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CC –BY Relationship of socio-economic status and childhood cancer: an in-hospital cross-sectional study in a developing country

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Abstract: *Background:* Socio-economic factors are known to affect health quality, disease occurrence as well as health-seeking behaviors in several ways.

Objectives: To determine the influence of socio-economic factors on awareness of cancer, health-seeking behaviors among parents of children with cancer in a developing country and occurrence of cancer using Burkitt lymphoma as index malignancy.

Methods: This was a descriptive cross-sectional study that involved children with cancer seen over a 2-year period in a tertiary hospital in Nigeria. Information was obtained by interview through administration of a questionnaire and retrieval of clinical data from patients' case notes.

Results: The caregivers of 91 children (46 boys, 45 girls) were interviewed including 86 biological parents. Majority (84.6%) of the children belonged to the low socio-economic classes 3-5; 45 of 86 parents (52.3%), more likely in parents from higher socio-economic classes, were aware of

cancer but only 7 (8.1%) knew it could occur in children. There was no association between Burkitt lymphoma and socio-economic class. Twenty-eight (30.8%) parents of the 91 children visited alternate sources of health care, most commonly traditional healers, followed by religious centers. There was no association between visits to such centers and the parents' socio-economic status or with presentation with metastatic disease.

Conclusions: Awareness of childhood cancer is low among this cohort of parents; their socio-economic status seems to impact on this level of awareness but not on their health-seeking behaviors for their affected children. Focused health education is needed to increase childhood cancer awareness and appropriate health-seeking behavior among the population studied.

Key words: socio-economic; childhood; cancer; health-seeking; behaviour; awareness

Introduction

Social and economic factors are known to affect health and well-being in several ways. For example, individuals of lower socio-economic status (SES) have poorer health metrics than those in higher socio-economic classes.¹ Similarly, children with lower SES have been reported to have poorer health indices compared with those in the higher SES.² By the same token, socio-economic and cultural factors are believed to influence help-seeking attitudes in childhood cancer; this usually results in late in-hospital presentation and subsequent poor outcomes in Nigeria.^{3,4} The influence of cultural factors on health access are not limited to developing countries. A study in the United Kingdom revealed that blacks and ethnic minorities had poor knowledge of cancer and also had beliefs and attitudes that might hinder their

accessing of clinical services aimed at early diagnosis of cancer.⁵ Knowledge of early symptoms or signs of cancer is believed to be important in facilitating early help-seeking from health facilities and consequently, early diagnosis.⁶ However, knowledge of early clinical features can only be predicated, in the first instance, on awareness of the existence of cancer.

In another light, socio-economic factors have also been considered to play a role on the occurrence of cancer. For example, the risk of cancers of the lungs and stomach are higher in socially disadvantaged groups while that of cancer of the breast is higher in socially advantaged groups.⁷ More specifically, descriptive studies have shown that most children with Burkitt lymphoma, the most common childhood tumour in Nigeria, belong to the low socio-economic classes.^{8,9} Due to lack of ana-

lytical studies on the subject, it is not clear if this pattern reflects the low socio-economic status of the general populace; whether this pattern is peculiar to Burkitt Lymphoma in contradistinction to other tumours, or if there is a statistical association between Burkitt Lymphoma and socioeconomic class. The latter may indicate some contribution of socio-economic class to the occurrence of the disease and therefore a potential target for control measures. The objectives of this study were therefore, to determine the influence of socio-economic factors on awareness of cancer among parents of a cohort of children with cancer, help-seeking by these parents from alternative medicine and to compare the socio-economic status in children with Burkitt lymphoma as a reference with those of other childhood cancers. Confirmation of the significance of these factors would give impetus to educational drives and other efforts aimed at their remediation.

