Level of Knowledge and Challenges Associated With Practice of Dental Implants among Dental Practitioners in Selected Hospitals in South East, Nigeria

Samuel Chinonyerem Okoronkwo[1*], Peter Chidiebere Okorie[1],
Marcus Ikechukwu Onyemobi[2], Chidinma Sonia Obiekwe[3], John Emaimo[1],
Raphael Onyejiaka Azubuine[1] and Esther Chinwedu Okoronkwo[1]

[1]*Department of Dental Technology, Faculty of Dental Health, Federal College of Dental Technology and Therapy, Enugu, Nigeria.*
[2]*Marcproff Dental Company, Federal College of Dental Technology and Therapy, Enugu, Nigeria.*
[3]*Department of Dental Technology, School of Health, Federal University of Technology, Owerri, Nigeria.*

Authors' contributions

This work was carried out in collaboration among all authors. Author SCO designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author ECO supervised the research work. Authors PCO, MIO and ROA managed the analyses of the study. Authors SCO and JE managed the literature searches. All authors read and approved the final manuscript.

Article Information

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ABSTRACT

Aim: This study is aimed at ascertaining the level of knowledge and challenges associated with the practice of dental implants among dental practitioners in selected hospitals in South East, Nigeria.
Study Design: the study employed cross sectional study design.
Place and Duration of Study: The research was carried out within six months (September 2018 to March 2019) in selected hospitals and clinics in South-East, Nigeria.

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*Corresponding author: E-mail: okoronkwosamuelc@gmail.com;

Methodology: Data were collected using structural pretested questionnaire administered to 117 purposefully selected consenting respondents (Dental Professionals). Data were analyzed descriptively and inferentially using SPSS version 20. The hypotheses were tested at 0.05 level of significance and data generated were subjected to percentage findings presented by the use of tables. Data collected were analyzed and discussed.

Result: the result affirmed female respondents were more than male with 59.0%, indicating Dental Therapist as majority in proportion with 64%. On quality of implant shows 64.9% and 56.4% on comfort and function which indicates it as a good quality, 64.9% poor availability and 49.6% awareness and knowledge. While inferentially, using Pearson Chi-Square showed a significant relationship of 177.552; df = 16 @ P=0.05 between profession of respondents and knowledge of dental implant materials/devices types while using ANOVA showed a significant relationship with F =42.147; df =4 @ P=.05; knowledge of dental implant materials and assessment of dental implant to aesthetics on oral cavity, F =77.760; df =4 @ P=.05 and knowledge of dental implant materials and assessment of dental implant to retention on oral cavity, F =54.985; df =4 @ P=.05.

Conclusion: from the results obtained, accredited dental implant as an appliance capable of obviating most of dentures shortcomings which depends on contra-indication and indication of it, and its challenges in the profession. Although there are challenges associated with dental implant awareness and application in Nigeria. Recommendations and tips on successful further studies were given.

1. INTRODUCTION

The challenges encountered in dentistry for the treatment of edentulous patient shown that over 45% of the world substantial people above 65 of age are edentulous according to survey done by National institute of Dental Research, NIDR, [1]. Based on these fact, programmes were designed to treat and prevent the infectious and inherited craniofacial-oral-dental diseases and disorder that compromises thousands of human lives. Removable dentures and fixed bridges were commonly used for treatment of edentulous patients to restore their dentition. This partial denture derives its support from greater number of teeth and can be braced by components on both sides of the arch. But those having weak abutment tooth and cannot masticate properly, oral restoration can be improved with dental implant [2].

Dental implant is any biocompatible material or device placed in or on oral tissues to support oral prosthesis [3]. The common implant today is osseointegrated implant, based on the discovery by Swedish professor, Per-ingvar Branemark which shown that Titanium can be successfully fused into the bone where osteoblast grows on and into the rough surface of the implanted titanium. This forms the structural and functional connection between the living tissue, bone and the implant, without long term soft tissue inflammation or ultimate fixture rejection. This process is regarded as osseo-integration [2]

while Fibre-osseous integration is a tissue to implant contact with healthy dense collegenous tissue between the implant and bone [4]. Factors like biocompatibility of material, size of the gap between the implant and the bone, traumatic surgery and immobility are necessary to achieve a successful osseo-integrated bone to implant interface. Basically there are two classes of materials used for dental implant and they are metals and ceramics. Metals are co-based alloys (cobalt-chromium-molybdenum based alloy) and titanium (commercial pure titanium) while ceramics are inert (Aluminium, carbon and zirconia) and bioactive ceramics (calcium phosphate and bioactive glasses).

