

Demand for Dental Health Care in Kenyan Households

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Abstract: The demand for dental care is derived from the demand for dental health. Individuals choose to receive dental services because they believe they have a need for those services to maintain their oral health. The consumers combine their time and market commodities as inputs to produce their own dental health. Dental health is considered to have the same properties as durable capital stock that directly enters the utility function together with other market goods consumed by individuals. An individual's initial stock of oral health depreciates over time, but it can be increased by investments in dental care. Dental care services are sought because of their potential for preventing the depletion of good oral health and improving oral health. The individual's stocks of other human capital, particularly stock of knowledge or education are assumed to affect the efficiency of the oral health production process. This study sought to establish determinants of demand for dental care services among households in Kenya. It was based on the health production function (HPF) model since individuals choose to receive dental services because they believe they have a need for those services to maintain their oral health. The researchers conducted a regression model on the demand for dental care with the dependent variable as log of dental care expenditure. The study established an income elasticity of 0.316, showing that the demand for dental care increases by 32% when total monthly income for the household increases twofold. The demand for dental care services increases by 34% as a result of an increased coverage of private health insurance by 10% but decreases by 83% with a 10% increase in NHIF coverage in households. As age of the household head increases, this leads to a decrement in the demand for dental care by the household. Males demand for dental care exceeds the demand for females by 18 times. As the individual rating of health status in relation to the age mates improves; it increases the demand for dental care. Marital status is a key determinant of the demand for dental care in Kenyan households. Households headed by divorced or separated individuals have 3.4 times less demand for dental care than in households where the head is currently married. Households whose head is widowed have demand for dental care which is 4.9 times greater than for the currently married heads of households. Demand for dental care in Kenya is not influenced by the highest level of education attained of the household head. In households where the household head has attained secondary education, the demand for dental care is two times higher than in households where the head of household has not attained secondary education. The study recommends that the fact that demand for dental care services decreases with an increase in NHIF coverage in households, calls for an urgent measure by the government to include dental care services in the NHIF scheme.

Keywords: Dental Health Care, Demand, Household, Health Production

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I. Introduction

1.1 Background to the study

Dental health is ultimately the main objective and product of dental care. With the development of the theory of human capital by ³, the economic approach to the demand for dental health and dental care has considered the demand for dental care as being derived from the demand for dental health ⁷. Since the primary goal of dentistry is to produce good dental health, improvement in dental health is an important indicator of the overall performance of the dental care system ¹¹.

In a model outlined by ² in his theory of the allocation of time, households are assumed not only to consume goods and services but also to produce them. By using their own time and market goods, households produce basic commodities from which they derive utility. The utility related to a market good is thus dependent upon the time allocated to the consumption of that good. Hence, in addition to the traditional income budget constraint, utility maximization should also take into account both time resources and appropriate production technologies.

The demand for dental care is derived from the demand for dental health ¹¹. The consumers combine their time and market commodities as inputs to produce their own dental health. Dental health is considered to have the same properties as durable capital stock that directly enters the utility function together with other

market goods consumed by individuals. An individual's initial stock of oral health depreciates over time, but it can be increased by investments in dental care. Dental care services are sought because of their potential for preventing the depletion of good oral health and improving oral health¹¹. The individual's stocks of other human capital, particularly stock of knowledge or education are assumed to affect the efficiency of the oral health production process. On the constraint side, income basically determines the set of feasible choices between dental care and other goods¹¹. Grossman's demand theory has traditionally been applied on the demand side in the analysis of dental care utilization.

Individuals choose to receive dental services because they believe they have a need for those services to maintain their oral health. Dental care is a normal necessity good with a positive elasticity of less than one¹. The demand for dental health care has an income elasticity which is positive and small based on a study in Canada by¹.

1.2 Problem Statement

Dental health affects everyone from children, youths and adults. It is hard to believe that an individual's desire to go to the dentist and receive dental treatment is simply due to the joy of the experience. Rather, it is more reasonable that people seek oral health professionals because they need something that the professional can provide¹⁰. While an unattractive smile is not technically a "dental problem," it is a major reason why many patients seek dental treatment, since an unattractive smile can really lower a person's self-esteem. Dental services cover different areas including dental check-ups, teeth gum therapy, teeth extractions, dental scaling, dental fillings, root canal, dental crowns, teeth whitening, and dental braces. Financing for public oral health care delivery in Kenya is very limited and Kenyans either pay 'out of pocket' or utilize dental insurance covers after paying a premium. The same case applies to other countries like in Finland where according to¹¹ the use of dental services depends not only on the out-of-pocket price faced by the patient; but also other factors unique to dentistry that have impacts upon demand for dental services are third party payment schemes and public subsidy schemes.