Materials and Methods

This was a cross sectional descriptive study involving all children diagnosed with cancer at the Pediatric Hematology and Oncology Unit of the University College Hospital, Ibadan, South-western Nigeria. This hospital is an 850-bed tertiary health facility that takes care of both adults and children. It serves as a referral center for cancer in Oyo state in which it is located, as well as some surrounding cities and states of the nation. Nigeria has a dual health service consisting of private and public services. The hospital in which the present study was carried out is a public hospital. The health structure of the country comprises three levels of care namely primary, secondary and tertiary.¹⁰ Childhood cancer is managed mainly at government owned tertiary centers, so that children irrespective of their social classes are likely to be managed mainly at tertiary health centers. There is a National Health Insurance Scheme which is utilized by only about 4 percent of the population. Therefore, payment for health services in the country is mainly through out-of-pocket expenditure.^{11, 12}

The present study took place over a period of two years from July 2012-June 2014. Information was obtained by interview through administration of a questionnaire and retrieval of clinical data from the patients' case notes. Information obtained through interview included socio-demographic data, awareness of cancer, and health-seeking from alternative sources of health care. Stratification of the children into socio-economic classes was done with the classification by Oyedemi¹³ which is based on the parent's level of education and occupation. The respective strata of this classification system are shown in table 1. The mean of four scores (one each from the father's educational level and occupation and also from the mother's educational level and occupation) to the nearest whole number was the social class assigned to the child on a 5-point scale¹³ with class 1 representing the highest level of socio-economic status, and 5 the lowest.

Table 1: Parameters used in classification of socio-economic status

Parameter	
<i>Educational level</i>	
University graduates or equivalents	1
School certificate (SSCE/GCE O'Level) holders who also have teaching or other professional training	2
School certificate or grade II teachers' certificate Holders or equivalents	3
Modern 3 and primary six certificate holders	4
Those who can just read and write or the illiterate	
<i>Occupation</i>	
Senior public servants, professionals, managers, Large scale traders, businesswomen and contractors	1
Intermediate grade public servants, senior schoolteachers	2
Junior schoolteachers, drivers and artisans	3
Petty traders, messengers, labourers and similar grades	4
Unemployed, fulltime housewives, students and Subsistence farmers	5

Information on the pathologic diagnosis and stage of the disease was obtained from the case notes.

Ethical approval was obtained from the Joint University of Ibadan/University College Hospital, Ibadan Ethics Committee and informed consent was obtained from the parents or guardians.

Data were entered into a micro-computer using the Statistical Package for Social Sciences, version 22.0. Means and medians were computed and categorical variable presented in frequencies and proportions. Association between categorical variables was tested using the Chi-Square test and when applicable, the Fisher's Exact test. Non-parametric variables were compared using the Independent samples Median test. Statistical significance was set at $p < 0.05$.

Results

The caregivers of 91 children with cancer comprising 46 boys and 45 girls were interviewed and questionnaires completed. Out of the 91 respondents 17 (18.7%) were fathers, 69 (75.8%) mothers and the remaining 5 (5.5%) were 3 grandmothers, 1 uncle and 1 aunt. The diagnoses in the children are shown in table 2 with Retinoblastoma accounting for the majority.

The distribution of the children across the 5 socio-economic classes was as follows: 4 (4.4%) children in class 1; 10 (11.0%) in class 2; 49 (53.8%) in 3; 27 (29.7%) in 4, and only 1 (1.1%) child in class 5.

Analysis of the relationship between socio-economic status of children and tumors was done using Burkitt Lymphoma as index malignancy. Comparing the socio-economic status of families of children with Burkitt Lymphoma with other children revealed that none (0%) of the 12 children with Burkitt Lymphoma belonged to the higher socio-economic classes (1&2); 12 (100%) belonged to classes 3-5, whereas 14 (17.7%) of the 79 children with other malignancies belonged to the high socio-economic classes 1&2, the rest 65 (82.3%) be-

longing in the lower socio-economic classes 3-5. This difference was however not statistically significant (Fisher's Exact test, $p = 0.201$).

