, made by native healers on children with splenomegaly. Interestingly, these boys aged 8 - 13 years no longer had palpable splenomegaly. Three boys had palpable hepa

Table 2: Details of the Boys with Hypospadias

Serial No.	Age (years)	Sibling Position	Weight in kg (age mean \pm SD)	Height in cm (age mean \pm SD)	Hypospadias Type
70	7	2 nd	21 (21.9 \pm 2.5)	125 (199 \pm 5)	glanular
93	9	4 th	21 (24.7 \pm 3.3)	117 (126 \pm 5.8)	glanular
121	10	1 st	26 (26.6 \pm 5)	133 (129 \pm 5.5)	glanular
206	6	6 th	17 (21 \pm 2.4)	106 (117 \pm 5)	glanular
214	6	1 st	24 (21 \pm 2.4)	116 (117 \pm 5)	coronal
286	8	2 nd	22 (23 \pm 2.5)	112 (123 \pm 5.5)	glanular
311	8	6 th	23 (23 \pm 2.5)	120 (123 \pm 5.5)	coronal
577	13	nr	38 (32 \pm 6.4)	148 (141 \pm 11)	glanular
635	8	nr	22 (23 \pm 2.5)	116 (123 \pm 5.5)	glanular
749	9	nr	25 (24.7 \pm 3.3)	127 (126 \pm 5.8)	glanular
897	7	1 st	23 (21.9 \pm 2.5)	121 (119 \pm 5)	coronal
936	10	6 th	24 (26.6 \pm 5)	123 (129 \pm 5.5)	glanular

SD = standard deviation; nr = not recorded

tomegaly; two of them suffered from sickle cell disease and also had associated splenomegaly.

Eleven boys (1.0%) had a patent processus vaginalis (PPV) either in the form of an inguinal hernia or a communicating hydrocele. The PPV was on the left side in 8 boys, on the right side in 2 boys, and bilateral in one participant. These are exclusive of those associated with undescended testes. Three herniotomy scars were seen in the inguinal region, and these were not associated with any orchidopexy scrotal scars. The incidence of PPV in this group of boys was therefore 1.3%. None of these congenital hernias was associated with hypospadias.

Cultural circumcision at infancy is predominantly practised in this part of the country, and of all the boys examined, only 4 were uncircumcised. One of them had developed a true phimosis with preputial scarring. The only circumcision complication seen was an abnormal scarring related to secondary wound healing. No urethral fistula or glandular trauma was seen. Curvature of the phallus to one side or the other in the flaccid state was seen in 18 boys (1.6%).

Twelve boys (1.1%) had hypospadias. Nine of them (75%) had glanular and the other three coronal hypospadias. All the boys were cir-

cumcised. No case of penile hypospadias (repaired or not) nor of the more severe and less common types of hypospadias was seen in this series. As expected, none of the distal hypospadias was associated with a chordee. The details of the participants with hypospadias are summarized in Table 2.

Cryptorchidism and retractile testes were found in 9 (0.8%) and 35 (3.2%) boys, respectively and have been discussed in a previous article².

DISCUSSION

Hypospadias may be due to a defect in androgen action in-utero due to mutation of the 5 alpha reductase-2 or of the androgen receptor gene⁴. An aetiological role for environmental chemical products acting as endocrine disrupters has also been postulated⁴. Hypospadias is classified into anterior, middle and posterior after the correction of any associated chordee and this guides the selection of the urethroplasty method⁵. Severe forms of hypospadias (penile, peno-scrotal and perineal) are more likely to be associated with other abnormalities such as cryptorchidism⁶ reflecting a corresponding intrauterine androgen action derangement in urogenital organ formation or as a component of a congenital malformation syndrome. All our subjects were well, had no

other significant finding on general examination, and were, therefore, assumed to have isolated (simple) hypospadias.

Since no corrected cases of hypospadias were seen, the prevalence of 1.1% we found is equivalent to the incidence. The reported incidence of hypospadias from other parts of the world is 2-8.2 per 1000⁷⁻⁹. The 1.1% incidence of hypospadias in this series is higher than the above mentioned reports, and may be even more significant as a higher incidence is reported in Caucasians compared to blacks⁸ although racial differences have not been confirmed by others¹⁰. Local, national, and ethnic variations in the incidence of hypospadias have been reported^{8,9}. Little has been published on the epidemiology of hypospadias in Nigeria. More studies are, therefore, needed to document any local variation. This will also provide useful information for specialist health facilities and manpower planning.

Observational studies based on birth defect registry data have suggested an increase in the incidence of hypospadias and other genitourinary anomalies in Europe and America ascribed to environmental factors^{11,12}. However, other studies^{7,13} have not confirmed the suggested rise in incidence. Variations in the completeness of data and artefacts in the various data systems may largely account for the controversy about the suspected upward trend in incidence^{12,13}.

Ofofode and Oluwasanmi¹⁴ based on their own study and that from a neighbouring hospital, suggested a low incidence (1 : 2275) of hypospadias in Western Nigeria. This was a hospital-based study from a plastic surgery unit with a high proportion of severe hypospadias presenting for repair. This is reflected in the high incidence (57%) of associated anomalies in their series, in contrast to the simple hypospadias in our community-based survey.

