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Infertility, Psychological Distress, and Coping Strategies among Women in Mali, West Africa: A Mixed-Methods Study

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Abstract

Relatively little is known about infertility and its consequences in Mali, West Africa where the context and culture are different from those of previously studied settings. This study therefore aimed to specifically examine infertility induced psychological distress and coping strategies among women in Mali. A convergent mixed-methods design—correlational cross-sectional and qualitative descriptive—guided the study. Fifty-eight infertile Malian women participated: 52 completed the Psychological Evaluation Test specific for infertility and a question on general health status, and 26 were interviewed in-depth. Over 20% scored above the cut-off point for psychological distress, and 48% described their general health as poor. There was no significant difference between women with primary vs. secondary infertility. The study found that infertile women lived with marital tensions, criticism from relatives, and stigmatization from the community. They experienced sadness, loneliness, and social deprivation. Coping strategies included traditional and biomedical treatments, religious faith and practices, and self-isolation. Health care professionals should provide holistic care for infertile women to meet their physical, spiritual, psychological, and social needs. (*Afr J Reprod Health* 2018; 22[1]: 60-72).

Keywords: coping; infertility; psychological distress; Mali; mixed-methods

Résumé

Relativement, on connaît mal l'infertilité et ses conséquences au Mali, en Afrique de l'Ouest où le contexte et la culture sont différents de ceux qu'on a étudiés auparavant. Cette étude visait donc spécifiquement à examiner la détresse psychologique induite par l'infertilité et les stratégies d'adaptation chez les femmes au Mali. Un modèle des méthodes mixtes - convergentes, corrélatives, transversales et qualitatives descriptives - a guidé l'étude. Cinquante-huit femmes maliennes infertiles ont participé: 52 ont complété le test d'évaluation psychologique spécifique à l'infertilité et une question sur l'état de santé général, et 26 ont été interrogées en profondeur. Plus de 20% d'entre elles ont obtenu un score supérieur à la limite de la détresse psychologique et 48% ont qualifié leur état de santé général de médiocre. Il n'y avait pas de différence significative entre les femmes avec l'infertilité primaire vs secondaire. L'étude a révélé que les femmes infertiles sont victimes des tensions conjugales, des critiques de la part de leurs proches et la stigmatisation de la communauté. Elles ont connu la tristesse, la solitude et la privation sociale. Les stratégies d'adaptation comprenaient les traitements traditionnels et biomédicaux, la foi et les pratiques religieuses et l'auto-isolement. Les professionnels de la santé devraient fournir des soins holistiques aux femmes infertiles pour répondre à leurs besoins physiques, spirituels, psychologiques et sociaux. (*Afr J Reprod Health* 2018; 22[1]: 60-72).

Mots clés: adaptation, infertilité, la détresse psychologique, Mali, méthodes mixtes

Introduction

Children are valued in sub-Saharan African (SSA) countries for cultural, economic, and social reasons¹⁻². Infertility, the inability to conceive after unprotected regular sexual intercourse during the previous 12 months or more, can result in

social death³. Women in SSA desire children to extend the family line⁴⁻⁶, for marital stability^{2,7}, emotional and social security^{2,5}, a meaningful life⁷⁻⁸, and for the honor and prestige of motherhood^{2,9}. SSA women who have already conceived and birthed children often want to have more¹⁰ because a large family size continues to be

the ideal^{4,11}. Women without children can be perceived as incomplete, of little value, or even cursed¹²⁻¹⁴. “Infertility strikes at the very sense of a woman’s identity and draws on deep cultural images of what constitutes a woman” (p.114)⁹, and is “held to be the worst kind of [social] invisibility and poverty” (p.67)⁶. Women in SAA unable to conceive and birth children may face severe, negative life circumstances, including taunts, insults, social isolation, marital instability, intimate partner violence, divorce, economic deprivation, psychological and emotional distress, stigmatization, and discrimination from family and community members^{2,6,14-22}.

Background

Mali, a landlocked country in West Africa, has a population of over 17 million and this is expected to double by 2035. On average Malian women birth six children. This represents a fertility rate unchanged for several decades because of preference for large families, early childbearing, low levels of female education, and low contraceptive use²³. Thirteen percent of Malian girls give birth under the age of 15. Forty-five percent of the women between the ages of 18-22 had their first child before the age of 18²⁴. As reported in 2004, among Malian women ages 15-49, the prevalence of primary infertility was 10.4% and secondary infertility was 23.6%²⁵. This equates to almost half a million women with primary infertility and a million with secondary infertility. Per the 2009 Malian census, 41.8% of married women were in a polygynous marriage compared to 29.7% of married men²⁶. Malian men are known to take another wife if one of his wives does not bear him children.

Relatively little is known about infertility and its consequences in Mali where the context and culture are different from those of previously studied settings. Therefore, the aim of this study was to examine infertility induced psychological distress and coping strategies among women specifically in the Malian context. When health care professionals gain a deeper understanding of infertility and its effects on Malian women’s lives, including how the women cope with infertility,

they may be more in tune to this life stressor while providing care. Such understanding can lead to the development of new or better counseling strategies and interventions to lessen the deleterious effects of infertility on women in Mali, thus improving their general well-being.

