

Original Article

Comparison of fertility quality of life between urban and rural infertile couples

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Abstract: To determine whether the fertility quality of life differs between infertile couples from urban and rural areas in China. A cross-sectional prospective study consisting of 670 infertile couples in assisted reproduction clinic of the First Affiliated Hospital of Zhengzhou University was conducted. Among all participants, 358 infertile couples (31.22 years for women and 32.58 years for men) were urban residents and 312 (29.79 years for women and 30.77 for men) were from rural areas. Male and female counterparts completed the FertiQoL questionnaire independently. Paired *t*-test was utilized to explore the differences of fertility quality of life (QoL) between urban and rural infertile couples. Whether and to what extent various characteristics contribute to the differences regarding fertility QoL was assessed by multiple stepwise regression analysis. For all patients, women obtained significantly lower FertiQoL questionnaire scores compared with male counterparts, indicating lower fertility quality of life. Infertile couples resided in rural areas had considerably lower FertiQoL scores than those from urban residents. Coping style, cognition of children, family monthly net income, employment status, educational level and social support were risk factors predicting the differences in the fertility quality of life between urban and rural infertile couples. The results show the fertility QoL significantly differs between infertile couples from urban and rural areas. According to different characteristics of coping style, cognition of children, family monthly net income, employment status, educational level and social support, targeted measures should be taken to resolve the difference, especially for rural women.

Keywords: Infertility, fertility quality of life, urban and rural area, couple

Introduction

Psychological consequences of infertility render infertility as an intense experience; both patients and their partners constantly suffer from profound distress, especially for the female partners [1, 2]. Infertility and undergoing fertility treatment exacerbate the intensity of stresses of the couple and negatively affect patients' quality of life (QoL) [3, 4]. Newton *et al.* suggested that infertility-related stress is a multidimensional complication including social, sexual and relationship concern, eagerness for parenthood and rejection of childfree lifestyle [5]. Infertility-related stress exerts both direct and indirect effect on the treatment outcome for female patients [6]. Infertility-inducing stress and non-specific anxiety have been proven to be negatively associated with positive pregnancy outcome after *in vitro* fertilization (IVF) [7]. Owing to the intertwined relationship be-

tween infertility and quality of life, integrating quality of life assessment should be integrated to address the infertility problems [8]. Although standardized generic instruments have been widely adopted to evaluate the quality of life of infertile couples, these tools fail to represent all the problems of infertile patients. Hence, FertiQoL questionnaire would be more valuable for resolving a variety of challenges [9]. Obviously, the evaluation of quality of life plays a pivotal role in improving mental health and possibly increasing pregnancy rate for infertile patients.

Infertility is a shared condition, affecting a woman and her partner, therefore both members of the infertile couple should be studied individually before an accurate design for psychological interventions can be developed [10]. Individuals perceive stress differently [11], and most scholars declare women have lower ferti-

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ity quality of life compared with their partners [10, 12, 13]. Furthermore, fertility quality of life is affected by individual and societal factors [14]. So far, only one study has been conducted to statistically compare the quality of life between urban and rural infertile couples and demonstrate that fertility quality of life does not differ between urban and rural infertile couples [13]. In China, urban residents live a faster-paced lifestyle and most couples have their own jobs. In contrast, in rural areas where most women are unemployed and live a lower standard of life and are still more affected by traditional attitudes. The cognition and coping strategies to conceiving children might be different in terms of lifestyle, cognition, coping style, economic income and educational level between urban and rural areas. Whether the residence difference affects the fertility quality of life of infertile couples remains to be elucidated.

This study was designed to identify the differences of fertility quality of life between urban and rural infertile couples in China, using the FertiQoL questionnaire. Considering sharp differences between urban and rural areas, we hypothesize that the fertility quality of life of infertile couples will also tend to differ between urban and rural areas. Understanding the differences in the fertility quality of life between urban and rural infertile couples contributes to improving the quality of care to the infertile couples.

Materials and methods

Study methods

From November 2014 to May 2015, 716 infertile couples admitted to the assisted reproduction center of our hospital participated in this study. While there are 46 infertile couples in one or both sides did not complete the questionnaires, so the sample came to 670 couples. In total, 1340 participants were consecutively recruited and invited to complete a survey while waiting for medical service. All respondents were informed about the objective of this study and the confidentiality of the date before they started to fill out the questionnaires, and sign the informed consents simultaneously. To avoid the interference in the couple's responses, both the male and female members were required to complete the FertiQoL questionnaire

individually and independently. This study was approved by the institutional ethics committee of the First Affiliated Hospital of Zhengzhou University, China.

