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## Demographic Characteristics and Food Consumption Pattern of Head and Neck Cancer Patients in a Tertiary Health Institution North West Nigeria

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**Abstract:** Social, economic and environmental factors have influenced incidence and nature of head and neck cancers all over the world. The study is aimed at evaluating the socio demographic characteristics and food consumption of head and neck cancer patients and see if there may be links to predisposition to cancer. The prospective study was carried out on consecutive head and neck cancer patients seen in the Otorhinolaryngology out patient clinic and ward over a 6 month period (Oct 2011-March 2012). Information on the demographics, socioeconomic status and food consumption pattern were elicited from the respondents by the use of structured questionnaire. Data processing and analysis was done using Microsoft excel and Statistical Package for Social Sciences (SPSS) for windows, version 18.0. Thirty four head and neck cancer patients comprising 19 males (55.9%) and 15 females (44.1%) participated in the study. The ages of the patients ranged from 12-62 years. The respondents consisted of 11 local farmers (32.4%), 8 full time housewives (23.5%), 5 civil servants (14.7%) and 4 businessmen (11.8%). More than half (58.8%) of the head and neck cancer patients had no formal education while 14.7% attained secondary education. Household size of 5-10 accounted for 47.1%, 11-15 (20.6%), 16-20 (20.6%). Monthly income of <N5,000 (\$33) was recorded in 12 patients (35.3%), N5,000 (\$33)-N10,000 (\$67) in 8 patients (23.5%), N10,000 (\$67)-N20,000 (\$133) in 10 patients (29.4%). Food frequency analysis showed a low consumption of vegetables and relatively high intake of simple carbohydrate food sources. Majority of head and neck cancer patients in this study were characterized by low income of <N10,000 (\$67) per month (58.8%), large family size of 5-20 (88.3%) and no formal education (58.8%). Socioeconomic empowerment programs will go a long way in improving quality of living and invariably reducing incidence of head and neck cancer.

**Key words:** Head and neck cancer, demographic, characteristics, North West Nigeria

### INTRODUCTION

Knowledge of the socio-demographic profile of people presenting at diagnosis with a new head and neck cancer can help the treating team assist and provide services for these people in an appropriate and timely manner as they face the many challenges associated with the disease and treatment (Argiris *et al.*, 2008; Saunders *et al.*, 2007). Most will present with advanced disease and will likely quickly transition into treatment (Argiris *et al.*, 2008; Chaukar *et al.*, 2009). At the point of diagnosis, disease may already affect vital functions and communication ability (Hammerlid *et al.*, 2001) and the individual is likely to have varying levels of emotional distress (Larsson *et al.*, 2007; Murphy *et al.*, 2007).

The considerable health-related quality of life research literature on head and neck cancer patients focuses predominantly on the period of treatment to survivorship (Larsson *et al.*, 2007; Murphy *et al.*, 2007; Penner, 2009; Verdonk-de Leeuw *et al.*, 2010; Llewellyn *et al.*, 2006). However, as the present socio-demographic findings

indicate, there is also need to understand the situation of these patients during the period of diagnosis to treatment, a period of considerable challenge and vulnerability. Socio-demographic indices for this diagnostic group influencing patient outcome have been shown to be age, marital status, emotional status, income and occupation (Penner, 2009; Tschiesner *et al.*, 2009). The likely median age at diagnosis is early 60s, with a possible trend towards younger patient age (Argiris *et al.*, 2008; Braakhuis *et al.*, 2009). Such a trend would increase the relevance of work and income support mechanisms (for those of working age who are unable to work) in understanding the magnitude of challenges people face as they transition into treatment. Anecdotally, head and neck cancer patients have been regarded as disproportionately socio-economically challenged. In the literature, research indicating a socio-economically challenged profile for head and neck cancer patients is documented in regional and ethnic minority studies (Gourin and Podolsky, 2006; Patel *et al.*,

2006; Rozniatowski *et al.*, 2005; Ligier *et al.*, 2011) case-control studies (Johnson *et al.*, 2010; Conway *et al.*, 2010) and a recent large population study showing decreasing incidence with increasing social advantage using indices such as income, work and housing (Anderson *et al.*, 2008; Wilson *et al.*, 2011).

