



Sociodemographic factors and the determinants of the choice of oral hygiene products by the paediatric dental patients in a Nigerian Teaching Hospital.

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ABSTRACT

This study was to determine the relationship between the sociodemographic variables and the factors that determine the choice of oral hygiene products among the paediatric patients of a tertiary Hospital in Lagos, Nigeria. Ninety-one consenting paediatric dental patients were recruited from the Child Dental Health Department of the Lagos State University Teaching Hospital, Lagos, Nigeria. Data collection was conducted using a self-administered questionnaire. Data analysis was carried out using SPSS version 24. The children's (subjects) mean age was 10.6±2.9 years old, ranging from 4 to 16 years old, most of them 51(56%) were middle childhood aged between 6 years and 11 years old, the majority of the subjects noted that only previous experience with the toothpaste 57(62.6%) and professional advice 59(64.8%) were influential on their choice of toothpaste. More of the subjects confirmed that the size of bristles 49(53.9%), texture of bristles 69(75.8%), shape of the head 46(50.6%), Previous experience with the toothbrush 58(63.7%), and professional advice 64(70.3%) were influential in their choice of toothbrush. The colour of the bristles was the factor associated with toothbrush choice, while fluoride content, packaging and previous use were the determining factors of the choice of toothpaste; these factors should be incorporated in the oral health education and promotion directed at these age groups.

I. INTRODUCTION

Good oral hygiene is very essential for healthy oral health status and, by extension, the overall systemic health [1,2]. Globally, the most

common oral hygiene aid is the toothbrush and the toothpaste [3,4]. Toothbrushes and toothpaste come in several designs and forms[3]. Toothbrushes in different brands vary in the colour and texture of the bristles, size and shape of the head, shape, form and angulation of the handle, the packaging and the cost[3,4,5]. The toothpastes also come in different brands, colours, smells, and flavours, various forms of packaging[6], they may be fluoride or herbal-containing, and they also come at different costs[6,7]. Choice is the ability to decide between alternatives freely[8]. Socio-demographic factors such as age, educational status, and income, amongst others, also determine the choice of toothbrushes and toothpastes [9]. Choice among children is heavily influenced by the parents and the guardians[10]. In many cases, professional advice also plays a lot of roles in health choices.

Consumer choices have a lot of effect on the manufacturers of these oral hygiene products; they package and design the products to suit popular demands while also targeting other competing manufacturers to edge them out and maximise their profits[11]. They also take advantage of the consumer's choice to strategise ways of winning new customers while also keeping the old ones. The colours, images, beauty and the form of the packaging all impact the appearance and attraction of the consumers to the products. It also contributes a lot to the brand and marketing ability[12]. Brand is a 'name, logo, design, image, or some other factor that identifies a product or service and differentiates it from other products[13]. Brands have effectively been entrenched in the consumers through rigorous advertising in several media channels, both electronic and non-electronic [13]. It has also been used to influence consumer choices through the



sponsorship of many programs, including Oral and dental health programs [14]. Properties of these products, such as the texture of the toothbrushes and the herbal or fluoride content of the toothpastes, may result in differing preferences for these products in different communities.

A previous Nigerian study by Opeodu and coworkers in Ibadan, Nigeria, showed that the texture of the toothbrush, the brand of the toothbrush, and previous experience of use were significant determinants of the choice of toothbrush, while fluoride content, previous use, and Professional instruction were the significant factors for their choice of toothpaste [15]. Another Nigerian study involving university undergraduates revealed that the major factors influencing their choice of oral hygiene products were cost, texture, and inadequate oral health education [16]. In a cross-sectional hospital-based study in Pakistan, the cost of the products, advertisement and instructions from the mass media were identified as the major determinants of the choice of oral hygiene materials [17]. An Indian study showed that brand availability and previous use were very influential on their choice of both the toothbrush and toothpaste [18]. A research work in Morocco revealed that respondents made their choice of toothpastes based on the brands, family influence and choices, and advertisements [19]. This further supports the fact that the determinants of the choice of oral hygiene products vary from place to place.

A lot of the previous studies have focused on the adult population. A study of a paediatric population on their preferences for oral hygiene products will provide essential information for both the manufacturers, parents and the dental professional to attend to their special desires and enhance quality oral health delivery to this population. This study, therefore, is to determine the factors that influence the choice of toothbrush and toothpaste among the paediatric dental patients attending the Lagos State University College of Medicine, Lagos, Nigeria and also to assess the effect of the sociodemographic variables, including the mothers' age and educational status, on these factors.