Therefore, this study ascertaining the level of knowledge and challenges of dental implants among dental professionals in selected Hospitals in South-East Nigeria is motivated by the researcher's observation during his visit to one of the dental clinics in Enugu, Nigeria. Where patients with greatly resorbed edentulous ridge requesting for a prosthesis with comfort, stability, retention and efficiency. While others with gum stripping which is, life threatening denture induce disease with complains of denture irritation were in queue for a preferable prosthesis. This factors are obviously the shortcoming of dentures, which dental implants has the capacity to obviate because they are the nearest equivalent replacement to the natural tooth, and are therefore a useful addition in the management of patients who have missing teeth because of

disease, trauma or developmental anomalies [5]. Therefore, it is required to ascertain its prospect and challenges among dental professionals in south eastern Nigeria for appropriate promotion, awareness and knowledge if need be at the end of the study.

2. MATERIALS AND METHODS

This study employed a cross-sectional design with the population of the study comprising of selected Dental Professionals in South East Nigeria. A pretested questionnaire were used to ascertain the level of knowledge and challenges of Dental Implant in selected Hospital in south east Nigeria. The questionnaire were validated using language clarity and content validation. Fifty questionnaires were pretested from five different Dental Hospitals in Nigeria outside south-East region but with similar characteristics but not included for actual study. The questionnaire was tested for reliability using kuder-Richardson-21 and Cronbach's alpha reliability coefficient with a value of 0.86 and 0.81 respectively was obtained.

The sample size of the study comprised of 117 dental professional in the selected hospitals in south east, Nigeria. And the sample was drawn from the five selected hospitals through multistage sampling technique. In stage one; the first step were to stratify the selected hospitals by state, hence five strata: Abia, Anambra, Ebonyi, Enugu and Imo. The next step were the selection of hospitals that offer Dental/oral healthcare services from each stratum using simple random sampling (balloting). The hospitals are; Federal Medical Centre, (FMC) Umuahia, Federal Medical Centre, (FMC) Owerri, University of Nigeria Teaching Hospital, (UNTH) ituku - Enugu, Alex Ekwueme Federal University Teaching Hospital, (AE-FUTHA), Abakilik - Ebonyi and Nnamdi Azikiwe University Teaching Hospital, (NAUTH) Newi – Anambra state, Nigeria. The second stage was the selection of all respondents from each hospital; Federal Medical Centre, (FMC) Umuahia (14 professionals), Federal Medical Centre, (FMC) Owerri (27 professionals); University of Nigeria Teaching Hospital, (UNTH) ituku-Enugu (43 Professionals), Alex Ekwueme Federal University Teaching Hospital, (AE-FUTHA), Abakiliki-Ebonyi (21 professional) and Nnamdi Azikiwe University Teaching Hospital, (NAUTH) Newi – Anambra (12 Professionals).

Data were collected by administering structured pretested close-ended questionnaire to the professionals. The Dental professionals were selected from those within the practicing bracket of the study which includes current staff, Dental house officers, interns and NYSC members excluding Students on Clinical/lab attachment. After this was done, the questionnaires were distributed to the selected professionals and supervised as they fill-in the questionnaire.

The data generated from the questionnaire were collected and collated by the researcher and were entered into computer software called Statistical Package for Social Science (SPSS) version 20 for both descriptive and inferential statistical analysis. The researcher used simple percentage and frequency to analyze the research objectives and data collected. Chi-square was used to analyze the research hypotheses. The hypotheses were tested at 0.05 levels of significance. Data were subjected to percentage findings presented by the use of tables.

3. RESULTS

3.1 Socio-Demographic Characteristics

Result shows that the mean age of the respondents is 17.9 ± 35.0, while the modal age is 41 - 50 years (35.0%). The majority of the studied respondents were females (59.0%) while male were (41%). Greater proportions of the respondents (29.0%) are Dental Therapist, while (64.1%) respondents studied in Nigeria.