Questionnaire design

In this study, two questionnaires were utilized for fertility quality of life assessment. The first questionnaire was a socio-demographic and clinical data form, which consisted of 16 questions including age, residence, educational level, employment status, monthly family net income, duration and type of infertility, infertility factor, cognition of children, social support, coping style, lifestyle, and history of assisted reproductive technology (ART), etc.

The second part was FertiQoL questionnaire. The FertiQoL questionnaire [9], which consists of the Core and optional treatment FertiQoL modules, is a more sensitive, reliable and valid measure of QoL in infertile women than conventional measures such as the WHO-BREF and SF-36 [7]. The Core FertiQoL module contains four domains including the emotional, mind/body, relational and social domains with 24 items in total. The optional treatment FertiQoL module (10 items) is used to assess the environment and tolerability towards the infertility therapy. In this study, traditional Chinese version of the FertiQoL questionnaire was used to evaluate the fertility QoL of infertile couples. The subscale and total FertiQoL scores were computed and transformed to achieve a range of 0 to 100, where higher scores indicate better fertility QoL. In this study, Cronbach's α was 0.87 for the female and 0.85 for the male.

Statistical analysis

The socio-demographic and clinical variables were described through descriptive statistics, and comparisons of proportions were run by *chi-square* test. All FertiQoL scores were expressed as means \pm SD. Paired *t*-test was used to statistically compare the level of fertility quality of life between spouses measured by FertiQoL overall and subscale scores. The FertiQoL scores between urban and rural infertile couples were statistically compared using *t*-test for independent samples. Multiple linear stepwise regression analysis was carried out to explore whether and to what extent various

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Table 1. Demographic characteristics of infertile spouses between urban and rural groups (n=670 couples)

Patient characteristics	Urban (n=358)	Rural (n=312)	X ² -value	P-value
Personal characteristics	Women, n (%) / men, n (%)	Women, n (%) / men, n (%)		
Age			15.106/11.129	0.001/0.004
<30	148 (41.3%)/124 (34.6%)	174 (55.8%)/144 (46.2%)		
30~35	112 (31.3%)/120 (33.5%)	82 (26.3%)/98 (31.4%)		
>35	98 (27.4%)/114 (31.9%)	56 (17.9%)/70 (22.4%)		
Educational level			249.258/276.341	0.000/0.000
High school degree or below	44 (12.3%)/36 (10.1%)	210 (67.3%)/196 (62.8%)		
Junior college degree	112 (31.3%)/106 (29.6%)	76 (24.4%)/98 (31.4%)		
University degree or above	202 (56.4%)/216 (60.3%)	26 (8.3%)/18 (9.2%)		
Employment status			107.431/321.001	0.000/0.000
Unemployed	36 (10.1%)/11 (3.1%)	242 (77.6%)/21 (6.7%)		
Employed	322 (89.9%)/347 (96.9%)	70 (22.4%)/291 (93.3%)		
Couple characteristics	N (%)	N (%)		
Net family monthly income			102.041	0.000
<5000 RMB	58 (16.2%)	142 (45.5%)		
5000~8000 RMB	160 (44.7%)	138 (44.2%)		
>8000 RMB	140 (39.1%)	32 (10.3%)		
Duration of infertility			1.472	0.479
<2 years	104 (29.1%)	104 (33.3%)		
2~5 years	166 (46.4%)	134 (42.9%)		
>5 years	88 (24.6%)	74 (23.7%)		
Type of infertility			0.732	0.392
Primary	200 (55.9%)	164 (52.6%)		
Secondary	158 (44.1%)	148 (47.4%)		
Infertility factor			6.353	0.096
Female	146 (40.8%)	114 (36.5%)		
Male	82 (22.9%)	92 (29.5%)		
Mixture	70 (19.5%)	68 (21.8%)		
Idiopathic	60 (16.8%)	38 (12.2%)		
Childbearing history			11.239	0.001
Yes	72 (20.1%)	98 (31.4%)		
No	286 (79.9%)	214 (68.6%)		
Cognition of children			5.117	0.024
Very important	166 (46.4%)	172 (55.1%)		
Not that important	192 (53.6%)	140 (44.9%)		
Social support			15.163	0.000
Yes	202 (56.4%)	129 (41.3%)		
No	156 (43.6%)	183 (58.7%)		
Coping style			5.869	0.015
Negative	173 (48.3%)	180 (57.7%)		
Positive	185 (51.7%)	132 (42.3%)		
Lifestyle			270.274	0.000
Fast-paced	292 (81.6%)	56 (17.9%)		
Slow-paced	66 (18.4%)	256 (82.1%)		
ART history			0.160	0.689
Yes	196 (54.7%)	166 (53.2%)		
No	162 (45.3%)	146 (46.8%)		

Bold values indicate statistical significance at P<0.05.