II. METHODOLOGY

The study was conducted in the Child Dental Health Department at the Dental Centre of the Lagos State University Teaching Hospital (LASUTH), Ikeja, Lagos, Nigeria. LASUTH is a tertiary health institution and teaching hospital located in Lagos, Nigeria.

This was a cross-sectional study involving 91 pediatric dental patients who were the subjects of this study; 44 were male, and 47 were female. Convenient sampling technique was used for selecting the sample. The inclusion criteria included consenting subjects aged 2 to 16 years. Participants who do not consent to the study or whose parents do not consent to the study were excluded from the study. Participants who were not accompanied by their parents were also excluded.

Data collection was conducted using a self-administered questionnaire, which comprised both open-ended and closed-ended questions. This was used to obtain the biodata such as the mother's age, the mother's educational status, the subject's age, the subject's educational status and sex. It was also used to collect data on whether they have a choice of a specific brand of toothpaste and toothbrush. The factors associated with toothbrushes and toothpastes, which may influence their choice, were also collected on the questionnaire. The subject ticked these factors as either influential or not influential, as applicable. The primary researcher explained and simplified the terms that the subject seemed not to understand. A sample toothbrush was provided to describe the different parts.

Written informed consent was obtained from the subjects and their mothers before they participated in the study. Ethical approval for this research was obtained from the Health Research and Ethics Committee of Lagos State University Teaching Hospital (LASUTH).

Data analysis was carried out using SPSS version 24. For continuous descriptive variables, such as age, sex and educational status, the mean, measures of variability, minimum, and maximum were determined. Simple frequency and percentages were determined for categorical variables such as age groups, sex, educational status, and the toothbrush and toothpaste factors. Pearson's chi-square analysis was carried out to determine the bivariate relationship of the sociodemographic of the subjects and their mothers and the factors that may affect the choice of toothbrushes and toothpastes. Multivariate analysis was done using binary logistic regression to determine the factors that influenced their choice of toothpaste and toothbrush while the covariates were controlled for. Statistical significance was determined at $p \leq 0.05$.

III. RESULTS

Mean mothers' age was 37.5 ± 7.1 years, ranging from 23 to 59 years; most of the mothers were between 30 and 39 years old, 42 (46.2%). The children's (subjects) mean age was 10.6 ± 2.9 years



old, ranging from 4 to 16 years old, most of them 51(56%) were middle childhood aged between 6 years and 11 years old, followed by the early

adolescents (12-18-yearsold) (Table 1). Males were 44(48.4%) and the females were 47(51.5%).

Table 1: Sociodemographic distribution of the subjects and their mothers.

Variable	Categories	Frequency (n)	Per cent (%)
Mother's age group	20-29	12	13.2
	30-39	42	46.2
	40-49	33	36.3
	50-59	4	4.4
Children's age group (years)	Early childhood (2-5)	3	3.3
	Middle childhood (6-11)	51	58
	Early adolescent (12-18)	37	40.7
Mothers' educational status	Uneducated	1	1.1
	Primary	8	8.8
	Secondary	37	40.7
	Post-secondary	45	49.5
Children's educational status	Nursery	4	4.4
	Primary	35	38.5
	Secondary	50	54.9
	Post-secondary	2	2.2
Sex	Male	44	48.7
	Female	47	51.6

The majority of the mothers attained a post-secondary level of education, 45(49.5%), followed by those with secondary level, 37(40.7%). Only one did not have any formal education 1(1.1%). A large percentage of the subjects were in the secondary level of education, 50(54.9%), followed by those in the primary school, 35(38.5%) (Table 1).

Table 2 shows the common characteristics of the oral hygiene products which may influence the choice of the subjects in this study. More of the subjects confirmed that the size of bristles 49(53.9%), texture of bristles 69(75.8%), shape of the head 46(50.6%), Previous experience with the toothbrush 58(63.7%), and professional advice 64(70.3%) were influential in their choice of

toothbrush. Factors such as colour of the bristles 47(51.6%), cost of the toothbrush 55(60.4%), brand 50(54.9%), design of the handle 51(56%), and packaging 54(59.3%) were not influential in the choice of a larger proportion of the subjects.

