THE INCIDENCE OF EXTERNAL MALE GENITAL DEFECTS IN ENUGU STATE OF NIGERIA: AN ESTIMATE BASED ON THE PREVALENCE AMONG SECONDARY SCHOOL STUDENTS.

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SUMMARY

Background: Enugu State typifies a Third World environment where most deliveries occur outside the hospital setting. In such circumstances, therefore, hospital-based data about congenital defects are unreliable and call for special methods of approach.

Objective: To assess the place of school prevalence survey results in estimating the population incidence of anomalies of the male external genitalia.

Method: From February 2, 2002 to August 1, 2004 a sample of male students aged 10 years and above seen in randomly selected secondary schools in Enugu State of Southeast Nigeria were guided through a protocol involving; self-administered questionnaires, physical examinations for evidence and types of anomalies present in their external genitalia and personal interviews.

The participant schools were selected by stratified random sampling; first by Local Government Area (LGA) and then by school. Consents for the study were obtained from Local Government authorities, Heads of the schools, and Parents' Teachers Associations, (P T A) Executives.

Results: Altogether, four urban and thirteen rural schools were studied over the 18 month-period of the investigation and a total of 6226 male students participated. Overall, 416 (6.8%) were identified with various types of external genital anomalies, with the prevalence rates observed being within the ranges of population prevalence reported in the literature. The commonest types of anomalies encountered were crypto-orchidism with / or without scrotal hypoplasia 268 (4.30%), inguino-(scrotal) hernias 56 (0.90%), and hydrocoeles 52 (0.83%), in descending order. As many as 183 (44%) of those with congenital genital defects were not aware they had them.

When compared with urban schools, rural schools were characterized by a higher frequency [8.4% vs. 2.8% respectively; $\chi^2 = 58.35$; $P < 0.0001$] and a lower level of awareness about anomalies of the external male genitalia [$P = 0.017$, by Wilcoxon's rank sum test]. Awareness level was also related to the subject's source of information [$P = 0.0012$, by Kruskal-Wallis ANOVA].

Conclusion: School prevalence surveys may provide close approximations of population prevalence with respect to external male genital anomalies. There is, however, a need for further studies in this direction.

Key words: *Anomalies, male genitalia, prevalence*

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INTRODUCTION

Several kinds of developmental defects of the external male genitalia have been described in the literature [1, 2]. the incidences of which differ from place to place. Their severities have ranged from life-threatening to mere cosmetic distortions. Abnormal development involves both male and female genitalia alike and genetic, environmental, and hormonal causes have been identified [3-7]. As opposed to genetic causes environmental causes usually have effects that are localized in a place and are, therefore, more readily identified and targeted for possible prevention, [8-10]. An essential step towards identification of an environmental cause is to study the pattern for possible identification of a clustering of such anomalies. Most of the available epidemiological data about the prevalence of genital defects are hospital based. However such incidence data are unreliable in countries such as Nigeria where most deliveries occur outside hospitals. Besides, superstitious beliefs abound concerning genital examination that often hampers community survey, [11]

In order to get round these difficulties the current study was designed with a focus on schools. This novel approach, if confirmed reliable, would have the advantage of providing a cheap and quick estimate of the prevalence of genital and / or other systems' anomalies in a population. The frequencies of the various types of anomalies observed in the current study are within the ranges reported in literature for developed countries, [1, 2]. Although there is a paucity of reliable local incidence data available for comparison, these preliminary findings appear encouraging enough for further studies to be undertaken aimed at a within- population validation of the novel sampling.

Some of these anomalies are treatable especially when detected on time. If uncorrected, some of them could manifest as profound social, psychological, medical and marital complications later in adult life [11-14]. Early detection and correction of male organ abnormalities are, therefore, important not only for aesthetics but also for normal psychosocial and physical development of the affected children. Some of the reasons proffered for late detection of external male genital defects are ignorance, religious and cultural inhibitions about sexuality, denial, false beliefs and alternative health care-seeking behaviours [15, 16].