Among the 86 parents, 45 (52.3%) had prior awareness of cancer as an ailment but only 7 (8.1%) knew cancer could occur in children. Regarding knowledge about causation of disease, 23 (26.7%) of the 86 parents believed that the source of their children's illness was spiritual; 47 (54.7%) were not sure of the cause of the illness, while only 16 (18.6%) believed it to be physical. Awareness of cancer both in general and its occurrence in childhood was significantly associated with a higher socio-economic class (Table 3).

Table 2: Types of malignancy found in the study population

Diagnosis	Frequency	Percent
Burkitt Lymphoma	12	13.2
Other Non-Hodgkin Lymphomas	5	5.5
Hodgkin Lymphoma	1	1.1
Retinoblastoma	24	26.4
Rhabdomyosarcoma	13	14.3
Nephroblastoma	9	9.9
Neuroblastoma	2	2.2
Central Nervous System tumor	9	9.9
Leukemia	10	11.0
Bone tumors	2	2.2
Hepatoblastoma	2	2.2
Testicular germ cell tumor	1	1.1
Parotid tumor	1	1.1
Total	91	100.0

Table 3: Relationship between parental socio-economic class (SEC) and cancer awareness and presumed cause

		SEC 1-2 (n=13)	SEC 3-5 (n=73)	+p-value
		Frequency (%)	Frequency (%)	
Cancer awareness	Yes	11(84.6)	34 (46.6%)	0.015
	No	2 (18.2)	39 (53.4)	
Childhood cancer awareness	Yes	4 (30.8)	3 (4.1)	0.009
	No	9 (69.2)	70 (95.9)	
Cause of illness	Spiritual	2	11	0.499
	Non-spiritual	11	52	

+Fisher's exact test

Attribution of the cause of cancer to spiritual factors was not associated with socio-economic class (Table 3). Median time between onset and diagnosis in children whose parents thought the illness was of spiritual origin was 25.8 weeks compared to 33.1 weeks in others (Independent samples median test, $p = 0.896$).

Twenty-eight (30.8%) of the 91 children had been taken to alternative sources of health care before in-hospital presentation. Out of the families from high socio-economic classes 1&2, 21.4% (3/14) visited alternative sources of health care compared to 25 of the 77 (32.5%) from lower socio-economic classes (Fisher exact test, $p = 0.537$). The alternative medicine sources visited were traditional herbal healers by 17(18.7%), Christian reli-

gious faith healers by 15(16.5%) and Islamic religious healers by 15(16.5%) of study participants. Time spent in such places receiving treatment ranged from 1-15 days with a median of 2 days. The median interval between onset of symptoms and diagnosis was 18.2 weeks among children who visited alternative sources of health and 13.0 weeks in those who did not visit this route (Independent samples median test $p = 0.228$).

Metastasis was present in 7 (50%) of the 14 children from higher socio-economic classes 1&2 compared with 33 (42.9%) of the 77 patients of lower socio-economic classes (Chi-Square test, $p = 0.620$). Metastatic disease was present in a higher proportion, 16 (57.1%) of 28 children who visited alternative sources of health compared with only 24 (38.1%) of 63 who never took this health-access route but the difference was not statistically significant (Pearson's Chi square test, $p = 0.091$).

Discussion

The findings concerning the main theme of the study suggest a notable trend of high patronage of complementary alternative medicine by this study group. This trend has been reported in high-income countries too.¹⁴ Almost a third of the children in this study at some point in time patronized alternative sources of health care such as churches, Islamic mission houses, as well as traditional/herbal medicine practitioners. This proportion is lower than the rate in a Swiss University Hospital where 53 percent of respondents had used Complementary and Alternative Medicine (CAM) for their children with cancer, mostly homeopathy.¹⁵