The majority of the subjects noted that only previous experience with the toothpaste 57(62.6%) and professional advice 59(64.8%) were influential on their choice of toothpaste. Colour of the toothpaste gel 52(57.1%), cost of the toothpaste 51(56%), taste of the toothpaste 46(50.6%), herbal content 56(61.5%), fluoride content 47(51.6%) Packaging 63(69.2%) and advertisement 58(63.7%) were not influential in their choice of toothpaste comparatively in a larger proportion of the subjects.

Table 2: Characteristics of the oral hygiene products

Oral hygiene product	Factor	Influential	Not influential
Toothbrush	Colour of the bristles	44(48.4%)	47(51.6%)
	Size of bristles	49(53.9%)	42(46.1%)
	Texture of the bristles	69(75.8%)	22(24.2%)
	Cost	36(39.6%)	55(60.4%)
	Brand	41(45.1%)	50(54.9%)
	Shape of the head	46(50.6%)	45(49.5%)
	Design of the handle	40(44%)	51(56%)
	Packaging	37(40.7%)	54(59.3%)
	Advertisement	31(34.1%)	60(66.9%)
	Influence of others	34(37.4%)	57(62.6%)
	Previous experience	58(63.7%)	33(36.3%)



	Professional advice	64(70.3%)	27(29.7%)
Toothpaste	Colour of toothpaste	39(42.9%)	52(57.1%)
	Cost of toothpaste	40 (44%)	51(56%)
	Taste of toothpaste	45(49.5%)	46(50.6%)
	Herbal content	35(38.5%)	56(61.5%)
	Fluoride content	44(48.4%)	47(51.6%)
	Packaging	28(30.8%)	63(69.2%)
	Advertisement	33(36.3%)	58(63.7%)
	Previous use of the toothpaste	57(62.6%)	34(37.4%)
	Professional advice	59(64.8%)	32(35.2%)

Table 3 shows the relationship between the socio-demographic variables and the determinant factors of the oral hygiene products. The subjects' age has a statistically significant association with the shape of the head of the toothbrush (p=0.04). The shape of the head was not influential among all of the 2-5 years old 3(100%) and the 12-18 years old 22(59.5%), while it was influential in a larger proportion of the 6-11 years old 30(58.8%). The subject's gender showed a statistically significant association with previous use experience of the toothbrush (p=0.04); the factor was influential in the majority of both genders, with males 23(52.3%) and females 24(51.1%). The educational status of the subjects was also significantly associated with the design of the handle of the toothbrushes (p=0.04). It was influential in a larger proportion of the primary schoolers, 20(57.1%), while it was not among the nursery preschoolers, 4(100%), and the secondary level schoolers, 32(64%).

The age group of subjects' mothers had a significant association with the packaging of the toothpastes (p=0.001), although the packaging was not influential on their choice across the age groups. The subjects' age groups showed a statistically significant association with professional advice (p=0.03). Professional advice was influential in a larger proportion of 6-11, 33(64.7%) and 12-18, 28(75.7%) age groups. There is a statistically significant association between the post-secondary educational status of mothers and the colour of the toothpaste gel (p=0.009). The colour of the gel was influential in the choice of the majority of the subjects, 24(53.3%). The post-secondary educational status of the mothers was significantly associated with the taste of the toothpaste, which was influential on the choice of the majority of the subjects, 26(67.8%), with p=0.04. This association was also true for previous experience of use of toothpastes 34(75.6%) (p=0.02).

Table 3: Bivariate analysis of sociodemographic variables and the determinants of choice of oral hygiene products

Oral hygiene product	Factor	Mothers' age group (P value)	Children's age group (P value)	Mothers' educational status (P value)	Children's educational status (P value)	Childs gender (P value)
Toothbrush	Colour of bristles	0.22	0.14	0.13	0.04*	0.61
	Size of bristles	0.82	0.17	0.10	0.07	0.74
	Texture of the bristles	0.49	0.58	0.35	0.62	0.95
	Cost	0.25	0.83	0.18	0.48	0.37
	Brand	0.23	0.15	0.38	0.20	0.48
	Shape of the head	0.71	0.04*	0.84	0.31	0.91
	Design of the handle	0.16	0.18	0.47	0.04*	0.54
	Packaging	0.65	0.57	0.30	0.40	0.16
	Advertisement	0.53	0.41	0.13	0.54	0.57
	Influence of others	0.42	0.70	0.37	0.23	0.29
	Previous experience	0.73	0.30	0.63	0.34	0.04*
	Professional advice	0.99	0.82	0.87	0.76	0.12
Toothpaste	Colour of toothpaste	0.17	0.16	0.009*	0.12	0.06



