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Common sense understanding of infertility among Ghanaian women with infertility

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Abstract

The purpose of this study was to describe women's beliefs about infertility and the socio-demographic and infertility-related health correlates of those beliefs. The study was a descriptive cross sectional survey. Women (N = 203) who were receiving treatment for infertility at two public hospitals in Ghana completed the Fertility Belief Questionnaire (FBQ) and questions about their socio-demographic and infertility-related health status. Confirmatory factor analyses of the FBQ and correlations among beliefs and socio-demographics and infertility-related health variables were examined. Six dimensions of beliefs were described: timeline chronic/acute, consequences, illness coherence, personal control, treatment control, and cause. Over 80% of the women believed that infertility is an acute problem. The majority agreed that there are negative consequences of infertility. Over 70% agreed that they had poor understanding of their infertility but believed that there was something they could personally or medically do to control their infertility (87%). Women with higher levels of education were more likely to report they understood their infertility and had personal control over their infertility. Women who were married for fewer years were significantly more likely to report negative consequences of infertility, that they had a poor understanding of their infertility and were less likely to endorse stress and supernatural causes of infertility. Women with infertility in Ghana have beliefs about infertility that may influence their health behaviors. There is a need to explore these beliefs and their influence on the health outcomes of women with infertility in Ghana.

Keywords: Infertility, Common sense, Ghanaian women

1. Introduction

Globally, about 10% of couples have difficulties conceiving successfully, and about 72.4 million women in the world are infertile (1). The World Health Organization (WHO) reported that most women with infertility live in the developing world (2). The prevalence of infertility is particularly high in sub-Saharan Africa, varying from 20% to 46% in some parts of West Africa (3). In 2009 the WHO estimated that 30% of sub-Saharan African couples have primary or secondary infertility, compared to 28% in South-Central Asia and 24% in South-East Asia (2). Even though this WHO report suggests a high prevalence of infertility in sub-Saharan Africa, little is known about the relationship between women's beliefs about infertility and their socio-demographic characteristics.

Infertility among African women has been associated with poorer psychosocial health, such as anxiety, stress, and depression (4). In these studies, the relationship between poorer psychosocial health and a few socio-demographic characteristics were

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examined, but education was the only socio-demographic variable found to be related (5). Factors other than socio-demographic variables, such as beliefs about infertility, have rarely been examined. Understanding African women's beliefs about infertility might help explain their psychosocial health problems or health behaviors.

In many African countries, beliefs about infertility are rooted in many cultural beliefs about the role of women, childbearing, and the family, and some of these beliefs may have a negative impact on women's psychological health or health care behaviors. Women with infertility are labeled as abnormal or incomplete in Ghanaian cultures (6). In South Africa, marital instability and stigma are believed to be consequences of being infertile (7). In Malawi, women with infertility are subordinated and not respected (8). In Nigeria, a woman with infertility is not allowed to make decisions within the family, cannot inherit her husband's property, is described as a man, and has a higher chance of being divorced (9), (10). Thus, infertility is reported as a major reason for a man to marry a second wife. In old age, a woman without children is not cared for, and in death, a woman with infertility may not be buried on a town land, because it is believed that this could harm the land's fertility (9). In Zimbabwe, Runganga and colleagues reported the belief that childbearing offers women a sense of womanhood, provide companionship and a source of emotional security for women (11). In Tanzania, stigma and lack of respect are the most importantly perceived consequences of being infertile (12). For women with primary infertility, stigma resulted in being called useless women in their communities because of the belief that the purpose of marriage is to bear children because women are incomplete without children (12).

Only two qualitative studies have examined African views about the causes of infertility. Both found beliefs about biomedical and behavioral causes (abortion, sexually transmitted infections, use of contraceptives, blood incompatibility, and promiscuity) as well as supernatural causes (witchcraft, curses from evil persons, "slap with a ring", punishment inflicted by the spirits of ancestors, and rituals performed with an egg) (10), (13). Generally, the studies conducted in Africa have described some of women's beliefs about infertility but have not examined factors that may be associated with those beliefs.