Enugu State is one of the Igbo-speaking states of the Nigerian South-east. In traditional Igbo culture sexuality is a taboo topic [11]. Studies about congenital genital defects are difficult among people with severe cultural or religious inhibition about sexuality [8]. This is even more difficult in a country such as Nigeria where traditional birth attendants with no knowledge about congenital defects deliver more pregnant women than trained obstetricians. In the current study an attempt was made, at elucidating the prevalence and pattern of external male genital defects among Igbo Nigerians, using the school setting as a model. The awareness about developmental defects of the external male genitalia in this culture was also assessed.

SUBJECTS AND METHODS

Boys aged 10years and above in randomly selected schools in Enugu State, South - East, Nigeria were studied over 18 month period from February 2002 to August 11, 2004.

*Sampling Method:*A cluster of random 3-stage sampling technique was used.

First, 12% of local government areas in Enugu state were randomly selected by a process involving lot picking.

Second, in the selected local government areas (L.G.A's), an exhaustive sample frame of all the government approved secondary schools was obtained from the state Ministry of Education. From this sample at least 10% of these registered schools were selected for the study.

Third, in each school so selected, all the male students aged 10 years and above who agreed to participate were recruited into the study. Efforts were made to elucidate reasons for those who did not participate. Some of them because they were absent from school during the period of study of their schools for various reasons.

All together 6226 boys were recruited. The ages of the children were determined by their date of birth as recorded in the school registers which also gave their different classes.

Each person recruited into the study passed through at least two of three possible stages.

First, all the participants completed a structured, pre-tested and self-administered questionnaire embedded with colour photographs of normal and abnormal external genitalia.

Information sought in this questionnaire included general knowledge about genital defects (25%), the major sources of such information (mother, father, both parents, peers, school teacher's and others) and the participants ability to correctly classify own genitalia as normal or abnormal.

In the third stage, all the participants who, on clinical examination were found to have external genital defects, were further interviewed in greater details. Another set pre-tested interviewer- administered, 25-question questionnaire answered. This stage involved details of all types of medical interventions so far sought by the candidates or either of their parents or both.

The parents of children passing through this third stage were traced to their homes and interviewed, collecting information regarding to their level of awareness, beliefs, as well as their plans as regards to the future of their child vis-à-vis the defect(s) detected.

These parents were also educated on their children's external genital defects and advised on prospects for remedy and prognosis.

It will be noted that some of the students refused to participate in the study for personal reasons, while others could not participate because they were absent from school during the period the study was carried out in their own school. The reasons for their absence could not be elicited. However the percentage of those who did not participate judging by class/school registers was not significant. Although the number was ignored, it was possible some few cases may have been missed but this may not have seriously affected the outcome of the study.

STATISTICAL METHODS

The statistical analysis was carried out using Statistical Package for the Social Sciences (SPSS) computer software version 11. The data were expressed as percentages (%) and Median (Range) and were compared using Chi-square test and Wilcoxon's rank sum tests respectively for binary and discrete data. Associations between awareness scores and the other variables studied (including their interactions) were explored by employing Chi-square analyses for trends, Kruskal-Wallis ANOVA and Spearman's correlation analysis as appropriate.

RESULTS

The results are expressed as per cent (%) and as median (range). A total of 6226 subjects aged 12.95 ± 3.2 years and in 7.71 (5 – 11) years of study participated in the survey. Out of all the 6226 participants 416 had evidence of defects in their external genitalia, giving an overall prevalence of 6.7%. Table 1 shows the pattern of anomalies observed.

The commonest types of anomalies encountered were crypto-orchidism with and without scrotal hypoplasia (4.30 %), Inguinal (-scrotal) hernias 56 (0.90%), and hydrocoeles 54 (0.83%). Genital defects were more frequent in rural than urban schools [8.4% vs. 2.8% respectively; $\chi^2 = 58.35$; $P < 0.0001$].

TABLE 1:
The Types and Frequencies of the Encountered Anomalies.

