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ORIGINAL ARTICLE

Patients' Management Patterns for Restorative Treatment Procedures: A 4-Year Overview at the Restorative Clinic of a Tertiary Hospital in Nigeria

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ABSTRACT

Objective: To determine the patients' management pattern for restorative treatment procedures at the Restorative Dentistry Clinic at the Lagos State University Teaching Hospital (LASUTH). **Material and Methods:** A descriptive and retrospective study design was employed to determine patients' management patterns for the restorative treatment procedures at the Restorative Dentistry Clinic at LASUTH. Treatment records of patients who attended the Restorative Clinic at the Lagos State University Hospital, Ikeja, Lagos, Nigeria, from 2011 to 2014 were reviewed; the effective treatments during the period under review were recorded as treatment procedures and were recorded as operative, endodontic, fixed prosthodontics, and removable procedures. **Results:** A total of 14,437 (75%) operative; 1,353 (7.0%) endodontic; and 559 (2.9%) fixed prosthodontics and 2,852 (14.9%) removable prosthodontic procedures were carried out during the period under review. This study showed that operative procedures were the most performed restorative procedures, whereas removable prosthodontics and endodontic procedures ranked second and third, respectively, to operative procedures. Fixed prosthodontics procedures were the least performed restorative procedures. **Conclusion:** This study showed that more efforts were being expended by dentists on operative services compared to endodontic, removable, and fixed prosthodontics services combined. Comprehensive studies, embracing all disciplines of dentistry, should be carried out to determine the level of demand and clinical relevance of procedures in clinical dental practice and hence to set specific and general objectives of dental education for the populace. Access to dental health Insurance services should also be increased in the country.

Keywords: Costs and Cost Analysis; Dentistry, Operative; Endodontics; Prosthodontics.

Introduction

In economics, demand can be defined as the ability and willingness of a buyer to pay for a good or service [1]. It could also be defined as the quantity of good or services, which a buyer is willing and able to pay for at a given time. On the other hand, supply is the quantity of good or service, which the producer is willing and able to supply to buyers at a given time [1]. The demand for and supply of goods and services is controlled by complex factors related to both the suppliers and the consumers whose activities are within the milieu of an ever-changing environment [2,3]. To this end, both the suppliers and consumers are always interested in the situation reports about the performance of goods and services in a competitive market [4-6].

An assessment of reports from surveys will enable the suppliers or producers of products or services to assess the performance and to make appropriate adjustments or corrections if necessary [4-6]. Consumers are also interested in these forms of reports to know which products or services are available, the price charged, the quality, quantity, mode of sales, and effective usage so that appropriate decisions can be made during purchases [4-6]. These reports are usually presented in the form of consumer reports on the products or services under consideration by the suppliers or professionally qualified bodies, including medical organizations.

The concept of demand and supply also applies to dental service. Even though some surveys had been conducted in Nigeria and other countries on the prevalence and incidence of dental and oral diseases, its impact on quality of life, as well as demand patterns in various communities [7-11], an understanding of the needs of dental patients can assist in the planning and development of workforce as well as the provisions of necessary facilities to cope with the specific demands of patients. In various studies, dental caries has been found to be significantly associated with financial, socioeconomic, and behavioral factors [12,13]. Therefore, medical consumption can be viewed as taking place in two stages. The informative stage consists of examinations and investigations, whereas the second or therapeutic stage, consists of subsequent treatments or follow-up services. Consumers are generally better informed about services in the first stage since they are frequently demanded and are rarely associated with complications. Consequently, demand for services at the informative stage is more price-sensitive compared to the therapeutic stage where patients are not adequately informed.

Patients' demand pattern for dental services can be influenced by several factors such as the payment methods available for services, namely, out of pocket expenses or the availability of health insurance; their perception about the type of dental services and the expertise of the attending dentist; information and understanding of the treatment options available as well as their exposure to the media. Since dental pain as a result of dental caries represents the main indication for most dental visits, and restorative treatments constitute a significant portion of services provided, it is desirable to determine the demand pattern for restorative services in a dental setting.

The purpose of this study was thus to determine the patterns of restorative treatment procedures with a view to assessing and re-appraising the distribution of efforts on the different types of work performed by dentists in the Restorative clinic at the Lagos State University Teaching Hospital (LASUTH), Ikeja, Lagos, Nigeria.