3.2 Quality of Dental Implant Characteristics

On the assessment of dental implant on performance and appearance, there are no poor or very poor affirmation on dental implants as a device rather there are average good responds on comfort, function, aesthetics and retention as very good quality of dental implants compared to dentures. This shows that the value rate of implants as a dental device will increase thereby promoting oral healthcare services.

3.3 Accessibility Characteristics of Dental Implant

On the accessibility of dental implant materials/device show high rate of poor availability 64.9%, affordability of dental implant materials/device is also very poor with 56.4%, while demand rate is 54.4 with 53.8%.

Table 1. Distribution of respondents by socio-demographic characteristics, n=117 (100%)

Variables	Frequency	Percentage
Name /Place of Work		
FMC Umuahia-Abia State	14	11.9
NAUTH Newi-Anambra State	12	10.3
AE-FUTHA, Ebonyi State	21	17.9
UNTH Enugu	43	36.8
FMC Owerri-Imo State	27	23.1
Age of Respondents		
21 - 30 years	21	17.9
31 – 40 years	29	24.8
41 – 50 years	41	35.0
50 – above	26	22.3
Gender of the Respondents		
Male	48	41.0
Female	68	59.0
Profession of the Respondent		
Dental Surgeon	25	21.4
Dental Technologist	29	24.8
Dental Therapist	34	29.0
Dental Nurse	18	15.4
Dental Surgery Assistants	11	9.40
Place of study		
Nigeria	75	64.1
Abroad	29	24.8
Both	13	11.1
Years of Practice.		
1 – 5 years	44	37.6
6 – 10 years	37	31.6
11 – 20 years	19	16.2
21 years and above	17	14.6

Mean Age: 17.9±35.0

3.4 Knowledge Level of Dental Implant Characteristics

In knowledge distribution of respondents, it was observed that awareness of dental implant materials and devices are very good at 49.6%, knowledge of types of implant device is also good at 56.4% but source of information is majorly in clinics/hospitals followed by institutions of learning.

The result in Table 5 showed relationship between age of respondents and knowledge of dental implant materials/devices types. Use of Pearson Chi-Square showed a significant relationship of *167.032; df = 12 @* p<0.05 between age of respondents and knowledge of dental implant materials/devices types.

The result in Table 6 showed relationship between gender of respondents and knowledge of dental implant materials/devices types. Use of Pearson Chi-Square showed a significant relationship of 63.527*; df = 4 @* p <0.05 between gender of respondents and knowledge of dental implant materials/devices types.

The result in Table 7 showed relationship between profession of respondents and knowledge of dental implant materials/devices types. Use of Pearson Chi-Square showed a significant relationship of 177.552*; df = 16 @* p <0.05 between profession of respondents and knowledge of dental implant materials/devices types.

The result in Table 8 showed relationship between years of practice of respondents and knowledge of dental implant materials/devices types. Use of Pearson Chi-Square showed a significant relationship of 177.552*; df =16 @* p<0.05 between years of practice of respondents

Table 2. Distribution of respondents by quality of dental implant, n=117 (100%)

Variables	Frequency	Percentage
Assessment of dental implant to comfort on oral cavity		
Very Poor	-	-
Poor	-	-
Good	23	19.7
Very good	76	64.9
Excellent	18	15.4
Assessment of dental implant to function on oral cavity		
Very poor	-	-
Poor	-	-
Good	66	56.4
Very good	23	19.7
Excellent	28	23.9
Assessment of dental implant to aesthetics on oral cavity		
Very poor	-	-
Poor	-	-
Good	29	24.8
Very good	47	40.2
Excellent	41	35
Assessment of dental implant to retention on oral cavity		
Very poor	-	-
Poor	-	-
Good	13	11.2
Very good	41	35
Excellent	63	53.8

Table 3. Distribution of respondents on accessibility of dental implant, n=117 (100%)

Variables	Frequency	Percentage
Availability level of dental implant material/device		
Very Poor	23	19.7
Poor	76	64.9
Good	18	15.4
Very good	-	-
Excellent	-	-
Affordability level of dental implant materials/devices		
Very poor	66	56.4
Poor	23	19.7
Good	28	23.9
Very good	-	-
Excellent	-	-
Demand rate of dental implant device from patients		
Very poor	64	54.7
Poor	41	35.0
Good	12	10.3
Very good	-	-
Excellent	-	-

and knowledge of dental implant materials/devices types.

