Original Research Article

Self-reported health status of a sample of patients receiving *in-vitro* fertilization treatment

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Abstract

Purpose: To determine the health status of patients receiving in-vitro fertilization (IVF) treatment and evaluate possible relationships with social demographic factors in comparison to those not receiving infertility treatment.

Methods: The EuroQoL Group-developed EQ5D-5L was used to elicit responses on the five dimensions that make up its health profile; Mobility, Self-Care, Usual Activities, Pain/Discomfort, and Anxiety/Depression. Respondents scored their perception of how good their health is using a calibrated visual analog scale (VAS) from 0 to 100 with higher values indicating a better-perceived health status. Respondents were randomly selected patients in the waiting area in selected clinics and pharmacies in Abuja, Nigeria. Student's Test and Chi-square were employed for inferential analyses where appropriate. P-values < 0.05 were interpreted as significant.

Results: About 43% of the respondents on IVF treatment reported problems with anxiety and depression compared to 10% of respondents not using IVF ($p = 0.0001$). They also reported problems with performing usual activities (12%) and pain/discomfort (22%) compared to 3% and 11% respectively for those not on infertility treatment ($p < 0.05$). Those aged 35-45 years and are currently on IVF treatment reported a significantly lower health status compared to those of the same age range who are not on treatment ($p = 0.0001$). Study participants on IVF treatment, irrespective of their educational level and marital status, significantly reported a lower health status ($p < 0.05$).

Conclusion: Infertility affects quality of life and the domain mostly affected is anxiety and depression. People taking IVF treatment reported a lower health status compared to those not receiving IVF treatment.

Keywords: IVF treatment, quality of life, health status, infertility, EQ5D-5L

Introduction

In recent times, infertility has become a concern with reports of increasing prevalence and psychosocial impacts [1-3]. The desire to conceive and birth a child immediately after marriage makes couples constantly engage in several interventions in cases where childbirth has not occurred within 12 months of continuous intercourse.

Infertility has a psychological impact on both males and females [4] and with studies now reporting infertility in males rather than being considered a woman's issue [5]. Families who have been unable to achieve childbirth have been described to suffer several consequences ranging from psychological, marital, economic, spiritual and social impact [6]. The African society places this group of people under severe pressure and thus drives infertile couples to desperation in search of a remedy for their perceived misfortune [7].

Infertile couples suffer impaired quality of life (QOL) [8] which has led to the invention of the term fertility quality of life (FertiQOL) in literature referring to specifically evaluating the

impact of fertility problems on various life dimensions [9-10]. The concept of quality of life describes development, growth, and well-being which reflects individuals' perceptions of their position in the community as well as their goals, expectations, standards, and priorities [11].

To quantify the impact of infertility treatment on couples, measurement of the health status provides useful insights [12]. Quantification of health impact has become imperative in assisting policymakers in making proper decisions as well as aiding the proper allocation of resources. Several instruments such as WHOQOL, SF-36, HUI3 and EQ5D13 have been developed for measuring health-related quality of life. The EuroQol 5 dimensions (EQ-5D) is one of the most popular and standardized quality-of-life questionnaires for indirectly estimating utilities [14].

Health-related quality of life (HrQOL) can be estimated by using the EQ-5D–5L which has five dimensions (mobility, self-care, usual activities, pain/discomfort, anxiety/depression), each with five response levels. These five-response levels were developed to reduce the potential for ceiling effects and to address concerns about the sensitivity of the original 3L version (EQ-5D-3L) for detecting clinically important differences in HrQOL [15].

Emerging evidence suggests the newer 5-level version does have improved measurement properties including feasibility, ceiling effects, sensitivity and convergent validity and therefore may be more useful for measuring population-level health status [16-18]. EQ-5D-5L has been used in several countries such as Canada [19], the UK [16], Germany [20], Spain [21], etc. to evaluate relationship between health-related quality of life and socio-demographic characteristics. Increasingly, these studies are gaining traction as they have now been adopted to guide clinical, funding, public and health policy decisions [22-24].