Type of Anomaly	Number	%
Maldescended testes (Cryptorchidism ± scrotal hypoplasia.)	268	4.30
Inguino- (scrotal)- Hernias	56	1.00
Congenital Hydrocoeles	52	0.84
Hypospadias	22	0.35
Glandular	15	0.24
Penile	6	0.10
Peno-scrotal	1	0.02
Lateral curvature of penis	10	0.20
Micro (rudimentary) penis	3	0.05
Inguino-scrotal lymph oedema	2	0.03
Glandular epispadias	1	0.02
Bifid penis	1	0.02
Hydrocoeles of the cord	1	0.02
TOTAL	**416**	**6.7**

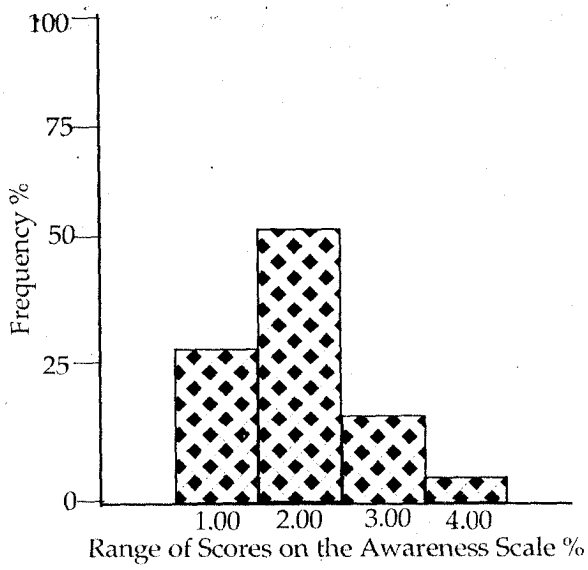

Fig. 1: The Frequency Distribution of Awareness Scores

Fig.1. shows the frequency distribution of general awareness scores among the participants. (In this figure the x-axis shows the numerical codes for the ranges of percentage (%) scores as follows: 1.0 = 0% to 25%, 2.0 = between 25% and 50%, 3.0 = 50% to 75%, 4.0 = above 75%. The y-axis shows the percentage of participants (%) whose scores were within the corresponding range. Range of scores = 0% - 100%; median score = 46.72%). Each of the questions answered correctly was scored 4% while wrongly answered questions were scored 0% each. The score for general awareness was 46.72% (0% – 100%). One hundred and eighty three of the subjects found with genital defects were completely unaware of their anomalies, a case-ignorance rate of 44.0%. The level of case-ignorance about genital defects was found to be more in rural than in urban schools [84.6% vs. 51.4%; χ^2 = 4.83; P = 0.028], despite the higher frequency of cases found in the former. Of all the subjects from urban schools who were found with anomalies, 44 (84.6%) had had some form of medical intervention as against 5 (0.01%) from rural schools [P < 0.001, by Fisher's exact test].

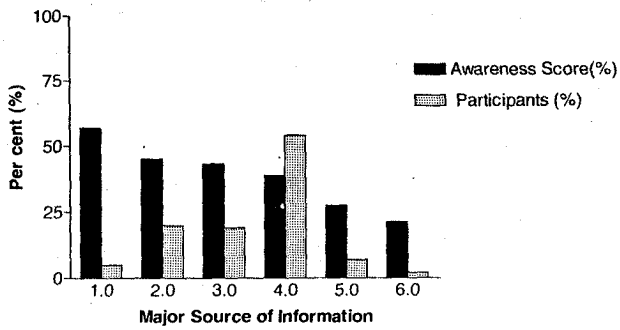

Fig. 2. The differences in awareness scores of participants grouped according to their major sources of information.

The high level of ignorance observed in this study prompted further analyses in order to determine some of the factors responsible. To investigate this, therefore, the relationships of awareness scores to such variables as age, year of study, the location of the school (rural or urban), the main source of information about congenital genital defects, and the presence or absence of a genital anomaly in the individual were examined. General awareness scores were found to be significantly higher the higher the age [P = 0.003, by Kruskal-Wallis ANOVA] and the higher the year of study [P = 0.036, by Kruskal-Wallis ANOVA]. The scores were

