Predictors of Quality of Life in Infertile Women: Comparison between UK and Nigerian Women

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ABSTRACT

Background: Predictors of Quality Of Life (QOL) vary in different infertile populations. Identifying factors that promote or worsen the quality of life in different regions and populations is thus essential to inform interventions designed to improve the quality of life for infertile women. This study examined the QOL of infertile women accessing Assisted Reproductive Treatment (ART) in two contrasting countries: the UK and Nigeria. The study also sought to identify predictors of the quality of life of these women.

Methods: Quality of life was measured using the World Health Organization Quality of Life (WHOQOL-BREF) questionnaire in 116 infertile women (UK=64, Nigeria=52) accessing ART. The socio-demographic details of the women were collected using a structured questionnaire. Predictors of QOL were evaluated using multiple regression analysis.

Results: UK women obtained higher QOL scores in all domains compared to Nigerian women. Multiple regression analysis showed that among the UK women, increased age, level of education and income were associated with a positive impact on quality of life (p<0.05). In contrast, prolonged duration of infertility had a negative effect on QOL scores (p<0.01). However, female-related infertility and decreased income levels within the Nigerian cohort were associated with negative QOL scores.

Conclusion: Infertility impairs various aspects of QOL of women affected by it, regardless of the population. A comprehensive evaluation of these women should include effective counseling and assessment of their socio-cultural backgrounds.

Keywords: Infertility, Quality of life, Assisted reproductive treatment, Nigeria, United Kingdom

INTRODUCTION

Infertility is defined by as "a disease characterized by the failure to establish a clinical pregnancy after 12 months of regular, unprotected sexual intercourse or due to an impairment of a persona capacity to reproduce either as an individual or with his/her partner". In many cultures, infertility is fraught with negative psychological consequences. Its effects have been reported to impact several aspects of a couple's existence; such as marital life, family life (Orji, Kuti, & Fasubaa, 2002), psychosocial well-being and economically. Therefore, a systematic approach is required to examine this phenomenon. Quality of Life (QOL) assessment has emerged as a well-

established concept to address this complex and multi-dimensional issue [1-5].

QOL is defined by the World Health Organization (WHO) as an individual's "perception of their position in life from the viewpoint of the culture and value systems in which they live and in relation to their goals". The QOL assessments include aspects of an individual's physical, psychological, social, spiritual, and environmental facets. In most cases, healthcare professionals measure the results of an intervention by the decrease in symptoms, as they tend to pay more attention to the diagnosis, investigations or treatment. However, patients measure this by their ability to go about their daily activities. QOL evaluation provides a more holistic assessment of an individual's health condition and treatment outcomes, which goes beyond just symptomatology. Since infertility

is known to adversely affect the mental and social health of infertile women, QOL assessment should be as equally important as treatment [6-10].

Consequently, knowledge of the various factors which may affect a patient's quality of life might actually improve and promote patient-centred care, because patients are more capable of making a subjective evaluation of their health. Previous studies have consistently shown that infertility is associated with decreased scores in the various quality of life domains. The main impact was reported in domains associated with mental health, emotional behaviour, social and environmental health. These reports emanated from studies conducted in high income countries with only a few in low-middle income countries. To the best of our knowledge, no study has evaluated the impact of infertility cross-culturally on QOL. The findings from this study allows for comparison and detection of possible differences in the QOL of infertile women from various parts of the world [11-13].

METHODS

Study Design

This cross-sectional descriptive study was carried out among women with infertility attending for assisted reproductive treatment. Prior to participation, potential respondents read the study information leaflet and three copies of written informed consent were obtained. The eligible participants were assured that their participation was voluntary, and they were free to withdraw from the study at any time without giving a reason. Infertility is defined as the inability to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse collaborated [14].