The result in Table 9 showed relationship between knowledge of dental implant materials and assessment of dental implant to comfort on oral cavity. Use of ANOVA showed a significant relationship with F =42.147; df =4 @ p<0.05; knowledge of dental implant materials and assessment of dental implant to aesthetics on oral cavity, F =77.760; df =4 @ p <0.05 and knowledge of dental implant materials and assessment of dental implant to retention on oral cavity, F =54.985; df =4 @ p <0.05.

Table 4. Distribution of respondents on knowledge of dental implant, n=117 (100%)

Variables	Frequency	Percentage
Awareness of dental implant material/device		
Very Poor	-	-
Poor	-	-
Good	18	15.4
Very good	58	49.6
Excellent	41	35
Knowledge of dental implant materials/devices types		
Very poor	-	-
Poor	-	-
Good	66	56.4
Very good	23	19.7
Excellent	28	23.9
Sources of information on dental implant practice		
TV/Radio	-	-
Magazine/Newspaper	-	-
Internet/social media	29	24.8
Clinic/Hospital	47	40.2
Institution of learning/Health outreach	41	35
Relevant of dental implant compared to denture		
Very poor	-	-
Poor	-	-
Good	13	11.2
Very good	41	35
Excellent	63	53.8

Table 5. Age of respondents * knowledge of dental implant materials/devices types

		Knowledge of dental implant materials/devices types					
		Very poor	Poor	Good	Very good	Excellent	Total
Age of Respondents	21-30 Years	1	1	19	0	0	21
	31 – 40 years	0	0	30	0	0	30
	41 – 50 years	0	0	15	23	2	40
	50 – above	0	0	0	0	26	26
Total		1	1	64	23	28	117

Pearson Chi-Square (X^2) = 167.032; df = 12; Pv-0.001

The result in Table 10 showed relationship between knowledge of dental implant materials/devices types and availability level of dental implant material/device. Use of T-test showed a moderate relationship with r = 0.675 @ p<0.05. Also, there is a strong relationship between knowledge of dental implant materials/devices types and affordability level of dental implant materials/devices with r = 0.885 @ p<0.05.

4. DISCUSSION

From outcome of this study, it was observed that majority of the studied respondents were females (59.0%) while male were (41%) indicating that the female gender has more demographic manpower in the area than male but the reverse is the case when patients are involved. A study done by Ajayi, Abiodun-solanke, Gbadebo, Fasola, Dosumu and Arotiba [6] on Dental implant treatment at a Nigerian Teaching Hospital, Ibadan, Nigeria shows that the demographic characteristics of patients treated with endosseous implants at Ibadan, Nigeria within 2008-2013 are 15(65.2%) males and 8(34.8%) females.

On the assessment of dental implant on performance and appearance, shows that the value rate of implants as a dental device will

Table 6. Gender of the respondents * knowledge of dental implant materials/devices types

Gender of the Respondents		Knowledge of dental implant materials/devices types					
		Very poor	Poor	Good	Very good	Excellent	Total
Gender of the	Male	1	1	46	0	0	48
Respondents	Female	0	0	18	23	28	69
Total		1	1	64	23	28	117

Pearson Chi-Square (X^2) = 63.527; df = 4; Pv-0.001

Table 7. Profession of the respondent * knowledge of dental implant materials/devices types

Profession of the Respondent		Knowledge of dental implant materials/devices types					
		Very poor	Poor	Good	Very good	Excellent	Total
Profession	Dental Surgeon	1	1	23	0	0	25
of the	Dental Technologist	0	0	29	0	0	29
Respondent	Dental Therapist	0	0	12	22	0	34
	Dental Nurse	0	0	0	1	17	18
	Dental Surgery Assistants	0	0	0	0	11	11
Total		1	1	64	23	28	117