1.3 Objectives

To establish determinants of demand for dental care services among households in Kenya.

II. Methodology

2.1 Theoretical Framework

Using² household production approach to build up a model of the demand for health, as regards dental health here, Grossman comprehended that consumers do not demand dental care (as applied here) *per se*, but rather dental health for their well-being^{4, 5, 6}. Hence, the demand for dental care is derived from the demand for dental health and the consumers combine their time and market commodities as inputs to produce their own dental health¹¹.

This study was based on the health production function (HPF) model which according to¹⁰ is the popular demand model for medicine and dentistry. In the HPF model, health is the ultimate object of individual desire. Individuals choose to receive dental services because they believe they have a need for those services to maintain their oral health.

2.2 Analytical Framework

The dependent variable is log of dental care expenditure (LnDentExp) and the independent variables are log of total monthly household income (Lntotmoninc), lifestyle variable specifically smoking (Smoke), presence of health insurance specifically private health insurance (PHI) and national health insurance fund (NHIF). The control variables includes age, sex, area of residence, household size, self assessed health (SAH), marital status and education level.

All the analyses were conducted using Stata/MP Version 14.2 and the level of significance was set at 0.05. The linear regression model which is based on the work of¹ was estimated to measure the income elasticity of Kenyan households with respect to demand for dental care. Therefore, log of dental care expenditure (LnDentExp) was used as a function of the log of total household income (Lntotmoninc) after controlling for PHI, NHIF, age, sex, area of residence, household size, self assessed health (SAH), marital status and education level variables. We use the log-log format in order to interpret the results as elasticity, which is standard in economic analyses.

2.3 Survey Design and Sampling

The 2013 Kenya Household Health Expenditure and Utilization Survey (2013 KHHEUS) was conducted by the Ministry of Health (MoH), in conjunction with the Kenya National Bureau of Statistics (KNBS). The KHHEUS Technical Working Group (TWG), comprised of representatives from the MoH

(Division of Policy and Planning and other divisions), the KNBS, and the USAID-funded Health Policy Project (HPP), oversaw all technical aspects of the survey planning and implementation ⁹.

The 2013 KHHEUS was designed as a household-based survey. The National Sample Survey and Evaluation Programme (NASSEP) master sample, which was developed on the platform of a multistage sampling design and maintained by KNBS, was used to select the representative sample. Using this master sample, a total of 33,675 households were drawn for this survey. This sample was constructed to allow for estimates of key indicators both at the national and county levels for each of the 44 counties covered, and for urban and rural regions. Survey weights are used to make sample data representative of an entire population. Weights therefore are applied to adjust for differences in the probability of the selection and interview of the cases in a sample, either due to design or other factors ⁹.

III. Results

3.1 Determinants of Demand for Dental Care in Kenyan Households

In order to establish our objective, the researchers conducted a regression model on the demand for dental care in Kenya and the results are presented in figure 4.1 and in Appendix I.

3.1.1 Income Elasticity Demand for Dental Care in Kenya

Based on the results, the coefficient of household income was statistically significant at the 5 per cent level of significance. The estimated value of the coefficient was 0.316, which is the degree of elasticity in dental care as a result of monthly household income. This shows that if you increase total monthly income for the household by 100%, the demand for dental care will increase by 32%.