Infertility has been viewed to be the most reproductive health concern for Nigerian women [25] and the increasing popularity of IVF treatment [26] can be linked to rising incidences as reported in health institutions in parts of Nigeria [27-29]. With reference to infertility and its treatment in Nigeria, it has become imperative to monitor health status over time with the aim of identifying groups at risk of poor

health due to infertility. This study is an attempt to provide possible useful information relating to the assessment of the burden of infertility on health status. Therefore, this study aims to explore the use of EQ-5D-5L in determining the self-reported health status of those receiving IVF treatment as well as to explore possible relationships between sociodemographic factors and health status.

Methods

Setting
The study was conducted in the six area councils in Abuja, the Federal Capital Territory of Nigeria, which includes: Abaji, Abuja Municipal, Bwari, Gwagwalada, Kuje and Kwali.

The instrument
The tool utilised in this investigation was the UK version of the EuroQoLGroup-developed EQ-5D-5L [30-31], which is a standardised quantitative generic measure of health status. Mobility, Self-Care, Usual Activities, Pain/Discomfort, and Anxiety/Depression are the five dimensions that make up its health profile. Five response levels were available for each domain (no problem, slight problems, moderate problems, severe problems and extreme problems).

Respondents can score their current perception of their health using a calibrated vertical 20 cm visual analogue scale (VAS) that ranges from 0 to 100 on the second page of the instrument. On the scale, zero corresponds to the "worst imaginable health" and 100 to the "highest imaginable health" [32-33]. Thus, the higher the value of VAS the better the perceived health status of the respondent. A section was added for the collection of respondents' demographic data such as age, sex, marital status, occupation, level of education, number of children, and usage of IVF treatment.

Sample size determination
With the aid of Raosoft [34], an online sample size calculator, the sample size was determined to be 385 at a confidence level of 95% and a margin of error of 5%. The inclusion criteria were set to include male or female respondents, who have been trying to achieve conception for up to 12 months and are using IVF (as a confirmation of infertility diagnosis). A male respondent in this first category had to confirm

that his wife was currently receiving treatment for infertility. Also included were those whose attempt at conception via normal natural method was less than 12 months but were not currently receiving infertility treatment.

Data collection
Using a lottery technique, a list of clinics and pharmacies in Abuja was drawn up, and then one pharmacy and one clinic were randomly selected for this study from each area council. Patients waiting to see the physician or collect dispensed medications in these selected clinics and pharmacies were approached to participate in this study with a detailed explanation of the aim of the study provided to them. Where consent was not granted the next patient in line was approached for recruitment. Effort was made to ensure completion of the items at the point of administration.

Data analysis
Prior to data analysis, all filled questionnaires were screened for completeness and the questionnaires that were found usable were coded, crosschecked for accuracy, and entered into Microsoft Excel 2016 for sorting, calculation of frequencies, means and standard deviations. In the EQ-5D-5L, those reporting no problems were grouped together as "No" while respondents with slight problems, moderate problems, severe problems, and extreme problems were grouped as "Yes".

In computing the relationship between self-reported health status on the VAS and social demographic factors, respondents receiving IVF treatment were matched by age and gender with those not receiving IVF treatment to reduce the influence of confounding factors. Where an exact age was not found in matching for an IVF treatment respondent, the closest in age from those not treated for infertility was used.

Thus, a one-tailed test of significance was applied. Inferential analyses, Student t-test and Chi-square with Yates correction to determine possible relationship between EQ5D-5L Health Domains and use of IVF treatment for infertility were performed with the aid of GraphPad InStat version 3.10 (GraphPad Software Inc., La Jolla, California) which reports exact *p*-values. P-values < 0.05 were interpreted as significant.

Results

A total of 499 respondents participated in the study with females accounting for 58% of the responses. Those aged 35-44 years were 47% while married respondents were 60%. Majority of the respondents had tertiary education and work in the private sector (52% and 32% respectively). More than half (56%) reported having a child while only 19% reported use of IVF treatment for infertility.