Leventhal's Common Sense Model (CSM) of illness representation proposes that individuals have mental representations or "lay theories" of their illness or health problems that are based on concrete and abstract sources of information, and the interpretation of this information forms the individual's representations of illness (14), (15). Sources of information include the culture, family members, friends, health care providers and personal experiences (16). The CSM asserts that illness representations, whether medically sound or not, guide coping behaviors, such as seeking health care or engaging in positive or negative health behaviors. These coping behaviors in turn influence physical and mental health outcomes (14).

Illness representations have five dimensions: identity, cause, timeline, consequences, and control/cure. Identity is beliefs about the symptoms that are attached to the health problem. Cause is beliefs about the origin of the health problem. Timeline is beliefs about whether the health problem is acute, chronic, or cyclical. Consequences are the beliefs about the short and long term outcomes of the health problem. Control/cure involves beliefs about whether the illness is curable or controllable, either through personal actions or medical care. Two dimensions (illness coherence and emotional response) were later added to the model (17). Illness coherence is the individual's beliefs about whether he/she has a clear picture or understanding of the health problem. Emotional response is the person's beliefs about their emotional responses to the health problem.

The CSM has been used to study a variety of health problems but has not been used to study infertility. The purpose of this study was to describe Ghanaian women's representations (beliefs) of infertility and to identify the socio-demographic and infertility-related health correlates of these beliefs.

2. Materials and Methods

The study was a cross-sectional descriptive survey. Two hundred and three women receiving treatment for infertility from two public hospitals in Ghana were recruited between January and April, 2011. Women who were 18 years or older, could read and write in English, and were contacting the gynecology units of the two public hospitals for infertility services were eligible for the study.

A power analysis indicated a sample of 115 as adequate to detect bivariate correlations of 0.30. For factor analysis, a total sample size of 200 is generally considered acceptable (19). Therefore, recruitment was aimed at a total sample size of 200 women with infertility.

Letters were written to the heads of the gynecology units of the two hospitals to inform them about the study and seek permission to recruit. The

proposal for the study was reviewed and approved by the Social Science Institutional Review Board at the University of Wisconsin-Madison.

In the Gynecology unit of each site, women with infertility were identified by doctors and nurses during consultations. Potential participants were given the study flyer, and asked if they wanted to talk to the researcher. Those who were willing to participate met with the researcher after their consultation appointment and were given written information about the study and an opportunity to ask questions. Completing the anonymous survey was considered consent to participate. Completed surveys were returned to a locked box in front of each consulting room and were collected at the end of each clinic day.

2.1. Measures

2.1.1. Fertility Belief Questionnaire (FBQ)

Beliefs about infertility were measured with the Fertility Belief Questionnaire (FBQ). The FBQ was developed based on a revision of the Revised Illness Perception Question (IPQ-R) (17). The IPQ-R was revised in the following ways. The word "illness" in the IPQ-R was replaced with "fertility problem" in the FBQ. Some statements in the IPQ-R that might be difficult to understand were revised to the level of understanding of a sixth grader (primary six in Ghana). New items were added to three subscales (consequence, treatment control, and cause) based on a preliminary study and the literature review (7), (9), (10) in order to assure the cultural appropriateness of the FBQ. Some items in the cause subscale of the IPQ-R that were based on concepts not meaningful in Ghana were deleted and other culturally-specific causes were added. The entire emotional subscale was also deleted because many of the items were not culturally appropriate. Similarly, the entire identity subscale was deleted because, medically, infertility does not have recognizable symptoms. The FBQ was assessed for content validity by both expert and lay panels, with an average Scale Content Validity Index (S-CVI) ranging from .76 to .90 for each subscale. The FBQ has 57 items with 6 subscales: timeline chronic/acute (3 items), consequence (11 items), illness coherence (5 items), personal control (5 items), treatment control (6 items), and cause (27 items). Items for five subscales (all except Cause) were rated on a six point scale from *strongly disagree* (0) to *strongly agree* (5). Each cause item was rated on a three point scale: *yes* (2), *not sure/don't know* (1), *and no* (0). High scores on the timeline chronic/acute, consequences, and illness coherence subscales indicate beliefs that infertility is chronic rather than acute, has negative consequences, and that infertility is poorly understood, respectively. High scores on the personal control and treatment control subscales indicate beliefs that infertility is controllable through either personal behavior or medical treatment.