	Cost of toothpaste	0.66	0.94	0.59	0.41	0.95
	Taste of toothpaste	0.66	0.19	0.04*	0.02*	0.90
	Herbal content	0.91	0.13	0.07	0.28	0.09
	Fluoride content	0.74	0.54	0.28	0.39	0.34
	Packaging	0.001*	0.57	0.31	0.13	0.54
	Advertisement/Brand	0.79	0.41	0.04*	0.20	0.26
	Previous use of the toothpaste	0.14	0.46	0.02*	0.93	0.09
	Professional advice	0.22	0.03*	0.1	0.60	0.13

Advertisements and mothers' educational status have a statistically significant association (p=0.04) it was not influential on their choice across the different levels. The educational status of the subjects was significantly associated with the taste of toothpastes (p=0.02). It was influential among the majority of the subjects in the primary school, 21(60%), and post-secondary, 2(100%) levels. (Table 3).

Logistic regression (Table 4) showed that colour of the bristles was the factor associated with the choice of toothbrush when the covariates were controlled for (p=0.025)OR (5.7) CI(1.23-26.4). Table 5 showed that fluoride content (p=0.04) OR (3.37) CI (1.04-11.1), packaging (p=0.02) OR (3.95) CI(1.21-12.8) and previous use(p=0.02) OR (5.37) CI (1.30-22.17) were the determining factors of the choice of toothpaste when the covariates were controlled for.

Table 4:Multivariate analysis of the determinants of choice of toothbrush by the subjects

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Step 1 ^a Colour of bristles	1.744	.780	4.993	1	.025*	5.720	1.239	26.407
Sizeofbristles	-.591	.860	.472	1	.492	.554	.103	2.989
Texture of bristles	.967	.862	1.259	1	.262	2.630	.486	14.249
Cost of brush	.439	.676	.422	1	.516	1.551	.413	5.831
Shape of head of brush	1.499	.809	3.439	1	.064	4.478	.918	21.844
Design of handle	-.152	.768	.039	1	.843	.859	.191	3.872
Packaging	.767	.718	1.140	1	.286	2.153	.527	8.801
Advertisement	.201	.757	.071	1	.790	1.223	.277	5.394
Peoples influence	-.232	.718	.104	1	.747	.793	.194	3.242
Previoususe	.779	.799	.950	1	.330	2.178	.455	10.429
Professionalinstruction	.042	.777	.003	1	.957	1.043	.228	4.780
Constant	-7.569	1.778	18.122	1	.000	.001		

Table 5:Multivariate analysis of the determinants of choice of toothpaste by the subjects

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Step 1 ^a Colour of toothpaste	1.125	.793	2.014	1	.156	3.079	.651	14.556
Cost of toothpaste	.784	.605	1.679	1	.195	2.190	.669	7.167
Taste of toothpaste	-.301	.783	.148	1	.701	.740	.159	3.436
Herbalcontent	-.191	.625	.093	1	.760	.826	.243	2.813
Fluoridecontent	1.222	.605	4.084	1	.043*	3.393	1.037	11.098
Packaging	1.373	.602	5.205	1	.023*	3.945	1.213	12.828



Previoususe	1.681	.724	5.396	1	.020*	5.370	1.300	22.174
Professionalinstruction	-.139	.512	.074	1	.786	.870	.319	2.375
Constant	-7.605	1.901	15.999	1	.000	.000		

IV. DISCUSSION

The children's mean age ranged from 4 to 16 years old; most of them were in the middle childhood stage. A large percentage of them were in the secondary level of education, followed by those in the primary school. The male-to-female ratio was 1:1.06. The mothers' ages ranged from 23 to 59 years; most were between 30 and 39 years old. The majority of them attained a post-secondary level of education. This showed that the average mother is a young adult who is well educated, and the parental demographics is known to hugely impact the children [10, 20].