The majority of research originates in the United States of America and Europe and consequently does not address other regional-specific issues including differences in cultural norms, distance and relocation for treatment, hospital, government support and primary care support. The purpose of this study is to address a significant need for baseline local, Nigerian specific socio-demographic data at the time of diagnosis on a range of variables including age, gender, marital status, level of education, income, occupation and household size. The findings provide fresh insights that challenge the assumption with regards to the socio-economically challenged profile of head and neck patients. Usmanu Danfodiyo University Teaching Hospital is a major regional referral centre for Head and Neck cancer patients requiring one form of surgical treatment or the other. Ignorance, poverty, local customs and beliefs are major problems facing Head and Neck cancer patients in this region culminating in late presentation of most of these patients.

## MATERIALS AND METHODS

The study was conducted in Department of Otorhinolaryngology of Usmanu Danfodiyo University Teaching Hospital, Sokoto. The study involved patients with Head and neck cancer which were admitted over one month study period. These were clinically and histologically confirmed cancers diagnosed in the head and neck region.

Data used for this study was collected by the use of structured questionnaire. The questionnaire was divided into different sections. Information elicited included demographic and socio-economic status of the patients and frequency of consumption of selected foods by the patients.

The Food Frequency Questionnaire (FFQ) was used to assess the usual dietary intake of the cancer patients (Barros *et al.*, 1997). The foods included in the questionnaire were grouped into broad categories such as dairy products, meat, fish and eggs, fats, starchy foods, sweets and desserts, vegetables and fruits. Within these categories, respondents' intakes were classified as low ( $\leq 1-3$  times/week), moderate (4-6 times/week) or high ( $\geq 7$  times/week or if consumed daily) (Mehdad *et al.*, 2010).

Data collection and editing was done manually. Data processing and analysis was done using Microsoft Excel and Statistical Package for Social Sciences (SPSS) for Windows, version 18.0 (Statistical Package for Social Sciences, Chicago, IL, USA). Statistical

methods used were mean, standard deviations, frequency and percentages and correlation.  $p < 0.05$  was considered statistically significant.

## RESULTS

Thirty four patient: 19 males (55.9%), 15 females (44.1%) participated in the study aged 12-62 years (mean 38.97 years; male 45.05 years, female 31.27 years) with majority (29.4%) within the age range of 31-40 years and 23.5% above 50 years. The respondents consisted of 11 local farmers (32.4%), 8 full time housewives (23.5%), 5 civil servants (14.7%) and 4 businessmen (11.8%). More than half (58.8%) of the cancer patients had no formal education while 14.7%

Table 1: General characteristics of the study population

	Frequency	Percentage
Sex		
Male	19	55.9
Female	15	44.1
Total	34	100.0
Age		
12-20	6	17.6
21-30	4	11.8
31-40	10	29.4
41-50	6	17.6
51-62	8	23.5
Total	34	100.0
Marital status		
Single	6	17.6
Married	25	73.5
Divorced	3	8.8
Total	34	100.0
Education		
No formal education	20	58.8
Primary	4	11.8
Secondary	5	14.7
Tertiary	2	5.9
Quranic	3	8.8
Total	34	100.0
Occupation		
Not gainfully employed	2	5.9
Civil servant	5	14.7
Local farmer	11	32.4
Business	4	11.8
Full time housewife	8	23.5
Others	4	11.8
Total	34	100.0
Household size		
5-10	16	47.1
11-15	7	20.6
16-20	7	20.6
Above 20	4	11.8
Total	34	100.0
Income per month		
<N5, 000 (\$33)	12	35.3
N5,000 (\$33)-N10,000 (\$67)	8	23.5
N10,000 (\$67)-N20,000 (\$133)	10	29.4
N20,000 (\$133)-N30,000 (\$200)	2	5.9
N30,000 (\$200)-N40,000 (\$267)	1	2.9
N40,000 (\$267)-N50,000 (\$333)	1	2.9
Total	34	100.0

Table 2: Pearson correlation coefficient showing the relationship between demographic characteristics and nutritional status of head and neck cancer patients

	Sex	Age	Marital status	Education	Occupation	Household size	Income	Nutritional status
Sex	1							
Age	-0.456**	1						
Marital status	-0.196	0.442**	1					
Education	-0.095	-0.139	-0.139	1				
Occupation	0.436**	-0.256	-0.057	-0.033	1			
Household size	-0.142	0.182	0.158	0.040	-0.238	1		
Income	-0.141	0.452**	0.270	0.116	-0.146	0.183	1	
Nutritional status	-0.112	-0.934*	0.130	0.506**	-0.519	0.475**	-0.919*	1