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Table 2. Paired t-test of FertiQoL scores between women and men (within-couple)

Characteristics	Urban (n=358)				Rural (n=312)			
	Women	Men	t	P-value	Women	Men	t	P-value
FertiQoL total score mean (SD)	58.24 (11.87)	63.67 (12.25)	-8.235	0.000	50.66 (12.36)	57.91 (12.83)	-11.540	0.000
Emotional	59.06 (17.73)	63.94 (18.08)	-4.619	0.000	51.06 (19.53)	55.74 (17.81)	-4.618	0.000
Mind/Body	62.09 (19.12)	66.01 (19.16)	-3.609	0.000	54.56 (21.52)	61.16 (24.90)	-4.789	0.000
Relational	59.54 (13.09)	67.71 (14.27)	-10.211	0.000	51.58 (14.04)	60.15 (15.57)	-9.662	0.000
Social	61.13 (14.95)	67.50 (16.45)	-6.725	0.000	54.35 (15.21)	60.04 (18.10)	-5.771	0.000
Environment	52.75 (9.66)	56.45 (13.09)	-5.344	0.000	44.77 (9.35)	54.81 (13.41)	-12.206	0.000
Tolerability	54.24 (18.47)	58.73 (16.62)	-4.237	0.000	47.04 (17.74)	54.37 (16.81)	-7.006	0.000

Bold values indicate statistical significance at $P < 0.05$.

Table 3. Comparison of FertiQoL scores between urban and rural group assessed by t-test

Characteristics	Women in urban and rural groups		Men in urban and rural groups	
	t	P-value	t	P-value
FertiQoL total score	8.088	0.000	5.936	0.000
Emotional	5.556	0.000	5.898	0.000
Mind/Body	4.760	0.000	2.844	0.005
Relational	7.595	0.000	6.561	0.000
Social	5.802	0.000	5.589	0.000
Environment	10.824	0.000	1.599	0.110
Tolerability	5.125	0.000	3.370	0.001

Bold values indicate statistical significance at $P < 0.05$.

characteristics contribute to the difference in the fertility QoL. All statistical analyses were conducted using PASW Statistical version 17.0 (SPSS Inc., Chicago, IL, USA). Significance for all multilevel analyses was set at $P < 0.05$.

Results

Demographic data

In total, 670 infertile couples completed the questionnaires. The baseline characteristics of the enrolled patients are illustrated in **Table 1**. Among them, 358 infertile couples were urban residents with mean age of 31.22 years for women and 32.58 for men, and 312 infertile couples were from rural areas, aged 29.79 on average for the female and 30.77 for male counterparts. Both in urban and rural groups, most couples were aged younger than 30 years. Compared to the urban couples, rural couples were somewhat younger, had a lower level of education and monthly family income and a higher unemployed rate, especially for the rural

women. In addition, a higher percentage of rural couples more valued the importance of having children than urban counterparts. The history of childbearing, social support, coping style and lifestyle significantly differed between urban and rural couples.

FertiQoL scores

Paired t-test was conducted to compare the FertiQoL score within 670 couples from urban and rural regions. In both urban and rural groups, female participants obtained significantly lower total- and sub-scale FertiQoL scores compared with their male counterparts, as shown in **Table 2**. As presented in **Table 3**, women in the urban group had a significantly better fertility QoL in terms of the FertiQoL total scale and six subscale scores than their counterparts from rural areas (all $P < 0.001$). Apart from the subscale 'Environment' score, the FertiQoL total and five subscale scores obtained by the urban male individuals were significantly higher than those in the rural group (all $P < 0.001$).

Risk factors for fertility QoL

Multiple linear stepwise regression analysis demonstrated that coping style, gender, infertility factor, ART history, cognition of children, family monthly net income, employment status, educational level, social support and duration of infertility were significant risk factors evaluating the fertility QoL ($R^2 = 0.465$, $F = 57.323$, $P = 0.000$), as illustrated in **Table 4**. Multiple regression analysis estimated a linear equation as follows: Total FertiQoL score = $36.633 + (13.770)$ Coping style + (-5.527) Gender + (1.418) Infertility factor + (2.819) ART history +

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Table 4. Multiple linear stepwise regression analysis model

Independent variables	B	Standard error	Standardized coefficients of regression	t	P-value
Normal	36.633	3.757		9.749	0.000
Coping style	13.770	0.788	0.543	17.474	0.000
Gender	-5.527	1.038	-0.218	-5.324	0.000
Infertility factor	1.418	0.339	0.121	4.180	0.000
ART history	2.819	0.742	0.111	3.798	0.000
Cognition of children	2.575	0.732	0.102	3.520	0.000
Net family monthly income	0.534	0.201	0.090	2.654	0.008
Employment status	-1.894	0.532	-0.127	-3.560	0.000
Educational level	-1.481	0.578	-0.099	-2.563	0.011
Social support	-2.491	0.918	-0.081	-2.714	0.007
Duration of infertility	1.353	0.620	0.079	2.181	0.030

Total FertiQoL score was taken as a dependent variable. $R^2=0.465$, $F=57.323$, $P=0.000$.