Composite reliability (20), which is a measure of the overall reliability of a construct (21) was computed for all the FBQ subscales (except Cause) and were: timeline (0.33), consequence (0.79), illness coherence (0.71), personal control (0.75), and treatment control (0.54). The low reliabilities for timeline and treatment control are addressed in the data analysis section.

2.1.2. Socio-demographic and infertility-related health information

Participants were asked to complete a socio-demographic and infertility-related health information questionnaire that included questions about age, educational level, income, marital status, type of marriage (monogamous or polygamous), length of marriage, number of children, primary or secondary infertility (ever been pregnant or not), type of infertility treatment (medical and non-medical) and length of infertility treatment. They were also asked about their geographic location in terms of whether they were from northern or southern Ghana.

2.2. Data analysis

SPSS Version 18.0 was used for data analysis. Descriptive statistics were used to describe the 6 dimensions of representations (timeline chronic/acute, consequence, illness coherence, personal control, treatment control, and cause) of infertility and the women's socio-demographic and infertility-related health characteristics. To further understand the causes, exploratory factor analysis was used to classify the causal beliefs.

Age, level of education, marriage duration, religion, income, type of treatment, and treatment duration were recoded into dichotomous dummy variables because of their frequency distributions.

Spearman's correlations between the representations (beliefs) and the demographic and infertility-related health variables were computed. Because the reliabilities for timeline and treatment control subscales were low, only consequence, illness coherence, and personal control were included in these analyses. Timeline and treatment control were only used for descriptive purposes because of the low reliabilities. In order to control the type 1 error rate, the *p*-values for all correlations were adjusted using Sidak *p*-value procedures (22). Therefore, all

significant correlations reported were based on the adjusted *p*-values.

3. Results and Discussion

3.1. Sample Characteristics

Table 1 summarizes the socio-demographic characteristics of the sample. The majorities of women were natives of southern Ghana, between the ages of 30 to 39 years, and had high school or higher education. More than half (62%) of the women had a monthly income of three hundred cedis ($150), which would be considered a poverty level in Ghana. The majority of women (87%) were married, 85% were in monogamous marriages and had been married for 4 or more years.

Table 2 summarizes the infertility-related health characteristics of the sample. Nearly three quarters (72%) of the women had secondary infertility by self-report of prior pregnancies, and 37% of these women had children. Among those who had children, 79% had one child. The majority (77%) was receiving medical treatment only, and 57% of those in medical treatment received treatment for one year or less.

Table 1. Socio-Demographic Characteristics of the Sample (N = 203)

Demographic Characteristics	Frequency	Percent
Age in years		
18 to29	60	29.6
30 to 39	121	59.6
40 to 49	22	10.8
Missing values	0	
Level of education		
Primary 6 (6^{th} grade)	27	13.3
Junior secondary school (middle school)	39	19.2
Senior secondary school (high school)	79	38.9
Bachelor's degree	53	26.1
Masters / PhD	5	2.5
Missing values	0	0
Monthly income		
100 to 300 cedis ($200)	123	61.8
400 to 600 cedis ($360)	50	25.1
700 to 900 cedis ($ 610)	9	4.5
1000 cedis and above ($670 and above)	17	8.5
Missing values	4	2.0
Marital status		
Married	177	87.2
Not married	26	12.8
Missing values	0	0
Duration of marriage		
1 to 12 months	32	17.4
2 to 3 years	55	29.9
4 to 10 years	78	42.4
11 years and above	19	10.3
Not applicable	15	7.4
Missing values	4	2
Type of marriage		
Monogamous	171	85.1

Polygamous	19	9.5
Not applicable	11	5.5
Missing values	2	1
Religion		
Christianity	185	91.1
Islam	18	8.9
Missing values	0	
Country location		
Northern Ghana	31	15.6
Southern Ghana	168	84.4
Missing values	4	2
Study Site		
Military hospital	103	50.7
Korle-Bu hospital	100	49.3
Missing values	0	0

