ORIGINAL RESEARCH

Willingness to Pay for Infertility Treatments in the Federal Capital Territory, Abuja, Nigeria

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To cite this article: Bello MA, Odigie RU and Udezi WA. Willingness to pay for infertility treatments in the Federal Capital Territory, Abuja, Nigeria. Journal of Basic and Social Pharmacy Research, 2022;2(5):64-73
ISSN: 2705-3245

ABSTRACT

Introduction: The burden of infertility has been on the rise in recent times, and not only does it affect millions worldwide, but it also impacts families in numerous ways. Quantification of this burden helps to ascertain the level of competition for available resources for healthcare.
Objectives: The objectives of this study were to determine the willingness to pay (WTP) for the treatment of infertility and its possible relationship with sociodemographic factors.
Methods: A contingent valuation method using payment cards containing a description of the features and price options was used to elicit WTP values for two treatment options for infertility. Participants were recruited across several hospitals in Abuja. Kruskal Wallis and Man-Whitney U tests were employed as applicable to investigate the effects of socio-demographic factors on WTP.
Results: WTP results showed that mean willingness to pay for Option A (NGN696,701 ≃ $1,1828.61) was significantly higher than Option B (N578,982 ≃ $1,519.64) with respondents preferring Option A to B (P=0.0001). Older respondents, those with post-secondary education and those who have waited for more than 12 years to have a child were significantly more willing to pay higher for both Option A and Option B (P=0.0001). Respondents who earned higher were also willing to pay significantly higher for both options.
Conclusion: Patients who are older and have waited for longer periods before giving birth were more willing to pay higher for the two infertility treatment options provided. Those respondents with better income also showed a willingness to pay higher than those with lower monthly earnings.

Keywords: Willingness to pay; Pharmacoeconomic evaluation; Cost-benefit analysis; Infertility; Treatment; Nigeria

INTRODUCTION

Infertility is defined as the inability of couples to achieve a clinical pregnancy despite 12 months or more of regular unprotected sexual intercourse[1]. Infertility could be primary where conception is not achieved at all or secondary where conception becomes impossible after one birth[1]. Though several cultures apportion significant blame to the females for infertility cases[2,3], the aetiology of infertility has been linked with several causes in which males and females are implicated[4-6]. The burden of infertility has been on the rise in recent times, and not only does it affect millions worldwide, but it also impacts families and communities in numerous ways[1,4]. A report showed a total of 7.3 million women predominantly aged 15-44 used infertility services between 2006 and

2010; representing an increase of about 600,000 women from 1982 who have ever used medical assistance to conceive in the United States[7]. Estimates report that between 48 million couples and 186 million individuals live with infertility globally[1,8,9]. At a time when there is rapid population growth in the world, it may seem illogical to think of the impossibility of a surge in infertility cases, however, several statistics have revealed increasing levels of infertility and a decrease in fertility rate across several countries and demography[10,11]. According to recent reports by Nigeria Demographic Health Survey (NDHS), Nigeria's total fertility rate (TFR), which measures the number of children a woman is likely to have during her childbearing years, decreased from 5.5 births per woman in 2013 to 5.3 births per woman in the 2018[12,13]. Despite this decrease, it is important also to state that Nigeria is viewed to rank highly in world fertility rating[14]. In Nigeria, it is common knowledge that children are treated as a necessity, especially for newly married couples and so any couple unable to conceive within a year of marriage usually faces several criticisms and derogatory remarks from family and concerned individuals. Culturally children are loved and highly celebrated in Africa and couples who are unable to conceive make necessary efforts in seeking intervention evidenced by increasing clinic attendance for fertility-related cases across several hospitals[11]. With this rise in the cases of infertility, the treatment-seeking patterns of parents who desire children invariably should be studied rather than ignored as with several factors affecting health status in Nigeria[15]. In the same light, male infertility has become a prominent situation worthy of commensurate efforts as with female infertility[16,17]. New reproductive technologies and infertility treatment being introduced to Africa also point in the direction of increasing prevalence in which case, private clinics receive a significantly higher proportion of supplies compared to the public health sector[18].

Several studies have explored various aspects of the subject matter such as psychological impact[19], its management/treatment[7,20-23], sociocultural impact [24], causes, and prevalence[25,26]. Some studies have also considered policies relating to infertility and interventions available[27] and financing infertility treatment[28]. The economic impact of infertility on couples is yet to receive good attention. With the various interventions available, patients are left to determine which treatment options suit them given their socioeconomic realities. Weighing the cost and benefit of interventions patients are often left hanging in decision making and it becomes difficult to ascertain the very factor that influences the choice of therapy given the limitation of resources, cost, and accessibility of the intervention. Though several schools of thought have debated the adequacy of attention to infertility[3,15], it is important to state that neglect of the rising statistics may haunt the healthcare systems in the near future. The ever-evolving world and several factors both extrinsic and intrinsic[16,17] account for the rising figures making infertility a critical subject in the healthcare system in which it inadvertently competes for available resources for healthcare[18].