Maternal age, parity, low birth weight, low socio-economic status¹⁵ and parental subfertility¹⁶ may be independent risk factors for hypospadias. Although our survey was not designed to evaluate these factors, it is interesting that the sibling positions of our participants with hypospadias (Table 2) ranged from 1st to 6th. Our participants were mostly from lower socio-economic families. Familial clustering has been reported^{6,9} but a survey of the affected participants' families was beyond the scope of our study.

In a large descriptive epidemiological study from South Wales involving a birth population of nearly 47000 singleton, and over 1000 twin males, Roberts and Lloyd demonstrated a cyclical pattern in the frequency of hypospadias with a peak incidence among conceptions whose phase 3 sexual organogenesis occurred in the winter¹⁷. Citing a similar observation from a United States national database, they hypothesized the effect of daylight on maternal and foetal pituitary gonadotrophic function as an aetiologic factor for hypospadias in those genetically predisposed. No such seasonal pattern was however seen in other registry data from England and Wales¹⁸. The amount of daylight varies very little between the seasons in the tropical climate of Southern Nigeria.

The penile curvatures we observed were presumably congenital in origin. However, the high incidence in this series (1.6%) compared to others (0.6%¹⁹) leads us to hypothesize a possible acquired aetiological factor such as scar tissue following infantile circumcision. Some of these penile curvatures seen in the flaccid state may not be functionally relevant.

The 1.3% incidence of a patent processus vaginalis in our series is within the expected range²⁰. Of interest, however, is the fact that only 3 out of 14 (21%) have been repaired in this group of boys aged five years and above. This is a reflection of the lack of access to healthcare. It is, therefore, not surprising that many paediatric hernias present with complications²¹ in our country.

The high prevalence rate (26%) of umbilical hernia observed in this series may be a result of genetic predisposition or socio-economic factors such as neonatal umbilical infection and malnutrition. An earlier study from Ilorin in the Western part of Nigeria showed a prevalence of 19.4% and suggested an ethnic variation in the incidence of umbilical hernia²². The majority of childhood umbilical hernias resolve spontaneously²³. This natural history is illustrated to some extent in Table 1, which shows a tendency to a decreased prevalence rate with increasing age. This fact is well known to the people who generally did not seek treatment for an umbilical hernia. That only 3 scars of umbilical hernia repair (1.1%) were seen suggests a low complication rate. It is very likely, however, that demands for the repair of such hernias for cosmetic indications are likely to rise. An apparent paradox is that the mean diameter of the hernia (Table 1) seems to in-

crease as the prevalence rate decreases with age. This is because the larger hernias tend to persist into teenage or adult years.

The splenomegaly rate of 7% is a reflection of the degree of endemic malarial infestation²⁴, in this sub-urban community. The genetic predisposition to sickle cell disease in the black race world-wide was also a contributor to hepato-splenomegaly in this study. These have implications for trauma, contact sports and sport related injuries in school children in this part of the world.

In conclusion, the incidence and prevalence of simple hypospadias was higher than previously suggested by a tertiary hospital based report from Western Nigeria. Umbilical hernia was very common but apparently only very few cases needed treatment. While the incidence of umbilical hernia may change with socio-economic conditions, the demand for the treatment of both conditions due to cosmetic indications may increase in the future. The incidence of a patent processus vaginalis was similar to other parts of the world, although surgical correction was delayed. Splenomegaly was common due mainly to endemic malaria but also due to sickle cell disease, with implications for the management of childhood trauma in this part of the world. These data provide useful information in the planning of healthcare delivery.

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RESUME

Prévalence de l'Hypospadias et des Anomalies Abdominales et Pénoscrotales parmi des Garçons d'Ecole Primaire dans une Communauté Nigérienne

Objectifs: Déterminer la prévalence des hypospadias, des processus vaginalis patents, des hernies ombilicales, des splénomégalies et des cryptorchidies dans une communauté Nigérienne. **Patients et Méthodes :** Une étude utilisant la méthode de cluster-sampling (faisceau-prélèvement) a été réalisée. Mille et quatre-vingt-seize garçons d'école primaire âgés de 5 à 13 ans de cinq écoles aléatoirement choisies dans le secteur administratif de la région de gouvernerat d'Ogbaru (LGA) du Nigéria oriental ont participé à cette étude. Chaque participant a subi un examen physique général, abdominal, du pli de l'aîne et pénoscrotal. **Résultats:** La prévalence des hypospadias était de 1.1% et elle était équivalente à l'incidence. La prévalence des processus vaginalis patents était de 1.0% avec une incidence estimée de 1.3%. La cryptorchidie était présente chez 0.8% des cas et un testicule rétractile dans 3.2%. La prévalence de l'hernie ombilicale était de 26% et le taux de splénomégalie était de 7%. **Conclusion:** L'incidence et la prévalence des hypospadias simples étaient plus élevées que précédemment suggérées par le rapport d'un hôpital de santé de base du Nigéria occidental. L'hernie ombilicale était très commune mais seulement peu de cas nécessitent un traitement. L'incidence des processus vaginalis patents était semblable à celui rapportée dans d'autres régions du monde, bien que la correction chirurgicale ait été retardée. La splénomégalie était un terrain commun, non seulement de part la malaria endémique, mais également en raison de l'anémie falciforme, avec des implications pour la gestion des traumatismes chez les enfants dans la présente partie du monde.

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