(2.575) Cognition of children + (0.534) Net family monthly income + (-1.894) Employment status + (-1.481) Educational level + (-2.491) Social support + (1.353) Duration of infertility.

Discussion

Overall, this study provided more insight into the impact of residence differences upon the fertility QoL of infertile couples, which has been rarely analyzed in previous investigations. We found several interesting differences between the urban and rural group that are worthy of further discussion.

First, both in the urban and rural areas, the female subjects had worse fertility QoL than their partners, which was consistent with previous research results [15]. A possible explanation might be gender role attitudes proved to make a difference on the fertility QoL of infertile couples, regardless of residence area. In general, childbearing is a basic obligation as a wife, which unconsciously causes psychological and mental stress to women, which increases the risk of mental and emotional disorders, such as depression, anxiety, low self-esteem and marital dissatisfaction [16-18]. In addition, an infertile woman might have the lowest membership status within her family [19], and suffer from more invasive manipulation during the therapeutic process than their spouses. Hence, women are more inclined to be affected by infertility than their partners regardless of urban or rural areas.

Second, infertile couples in the rural group had a worse fertility QoL than those from the urban area, indicating that the QoL of infertile couples living in rural areas might be more associated with infertility-related problems than the QoL of their rural counterparts, which is inconsistent with previous study [13], and this could be explained by different national conditions between Iran and China. In this study, coping style, gender, infertility factor, ART history, cognition of children, family monthly net income, employment status, educational level, social support and duration of infertility were significant predictors of fertility QoL. However, there were some differences existing in the cognition of children, family monthly net income, employment status, educational level, social support and coping style between urban and rural couples. Thus, the difference of fertility QoL between urban and rural couples might be caused by the following reasons. First, procreation plays a pivotal role in the traditional Chinese culture. Along with the changing lifestyle, the influence of Western culture and higher educational level in urban areas, urban couples might be more open-minded, even some might have the willingness to pursue a DINK lifestyle. However, infertile couples in rural areas are more heavily affected by the deep-rooted thoughts which value the importance of having a child, therefore influencing their fertility QoL.

Second, most rural women are unemployed and live a relatively comfortable life. They suffer from less working stress but bear the responsibility of taking care of children and housework. If being infertile, the infertile couples would be disturbed. If being employed, to the couples may ignore the problem of infertility and have a better fertility QoL. Third, higher education level and family monthly net income exert a positive impact upon the fertility QoL. Higher educational level may overcome the negative effect of increased duration of infertility [20]. Keramat et al. demonstrated that high-

er family monthly income is associated with better social support [13]. Social support reduces mental stress, which increases the chance of seeking and insisting on treatment [21]. Due to higher education level and family monthly net income, urban couples tend to have better fertility QoL compared with rural counterparts. Furthermore, ART institutions have been established in urban areas rather than rural regions, which provide better and more convenient medical service for the urban couples. However, rural couples have to pay more time and energy on seeking medical treatment. As a result, rural couples are possibly exposed to more distress from infertility and lack timely medical therapy, leading to negative coping style and less social support. Social support and coping strategies are utilized to deal with infertility stress and social support, and positive coping strategies have been proven to be associated with less stress [22], rural spouses are more likely to experience lower fertility QoL.

There are several strengths in this study. First, paired design is a powerful methodology to draw conclusion about the functioning of the infertile spouses [23]. Secondly, the large sample size and the use of FertiQoL, a widely validated disease-specific questionnaire, guarantee the reliability of present findings.

However, the study has some limitations should be acknowledged. For one thing, the couples who are unwilling to seek medical treatment are not recruited in this investigation, which might yield biased results. Moreover, due to cultural differences, our results are not applicable to all countries and regions. Further research in other countries should be conducted.

Conclusion

The female patients are more affected by infertility than men both in urban and rural areas. Rural infertile couples have lower fertility QoL. More attention should be diverted to rural infertile couples. The rural couples should be informed of the possibility and normality of infertility to correct their cognition of infertility and traditional views, letting them understand procreation is our right but not obligation and eliminating their sense of shame and inferiority. Although most rural women are unemployed, we should encourage them to work or relax

themselves but not focusing on infertility. Also, we should transfer more information and knowledge about infertility and the treatment of infertility and provide more support for rural couples. Considering the poorer medical service in rural areas, more platforms should be established for communicating and attaining efficient information if possible.

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Disclosure of conflict of interest

None.

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