Table 1: Demographics of respondents (n = 499)

Variable	Number responding	Percentage
Sex		
Male	210	42
Female	289	58
Age (Years)		
18-24	46	9
25-34	155	31
35-44	233	47
45-54	56	11
55 and above	9	2
Marital Status		
Married	299	60
Single	160	32
Others*	40	8
Occupation		
Student	38	8
Government Worker	99	20
Self-Employed	156	31
Unemployed	28	6
Private Sector Worker	160	32
Retired	18	4
Education		
Nil	9	2
Primary	25	5
Secondary	207	41
Tertiary	258	52
IVF Treatment		
No	406	81
Yes	93	19
Has a Child		
Yes	280	56
No	219	44

Others = divorced, separated or widowed

About 43% of the respondents who were on IVF treatment reported some form of problems with anxiety and depression compared to 10% of respondents who were not receiving treatment for infertility (*p* = 0.0001). A significant proportion of those receiving IVF treatment also reported problems with performing their usual activities (12%) and pain/discomfort (22%) compared to 3% and 11% respectively for those not receiving IVF treatment (*p* < 0.05) (Tables 2a and 2b)

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Table 2a: Relationship between EQ5D-5L health domains and use of IVF treatment for infertility (n = 499)

Variable	Frequency (%)											
	Mobility				Self-care				Usual Activities			
	No	(%)	Yes	(%)	No	(%)	Yes	(%)	No	(%)	Yes	(%)
No IVF	394	(97)	12	(3)	400	(98)	6	(2)	394	(97)	12	(3)
IVF	86	(93)	7	(7)	89	(96)	4	(4)	82	(88)	11	(12)
p-value	0.0755				0.1795				0.0007			

Table 2b: Relationship between EQ5D-5L health domains and use of IVF treatment for infertility (n = 499)

Variable	Frequency (%)							
	Pain/Discomfort				Anxiety/Depression			
	No	(%)	Yes	(%)	No	(%)	Yes	(%)
No IVF	362	(89)	44	(11)	365	(90)	41	(10)
IVF	73	(78)	20	(22)	53	(57)	40	(43)
p-value	0.0092				0.0001			

The health domain in which the respondents had more problems was anxiety/depression ($p < 0.0001$). Further analysis, after matching by gender and age, showed that those who were receiving IVF treatment aged between 35-45 years and those aged 18-25 years reported a significantly lower health status compared to those in the same age range who were not on IVF treatment ($p = 0.0001$). Both males whose spouses were receiving IVF treatment and females receiving treatment reported a significantly lower health status compared to those not on infertility treatment ($p < 0.05$). Respondents who were receiving IVF treatment irrespective of educational levels and marital status significantly reported lower health status compared to those not undergoing IVF treatment ($p < 0.05$). Similarly, private sector workers who were not receiving IVF treatment reported significantly higher health status compared to their counterparts receiving IVF treatment ($p = 0.0001$) (Table 3).

Table 3: Comparison of self-reported health status (VAS) between those receiving IVF treatment and those not on treatment based on social demographic factors (n = 186)

Variable	IVF		NO IVF		*p*-value
	n	Mean VAS±SD	n	Mean VAS±SD	
Age					
18-34	12	72.50 ± 7.23	12	82.92 ± 4.98	0.0005
35-45	70	69.79 ± 9.50	70	77.57 ± 8.99	0.0001
45 and above	11	64.55 ± 8.50	11	66.36 ± 8.09	0.6145
Sex					
Male	29	67.93 ± 9.02	29	74.48 ± 10.80	0.0151
Female	64	70.23 ± 9.36	64	78.05 ± 8.62	0.0001
Marital Status					
Married	68	69.63 ± 9.36	71	76.34 ± 9.71	0.0001
Single and Others	25	69.20 ± 9.21	22	78.86 ± 8.44	0.0005
Occupation					
Government Worker	35	69.29 ± 9.86	25	75.00 ± 8.86	0.0247
Self Employed	16	73.44 ± 9.78	30	77.83 ± 9.43	0.1447
Unemployed	7	72.14 ± 6.99	8	75.63 ± 8.21	0.3953
Private Sector Worker	29	67.41 ± 7.75	25	80.20 ± 8.46	0.0001
Retired	5	64.00 ± 9.62	4	61.25 ± 4.78	0.6205
Education					
Secondary and below	28	68.57 ± 10.44	50	76.10 ± 9.05	0.0013
Tertiary	65	69.92 ± 8.77	43	77.91 ± 9.89	0.0001

Discussion

Results of this study show that a higher proportion of people treating infertility report problems in the EQ5D-5L domains compared to those not receiving infertility treatment. This tends to buttress the fact that infertility is known to reduce health and quality of life for many patients as reported in several studies [6,35]. There was a statistically significant difference in the responses to three of the domains - Usual activities, pain/discomfort and

anxiety/depression. This observation is probably related to the psychosomatic nature of infertility which results in marked changes in the usual activities of patients, heightened pain/discomfort, anxiety and depression [36].