Table 2. Infertility-related health information

Health Information	Frequency	Percent
Type of infertility		
Primary	57	28.1
Secondary	146	71.9
Missing values	0	0
Having children		
Yes	75	36.9
No	128	63.1
Missing values	0	0
Number of children		
One	61	79.2
Two or more	16	20.8
Not applicable	126	62.1
Missing values	0	0
Type of treatment		
Medical treatment	147	76.6
Traditional treatment	17	8.9
Medical and traditional	25	13
Other	3	1.6
Not applicable	2	1
Missing values	9	4.4
Duration of medical treatment		
1 to 12 months	107	56.6.
2 to 3 years	52	27.5
4 to 10 years	27	14.3
11 years and above	3	1.6
Not applicable	3	1.6
Missing Values	11	5.4

3.2. Beliefs about Infertility

Table 3 shows the descriptive statistics for the FBQ subscales, except cause. To further describe beliefs about infertility, the percentage of women agreeing or disagreeing with each item was computed. Responses to *strongly agree*, *moderately agree*, and *slightly agree* were collapsed into *agree* (1) while *strongly disagree*, *moderately disagree*, and *slightly disagree* were collapsed into *disagree* (0). Responses to each item of the five subscales are presented in Table 3.

Over 80% of the women endorsed beliefs that suggested infertility is an acute problem that will last a short time and improve in time. The majority of women agreed that there are negative personal and family consequences of infertility. However, they disagreed that it is difficult for them to interact with other people's children or with people in their communities because of their infertility.

For illness coherence, the majority agreed to items that suggested that their infertility was confusing, surprising, and that they did not have a clear understanding of their infertility. Over 70% of the women agreed that what they do can determine whether their fertility problem gets better or worse and that the outcome of their fertility problem depends on them. For treatment control, the majority of women reported that some form of treatment can be done to control their fertility problems. For instance, over 80% agreed that the use of herbs, prayers and medical treatment might cure their fertility problems.

In summary, these results suggest beliefs that infertility is an acute problem, that there are negative consequences to self and family as a result of infertility, women believed they had a poor understanding of their infertility, but that their personal behaviors (personal control) and that medical or lay treatments (treatment control) could control their infertility.

Table 3. Mean scale scores and percent agreement with items on the FBQ timeline, consequences, Illness Coherence, Personal control, and Treatment control subscales

Item	Percent agreement	Percent disagreement	Mean (SD) of FBQ subscale
Timeline chronic/acute			0.85 (1.09)
My fertility problem will last a short time	84.2%	15.8%	
My fertility problem is likely to be permanent(R)	19.8%	80.2%	
My fertility problem will improve in time	93.1%	69.0%	
Consequence			2.49 (1.21)
My fertility problem is a serious condition	52.2%	47.8%	
My fertility problem has major consequences on my life	66.0%	34.0%	
My fertility problem does not have much effect on my life(R)	44.3%	55.7%	
My fertility problem strongly affects the way others see me	61.6%	38.4%	
My fertility problem has serious financial consequences	69.0%	31.0%	
My fertility problem causes difficulties for those who are close to me	53.5%	46.5%	
I can be divorced because of my fertility problem	53.7%	46.3%	
My fertility problem makes me feel incomplete	61.6%	38.4%	
I don't interact with other people's children because of my fertility problem	26.6%	73.4%	
It is difficult for me to interact with people in my community because of my fertility problem	31.0%	69.0%	
My fertility problem makes me have problems with my in-laws	52.2%	47.8%	

Illness Coherence			3.21 (1.53)
My fertility problem is confusing to me	70.0%	30.0%	
My fertility problem is surprising to me	73.8%	26.2%	
I don't understand my fertility problem	75.4%	24.6%	
My fertility problem doesn't make any sense to me	60.9%	39.1%	
I have a clear picture or understanding of my fertility problem(R)	48.3%	51.7%	
Personal Control			3.44 (0.99)
There are many things I can do to control my fertility problem	86.6%	13.4%	
What I do can determine whether my fertility problem gets better or worst	80.7%	19.3%	
The outcome of my fertility problem depends on me	70.9%	29.1%	
Nothing I do will affect my fertility problem(R)	28.6%	71.4%	
My actions will have no effect on the outcome of my fertility problem(R)	49.8%	50.2%	
Treatment Control			3.63 (0.91)
The use of herbs can treat my fertility problem	69.8%	30.2%	
I use prayer as a means to solve/cure my fertility problem	85.5%	14.5%	
I combine prayers with herbs and hospital treatment to solve my fertility	84.2%	15.8%	
There is very little that can be done to improve my fertility problem (R)	40.1%	`59.9%	
Hospital treatment will be effective in curing my fertility problem	87.2%	12.8%	
There is nothing that can help my fertility problem (R)	10.8%	89.2%	

Note: R = Reversed code

To explore beliefs about causes, an Exploratory Factor Analysis (EFA) was performed (see Table 4). Items with factor loadings > .30 were retained. Results suggested five meaningful factors.