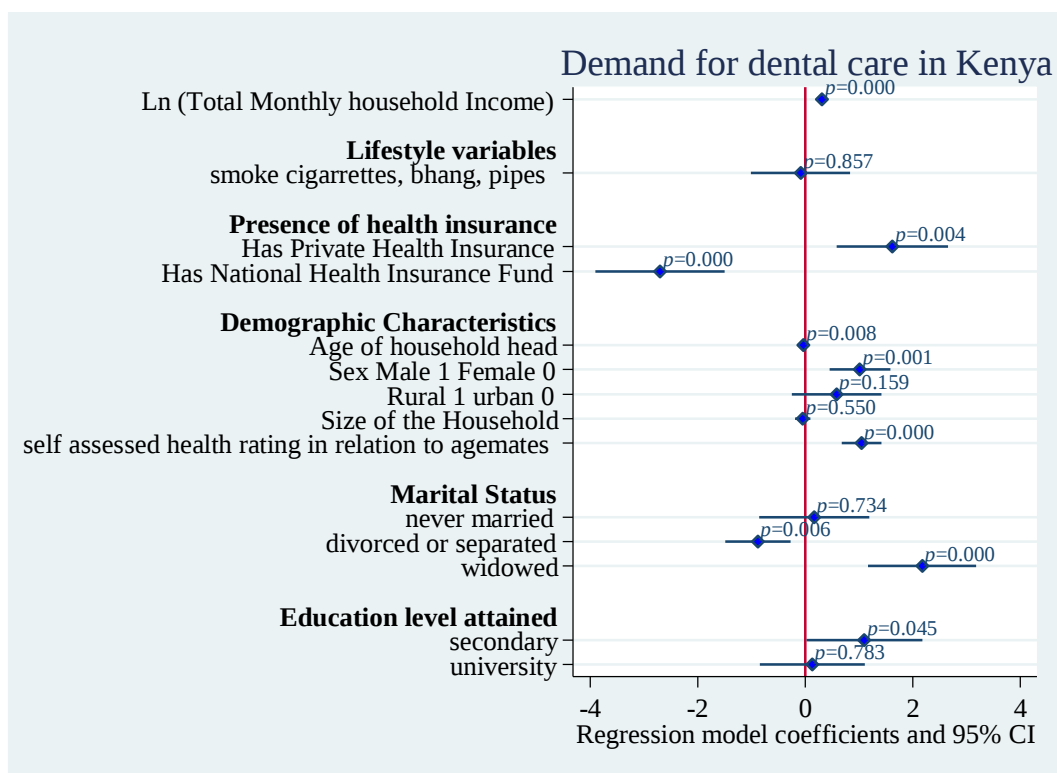


Figure 4.1: Weighted Regression Model estimation

Table 4.1: Tests for Joint Significance of the Model Coefficients

Model F (14, 10)	47.89*	Prob > F = 0.0000
Presence of Insurance F (2, 22)	14.99*	Prob > F = 0.0001
Marital Status F (3, 21)	6.21*	Prob > F = 0.0035
Education level F (2, 22)	2.15	Prob > F = 0.1407
Demographic Characteristics F (10, 14)	6.30*	Prob > F = 0.0011

* denotes statistically significant at the 5 percent level

3.1.2 Lifestyle and Demand for Dental Care

Lifestyle variable as represented by whether the household head smokes cigarettes, bhang or pipes has a negative coefficient which is not statistically significant. The negative sign in the coefficient indicates that households headed by an individual who smokes have lesser chances of seeking dental care services compared to the other households, even though it was not supported by statistical test of significance.

3.1.3 Insurance and Demand for Dental Care

The presence of insurance in household was proxied by two measures namely whether any member of the household has a private health insurance (PHI) and whether there is an individual with National Health Insurance Fund (NHIF). The regression results show that the coefficient of private health insurance had a positive coefficient which was statistically significant at the 5 per cent level. The coefficient value for PHI was 1.624, which implies increasing the coverage of private health insurance in households by 10%, would lead to 34% greater demand for dental care services in relation to those without private health insurance. However, the coefficient for NHIF is negative and statistically significant at the 5 per cent level of significance. The value of the coefficient was -2.698, which implies that increasing the coverage of NHIF to households by 10% would lead to 83% lesser demand for dental care services compared to those without NHIF. The test for joint significance on the presence of insurance presented in Table 4.1 gives a statistically significant F-value of 14.99, showing that insurance cover has a significant influence on demand for dental care in Kenya. Similar findings were deduced by ⁸, who estimated that universal coverage would increase the dental care utilization rate by no more than 0.095 (from 0.752 to 0.847), a 13% increase.

3.1.4 Demographic Characteristics and Demand for Dental Care

The demographic characteristics included in this study are age, sex, area of residence, size of the household, self assessed health (SAH), marital status and education level variables. The age of the household head has a negative coefficient which is statistically significant at the 5 per cent level. This shows that as age of the household increases, this leads to a decrement in the demand for dental care by the household. The coefficient for sex of 1.022 is positive and significant at the 5 per cent level. This indicates that the demand for dental care by males is 18 times greater than by females. The coefficient for area of residence is positive but not statistically significant; indicating the demand for dental care in the rural areas is the same as in urban areas. Size of the household has a negative coefficient which is statistically not significant, illustrating that the demand for dental care in Kenya is not influenced by the size of the household. Self assessed health in relation to age mates is positive and significant at the 5 per cent level. This shows that as the individual rating of health status in relation to the age mates improves; it increases the demand for dental care.