Importantly however, this study showed that there was no statistically significant association between socio-economic status and the use of alternative sources of health care by the subjects. This suggests that this health-seeking behavior knows no socio-economic barriers but is more probably a reflection of the culture of the people. Health educational efforts to prevent such practices should therefore cut across all strata of the society. It is also noteworthy that patronizing such alternative sources of health services did not significantly contribute to delayed diagnosis of cancer. Although the pre-diagnostic interval was longer in children who patronized alternative health care sources, the difference was not statistically significant. Similarly, presentation with metastatic disease was not significantly higher in children who had used alternative medicine. This is not surprising, giving the very short median time (only 2 days) spent in such places. This contrasts with findings in breast cancer patients both in Nigeria and Pakistan where the use of alternative and complementary medicine (CAM) significantly has been shown to increase pre-diagnostic delay and presentation with advanced disease.^{16,17} This difference in the impact of using CAM in children in this study compared to adult breast cancer patients may be due to fears of early death of children due to their vulnerability and therefore minimal length of time spent in CAM. Therefore rather than lay all the blame on the

parents and visits to alternative medical practitioners for delayed diagnosis in children, health system defects should be re-appraised. The need for this is corroborated by a recent report that revealed how inadequacies of health systems might be contributory to delayed diagnosis of childhood cancer.⁴ Some of these factors include late referrals to tertiary centers, a chain of multiple referrals before arriving at the place where diagnosis is made and out-of-pocket financing of cancer treatment.⁴

Delay in the interval between onset of symptoms of cancer and diagnosis or treatment has been associated with a poorer survival.¹⁸ Lack of awareness of the seriousness of symptoms or not recognizing the symptom to be due to cancer is a major risk factor for delayed presentation of patients.¹⁹ In the present study, only 8.1% of parents were aware that cancer could occur in children. This finding is in keeping with the low awareness rates also reported in guardians of 5.0% in Kenya and 19% in Uganda.²⁰ This implies that the index of suspicion of cancer is likely to be low when children develop symptoms of the disease and so foster delayed health-seeking in appropriate facilities. The association between higher socio-economic class and cancer awareness in this study is in keeping with findings by other workers.²¹ Our findings highlight the need for establishment of childhood cancer awareness programmes, paying extra attention to individuals from lower socio-economic classes. This is vital since cancer awareness is a potentially modifiable contributor to the variations seen in healthcare seeking and, ultimately, survival.²² The present study also did not show any association between socio-economic status and presentation with metastatic disease. This is in contrast with findings in a study on Osteosarcoma in the United States where individuals from low socio-economic classes were more likely to present with metastatic disease.²³ The contrasting finding of this study concerning this point may be due to other overriding cultural factors or barriers in accessing health that pervade the entire socio-economic landscape of the health system in Nigeria.^{12, 24}

Although Burkitt Lymphoma is the most common childhood malignant tumour in Nigeria, its ranking second in the present study is in keeping with declining frequency of the tumour in Ibadan, which has been attributed to possibility of improved malaria control.²⁵ Studies on

Burkitt lymphoma in Nigeria have revealed that most children were from low socio-economic classes.⁸ However, a statistical association between the condition and socio-economic class has neither been tested for, nor established. The uniqueness of the present study, unlike previous ones is that it compared socio-economic classes of children with Burkitt Lymphoma with those of children with other tumours. Although the present study, like the ones before, reveals a predominance of low socio-economic classes in affected children as a whole, no statistically significant association with socio-economic status was found. The established fact of the predominance of children of low socio-economic class in Burkitt Lymphoma may therefore reflect nothing more than the picture in the general population of children with tumours since only 15.4 % of the study population belonged to the high socio-economic classes. Indeed, it may also actually just be a reflection of the distribution of socio-economic classes across the general population but the validation of this impression is beyond the scope of this present work.

Conclusions

This study has highlighted a low level of awareness of occurrence of cancer in childhood among mothers of affected children in this developing country, the health-seeking behaviour of parents of children with cancer with a high rate of pre-hospital consultation of CAM, and some socio-economic and cultural issues in childhood cancer. Socio-economic status is associated with awareness of cancer but not with perception of its causation, utilization of alternative medicine and presentation with metastatic disease within the study population. This study has also confirmed a lack of statistical association between Burkitt lymphoma and socio-economic class. Health educational efforts and health system reforms aimed at promoting early diagnosis and better outcomes for childhood cancer are recommended and should cut across all strata of our society.

Conflicts of interest: None

Funding: None

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