Across several demographics, patients who seek medical interventions are often faced with decision-making. In relating the cost of the intervention to the outcome, several analyses can be considered such as Cost Minimization Analysis, Cost Benefit Analysis, Cost Effectiveness analysis, and cost-utility analysis. In most cases, cost, effectiveness, benefits, and satisfaction are considered in decision-making by patients, policymakers, treatment providers as well as Pharmaceutical companies. Depending on patient preferences, several outcomes are possible. With a number of infertile women highly stigmatized[2,28], they would readily jump into any intervention which would bring succour to them. Appreciating the economic impact of infertility and its associated consequences would enrich decision-making and assist in developing policy guiding sponsorship for infertility management as well as developing programmes to alleviate the burden of infertility. Cost-benefit analysis

of therapeutic alternatives makes it possible to compare outcomes of different options.

In recent times, there has been an increasing interest in the contingent valuation method as an instrument for assessing the preferences for health-related goods and services[29]. Willingness to pay (WTP) is a contingent valuation approach that can help determine the maximum price a customer is willing to pay for a product or service[30]. In estimating these values, decision-makers are able to determine what price maximizes outcomes and when the subject of infertility comes to bear, treatment-seeking behaviour is critical, and it would be important to consider the quantitative health benefits from interventions[31]. WTP presents respondents with hypothetical scenarios about a certain intervention or specific program that it is intended to evaluate[32]. WTP finds application in price decisions, new product development, and marketing approach[33] with increasing popularity[34] in Pharmacoeconomics. WTP approach measures the maximum amount a respondent is willing to pay for an intervention given stated benefits taking human preferences into due consideration in decision making as a critical concept in cost-benefit analysis[35]. Cost-benefit analysis is seen as an empirical test of whether proposed public actions would increase preference satisfaction[36]. This study was aimed at determining willingness to pay for two different treatment options for infertility with associated risks and benefits of the treatments clearly stated. The impact of associated sociodemographic factors was also evaluated.

METHODS

Setting

The study was conducted in the six area councils in Abuja, Federal Capital Territory, Nigeria.

Respondents

The respondents were consecutively recruited from randomly selected Pharmacies and Clinics using a lottery technique with one Pharmacy and one Clinic in each council area. The aim of the study was explained to the participant before instrument administration. In cases where an individual fail to give his consent the next patient in line in the waiting area to see the physician or collect dispensed medications is approached to take part in the study.

The Instrument and Data Collection

A questionnaire was the instrument used to collect relevant information from the respondents. The questionnaire was divided into two sections - Section A and Section B. Section A collected sociodemographic characteristics of the respondents such as age, marital status, income, sex, occupation, educational level, number of children, and duration of waiting to bear a child. Section B had payment cards containing detailed descriptions of two treatment options for infertility which had different attributes such as the probability of childbirth, risk of miscarriage, and probability of discontinuation of treatment due to overstimulation of the ovary. Attributes of the treatment options were agreed on by a panel of five Gynaecologists who manage infertility cases based on drugs that they currently use. Attributes of the treatment options are summarized in table 1 below:

With the aid of Raosoft, an online sample size calculator (available at www.rasosoft.com/samplesize.html), the sample size was determined to be 385 at a confidence level of 95% and a margin of error of 5%.

Table 1: Attributes of the two infertility treatment options

Attributes	Option A	Option B
Probability of giving birth to a living child.	26%	21%
Chance of miscarriage	25.4%	27.6%
Probability of treatment discontinuation due to over stimulation of the ovary	1.9%	1.2%

Different price options in Nigerian naira were written on payment cards which also contained a description of the features of the treatment option being evaluated. The payment cards were presented to the respondent, who were required to select one of the prices from among the thirteen (13) price options (range = N50,000 – N1,200,00) presented on the cards. The same price ranges were presented for the two treatment options. To reduce order bias, the WTP questions were rotated such that if the first participant was presented with Option A first, the second respondent would be presented with Option B first. A contingent valuation technique was used to derive the maximum amount of money each respondent was willing to pay for each treatment [37]. Prices were written in Nigerian Naira

Data Analysis

Before commencing data analysis, all filled questionnaires were evaluated for completeness and the questionnaires that were found usable were coded and entered into Microsoft Excel 2016 for descriptive statistics after the data has been crosschecked for accuracy. The mean amounts respondents were willing to pay were computed.