Factor 1 contained 8 items and was labeled possible medical causes. Factor 2 contained 5 items and was labeled stress-related causes. Factor 3 was labeled bio-behavioral risk causes and contained 7 items. Factor 4 was labeled supernatural causes and contained 4 items. Factor 5 was labeled drinking and smoking and contained 2 items.

The means and standard deviations were computed for each cause subscale (factors). Composite reliabilities ranged from .77 - .92, except for *drinking and smoking* (2 items), which was .31. Because of the low reliability, this subscale was not used in further correlational analyses. Higher scores on each subscale suggest a stronger belief in that factor as a cause of infertility.

The highest mean subscale scores were for bio-behavioral risk and stress-related causes.

To further explore causal beliefs, the percentage of women agreeing, disagreeing, or responding "don't know" to each cause item is shown in Table 4.

The five items with the highest percent agreement were "husband's infertility" (71%), "stress" (70%),

husband's refusal to see a doctor (67%), getting old (63%), and a person's emotional state (60%).

The five items with the highest percent disagreement were: hereditary (53%), use of family planning pills (47%), curse from ancestors (46%), over weight (41%), and thinking negatively about life (40%). The five items with the highest percent agreement with "don't know/unsure" were: high blood pressure (41%), poor diet (33%), over weight (30%), sexually transmitted infections (24%), and a curse from ancestors (26%).

Table 4. FBQ Cause scale Items, % agreement, Factor Loadings, and subscale descriptive statistics

Item	**Mean (SD) of cause subscales**	***n* (%) agreement**	***n* (%) disagreement**	***n* (%) don't know/not sure**	**Factor loadings**				
Possible medical causes	.89 (.52)				1	2	3	4	5
Poor diet		55 (27.4)	80 (39.8)	66 (32.8)	.68				
Diabetes		30 (14.9)	72 (35.8)	99 (49.3)	.67				
Over weight		64 (29.1)	83 (40.9)	61 (30)	.66				
Under weight		28 (13.9)	99 (49.3)	74(36.8)	.61				
High blood pressure		58 (28.9)	60 (29.9)	83(41.3)	.58				
Thyroid problems		24 (12.0)	64 (32.0)	112(56.0)	.57				
Irregular menses		115(57.2)	50 (24.9)	36 (17.9)	.42				
Use of family planning pills		64(32.0)	93 (46.3)	43 (21.5)	.37				
Stress-related causes	1.25 (.72)								
Worrying about family problems		103(51.2)	66 (32.8)	32 (15.9)		.65			
A person's emotional state		121(59.9)	41 (20.3)	40 (19.8)		.81			
Thinking negatively about life		82 (41.0)	80 (40.0)	38 (19.0)		.68			
Husband's refusal to see a doctor		134 (66.7)	52 (25.9)	15 (7.5)		.51			
Stress		138 (69.7)	30 (15.2)	30 (15.2)		.46			
Bio-behavioral risk causes	1.24 (.58)								
Accident or injury		99 (50.0)	53 (26.8)	46 (23.2)			.73		
Sexually transmitted disease		102(50.7)	50 (24.9)	49 (24.4)			.61		
Husband's infertility		144(70.9)	42 (20.7)	17 (8.4)			.55		
Past sexual behavior		113(57.1)	48 (24.2)	37 (18.7)			.55		
Poor medical care in the past		102(51.3)	53 (26.6)	44 (22.1)			.54		
Hereditary		47(23.9)	105 (53.3)	45 (22.8)			.49		
Getting old		127(63.2)	50 (24.9)	24 (11.9)			.42		