Material and Methods

Study Design and Setting

A descriptive and retrospective study design was employed to determine patients' effective demand pattern for the restorative treatment procedures at the Restorative Dentistry Clinic of LASUTH. The dental

center is the clinical unit of the Faculty of Dentistry of the Lagos State University College of Medicine located in LASUTH. It is a state-owned tertiary health facility and a referral center for most inhabitants of Lagos and its environments. The Conservative Dentistry unit has eight operatories, each equipped with a fully functional dental chair and its accessories. It has a central room with three autoclaves for sterilizing instruments, two radiography rooms, a patients' waiting area, and restrooms. There are six dental nurses and other laboratory staff to assist the dentists. The dental center renders services with minimum interruption.

Study Procedure

The materials which were used for this study included: appointment, treatment, and fees book at the Restorative Clinic of the LASUTH from 2011 to 2014. The case notes of 8023 patients were carefully scrutinized and reviewed to obtain all necessary information concerning treatment procedures provided for patients from 2012 to 2015. The principal investigator and a second examiner were calibrated for data collection using forty randomly selected dental records of patients at the restorative dentistry department of the dental center for years that did not include the years under consideration for the present study. Inter-examiner reliability for both examiners was 0.88, whereas the intra-examiner reliability was 0.90 and 0.87 for the two examiners, respectively. The paper and electronic dental records of the patients were subsequently extracted by the dental record officers after they were given written permission from the medical records department and the principal investigator obtained records of the variables of interest specified. The chart review process was repeated by the other calibrated examiner and the data were compared for reproducibility and consistency. The effective treatment patterns during the period under review were recorded as treatment procedures carried out in the restorative clinic. The clinical fees charged for various conservation procedures were also recorded. All possible treatment procedures in restorative dentistry were also listed to produce a checklist for all possible procedures in a standard restorative clinic.

Classification of patients with respect to age and socioeconomic status was not considered because of incomplete records on these parameters. However, the age range of patients was between 17 years and 60 years, with a mean age of 25 years. The data obtained were statistically analyzed using Microsoft Excel software package 2010. Frequency and percentage were employed in the statistical analysis.

Results

Table 1 shows the percentage distribution of restorative procedures according to fields or subunits under restorative dentistry. It can be seen that the percent demands for operative, fixed prosthodontics and endodontic procedures, and removable prosthodontics during the period of study were 75%, 2.9%, 7.0%, and 14.9%, respectively. The total demand for restorative procedures was 19,201 during the study period. Operative procedures were the most demanded conservation services, with 14,437 procedures out of 19,201 restorative procedures. This was followed by removable prosthodontic services with a total of 2852 procedures. Fixed prosthodontic services were the least demanded conservation services, with 559 procedures. This table also shows a drastic reduction in the demands for restorative services in 2014.

Table 1. Distribution of restorative treatment procedures according to field and year.

Fields	Year				Total	
	2012	2013	2014	2015		
	N	N	N	N	N	%
Operative Dentistry	3998	4034	2729	3676	14437	75.0

Endodontics	322	379	449	203	1353	7.0
Fixed Prosthodontics	142	147	150	120	559	2.9
Removable Prosthodontics	1019	876	541	683	2852	14.9
Total	5481	5436	3861	4682	19201	100.0

Table 2 shows the frequency distribution of the various types of restorative procedures carried out during the period under investigation according to sex and year. The most demanded restoration type was amalgam restorations, which accounted for 9205, whereas composite restorations (2,929) and relative percent differences (2774) ranked 2nd and 3rd, respectively. Crown and Bridge restoration type (568) was the least demanded procedure. Endodontic procedures (anterior and posterior) (1353) ranked fifth in terms of demand, while glass ionomer cement restorations (2301) ranked fourth.

Table 2. Distribution of restoration types according to sex and year.

Restoration Types	2012		2013		2014		2015		Total
	Female N	Male N	Female N	Male N	Female N	Male N	Female N	Male N	N
A/F	1451	1086	1551	867	1092	528	1400	1174	9205
Comp	408	547	392	471	207	272	272	360	2929
Gic	237	267	291	405	308	322	97	374	2301
A/cr	33	77	48	50	39	42	36	37	362
P/cr	7	9	27	14	31	28	14	11	141
Abr	6	6	1	6	6	1	5	5	36
Pbr	2	2	0	1	10	2	8	4	29
A-endo	55	97	68	102	50	167	46	89	647
P/endo	100	70	129	80	143	89	44	24	679
Rpd	313	647	311	449	178	260	264	392	2774
Fd	8	20	4	12	4	3	16	11	78
V/n	-	-	-	-	-	-	-	-	Nil
Cg/inly	-	-	-	-	-	-	-	-	Nil
Cg/onlay	-	-	-	-	-	-	-	-	Nil
Total	2828	2620	2832	2457	2068	1714	2202	2480	19,201