Participants/Recruitment

A total of 156 women infertile women (UK=93, Nig=63) who reported to the assisted conception unit of the Jessop fertility clinic Sheffield, as well as the IVF-unit of the University of Benin Teaching Hospital between August 2016 and June 2017 were approached by the first author. Inclusion criteria were women who: 1) met the medical definition of infertility; 2) were diagnosed with primary or secondary infertility; 3) were starting or repeating an IVF/ICSI cycle; and 4) using donor gametes. Reasons for exclusion included 1) women with an infertility history <12 months; 2) women using frozen embryos or undergoing intra-uterine insemination (IUI); and 3) women who did not give consent. For the final analysis, 116 infertile women (UK=64, Nigeria=52) aged between 25 and 55, gave written consent, completed the questionnaires and were enrolled in the study. The sampling process was one of convenience and the rationale for selecting participants was their availability at the time of the research.

Ethical approval

Ethical review on this study was performed and approved

by the NHS Health Research Authority-South Yorkshire research ethics committee in April 2016 and by the University of Benin Teaching Hospital ethical committee in September 2016 [15].

Survey Instruments

Patient information from both cohorts was captured using a pro-forma questionnaire on which patients were asked to provide information on the following: Age, Educational level, Employment status, Occupation, Duration of infertility, Marital status, Infertility Diagnosis, Treatment type, Funding source, number of treatment attempts, annual income and expenditure [16-20].

The WHOQOL-BREF is an abbreviated version of the original WHOQOL-100 assessment instrument developed by the WHO in collaboration with several countries, to measure the perception of one's own quality of life. It is a 26-item scale of which 24 of the items are divided into four domains, namely, physical health (7 items), psychological health (6 items), social relationships (3 items) and environmental health (8 items). The scores on each part reflect the participant's perception of their quality of life in that particular area, and higher scores indicate better QOL. The first two items in the questionnaire are examined separately. The first question asks about a participant's perception of quality of life, while the second question asks about a participant's overall perception of his or her health. According to the WHO guidelines for this scale, the raw scores for each domain would be transformed to a score from 0-100, to be directly comparable with the scores from the WHOQOL-100. This instrument has been used to assess QOL in several countries; representing different cultures and different health conditions including infertility [21].

Analyses/ Statistical analysis

The data were analyzed using Statistical Package for Social Science version 21 (SPSS, Inc., Chicago, IL, USA). Continuous variables were expressed as mean ± standard deviation and compared using student's t-test, while categorical variables were expressed as numbers and percentages and compared using Pearson's Chi-square test or Fisher's exact. Hierarchical multiple regression analysis was performed to assess the effect of independent predictors on QOL domains. Particular clinical and socio-demographic independent variables were selected because they are widely reported in previous studies. A $p<0.05$ was considered statistically significant [22-26].

RESULTS

A total of 116 women participated in the study. Table 1 showed the demographic characteristics of the respondents in the UK (n=64) and Nigeria (n=52). There was significant difference between UK and Nigerian women in relation to their mean age, marital status, duration of infertility, cause of infertility, type of treatment

and source of funding (p<0.05). However, there were no significant differences between both cohorts in educational level of the women, employment status and the number of attempts at the treatment (p>0.05).

As shown in Table 2, UK women obtained higher scores in all four domains of the QOL scale. However, there were no significant differences in the physical, psychological and overall perceived health domains of UK and Nigerian women. Whereas there were significant differences between the UK and Nigerian women (p<0.05) in the social and environmental domains as well as the overall QOL question. The highest average score of satisfaction was found in the environmental domain in both countries, while the lowest was found in the physical domain (Tables 1-3) [27-30].

Table 1: Socio-demographic & clinical characteristics of the UK & Nigerian participants.

Variable	UK n=64 n (%)	Nigeria n=52 n (%)
Age [mean±SD]	35.8 ± 4.19	39.4± 6.91
25-35	29 (45.3)	16 (30.8)
36-45	35 (54.7)	25 (48.1)
46-55	-	11 (21.2)
Educational level		
University	45 (70.3)	31 (59.6)
High School	16 (25.0)	14 (26.9)
Primary School	3 (4.7)	5 (9.6)
No School	-	2 (3.8)
Employment status		
Not working	3 (4.7)	2 (3.8)
Part-time	11 (17.2)	3 (5.8)
Full time	50 (78.1)	47 (90.4)
Marital status		
Married	41 (64.1)	47 (90.4)
Unmarried/Cohabitating	23 (35.9)	5 (9.6)
Duration of infertility		
<5 years	48 (75.0)	15 (28.8)
>5 years	16 (25.0)	37 (71.2)
Female factor	23 (35.9)	17 (32.7)
Male factor	18 (28.1)	7 (13.5)
Unexplained	22 (34.4)	19 (36.5)
2° Infertility	1 (1.6)	9 (17.3)
Type of ART		
IVF	41 (64.1)	23 (44.2)
ICSI	23 (35.9)	29 (55.8)
Number of Attempts		
1st Attempt	44 (68.8)	43 (82.7)
Repeat	20 (31.3)	9 (17.3)
Annual income Quintile		
Poorest	1(1.6)	-