Supernatural causes	1.20 (.86)				
A curse from ancestor		57(28.4)	92 (45.8)	52 (25.9)	.65
Witchcraft		91(45.0)	75 (37.1)	36 (17.8)	.55
Punishment from God		37(18.5)	137 (68.5)	25 (12.5)	.36
Failure of husband to pay bride price		22(11.0)	171 (85.5)	7 (3.5)	.30
Drinking and smoking	1.20 (.86)				
Smoking		101(50.2)	62 (30.8)	38 (18.9)	.73
Drinking alcohol		106(52.7)	63 (31.3)	32 (15.9)	.73

3.3. Socio-demographic and Infertility-related Health Correlates of Beliefs about Infertility

The correlations between beliefs and the socio-demographic and infertility-related health variables are shown in Table 5. Only education, length of marriage, religion, and length of treatment were significantly related to more than one domain of beliefs. Women with higher levels of education were more likely to report they understood their fertility problem (illness coherence) and had personal control over their fertility problem. They were more likely to endorse bio-behavioral risk causes of infertility and less likely to endorse stress-related causes. Women who were married for fewer years were significantly more likely to report negative consequences of infertility, that they had poor understanding of their infertility and were less likely to endorse stress and supernatural causes of infertility. Women who had been in treatment longer were more likely to endorse medical and stress related causes of infertility.

Table 5. Socio-demographic and infertility-related health correlates of FBQ (Spearman's rho)

Socio-demographic and health variables	**Consequences**	**Illness Coherence**	**Personal Control**	**Possible medical causes**	**Stress-related causes**	**Bio-behavioral risk cause**	**Supernatural causes**
Age	.12	.19*	.09	.04	.02	.09	.07
Level of education	-.15	-.43*	-.18*	-.03	.22*	-.18*	.15
Income	-.12	-.24*	.09	.10	.14	.02	.11
Marital status	.13	.13	.04	-.06	.00	.07	.07
Duration of marriage	.27*	.39*	-.05	-.13	-.12*	.00	-.19*
Type of marriage	.15	.08	-.06	-.06	-.06	-.16	-.07
Religion	.04	-.19*	-.56	-.19*	-.13	-.03	-.07
Geographic location	-.01	.13	-.15	.00	-..01	-.02	-.02
Type of treatment	-.17	-.27*	.00	-.20	-.24	-.05	-.13
Duration of treatment	.01	.13	-.07	-.23*	-.21*	-.07	-.17
Type of infertility	.15	.13	.12	.09	.13	.04	.05

NOTE: *Adjusted $p < .05$

To our knowledge this is the first study to systematically investigate women's beliefs about infertility in Africa and the first theoretically based study of infertility in Ghana. Results from this study indicate that Ghanaian women with infertility have beliefs about infertility that are consistent with the CSM. The results indicate that the different dimensions of beliefs are differentially related to some socio-demographic and health characteristics. These findings have implications for the health care of women with infertility and for future research in this area.

Leventhal and colleagues (14) proposed that the illness representation component of the Common Sense Model (CSM) has five dimensions: identity, cause, timeline, consequence, and cure/controllability. In this study, the women did have representations or beliefs about their infertility. They had beliefs about timeline, consequence, illness coherence, personal control, treatment control, and cause, as predicted by the CSM.

The women believed that infertility was an acute rather than a chronic problem. Believing that infertility is an acute problem might suggest that the women believed that conception was possible for them and this was consistent with the importance Ghanaian women attach to their fertility. However, because all of the women in this study were seeking treatment for infertility, it cannot be assumed that women who do not seek medical treatment would share the same belief about the acute nature of infertility.

Women believed that infertility has negative consequences for themselves and for their relationships, which is consistent with previous studies that have shown that infertility has some negative consequences for African women (5), (9). The highest percent agreements with items on the consequence subscale were that infertility has serious financial consequences followed by the belief that infertility has major consequences for their lives. The majority of women in this study were low income women, which may have contributed to their financial burden related to infertility or its treatment. Women's beliefs about consequences support the cultural importance of childbearing in Ghana.