A/F = Amalgam Filling, A/endo = Anterior Endodontic Root Filling, Comp = composite filling, P/endo = posterior endodontic root filling, Gic = glass ionomer filling, Rpd = removal partial denture, A/cr = anterior crown, F/d = full denture, P/cr = posterior crown, V/n = veneer, A/br = Anterior Bridge, Cg/inlay = Cast Gold Inlay, P/BR = Posterior Bridge, Cg/onlay = Cast Gold Onlay.

Table 3 shows the distribution of clinical fees charged for various restorative procedures during the period under review. It can be seen from the table that the price for fixed prosthodontics was higher than that charged for other restorative procedures. For example, the cost of an amalgam restoration was N2,500.00 per unit, while a unit of porcelain fused to metal crown was N50,000.00.

Table 3. Distribution of fees charged for restorative procedures in Naira (₦)

Restorative Procedures	Fees Charge per Procedure*
Amalgam per Unit	₦2,500.00
GIC per Unit	₦3,500.00
Composite per Unit	₦5,000.00
Root Canal per Unit (Anterior)	₦7,500.00
Root Canal per Unit (Posterior)	₦9,500.00
Post and Core per Unit (Porcelain Crown)	₦40,000.00
Apicectomy	₦25,000.00
Acrylic Jacket Crown per Unit	₦10,000.00
PFM Crown/Bridge per Unit	₦35,000.00
Gold Inlay/Onlay per Unit	₦35,000.00
Gold Crown per Unit	₦35,000.00
Veneers – Composite/ Porcelain	₦20,000.00

Bleaching – Multiple Teeth	₦30,000.00
Single	₦25,000.00
Removable Partial Dentures – One Tooth	₦10,000.00
Additional Tooth	₦2,5000.00
Upper Full Denture	₦15,000.00
Lower Full Denture	₦15,000.00
Inlay/Onlay – (non-precious metal)	₦15,000.00
Post and Core (Yellow Gold)	₦40,000.00
Prefabricated Post	₦5,000.00
Post and Core – (non-precious metal)	₦8,000.00
Obturator	₦25,000.00
Denture Relining – with Acrylic	₦2,000.00
with Soft Liner	₦4,000.00
Denture Rebasing	₦2,500.00
Denture Repair	₦2,000.00
Emergency Partial Denture	₦5,000.00
Facial Prosthesis	₦45,000.00
Upper Chrome – Cobalt Denture – Skeletal Plate	₦25,000.00
Lower Chrome – Cobalt Denture – Skeletal Plate	₦20,000.00
Lingual Bar/Plate	₦5,000.00

*150 Naira was equal to 1US$ during the period under review.

Figure 1 shows the relative distribution of demands for the restorative procedures according to fields.

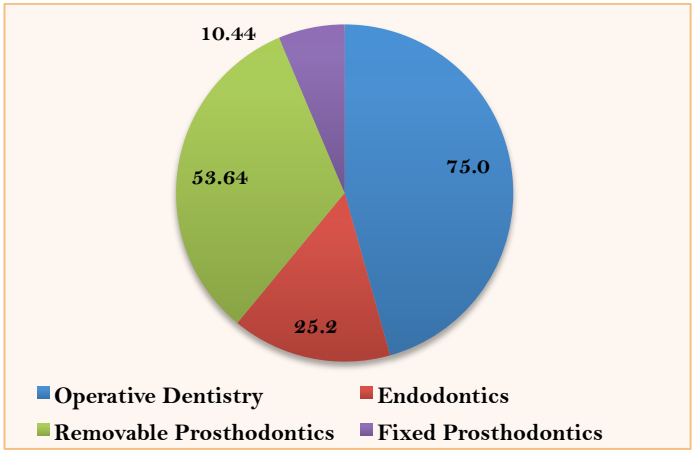

Figure 1. Pictorial distribution of restoration types, according to fields or sub-units of restorative dentistry.