also observed to be significantly higher among participants in urban schools compared with their counterparts in rural schools [P = 0.017, by Wilcoxon's rank sum test]. A classification of the participants according to their major sources of information is as follows: School teacher 312(5.01%), Mother 1245(20.00%), both parents 1183(19.00%), Peers 3363(54.01%), Father 436(7.00%) and Other 125(2.01%). Fig. 2 shows how the awareness scores were distributed against the different sources of information. (In fig 2 the x-axis shows the numerical codes used for the participants' major sources of information about congenital genital defects: 1.0 = Schoolteacher, 2.0 = Mother, 3.0 = both parents, 4.0 = Peers, 5.0 = Father, 6.0 = other sources. The y-axis represents the median scores as percentage (%) on the general awareness scale as well as the percentage of the participants involved.) Curiously, there is a statistically significant association between the participants' awareness scores and their major source of information about genital anomalies, in descending order of magnitude, as follows: School teacher, mother, both parents, peers, father, and other [P = 0.0012, by Kruskal-Wallis ANOVA]. In addition, the median score for general awareness was more among participants with genital defects than among their counterparts without such defects [416(53.51%) vs. 5810(40.77%) respectively; P = 0.011, by Wilcoxon's rank sum test].

Taking into consideration the finding in the current study that awareness was associated to both the age and year of study of the participants [r = 0.29; P = 0.005, Spearman's correlation] it became necessary to explore further how awareness scores would relate to year of study after controlling for the effect of age. This was achieved by performing regressions of awareness against year of study in each of the following five, arbitrarily chosen age brackets; 10.5-12.4, 12.5-14.4, 14.5-16.4, 16.5-18.4, 18.5-20.4 years. Independently of age, year of study did not significantly correlate with awareness scores [$0.003 \leq r \leq 0.107$; $0.062 \leq P \leq 0.191$, Spearman's correlations].

DISCUSSION

Some anomalies of the external genitalia are congenital and caused during foetal development. Reports from developed countries show that the most common abnormality is failure of the urethral tube to form correctly resulting in an additional hole in the penis [18]. This additional hole is usually located on the underside (hypospadias) or topside (epispadias) of the penis.

In the current study, however, the most frequently observed anomaly was testicular maldescent noted in 4.30% of the subjects, although the observed frequencies of hypospadias and epispadias were within the reported ranges [18].

It is not known, though, whether the predominance of maldescent found in this study is a reflection of reality or is merely an artefact of this novel sampling method.

The frequency of genital anomalies found was higher in rural than in urban schools. Although certain environmental factors have been found to play a role in some places [3-6] it is not possible to draw such a conclusion in this case. Further studies are certainly necessary to explain this rural-urban discrepancy. Awareness was also observed to be lower, despite the observed higher frequency of genital defects in rural schools. The latter may partly be attributable to the overall high illiteracy level and superstitious beliefs that typify the rural areas in Ibo land.

The major anomalies of the genitourinary tract may result in disturbances of sexual and reproductive function [14]. In general the children grow up with the same aspirations as their more normal peers, which are to marry, have intercourse and produce children. Some achieve this despite the deformities and in others specific reconstructive surgery may be needed. Parental awareness is of paramount

importance for the early detection and intervention in such cases. The overall awareness about developmental anomalies of the male external genitalia was found to be low among the students in this study. This possibly reflects an overall low awareness in the society. This hypothesis is further strengthened by the observation that as high as 44% of the affected students were completely unaware that they had such defects. An incidental, but very interesting finding was that only 312, constituting about 5.0% of all the students, gained apparently high quality knowledge about congenital genital anomalies from their teachers, resulting in their high scores on the awareness scale (median = 56.93%). On the contrary, a majority of the students (5914) or 95.0%) appeared to have gained low quality knowledge from the other sources to which they were exposed (mother, father, both parents, peers and others) and this probably resulted in their poor scores on the same scale (median ≤ 38.69%). Although a highly effective source of information, the contribution of formal sex education to the overall awareness about genital defects among the students appears, therefore, negligible.

The additional finding that awareness scores independently increased with age but not with the year of study further corroborates this tentative interpretation.

CONCLUSION

The burden of anomalies of the external male genitalia among Ibo Nigerians appears to be higher than generally appreciated because of the low level of awareness. It is recommended, therefore, that formal sex education be made compulsory in schools as an important first step towards arresting the situation.

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