Poor	2(3.1)	3(5.8)
Middle	12(18.8)	13(25.0)
Rich	22(34.4)	9(17.3)
Richest	27(42.2)	27 (51.9)
Source of Funding		
Self-funded	35 (54.7)	52 (100.0)
Government funded	29 (45.3)	-

Table 2: Comparison of QOL scores of UK and Nigerian infertile women.

	UK	Nigeria	Mean Difference		p-value
	M±SD	M±SD		95% CI	
Physical	55.8±9.4	55.0±7.8	-0.8±1.6	-4.1, 2.4	0.62
Psychological	62.7±11.8	61.6±9.4	-1.0±2.0	-5.0, 2.9	0.61
Social	69.3±20.2	56.3±17.0	-12.9±3.5	-19.9, -5.9	<0.001
Environmental	74.1±13.6	62.5±8.6	-11.5±2.1	-15.6, -7.4	<0.001
Q1	3.9±0.8	3.6±0.7	-0.3±0.2	-0.6, -0.04	0.03
Q2	3.6±1.1	3.4±0.9	-0.2±0.2	-0.5, 0.2	0.28

Table 3: Multiple regression for each WHOQOL-BREF domain in UK women (n=64).

	Physical			Psychological			Social			Environmental		
Variables	B	SE B	β	B	SE B	β	B	SE B	β	B	SE B	β
Age	0.69	0.27	.31*	0.2	0.35	0.06	0.73	0.62	0.15	0.26	4.2	0.08
Educational level	1.02	0.74	0.18	2.3	0.96	.32*	1.43	1.69	0.12	2.05	1.14	0.25
Marital status	-4.2	2.37	-0.21	-5	3.07	-0.19	-5.86	5.41	-0.14	-4.16	3.65	-0.15
Duration of infertility	-1.2	0.88	-0.18	-3	1.14	-.33*	0.77	2.01	0.05	-1.79	1.35	-0.18
Source of funding	3.98	2.32	0.21	2.1	3.01	0.09	7.57	5.29	0.19	0.57	3.57	0.02
Number of attempts	-1.2	1.66	-0.09	1.2	2.16	0.07	2.43	3.8	0.08	0.96	2.56	0.05
Annual income	2.98	1.31	.29*	1.9	1.7	0.15	5.59	3	0.26	3.79	2.02	.26*
Model R^2,	R^2=0.24,			R^2=0.183,			R^2=0.13,			R^2=.126,		
F,	F=2.52,			F=1.79,			F=1.23,			F=1.15,		
p-value	p=0.02			p=0.11			p=0.29			p=0.34		

In Table 3, the model tested the load of the socio-demographic variables to predict quality of life in the four domains of the WHOQOL-BREF. A close inspection of the analysis showed that, among the UK cohorts, age was only significantly associated with physical quality of life, with an increase in age associated with an increase in physical quality of life scores. Similarly, annual income was relevant, predicting the scores in two domains: physical and environmental QOL. Additionally, duration of infertility was negatively associated with psychological quality of life, and based on how this variable was scored, a shorter duration of infertility (<5 years) was associated with better psychological quality of life, than higher durations (>5 years). Equally significantly predictive of

psychological quality of life was educational level, with a higher educational level associated with better

psychological quality of life (Table 4) [31-33].

Table 4: Multiple regression for each WHOQOL-BREF domain in Nigerian women (n=52).