Discussion

This study can be likened to a consumers' report, and its findings have been highlighted in terms of the types of restorative services, the effective demand for restorative services, and the cost of services. The demand patterns showed that fixed prosthodontic procedures were the least demanded procedures compared to other restorative procedures in this study. It constituted 2.9% of the total procedures demanded, and this finding is within the range of the American Dental Association (ADA), the Research Triangle Institute (RTI), and the North Carolina (NC) [13-15] studies, in which fixed prosthodontic procedure accounted for 5.1%, 2.2%, and 6.9% respectively; and ranked fourth to operative procedures.

This low demand for fixed prosthodontic procedures could be attributed to the high costs of fixed prostheses as well as inadequate knowledge of these types of treatment modalities on the part of the patients. Income has been found to be positively associated with the consumption of both health care and dental care. For dental care, this relationship holds for both the extensive and the intensive margins of consumption. The

implications of this low demand for fixed prosthodontic procedures include under-utilization of the highly trained professionals in this area of dental services, underutilization of equipment, and possibly resulting in inadequate training of undergraduate and postgraduate dental students in the art and science of fixed prosthodontic procedures. An average of 139.2 fixed prosthodontic procedures were performed per year during the study period or a mere 12/month, and this number was very inadequate for the training of undergraduate and postgraduate dental students in the art and science of fixed prosthodontic procedures in an institution in a state which designated itself as a center of excellence in Nigeria. Furthermore, it was was observed that females accounted for a higher percentage of the restorative treatments done. A likely reason for this predisposition is that women care more about their health and their appearance and have greater esthetic concerns than men and tend to present earlier in the clinic when teeth are still restorable [10].

The demand for endodontic procedures accounted for 7.0% of the total demand in this study. This is contrary to the findings of ADA [14], RTI [15], and NC [16] reports in which endodontic procedures accounted for 2.4%, 2.2%, and 3.9%, respectively; and ranked third as compared with operative and fixed prosthodontic procedures. This pattern of demand was an indication of late presentation of cariously and pulpally involved teeth. This showed that increasing numbers of carious and traumatized teeth with pulpal involvement, which would have been extracted, were being treated endodontically as an alternative treatment modality. This positive development could be attributed to increased awareness and the desire of the patients and dentists to save as many teeth as possible in the population so as to reduce the number of removable and fixed prosthodontic procedures. Furthermore, this pattern of a relatively high demand for endodontic procedures might also be attributed to the fact that most endodontic procedures in Nigeria are carried out in the departments of restorative dentistry of the dental schools or in private clinics, which are reasonably well-equipped for endodontic treatment procedures [17].

Operative procedures were the most demanded restorative services in this study accounting for 75% of the total procedures. This pattern of demand confirmed the findings of the studies of Mullins et al. [18], ADA [14], Nash et al. [15], Konrad et al. [16], and Eklund et al. [19] in which operative procedures were shown to be the most demanded dental services. Therefore, more efforts were being expended on operative services than endodontic and fixed prosthodontic services combined. However, there was a drastic decline in demand for operative procedures and other conservation services in the 2014 segment of the period of study. Nevertheless, this decline cannot be compared, on the same basis, with the decline observed in demand for restorative procedures according to the findings of ADA [14], Nash et al. [15], Konrad et al. [16], Akpata [17], Mullins et al. [18] and Eklund et al. [19] in which the observed decline was attributed to improved oral health status of the surveyed populations as evidenced by the reduction in caries rates. The surveyed population in this study could not be said to have enjoyed improved oral health status and dental services according to a survey carried out by Loto et al. [20] in which oral and dental diseases were found to constitute major public health problems. Therefore, the general decline in the demand for restorative procedures at the specified segment of this study, that is, 2014, could be attributed to incessant industrial strikes or actions by Nigerian Medical Association and National Association of Resident Doctors rather than a reduction in the prevalence of caries because dental caries is still a major public health problem in Nigeria [19].

Both individuals and service providers can substantially influence the demand for and utilization of dental care [21]. Changes in dental health have an impact on the demand for and utilization of dental services. In turn, utilization also has an influence back on dental health. This drastic reduction in the total demand for restorative procedures might also have been caused by the reduction in the spending powers of the consumers

of dental services who are mainly civil servants whose salaries have remained the same, over the years, in the face of the devaluation of the Nigerian currency (Naira) and hyperinflation engendered by the Nigerian political and economic crises with serious adverse effects on the socioeconomic fabric of the society. Inadequate supply or complete lack of instruments and materials could also account for the drastic reduction in the supply and demand for restorative procedures in 2014.