Pearson Chi-Square (X^2) = 177.552; df = 16; Pv-0.001

Table 8. Years of practice * knowledge of dental implant materials/devices types

Years of Practice		Knowledge of dental implant materials/devices types					
		Very poor	Poor	Good	Very good	Excellent	Total
Years of	1-5 Years	1	1	42	0	0	44
Practice	6-10 Years	0	0	22	15	0	37
	11-20 years	0	0	0	8	11	19
	21 years and above	0	0	0	0	17	17
Total		1	1	64	23	28	117

Pearson Chi-Square (X^2) = 131.239; df = 12; Pv-0.001

Table 9. Assessment of dental implant * knowledge of dental implant

Anova						
Variables		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Assessment of dental	Between Groups	30.915	4	7.729	42.147	0
implant to comfort	Within Groups	20.538	112	0.183		
on oral cavity	Total	51.453	116			
Assessment of dental	Between Groups	90.632	4	22.658		.
implant to function	Within Groups	0	112	0		
on oral cavity	Total	90.632	116			
Assessment of dental	Between Groups	59.046	4	14.762	77.76	0
implant to aesthetics	Within Groups	21.262	112	0.19		
on oral cavity	Total	80.308	116			
Assessment of dental	Between Groups	45.135	4	11.284	54.985	0
implant to retention	Within Groups	22.984	112	0.205		
on oral cavity	Total	68.12	116			

Table 10. Paired samples correlations

Paired samples		N	Correlation	Sig.
Pair 1	Knowledge of dental implant materials/devices types & Availability level of dental implant material/device	117	0.675	0.000
Pair 2	Knowledge of dental implant materials/devices types & Affordability level of dental implant materials/devices	117	0.885	0.000

promote comfort, function, aesthetics and retention as compared to dentures. This is similar to a study done by Ajayi, et al. [6] on Dental implant treatment at a Nigerian Teaching Hospital, Ibadan, Nigeria shows that out of the 23 patients studied were followed up for a period of 1-5 years, there is a success/survival rate of 95.2%, though its slightly lower than the result. obtained in a 12 private general dental practice (GDP) [7]. Nevertheless in Nigeria, a retrospective review of implant replacement of missing teeth over a period of 6yrs at a private dental clinic revealed a success rate of 96% in 227 implants placed in 121 patients (M=68, F=53) with the highest number of implant placed in the molar region [8].

On the accessibility of dental implant materials/device shows poor availability rate of 64.9 %, indicating affordability of 56.4%, yet with demand rate is 53.8%. All this, is an indication for government and NGOs intervention. This is because another study done in Nigeria, also shows that cost of treatment is still unaffordable to a large number of Nigerians [6]. Another study by Ize-iyamu and Saheed [9] on cultural constraint on dental implant treatment in Benin City revealed that some individuals that believe in the god of iron, a traditional worship feel that the use of metallic materials in the treatment of dentition is not acceptable while another study indicates.

In knowledge distribution of respondents, 49.6% and 56.4% awareness and knowledge of dental implant materials and devices respectively, but source of information is majorly in clinics/hospitals followed by institutions of learning. Though a study done in Nigeria by Gbadebo, Lawal, Sulaiman & Ajayi [10] and Mgbeokwere, Okoye & Ekwueme [11] shown that the level of awareness of dental implant was 22.6% and 7.2% among patients and health workers respectively [6]. While another study carried out in Riyadh Saudi Arabia by Al-Johany, Al-Zoman, Al-Juhani, Al-Refeai [12] on Dental patients' awareness and knowledge in using dental implants as an option in replacing missing teeth shows that the level of awareness ranged from 66.4% to 77%.

5. CONCLUSION

Dental implant as a restorative devices is inheritable as an act of obviating denture prosthesis shortcomings but in south eastern Nigeria, its practice is seriously affected by the level of the nation's development especially in the aspect of its practice, availability and affordability. Dental professional in the region are encouraged to embrace an effort to practicing it. It's also recommended that government should equip the government owned hospitals with needed sophisticated equipment and materials thereby ensuring that the cost of delivery awareness to the public. The results of this study will help in organizing training and re-training programs for dental health care givers in south-eastern Nigeria.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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