Inferential analysis was performed with the aid of GraphPad InStat version 3.10 (GraphPad Software Inc., La Jolla, California) which reports exact P-values. Kruskal-Wallis or Mann-Whitney U test (as applicable) was used to conduct inferential analysis since the data did not have Gaussian distribution as confirmed by Kolmogorov-Smirnov normality tests. The possible relationship between Sociodemographic factors and WTP was explored. P-values <0.05 were interpreted as significant.

RESULTS

A total of 491 adults aged 18years and above participated in the study from the 600 people who were approached giving a response rate of 81.83%. Majority of these respondents were between 35-54 years (353, 72%) and 70% (342) of them were married. Those who have had post-secondary education constituted a majority (346, 71%). Majority of them had waited between 0 to 3 years for a child while about 5% of them had waited for more than 12years. Females accounted for 57% of responses compared to 43% responses from males and those with a single child accounted for most of the responses.

Table 2 showed that mean willingness to pay for the treatment options. Respondents were more willing to pay for Option A than Option B (P=0.0001).

Majority preferred Option A (310, 63%) to Option B (101, 21%) while 16% of the respondents where indifferent in their preference.

There was significant difference between sociodemographic factors and WTP values. Older respondents were significantly more willing to pay higher for both Option A and Option B compared to younger ones (P=0.0001).

Table 2: Willingness to Pay for Fertility treatment (N=491)

Option A Mean ± SD	Option B Mean ± SD	P-value
696701 ± 287899.0	578982 ± 266613.6	0.0001

Although females generally had higher values for WTP than Male, the difference was not significant for both Options A and B (P>0.05). Those with marital status not clearly defined were significantly more willing to pay for both drugs (P=0.0001) as well as those with post-secondary educational qualification. Students were less willing to pay for the treatment options provided (P=0.001) (Table 3).

Table 3: Relationship between Sociodemographic factors and Willingness to Pay

Variable	Frequency	Mean Amount willing to pay for Treatment Option A	Option B
Age (years)			
18-24	15	216667 ± 99403.0 *	143333 ± 56273.1 *
25-34	86	543023.3±244247.1	451162.8±218413.6
35-44	219	729589±253983.5	605479.5±239967.7
45-54	134	755597±285729.5	638283.6±266958.7
55 and above	32	831250±327687.4	656250±312056.1
p-value		0.0001	0.0001
Sex			
Male	210	662619±294457.3 *	555619±278356.2
Female	277	723213±279282.5	596029±257395.2
p -value		0.0209	0.0983
Marital Status			
Married	342	726901±274676.6 *	601608±258869.7 *
Single	98	541633±288196.3	452041±247973.1
Others	38	834210.5±252850	711315.8±260666.2
p -value		0.0001	0.0001
Educational Level			
Nil	6	600000±346410.2 *	566667±250333.1 *
Primary	11	372727.3±184883.3	327272.7±261116.5
Secondary	121	515289±272705.8	438430±245692.9
Post-Secondary	346	774942±256077.7	638815±250585.5
p -value		0.0001	0.0001
Occupation			
Student	19	336842±203334.8 *	294737±250496.6 *
Government worker	154	737338±252669.5	613831±260535.4
Self Employed	128	656640.6±290693.7	555078.1±259984.8
Unemployed	27	488889±288675.1	418519±274614.5
Private sector worker	144	771389±282354.3	631944±250496.8
Retired	15	773333.3±225092.6	593333.3±237446.7
p-value		0.0001	0.0001

* Data marked with the asterisk are significantly different ($p < 0.05$).

Table 4 showed that respondents who earned higher had a proportionate willingness to pay value compared to those that earned lower as demonstrated by their significant willingness to pay higher for both Options A and B. Number of Children was not statistically different with respect to WTP as seen in the findings (P>0.05) both for Option A and B. Those who have waited for more than 12years had significantly higher WTP for both interventions compared to those with shorter wait period (P=0.0001). Respondents who preferred either of the treatment option demonstrated a corresponding high WTP for their preferred drug whereas those who had no preference were significantly less willing to pay for both treatments (P=0.001).

Table 4: Relationship between sociodemographic factors and willingness to pay (contd.)