More of the subjects confirmed that the size of bristles, texture of bristles, shape of the head, previous experience with the toothbrush, and professional advice were influential in their choice of toothbrush; this was between 50 and 70 per cent of the subjects. This showed that the heads of their toothbrushes were more important to most of the subjects than the other parts; this may be because the head is involved in the cleaning process[21]. Factors such as the colour of the bristles, the cost of the toothbrush, the brand, the design of the handle, and the packaging were not influential in the choice of a larger proportion of the subjects. A larger proportion of the subjects noted that only prior experience with the toothpaste and professional advice influenced their choice of toothpaste. This emphasised the ability of younger people to trust when they are exposed to a pleasant experience and also their capacity to follow instructions[22]. Colour of the toothpaste gel, cost of the toothpaste, taste of the toothpaste, herbal content, fluoride content, packaging and advertisement were not influential in the choice of toothpaste of about 50 to 70 per cent of the subjects.

Sociodemographic variables had a profound effect on the choice of the oral hygiene products because it influences subjects' affinity for the different factors considered. Opeodu and Gbadebo reported that sociodemographic factors such as education, income and occupation have a notable effect on the choice of oral hygiene products in a study in Ibadan, Nigeria [15]. The subjects' age had a significant effect on their choice, based on the shape of the toothbrush head, which was influential, largely among the 6-11-year-olds, who were in the middle childhood stage, who may be easily

fascinated by shapes and forms[23]. The subject's gender significantly impacted their choice of toothbrush based on the previous use; the factor was influential in more than 50% in both genders, which showed that there was no gender predilection to trust and stay with what they perceived as pleasant and efficient[22]. The educational status of the subjects was also significantly influenced by their choice predicated on the design of the handle of the toothbrushes ($p=0.04$), which was evident in about 57% of the primary schoolers, who are early childhood subjects. It is not a surprise that the toothbrush handle's shape, size and colour might have fascinated them[22, 23]. The age group of subjects' mothers significantly affected the choice of toothpastes in less than 50% of the subjects, rooted in the packaging of the toothpastes ($p=0.001$) across the age groups. The influence of the parents on their children has a huge impact on their choices, character, and lifestyle[10].

The subjects' age groups had a significant effect on the choice of toothpastes, with about 65% of 6-11-year-olds and about 76% of the 12-18-year-olds, largely dependent on professional advice. The post-secondary educational status of the mothers effectively impacted the choice of the toothpastes of most of the subjects as regards the colour of the gel ($p=0.009$). This is also true of the taste of the toothpastes in about 68% of the subjects and previous use of the toothpaste in 76% of the subjects. Although the effect of advertisements impacted the choice of toothpaste in less than 50% of the subjects, the mothers' educational status had a significant effect on it ($p=0.04$). The subjects' educational status was significantly associated with the choice of toothpastes rooted in the taste of toothpastes ($p=0.02$) in 60% of those in primary school and all of those at post-secondary levels.

When the covariates were adjusted for, only the colour of the bristles was the factor associated with the subjects' choice of toothbrushes ($p=0.025$) OR (5.7) CI (1.23-26.4). Fluoride content ($p=0.04$) OR (3.37) CI (1.04-11.1), packaging ($p=0.02$) OR (3.95) CI (1.21-12.8) and previous use ($p=0.02$) OR (5.37) CI (1.30-22.17) were the determining factors of the choice of toothpastes. Previous experience is a determining factor in the choice of oral hygiene products in many previous studies [15, 17, 24].



V. CONCLUSION

Colour was a strong determinant of the choice of tooth brushes in the population of paediatric patients that participated in this study, which is not far-fetched as children and adolescents are very much attracted to aesthetics, colours and artworks. This means toothbrushes targeted at this group of patients have to be attractive and colourful, as this will enhance their interest in and compliance with oral hygiene instructions. Fluoride content, packaging and previous use of toothpastes were also significant factors in the choice of the age group studied and their choice of toothpastes. These should be incorporated in the commercially available toothpastes; they should be well and beautifully packaged to motivate acceptance and proper use by the children and the adolescents in our communities. Socioeconomic status of the parents was of immense influence on the choice of the oral hygiene products. The parents should be well educated on good and acceptable oral hygiene products and practices, as the knowledge they pass to their offspring forms their character.

CONFLICT OF INTEREST- None

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