\*Correlation is significant at 1% (p<0.01), \*Correlation is significant at 5% (p<0.05)

Table 3: Frequency of food intake

Foods	Low intake	Moderate intake	High intake
<b>Dairy products</b>			
Milk	60.0	30.0	10.0
Yoghurt	85.7	14.3	0.0
Cheese	100		
<b>Meat, fish and egg</b>			
Beef	38.7	9.7	51.6
Fish	38.1	19.0	42.9
Eggs	38.9	22.2	38.9
Chicken	60.0	0.0	0.0
<b>Fats</b>			
Groundnut oil	34.8	8.7	56.5
Palm oil	36.4	0.0	63.6
Butter	66.7	11.1	22.2
<b>Starchy foods</b>			
Fura	12.9	16.1	71.0
Kunu	13.8	6.9	79.3
Bread	34.8	39.1	26.1
Rice	30.4	34.8	34.8
Yam	36.4	54.5	9.1
Garri	55.6	27.8	16.7
Potato	52.9	35.3	11.8
Spaghetti/noodles	42.9	28.6	28.6
<b>Sweets and deserts</b>			
Sugar/gum/sweet	54.5	36.4	9.1
Biscuit	37.5	12.5	50.0
Ice cream	42.9	0.0	57.1
<b>Vegetables</b>			
Lettuce	54.2	41.7	4.2
Spinach	45.5	50.0	4.5
Beans	87.5	12.5	0.0
Garden egg	75.0	16.7	8.3
Cucumber	40.0	60.0	0.0
Cabbage	75.0	25.0	0.0
Carrot	64.3	35.7	0.0
Fresh tomato	63.2	31.6	5.3
<b>Fruits</b>			
Orange	52.4	42.9	4.8
Watermelon	57.1	42.9	0.0
Apple	57.1	42.9	0.0
Pineapple	100	0.0	0.0
Pawpaw	100	0.0	0.0

Data are presented as percentages of patients; low intake: 1-3 times/week; moderate intake: 5-6 times/week and high intake: =7 times/week or if consumed daily

attained secondary education. Majority (35.3%) of the respondents had monthly income below N5, 000 while 23.5 and 29.4%, respectively, were within the N5,000-N10,000 and N10,000-N20,000 income group. The result in Table 2 identified age (r = -0.934, p<0.05), education (r = 0.506, p<0.05), household size (r = 0.475, p<0.01) and income (r = -0.919, p<0.05) as significant

determinants of health status of the head and neck cancer patients studied.

Table 3 shows patient's poor dietary pattern. The analysis of the reported food frequency of usual intake showed that the majority of patients had low intakes of milk (60%) and yoghurt (85.7%). There was a generalized low intake of vegetables, less than 3 times per week, hence a poor intake of fibre, concomitantly with high and regular intake of simple carbohydrate food sources: 71 and 79.3% of head and neck cancer patients consumed fura and kunu respectively on a daily basis; rice, spaghetti/noodles and bread were the next most commonly consumed starch products, with 34.8, 28.6 and 26.1% of patients consuming those on a daily basis. There was also a reduced intake of foods rich in PUFA, mainly from dietary sources of n-3 fatty acids such as fish (low in 38.1% of patients). Overall, the consumption of fruits and vegetables was low. Low consumption of apple and watermelon was recorded in 57.1% of head and neck cancer patients and orange in 52.4% of patients.

## DISCUSSION

In 2004, cancer accounted for more than 13% of all deaths worldwide and the World Health Organization predicts an increase to almost 18% by 2030 Boyle *et al.* (2003). In the 1980's, the Europe against Cancer programme fixed the goal of reducing cancer mortality by 15% in Europe by the year 2000. Evaluation of the outcomes of the programme revealed that Portugal and Spain are among a limited number of European countries that showed an increased number of cancer deaths compared to those predicted (Clinton and Giovannucci, 1998). Nonetheless, the World Cancer Research Fund states that cancer is a preventable disease; a review of the past 30 years of authoritative estimates of the role of food, nutrition and lifestyles in the prevention of cancer, have suggested that approximately 30% of cancers are preventable (WCRF/AICR (World Cancer Research Fund and American Institute for Cancer Research), 2007; Mehdad *et al.*, 2010). Head and neck cancer is no exception. Exposure to inadequate diets throughout life may influence head and neck cancer progression due to the long pre-clinical stage (WCRF/AICR (World Cancer