Variables	Physical			Psychology			Social			Environmental		
	B	SE B	β	B	SE B	β	B	SE B	β	B	SE B	β
Age	0.04	0.22	0.04	0.27	0.28	0.2	0.56	0.47	0.23	0.26	0.25	0.21
Educational level	-0.41	0.66	-0.09	0.68	0.86	0.13	0.78	1.44	0.08	1.04	0.76	0.22
Marital status	4.55	3.83	0.17	7.73	5.01	0.24	8.75	8.32	0.15	2.91	4.38	0.1
Duration of infertility	3.64	2.63	0.21	1.74	3.44	0.08	4.2	5.72	0.11	-1.16	3.01	-0.06
Cause of infertility	1.92	0.87	.35*	1.04	1.13	0.16	1.01	1.88	0.08	1.11	0.99	0.19
Number of attempts	-3.31	3	-0.16	1.4	3.92	0.05	-8.88	6.51	-0.19	-0.43	3.43	-0.02
Annual income	0.69	1.23	0.09	0.27	1.61	0.03	7.07	2.67	.42*	3.43	1.41	.41*
Model R^2,	R^2= 0.222			R^2=0.081			R^2=0.216			R^2=0.140		
F,	F=, 1.79			F=0.55			F=1.73			F=1.02		
p-value	p=0.11			p=0.79			p=0.12			p=0.43		

DISCUSSION

This study examined the quality of life of infertile women in the UK and Nigeria. The aim was to evaluate and compare the QOL scores among women from two different countries using the WHOQOL-BREF and to determine the socio-demographic factors predicting their quality of life. To the best of our knowledge, the present study was the first to describe a wide and complex construct like QOL on infertility, in two different countries, cultures and races [34].

The findings emerging from this study indicated that the QOL scores of infertile Nigerian women were lower than that of their UK counterparts in some of the domains of life. For example, we observed lower quality of life scores within the Nigerian cohort compared to their UK counterparts in the social relationship's domain. This domain assesses the level of satisfaction in sexual life, relationships with other people and support. The low scores in this domain could be attributed to the negative social consequences of infertility in sub-Saharan Africa, particularly in Nigeria. In Nigeria, social status is tied closely to childbearing, and infertility can greatly impact one's social standing in the community. When a woman has no experience of pregnancy, labour, or parenting, she may be excluded from adult discussions. An earlier study by Pearce et al., on the perceptions of infertility and childlessness among the Yoruba ethnic group of Nigeria, observed that infertility was characterized as both a personal and public issue. Therefore, infertile women are often met with unfavorable attitudes from relatives, social

stigma and isolation. These negative social consequences could, in turn, affect their social quality of life [35].

The explained variance in the QOL scores relied on the fertility and socio-demographic variables. The coefficient of determination observed in the models were similar to those reported by previous studies. In our study, these socio-demographic and fertility variables were able to explain between 12-24% of the QOL variance. The analysis of how the domain scores varied according to the fertility and socio-demographic factors in both cohorts yielded some impressive results [36].

Firstly, it was observed that, within the UK cohort, increased QOL scores was associated with age in the physical domain; however, this was not observed in the Nigerian cohort. It was anticipated that older women from both cohorts would have more stress-related problems due to their age, and the possibility of ART being their last attempt at motherhood, while younger women who had more time and the option for more attempts, would have higher QOL scores. However, the results showed that younger age was associated with decreased physical quality of life. Similar results were observed in using the same survey instrument. The authors reported a positive association between older age and quality of life. Likewise, observed an association between age and general mental health, of which the authors opined might be due to older women having had more life experiences with the diagnosis, and therefore had adopted better coping strategies. However, contrary findings have been observed by other studies in a study investigating the factors influencing QOL of infertile women in the United Arab Emirates reported that increased age was

associated with decreased quality of life, with higher quality of life scores observed in younger infertile women. These inconsistencies in the findings may be due to methodological differences between the studies [37-40].

Another predictor observed was educational status. Within the UK cohort, educational level was positively associated with psychological quality of life. There are a few descriptions in the literature explaining the association between these two variables. Rashidi et al., states, it is possible that highly educated women feel less stigmatized as compared to those less educated. Additionally, Fardiazar et al., suggests that higher education provides higher overall insight and greater life independence, which could positively affect mental health and improve psychological quality of life. Several other studies have confirmed this association between women with higher educational level and better psychological QOL. This association was however not observed in the Nigerian cohort, possibly because as Aduloju et al., states, among Nigerian women, infertility affects their emotional, social and overall well-being, and this influence is not compensated for by a higher educational status.