Consistent with beliefs about the acute nature of infertility, the majority believed that treatment could cure or control their infertility. They strongly believed that their own actions and behavior could control their infertility. They also strongly endorsed beliefs that prayers, the use of herbs, and the use of medical (hospital) treatment could treat or solve their fertility problems. These results are not surprising given that all of the women in the study were seeking medical treatment. On the other hand, it is noteworthy that the women reported that they did not understand or have a clear picture of their infertility even though they had positive beliefs about control. This may suggest that the women wanted information about infertility but did not have access to the appropriate information.

Women endorsed many possible causes of infertility. The highest percent agreement for individual items for causes was "husband's infertility" (71%) followed by "stress" (70%) and husband's refusal to see a doctor (67%). It may be that these items are all related. That is, male infertility in Ghana is not culturally acceptable and therefore highly stressful to a relationship, and the possibility of male infertility in a couple could contribute to a husband refusing to see a doctor. There was very little endorsement overall for supernatural causes. However, among individual items, witchcraft was endorsed as a cause by 45% of the women. These findings have implications for nursing intervention and patient education in Ghana.

The CSM posits that representations are formed through experience, social interaction, and the broader culture. The correlations between socio-demographic and infertility-related health variables and beliefs about infertility provide partial support for this proposition, but not for all of the dimensions of beliefs. For instance, illness coherence was significantly related to many of the socio-demographic variables but other dimensions were not. Education, length of marriage, religion, and length of treatment were significantly related to a number of beliefs about infertility. These results suggest that women who may have had more exposure to health-related information (more educated, in medical treatment for a longer time) have more positive beliefs about infertility. However, other findings were difficult to interpret; those related to length of marriage and religion.

Personal control was related to only level of education, so that women who had less than high school education were less likely to have strong beliefs about personal control of their infertility. The strong belief in personal control and the lack of significant relationships with variables such as age and marital status may reflect specific cultural beliefs about infertility in Ghana. Whether these beliefs in personal control are related to women's health care behaviors, as is found in research in the U.S (23) is an important area for future research.

Among the infertility-related health variables, only type of treatment was significantly correlated

with illness coherence. Women who combined medical and alternative treatments for their infertility were more likely to report poorer perceived understanding of their infertility. It is not unusual for Ghanaians to combine medical and alternative treatments for their health problems, although in this sample few women (13%) reported doing so. For women with infertility, reporting a poor understanding of their infertility may have led them to seek more treatments, including alternative treatment.

In summary, Ghanaian women who were seeking medical treatment for infertility believed that infertility is an acute health problem, that infertility has negative consequences, that their own actions and behavior could control or cure their infertility, that their infertility could be cured or controlled by medical treatment or alternative sources of treatment, but believed that they do not have a clear picture or understanding of their infertility. They endorsed numerous beliefs about the causes of infertility, some of which were medically accurate but many were not. They also indicated that they were not sure about many medically accurate causes. For instance sexually transmitted infections are medically known causes of infertility. Yet, only one-fourth of the women in this study believed that they did not know or were not sure if sexually transmitted infections can cause infertility.

Limitations

There are four main limitations in this study. First, the design was cross-sectional. Therefore, it was not possible to sort out any cause and effect relationships between beliefs and socio-demographic variables. Longitudinal research is needed to identify causal relationships. Second, only clinic-based participants were recruited, which makes it difficult to generalize the findings to those who do not seek treatment (24). However, in Ghana where childbearing is highly valued among women, this clinic-based sample provided some information about the larger population of Ghanaian women with infertility, about whom little is currently known. Third, two of the FBQ subscales had low reliabilities and could not be used in the correlational analyses. Fourth, because only self-report data were used, very little information was available on the women's medical history, treatments for infertility, and what the women had been told about their infertility. Knowing the medical history could have helped to explain the choices of responses given by the women about their beliefs.

Conclusions

The CSM has been used as an organizing framework to study a variety of health problems, but not infertility. The findings based on the constructs of the CSM are relevant to the understanding of the relationship between Ghanaian women's beliefs about infertility and their socio-demographic and infertility-related health variables. There is the need to examine the relationship between Ghanaian women's beliefs about infertility and their psychosocial health.

Ethical approval

The proposal for the study was reviewed and approved by the Social Science Institutional Review Board at the University of Wisconsin-Madison. Protocol Number: SE-2010-0806.

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