More of the respondents taking IVF treatment reported some form of problems with anxiety and depression as well as a reduced ability to perform usual activities. They also significantly indicated having pains and discomfort. This impact could be because of the neurological interplay between the different domains such that the presence of anxiety and depression causes them to be uninterested in participating in usual activities.

The presence of pain on the other hand could impair their ability to carry out activities as they would normally do. The respondents reported more problems in the anxiety/depression domain. This finding agrees with previous studies which report that the most affected domains are mental health, vitality, emotional behaviour, psychological, environmental, physical functioning, and social functioning [37-38].

There was a statistically significant difference between those who were on IVF treatment and respondents of the same demographic category who were not receiving IVF treatment for infertility. The mean VAS was compared for both groups and generally, patients receiving IVF treatment tended to rate their quality of life lower than those not treating infertility. Though IVF treatment is becoming increasingly popular in Nigeria [39-40], there doesn't seem to be an improvement in the psychological state of those receiving the treatment despite the hopes it brings for conceiving a child.

Older respondents reported less quality health status compared to younger ones. Previous studies using EQ-5D have shown that younger age, male gender and longer duration of education were associated with better health status for patients managing disease conditions [16,19-21]. From our findings, Infertility and use of IVF treatment seem to follow this trend. Males whose spouses were undergoing IVF treatment also reported significantly lower health status compared to their counterparts whose spouses were not receiving IVF treatment. This implies that the mental status of a woman

undergoing IVF treatment impacts the health of her spouse. Anxiety and depression in a spouse may likely affect the marriage negatively. Also, the financial burden of the high cost of IVF treatment on a husband whose wife is unemployed can also contribute to the low health status of a husband [41]. This is buttressed by literature evidence which reported that infertility causes problems in marital relationships such that couples lose interest in having emotional and social connection with friends and family [42]. In such situations, it may be beneficial that the woman is enrolled in a mental or social support programme as obtainable in certain developed societies [43]. Both men and women significantly feel the impact of infertility on their health status and report symptoms of anxiety and depression compared to fertile individuals as substantiated by literature evidence [5,44].

From our findings, private sector workers undergoing IVF treatment reported a lower quality of life compared to those of the same demographic class not on IVF treatment. A probable interpretation of this finding is that private sector workers are known to work hard and often under intense pressure to achieve their targets. This pressure in combination with the continuous efforts to achieve childbirth may build a negative synergy thus leading to anxiety and depression, impaired productivity and consequently a lower quality of life compared to people who simply work hard and do not have to go through the pain of seeking childbirth via IVF treatment [45]. Lower quality of life has also been reported in a previous study in southwestern Nigeria for infertile women who are self-employed further strengthening the findings that infertility affects quality of life and health status [38].

Conclusion

Infertility significantly affects the quality of life of IVF patients than non-IVF patients. On The EQ5D-5L instrument, Respondents reported problems significantly with Pain/Discomfort, Usual activities and Anxiety/Depression. The domain most affected is anxiety and depression. Generally, those who were receiving IVF treatment reported lower quality of life as indicated by lower mean scores in the VAS Infertility significantly affects the quality of life of IVF patients than non-IVF patients. On The EQ5D-5L instrument, Respondents reported problems significantly with Pain/Discomfort,

Usual activities and Anxiety/Depression. The domain most affected is anxiety and depression. Generally, those who were receiving IVF treatment reported lower quality of life as indicated by lower mean scores in the VAS compared to those who were not. Males whose spouses were receiving IVF treatment significantly reported lower health status compared to those whose spouses were not.

Conflict of Interest

No conflict of interest is associated with this work.

Contribution of Authors

We declare that this work was done by the author(s) named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors. The contributions of the authors are as follows: Concept and design: MAB, AWU, acquisition of data: MAB, analysis and interpretation of data: RUO, AWU, drafting of the manuscript: RUO, MAB, critical revision of the paper for important intellectual content: AWU, administrative, technical and logistic support: MAB and supervision: AWU.

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