Our results further revealed that among the UK cohort, duration of infertility was implicated as a significant negative predictor of psychological quality of life, with increased durations (>5 years) associated with lower psychological quality of life. This effect was not observed in the Nigerian cohort. We posited that infertile women with longer durations of infertility might experience significantly more pressure from both family and community, as well as might have lost the hope of ever conceiving, which may negatively affect their quality of life. These results are consistent with previous others which found an association between duration of infertility and deterioration in QOL. Specifically, showed that prolonged duration of infertility was associated with lower scores in all the domains but more significantly in the psychological QOL domain. In contrast, several other studies have reported no evidence of the effect of duration of infertility on psychological quality of life.

Within the Nigerian cohort, the cause of infertility was significantly associated with the physical QOL domain; however, this was not observed in the UK cohort. With the way in which this variable was scored, the findings suggest that lower quality of life scores was reported when the cause of infertility was female-related, and better physical QOL domain scores were reported when the cause was male-factor or idiopathic/unexplained. This finding is in line to the one described by in which the authors reported lower quality of life scores among those with female-factor infertility. They suggested that this could be due to the cultural consequences of infertility among Arabs, in which a man must remarry if the woman cannot bear children. They further reported that when the aetiology is a combination of male and female factors or idiopathic, quality of life is increased. Similarly, in a univariate analysis observed that health-related quality of life was better in couples reporting male infertility and a combination of male and female infertility. Conversely,

reported that infertile women who attributed their infertility to their male partners, reported lower quality of life scores in the mental health domain. Similarly in an Iranian study to determine the factors associated with reduced quality of life among infertile women observed that quality of life was worse in women reporting male and female-factor as well as idiopathic infertility. The authors discussed that this might be because when the cause is from both the man and women, then options such as gamete donations are almost impractical. Additionally, when the aetiology is idiopathic, neither couple can play a supportive role to the other, thereby reducing their quality of life. Reported no associations between the aetiology of infertility and quality of life.

Annual income in the UK cohort was positively associated with physical and environmental QOL, while in the Nigerian cohort this variable was equally associated with the environmental and social QOL domains. This is not surprising as Chachamovich et al., have stated that this domain (environmental QOL) is closely related to substantive issues and is, therefore, more likely to be affected by financial aspects of the respondent's life (J. Chachamovich et al., 2009). Accordingly, the quality of life scores decreased with income values in both cohorts, which is unsurprising as the impact of medical expenses on quality of life is universal (Shen & Wang, 2014). As ART in most LMIC is only accessible to the more financially affluent in the society, it is expected that couples seeking ART in the Nigerian cohort are relatively wealthier than the general population, which can be inferred from the rather high number of respondents reported in the 'richest' socio-economic quintile of this study. Therefore, they may be more satisfied with the environmental proponents included in this domain. Given the strong positive correlation between annual income and monthly expenditure, it can also be inferred from the findings that the pressure to those with reduced expenditure rates has a significant effect on their quality of life.

STUDY LIMITATIONS AND FUTURE WORK
To the best of our knowledge, this study is the first of its kind to compare quality of life between infertile women in the UK and Nigeria. However, its quality could be further improved if a longitudinal design was employed. The cross-sectional design of this study does not permit any causal inference. We also believe including community-based participants might reveal different findings. Additionally, qualitative research methods should be employed to ascertain the responses of the women. Finally, this was a point-in-time sampling study, and the data was collected from only two public fertility clinics. Although both clinics were located in major cities, thereby minimising geographical barriers, the results are less generalizable than if multiple sites were sampled within both countries.

CONCLUSION

In conclusion, our findings indicate that age, educational level, duration of infertility and income were major predictors of quality of life among UK women, while cause

of infertility (particularly female-related) and income were major predictors among the Nigerian women. As such, it is important that health care professionals involved with infertility treatment are cognizant with these potential predictors and perform a comprehensive evaluation of these women prior to treatment. Furthermore, these women should be provided with adequate interventions to promote better quality of life.

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