Marital status was categorized into four namely never married, married or cohabiting, divorced or separated and widowed. Three of the marital status variables were included in the model and the reference category was being currently married or cohabiting. In the model results the coefficient for never married is positive but not statistically significant. This illustrates that the demand for dental care in Kenya is the same whether the individual is currently married or never married. Being divorced or separated has a negative and statistically significant coefficient of -0.8815 at the 5 per cent level. This indicates that households headed by divorced or separated individuals have 3.4 times less demand for dental care than in households where the head is currently married. Being widowed has a positive and statistically significant coefficient of 2.182 at the 5 per cent level. This shows that households whose head is widowed have demand for dental care which is 4.9 times greater than for the currently married heads of households. Table 4.1 on the joint effects of marital status produces a F-statistic of 6.21 which is statistically significant, showing that marital status of the household head is a key determinant of the demand for dental care in Kenyan households.

Education level was categorized into three; below secondary, secondary, and university. However, the below secondary was not included in the model hence acted as the reference category. Secondary level has a positive and statistically significant coefficient of 1.105 at the 5 per cent level. This indicates that in households where the household head has attained secondary education, the demand for dental care is two times higher than in households where the head of household has not attained secondary education. The coefficient for university is positive but not statistically significant. Table 4.1 reports similar results where a F- statistic of 2.15 which is not significant on education level is realized. This illustrates that demand for dental care in Kenya is not influenced by the highest level of education attained of the household head. However, the joint effect of demographic characteristics has a F statistic of 6.30 which is statistically significant at the 5 per cent level. This shows that demographic characteristics of the household head have a joint influence on the demand for dental care in Kenyan households.

IV. Conclusions and Recommendations

4.1 Conclusions

The demand for dental care increases by 32% when total monthly income for the household increases twofold. The demand for dental care services increases as a result of an increased coverage of private health insurance but decreases with an increase in NHIF coverage in households.

As age of the household increases, this leads to a decrement in the demand for dental care by the household. Males demand for dental care exceeds that the demand by females. As the individual rating of health status in relation to the age mates improves; it increases the demand for dental care.

Marital status is a key determinant of the demand for dental care in Kenyan households. Households headed by divorced or separated individuals have 3.4 times less demand for dental care than in households where the head is currently married. Households whose head is widowed have demand for dental care which is 4.9 times greater than for the currently married heads of households.

Demand for dental care in Kenya is not influenced by the highest level of education attained of the household head. In households where the household head has attained secondary education, the demand for dental care is two times higher than in households where the head of household has not attained secondary education.

4.2 Recommendations

- (i). Since the demand for dental care services increases as a result of an increased coverage of private health insurance, there is need for individual households to be encouraged to have private health insurance cover, which could be made possible by the government subsidizing the private insurance or through public private partnerships.
- (ii). The fact that demand for dental care services decreases with an increase in NHIF coverage in households, calls for an urgent measure by the government to include dental care services in the NHIF scheme.

V. References

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Appendices

Appendix I: Regression Model on Demand for Dental Care in Kenya

Indentalexp	Linearized					[95% Conf. Interval]
	Coef.	Std. Err.	t	P> t		
Intotmoninc	.3164723	.0466036	6.79	0.000	.2200654	.4128793
smoke	-.0813191	.4472152	-0.18	0.857	-1.006454	.8438161
PHI	1.624179	.5030463	3.23	0.004	.5835485	2.664809
NHIF	-2.698098	.5833893	-4.62	0.000	-3.90493	-1.491265
Age	-.0308193	.0105677	-2.92	0.008	-.0526803	-.0089583
Sex	1.022048	.2738702	3.73	0.001	.4555048	1.588592
rurlurb0	.586103	.4027821	1.46	0.159	-.2471153	1.419321
hhsze	-.0414077	.0682451	-0.61	0.550	-.1825833	.099768
SAH	1.051196	.1766282	5.95	0.000	.6858123	1.416579
nevermarried	.1702057	.4943566	0.34	0.734	-.8524489	1.19286
Divsep	-.8815368	.2933322	-3.01	0.006	-1.488341	-.274733
Widowed	2.181844	.4865506	4.48	0.000	1.175337	3.18835
secondary	1.105382	.5218835	2.12	0.045	.0257839	2.184981
university	.1314082	.4726298	0.28	0.783	-.8463012	1.109117
_cons	.5047026	.8599146	0.59	0.563	-1.274166	2.283572