Research Fund and American Institute for Cancer Research), 2007). The literature suggests various associations between dietary intake and risk of head and neck cancer: increased intake of calcium and meat with increased risk, whilst high lycopene, vitamin E and selenium intake with a decreased risk (Heinonen *et al.*, 1998; Chan and Giovannucci, 2001). Some support an association between saturated fat, red meat and dairy products with increased cancer risk but results are not consistent (Torniainen *et al.*, 2007). Other studies show inverse associations between dietary intake of plant foods including cereals, fruits and vegetables and reduced prostate cancer risk (Ornish *et al.*, 2005) others found no association (Key *et al.*, 2004). In the current study, whilst not possible to quantitatively assess nutrients, the analysis of the frequency of food intake demonstrated a low consumption of vegetables and selenium, lycopene and phytochemicals rich foods which are consistent with an increased risk of cancer.

Majority of head and neck cancer patients in this study were characterized by low income of <N10, 000 per month (58.8%), large family size of 5-20 (88.3%) and no formal education (58.8%). Income, household size and education were significantly ( $p < 0.05$ ) related to nutritional status of head and neck cancer patients. The low income, large family size and poor education is therefore associated with increased risk of head and neck cancer.

Ignorance plays significant role in linkage to patients who had head and neck cancer. Cultural beliefs will hold sway where habits are not subjected to scientific proofs or evidence such as feeding, shelter and good environmental hygiene.

Unlike the western culture, majority (47.1%) have household sizes of 5-10 persons. As a result of this extended family system, there is large number of people to cater for feeding, education, shelter etc. Therefore, resources will be shared and will be scarce, thus resulting in food insecurity. When a child is subjected to imbalance diet due to scarce food sources as a result of overcrowding in the family, the child will be nutritionally and immunologically ineffective to handle carcinogenic changes that could have been lifted earlier if the patients were eating a balanced diet with an immune booster. Overcrowded household may expose them to inclement conditions in the environment such as poor ventilation system, smoking cooking area, inadequate flooring and roofing materials and high dependence on firewood which is a major source of smoke which known to be one of the most disposing factors to carcinogenesis. This is contrary to what happens in the western world. The social security system in Nigeria expects four biological children with the parents, whereas the cultural regional belief permits a man to marry up to four wives. If all the wives have these number of children expected of them, the large family size will continue to be a

challenge. This would encourage inadequate feeding and poor western education.

Furthermore, since most of the respondents have low income status and large family size, they may not have the financial capacity to afford adequate nutrition which may worsen their health status. Majority of the head and neck cancer patients had poor income. If people are getting this small income, how are they expected to feed well? Lack of education, information, poor income predisposes the head and neck cancer patients to eating thrash. Poverty and ignorance expose them to repeated pathogens.

A study carried out on Asians and Pacific Islanders (APIs) revealed that lower neighborhood-level socioeconomic status is an independent negative prognostic factor among API patients diagnosed with head and neck cancer. Among APIs, living in a lower-socioeconomic status neighborhood was associated with a 26% increased risk of head and neck cancer-specific death and a 30% increased risk of overall death, independent of age, year of diagnosis, tumor stage, treatment and other factors (Chu *et al.*, 2011).

A Danish population-based study which used various factors including education, social class, housing district and world market affiliation to determine socioeconomic status, demonstrated that survival from mouth, pharynx and larynx cancers was shorter with lower SES, especially in men (Anderson *et al.*, 2008). Similarly, a population-based study of larynx cancer in Wales showed a large survival disparity between affluent and poor males, with a 17% absolute difference in 5-year survival between the groups (Rachet *et al.*, 2008). In the United States, both poorer health care insurance status (Medicaid dependent or uninsured patients) and living in an area with 15% of residents below the poverty line conferred a poorer outcome with head and neck cancer (Kwok *et al.*, 2010; Molina *et al.*, 2008). Such findings in predominantly non-Hispanic white patient populations indicate that the impact of socioeconomic status is an independent predictor of head and neck cancer survival that cannot be ignored.

**Conclusion:** The effect of socioeconomic status on head and neck cancer survival should be considered in future studies and particular attention should be paid to clinical care of lower-socioeconomic status head and neck cancer patients. Socioeconomic empowerment programs will go a long way in improving quality of living and invariably reducing incidence of head and neck cancer. Furthermore, future research should focus not only on possible diet related risk factors for cancer but also on how to encourage the adoption of protective diets and life styles.

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