



# Sociodemographic influences on immunization of children with chronic neurological disorders in Enugu, Nigeria



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## ABSTRACT

**Background:** Children with chronic neurological disorders (CND) may be at risk of under immunization. Both health workers and care givers may inappropriately categorize their clinical features as contraindication to immunization and may not want to immunize these children. This cross sectional study was to determine the influence of sociodemographic characteristics such as maternal education and occupation, fathers occupation and education, gender of the child and nature of CND on the immunization coverage rate of these children.

**Methods:** Information such as the child's biodata, parental educational status, occupation of parents and immunization status were obtained from interviewer administered pretested questionnaires and immunization cards of children with chronic neurological disorder.

The study population included children with chronic neurological disorders aged 6 months to 5 years and attending the pediatric neurology clinic of UNTH Enugu. Chi square tests were used to determine the significance in the relationship between the socio demographic factors and immunization coverage of these children.

**Results:** Mother's educational attainment and father's occupation were observed to significantly affect the immunization coverage of children with chronic neurological disorders. The type of chronic neurological disorders also significantly affected the immunization coverage of these children. Other factors such as child's gender, maternal occupation and father's education did not significantly influence the immunization coverage of these children with CND.

**Conclusion:** Children with obvious neurological deficits whose mothers have low educational attainment are at risk of low immunization coverage. It is recommended that healthcare workers should assess the immunization status of children with CND at every opportunity. Female education and empowerment should be encouraged as a means of enhancing the immunization coverage of these children.

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## 1. Introduction

Various studies have shown that immunization coverage of children with chronic neurological disorders is low [1–3]. A chronic neurological disorder could be defined as a disease condition that has persisted for a long time, at least 6 months. It is a continuing disease process. It has been postulated that these children may be at risk of under immunization principally because, both health care workers and health care givers may have inappropriately categorized the symptoms and signs of chronic neurological disorder as contraindications to immunization and thus, would not want to

immunize them [4,5]. In order to achieve universal immunization coverage and build sustainable programmes, it is essential to reach the currently unreached population such as these children with chronic neurological disorders. This cannot be done without better understanding the beliefs and behaviors of mothers, the care givers and health care givers who immunize these children.

The effectiveness of routine children immunization programme relies on multiple factors such as the demographic characteristics of these children. Schoeps et al. [6] working in Burkinafaso noted that maternal education, poverty, seasonality and area of residence were associated with timely adherence to BCG vaccination and completion of vaccination schedule. In rural Bangladesh Rahman and Obaida-Nasrash [7] showed that mothers age, parity, birth interval, maternal education, wealth and distance from vaccination

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post, positively affected immunization coverage. Also ethnicity was noted to significantly affect immunization in Nairobi [8]. Other factors such as possession of immunization card was also noted to significantly affect immunization in children [9]. This cross sectional study seeks to determine the influence of sociodemographic characteristics such as gender, maternal education and occupation, fathers occupation and education and type of chronic neurological disorders on the immunization coverage of children with chronic neurological disorders.

## 2. Methods

This study was carried out in the Pediatrics Neurological Clinic of the University of Nigeria Teaching Hospital (UNTH) Enugu in Enugu State. The Teaching Hospital serves as a referral center to states in South Eastern Nigeria.

The pediatric neurology clinic (PNC) holds once a week with an average attendance of 100 patients monthly and a total of 1255 patients per year. The study population consisted of children aged 6 months to five years with CNDs attending the PNC whose mothers were able to provide their immunization cards. Estimates of immunization coverage in developing countries are typically made on a standard card plus history, combining information obtained from the immunization card with information obtained from mothers report [10]. Use of only immunization cards tends to overestimate immunization coverage [10], while use of only parental recall of immunization tends to grossly underestimate immunization coverage [10]. The low literacy levels in our environment makes it difficult to obtain accurate immunization histories. This was revealed by the pilot study which was carried out to correct observed lapses in the questionnaire.

The study group involved children 6 months to 5 years. Less than 6 months most chronic neurological disorders may not have manifested. This study was conducted from May to December.

Sample size was calculated using the WHO formula for sample size determination in a finite population i.e. <10,000. Prevalence rate for children not age appropriately immunized in Enugu is not known. In the absence of a reasonable estimate, 50% was used as the prevalence rate [11].

$$\text{Where } N_0 = \frac{Z^2(p)(1-p)}{d^2}$$

Correction for a finite population of 200

$$n = \frac{N_0}{1 + \frac{N_0}{N}}$$

Z = Confidence interval (1.96).

D = Tolerable error, margin fixed at 0.05.

N = Total population of patients with CNDs attending the PNC in UNTH, Enugu within duration of study = 200.

$$N_0 = \frac{1.96^2 \times 0.50 \times 0.50}{0.05^2} = 384$$

$$n = \frac{384}{1 + \frac{384}{200}} = 131$$

The minimum sample size for the study was 131. This however was raised to 147 to allow for 12% non response rate [12].

Those who met the inclusion criteria were consecutively recruited until the desired sample size was reached. Subjects were clinically examined to establish the diagnosis.

Ethical clearance was obtained from the ethical and research committee of the UNTH, Enugu. Verbal consent of the mothers was sought and obtained before enrollment.

Pretested questionnaires adopted from the WHO manual for evaluation of immunization status of children [6], consisting of both open ended and forced choice questions was administered to the respondent by the investigator. The respondents were interviewed during the course of their clinical consultation. Information obtained includes child's biodata, parental educational status, and occupation, reasons for incomplete immunization, diagnosis and nature of chronic neurological disorder.

A child is fully immunized, if he is age appropriately immunized with NPI vaccines according to the schedule. A child is not fully immunized if he is not age appropriately immunized with the NPI vaccines he or she is due for.

Score	Profession/occupation
1	Senior public servants, professionals, managers, large scale traders, contractors
2	Intermediate grade public servants, Senior school teachers
3	Junior school teachers, drivers and artisans
4	Petty traders, laborers, messengers
5	Unemployed, full time housewives, students, subsistence farmers

## 3. Statistical analysis

Quantitative data are presented in tables. Yates corrected Chi square test were used to determine the significance in the relationship between the sociodemographic factors and immunization coverage of children with chronic neurological disorders.

## 4. Results

Table 1 shows the sociodemographic characteristics of subjects. One hundred and sixty-eight subjects were studied. The age range (mean ± SD) was 6–55(22.7 ± 14.3) months. The age group 12–23 months [54(32.1%)] was the most represented. The total number of children aged 23 months and below is 101 constituting 60.1% of the total. The male to female ratio is 1.4:1.

Table 2 shows the pattern of neurological disorders in the subjects. Children with epilepsy alone 84(50.0%) constituted the largest number followed by those with cerebral palsy 39(23.2%). Amongst children with cerebral palsy, those with associated speech defect and epilepsy constituted the largest number

**Table 1**  
Socio demographic characteristics of subjects.

Age in month	Subjects (%)
6–11	47(28.0)
12–23	54(32.1)
24–35	22(13.1)
36–47	28(16.7)
48–59	17(10.1)
Total	168
Sex	
Male	97(57.7)
Female	71(42.3)
Total	168
Socio-economic class	
Upper	61(36.3)
Middle	54(32.1)
Lower	53(31.6)
Total	168

Percentages in parenthesis.

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