A large body of research has identified the factors affecting dental care utilization, especially the importance of income and dental insurance in the demand for and utilization of dental services [22,23]. In Nigeria, the output of dental professionals from all the dental schools is too low to meet the therapeutic and preventive needs of dental patients, while the number of training facilities are inadequate to meet the oral health needs of the population. There is also inadequate regulation and monitoring of these training institutions. Moreover, the management of these facilities is influenced by inadequate funding derived from federal and state governments, as well as private, corporate or faith-based bodies. The facilities are also inequitably distributed, with more than half of them located in the southern part of the country [24]. Thus, public health insurance systems are usually justified on the grounds of equity and as a means of redistributing welfare from high-income individuals to low-income persons. The case for public health insurance as a mechanism for redistribution has been studied carefully and theoretically [25]. Some researchers have observed that health insurance, as a supplement to income taxation, can achieve redistribution more efficiently than increasing income taxes alone. Cost-sharing is thus expected to exert an impact on the number of healthcare services consumed [25,26]. A cost-sharing mechanism in dentistry also exerts an influence on patient demand for dental services and/or consumer moral hazard. Coverage levels of dental insurance also affect the amount and mix of care services consumed, and consumers who utilize a no-user-charge insurance plan have better periodontal health and fewer decayed teeth than those in the cost-sharing plans [27]. Availability of insurance also alters the structure of demand toward more expensive dental services [28]. Nigeria presently has very poor dental insurance coverage, and this may have been reflected in the low demand for expensive but necessary restorative treatment compared to cheaper dental services, whose costs can easily be borne out of pocket.

Conclusion

This study showed that operative dental procedures were the most performed restorative treatment modalities during the period under review. Removable prosthodontic, endodontic and fixed prosthodontic procedures ranked second, third, and fourth, respectively, in procedures accepted by patients. More comprehensive studies, embracing all disciplines of dentistry, should be done to determine their levels of demand and clinical relevance in dental practice, while dental education of the populace on treatment options for the sequelae of dental caries should be adequately done.

Authors' Contributions

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All authors declare that they contributed to critical review of intellectual content and approval of the final version to be published.

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None.

Conflict of Interest

The authors declare no conflicts of interest.

Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

References

[1] Pearce DW. Macmillan Dictionary of Modern Economics. 3rd. ed. London: The Macmillan Press Ltd.; 1986. p. 100.
[2] Ball R. Practical marketing for dentistry. 1. What is marketing?. Br Dent J 1996; 180:385-8. https://doi.org/10.1038/sj.bdj.4809095
[3] Ball R. Practical marketing for dentistry. 2. The core concepts of marketing. Br Dent J 1996; 180:427-32. https://doi.org/10.1038/sj.bdj.4809110
[4] Ball R. Practical marketing for dentistry 3. Relationship marketing and patient/customer satisfaction. Br Dent J 1996; 180:467-72. https://doi.org/10.1038/sj.bdj.4809129
[5] Ball R. Practical marketing for dentistry. 5. Buyer behaviour. Br Dent J 1996; 181:66-71. https://doi.org/10.1038/sj.bdj.4809161
[6] Ball R. Practical marketing for dentistry 6. Market segmentation and targeting. Br Dent J 1996; 181:105-10. https://doi.org/10.1038/sj.bdj.4809173
[7] Oyapero A, Adenaike A, Edomwonyi A, Adeniyi A, Olatosi O. Association between dental caries, odontogenic infections, oral hygiene status and anthropometric measurements of children in Lagos, Nigeria. Braz J Oral Sci 2021; 19:e201431. https://doi.org/10.20396/bjos.v19i0.8661431
[8] Olatosi OO, Oyapero A, Onyejaka NK, Boyede GO. Maternal knowledge, dental service utilization and self-reported oral hygiene practices in relation to oral health of preschool children in Lagos, Nigeria. PAMJ - One Health 2020; 2(10). https://doi.org/10.11604/pamj-oh.2020.2.10.22850
[9] Oyapero Afolabi. Maternal Perception About Early Childhood Caries in Nigeria. In: Kalipeni E, Iwelunmor J, Grigsby-Toussaint DS, Moise IK. Public Health, Disease and Development in Africa. London: Routledge Publishers; 2018. p. 192-210.
[10] Petersen PE. Sociobehavioural risk factors in dental caries - international perspectives. Community Dent Oral Epidemiol 2005; 33(4):274-9. https://doi.org/10.1111/j.1600-0528.2005.00235.x
[11] Olatosi OO, Oyapero A, Onyejaka NK. Disparities in caries experience and socio-behavioural risk indicators among private school children in Lagos, Nigeria. Pesqui Bras Odontopediatria clín Integr 2020; 20:e0023. https://doi.org/10.1590/pboci.2020.102
[12] Olatosi OO, Onyejaka NK, Oyapero A, Ashaolu JF, Abe A. Age and reasons for first dental visit among children in Lagos, Nigeria. Niger Postgrad Med J 2019; 26(3):158-63. https://doi.org/10.1590/pboci.2020.102
[13] Adeniyi AA, Oyapero A, Ekekezie OO, Braimoh MO. Dental caries and Nutritional status of school children in Lagos, Nigeria – a preliminary Survey. J West Afr Coll Surg 2016; 6(3):15-38.
[14] American Dental Association. Resource Papers for the Special Committee to Study the Future of Dentistry. Chicago: American Dental Association; 1981.
[15] Nash K, Douglass C, Wilson J. Economics of Scale and Productivity in Dental Practice. Research Triangle Park: N.C Research Triangle Institute; 1978.
[16] Konrad T, Defriese G. The Dental Office Practice Productivity Study: Findings. In: Baweden J, Defiese G, editors. Planning for Dental Care on a State-wide Basis. Chapel Hill: The Dental Foundation of North Carolina; 1981. p. 91-113.
[17] Akpata ES. Endodontic treatment in Nigeria. Int Endo J 1984; 17:139-51. https://doi.org/10.1111/j.1365-2591.1984.tb00397.x
[18] Mullins MR, Kaplan AL, Bader JD, Lange KW, Murray BP, Armstrong SR, et al. Summary results of the Kentucky dental practice demonstration: a cooperative project with practicing general dentists. J Am Dent Assoc 1983; 106(6):817-25. https://doi.org/10.14219/jada.archive.1983.0425
[19] Eklund SA, Pittman JL, Smith RC. Trends in dental care among insured Americans: 1980 to 1995. J Am Dent Assoc 1997; 128:171-8. https://doi.org/10.1080/0001635004291 81
[20] Loto AO, Oyapero A, Awotile AO, Adenuga-Taiwo OA, Enone LL, Menakaya IN. An update on the relative Vulnerability of the first and second permanent molars to caries in urban Nigerians. J Int Oral Health 2019; 11(5):274-9. https://doi.org/10.4103/jioh.jioh_9_19

[21] Parkin D, Yule B. Patient charges and the demand for dental care in Scotland, 1962-1981. Appl Econ 1988; 20(2):229-42. https://doi.org/10.1080/00036848800000007

[22] Adeniyi AA, Oyapero A. Predisposing, enabling and need factors influencing dental service utilization among a sample of adult Nigerians. Popul Med 2020; 2:44. https://doi.org/10.18332/popmed/128504

[23] Suominen-Taipale L, Widström E. Does dental service utilization drop during economic recession? The example of Finland, 1991-1994. Community Dent Oral Epidemiol 1998; 26(2):107-14. https://doi.org/10.1111/j.1600-0528.1998.tb01936.x

[24] Adeniyi AA, Sofola OO, Kalliecharan RV. An appraisal of the oral health care system in Nigeria. Int Dent J 2012; 62(6):292-300. https://doi.org/10.1111/j.1875-595X.2012.00122.x

[25] Thompson B, Cooney P, Lawrence H, Ravaghi V, Quinonez C. The potential oral health impact of cost barriers to dental care: findings from a Canadian population-based study. BMC Oral Health 2014; 14:78. https://doi.org/10.1186/1472-6831-14-78

[26] Chalkley M, Robinson R. Theory and Evidence on Cost Sharing in Health Care: An Economic Perspective. London: Office of Health Economics, BSC Print Ltd.; 1997.

[27] Thompson B, Cooney P, Lawrence H, Ravaghi V, Quiñonez C. Cost as a barrier to accessing dental care: Findings from a Canadian population-based study. J Public Health Dent 2014; 74(3):210-18. https://doi.org/10.1111/jphd.12048

[28] Choi MK. The impact of Medicaid insurance coverage on dental service use. J Health Econ 2011; 30(5):1020-31. https://doi.org/10.1016/j.jhealeco.2011.08.002