Variable	Frequency	Mean Amount willing to pay for Treatment	
		Option A	Option B
Income			
<80,000	99	394248.1±222744.4	361167.2±249509.9
80,000-199,999	228	671148.7±212808.9	550111.6±209591.3
>200,000	162	894481.5±243530.4	733506.0±226562.0
p -value		0.0001	0.0001
Number of Children			
0-1	273	685531±262729.9	571538±256702.5
2-4	218	710688±316679.2	588303±278844.5
p -value		0.3365	0.4893
Wait time (years)			
0-3	381	646929±280817.9	542205±263702.1
4-7	47	782978.7±223916.9	631914.9±222736.3
8-11	53	928947.4±202561.8	731578.9±210668.5
12 and above	25	940000±261278.9	808000±261278.9
p -value		0.0001	0.0001
Preferred Treatment Option			
A	310	766451.6±273601.8	607838.7±253300.9
B	101	642376.2±242695.9	623762.4±269634.3
None	80	495000.0±286245.9	410625.0±249897.9
p -value		0.0001	0.0001

DISCUSSION

In this study, the preferences of respondents clearly showed that several factors influence treatment seeking behaviour of patients and the impact of decision-making on the outcome of an intervention. More than half (63%) of the respondents preferred treatment option A which has a 26% probability of giving them their desired outcome which is a living child. This makes it easy to admit that the goal of an intervention is very important in the treatment-seeking behaviour of patients. As seen in this study females were willing to pay higher for both interventions presented compared to males, but the difference was found not to be statistically significant for option B. Due to sociocultural constructs, norms, and biases it is likely that female counterparts report higher WTPs than males because they are more concerned about infertility. Additionally, females may be able to raise multiples of their earnings by leveraging social support networks. Respondents in this study who are aged 35 and above seem to constitute a higher proportion of cases and interestingly willingness to pay values significantly increased with increasing age. Reports have also presented a high prevalence of infertility among this age group

evidenced by infertility clinic attendance[11,25]. This may be attributable to age-related stigma and trauma that accompanies infertility as older people tend to feel more desperate for treatment of infertility. Another logical perspective would take into cognizance that as women generally approach menopause, it becomes more biologically difficult to conceive as well as declining health status in males may contribute to difficulties in achieving conception with their spouse. This justifies the finding in the study linking aging with high WTP values.

Respondents in this study with marital status not well defined were more willing to pay for both treatment options than their married or single counterparts. It is valid to assume that married people would be willing to pay more than single people since the majority of single people may not be under intense pressure, however, it is rather intriguing that those with complex marital status were significantly more willing to pay for infertility treatment. This raises fundamental questions regarding the treatment-seeking behaviour of people who make up this group such as divorced, widowed, and separated persons.

Students were less willing to pay for the treatment options provided. Students are less likely to belong to the very old strata of the respondents and are such may not be as desperate in the quest for childbirth. There is also a possibility that more of the student respondents are single and so may have less desire for childbirth at this stage, perhaps, they may not be suffering from infertility or even think infertility is a worthwhile investment. Respondents who earned higher had a proportionate willingness to pay value compared to those who earn lower as demonstrated by their extremely significant willingness to pay higher for both Options A and B. Wealthier respondents seem to demonstrate high WTP for healthcare interventions as revealed in a similar study which accessed WTP for Malaria treatment in Nigeria.[37] The higher you earn the more likely it is that you can afford healthcare but given the socioeconomic realities in Nigeria, it raises questions as to the impact such high WTP would have on the ability to pay especially for those respondents with low net income. Matching the minimum earning of an average Nigerian and the level of poverty, it may now appear that infertility is a luxury that only the rich in society can afford.

Those who have waited for more than 12 years were significantly more willing to pay for both interventions compared to those with shorter wait periods. This is not unexpected as those who have waited longer may have tried several treatments and would continue to patronize treatment options with promising potential. Respondents who preferred either of the Drugs demonstrated a corresponding high WTP for their preferred drug whereas those who had no preference were significantly less willing to pay for both Drugs. The result of this study simply suggests that treatment seekers prioritize funding their pressing needs with resources available despite limitations and competition.

There is a need for policymakers to review infertility treatment funding given the increasing burden of the disease in recent times and the associated cost of treatment. Though not lethal and not dependent on socioeconomic status, infertility affects people across diverse demography, and it is, therefore, important to support the argument for the inclusion of African infertility on the international agenda to attract funding and beneficial policy[39,40] as supported by findings from this study.

CONCLUSION

Infertility affects people across different demography and treatment-seeking behaviour is different among these groups. Those patients who are older and have waited for longer periods before giving birth to a child were more willing to pay higher for the two treatment options provided. Richer respondents also significantly showed a willingness to pay higher than those with low economic status. Subsidizing infertility treatment would be beneficial to the poor and if the WTP amounts stated are economically viable to manufacturers, it may be advisable

that policymakers and development partners consider subsidizing infertility treatment.

ACKNOWLEDGEMENTS

None.
The authors declare no conflict of interest associated with this study

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