Infertility-related psychological distress

The master status model²⁷ used in the context of infertility provides theoretical support for this study. When parenthood is considered a master status in the individual or by the society, infertility causes distress. Women for whom motherhood is a central life identity experience significantly higher levels of psychological distress when they remain childless²⁷. Infertility-related psychological distress is conceptualized as a type of mental and emotional upset or turmoil that is grounded in the inability to conceive and bear children. This distress frequently has social or relational roots. Several qualitative (QL) studies in SSA countries (e.g., Ghana, Nigeria, and Rwanda) described psychological distress caused by harassment, verbal abuse, rejection, and stigmatization from the families of the husband of infertile women^{5,9,14,16,21}. In Rwanda, the continuity of the family line is a primary reason for procreation. Rwandan couples worry they will not have an honorable burial if they have no children. Infertile couples are also mistreated, ostracized, and stigmatized by community members. Family members sometimes urge a husband to have extramarital affairs or to divorce his wife if she does not give him children⁵. In Nigeria, female members of the husband’s family were usually the verbal abusers of an infertile wife. In that context, pressure to bear children increased with age^{9,14}. In Ghana, where infertility could mean no children or too few children, infertile women experience mocking and rejection when they have no one to send on errands, support them when ill, or help with housework; in addition, they are not permitted to ask other women’s children to help²¹. In Nigeria, co-wives in the Ijo society make life miserable for an infertile woman so that she eventually leaves the marriage²⁸.

Findings from quantitative (QN) studies reiterate the negative consequences of infertility. Infertile Ghanaian women reported high levels of stress, stigma, and depression^{1,29}. In Ghanaian polygynous households, a woman with one or more co-wives may experience higher levels of stress particularly when other wives have birthed children and she has not²⁹. Infertile Ghanaian women reported high levels of stress, stigma, and depression^{1,29}. Iranian infertile women rated their general health and health-related quality of life poorer than those of their fertile counterparts³⁰⁻³². Despite clear evidence of the negative consequences of infertility on infertile women in numerous countries, the effects of infertility and coping strategies among women in Mali are not well documented. With its unique socio-cultural context, a study of the consequences of infertility and coping strategies among infertile women is warranted.

Methods

Setting

The study protocol was reviewed and approved by two research ethics committees: one at Malone University, Ohio, USA and the other at the Hospital for Women & Children (HFE), a non-governmental hospital in Koutiala, in southern Mali. The study was conducted in 2013 and 2014 on site at HFE, a full-service hospital serving tens of thousands of patients each year. Koutiala, a town of approximately 150,000 inhabitants is one of the administrative cercles of Mali's Sikasso Region. It is surrounded by over a half a million people scattered in hundreds of villages³³.

Design

Previous research on this topic mainly used either QL or QN methods to examine the phenomenon of infertility-related psychological distress. A convergent mixed-methods design³⁴ - correlational cross-sectional and QL descriptive - guided this study. The intent of this design was to analyze QL and QN data separately and subsequently merge

both types of data to produce empirical, rich, and meaningful information³⁵.

Sample size and sample selection

The sample size of the QN part was calculated using G*Power online program^{36,37}. Using the point biserial correlation test with a .37 effect size, .80 power, and .05 alpha, the resulting minimal sample size was 52. A research assistant (RA) made announcements about the study in the out-patient waiting areas and then approached and the RA made announcements about the study in the out-patient waiting areas and then approached and recruited 58 women from the nearby infertility clinic through convenience sampling. Inclusion criteria were Malian women who could speak French or Bambara, attending the hospital's infertility clinic, and who identified themselves as being unable to conceive after at least 12 months of trying to get pregnant. Excluded were women known to have major mental illnesses, such as schizophrenia or major depression. For the QL arm, purposive sampling was used to recruit 20 women for the in-depth interview from the women who had taken part in the QN part of the study. An additional six women were interviewed later to reach data saturation which determined the sample size 38 at 26. Participants received the equivalent of 20 US dollars' worth of laboratory exams in appreciation of their time.

Data collection

A RA trained in was trained in the ethics of data collection and storage, as well as how to recruit participants and collect survey and interview data for this study. The RA - a Malian university graduate who speaks French and Bambara and who had previous experience in research data collection in Mali - explained the study's objectives, risks, and benefits to each potential participant. All participants willing to participate signed a consent form and were interviewed individually in a dedicated room at the hospital. Because literacy is low in this population, the RA read each QN question to the participant and then wrote down the woman's

answers. To ensure confidentiality, no identifiable information was collected.

QN data collection tools

General health status (GHS), the extent to which a woman perceives her own overall physical health, was measured by a single item created by the research team based on a review of the literature where more complex quality of life measures which included physical health were used^{30,32}. Each participant rated her own overall physical health status with the response choices of excellent (3), good (2), and poor (1). The higher the score, the better the participant perceived her general health.

Psychological distress, the extent to which a person emotionally reacts to her own infertility, was measured by the 15-item, Likert type Psychological Evaluation Test (PET)³⁹. This questionnaire, developed specifically for couples with infertility, has four response options: (1) never or rarely, (2) sometimes, (3) often, and (4) always. See Table 4 for the PET's questions. Scores can range from 15-60. The higher the score, the greater the psychological distress the participant reports. The PET cut-off score is ≥ 30 indicating presence of psychological distress. The original questionnaire was tested in 251 Brazilian infertile couples and yielded a good Cronbach's alpha of .88³⁹. In the present study, the questionnaire was translated from English into French, then into Bambara, one of the main local languages, and finally back-translated into English. Inconsistencies between the original and translated versions were discussed with Malian language informants until consensus was achieved. Cronbach's alpha for the PET-Bambara/French version used in this study was acceptable (0.73).

Demographic data were measured by a questionnaire created by the research team in French/Bambara. Each woman reported her age, years of formal education/schooling, years of husband's formal education, occupation, marriage type (monogamous or polygynous), religion, fertility status, and type of infertility (primary or secondary).

QL data collection

Twenty-six infertile women were interviewed face-to-face in Bambara or French by the first author and/or the RA using a semi-structured interview guide. Main questions included, "What is life like for you without children?" "How does being infertile affect your life?" and "What have you done to try to get pregnant?" Probing questions were used to dig deeper and clarify the women's comments. The tape-recorded interviews lasted from 15 to 60 minutes. Recordings were transcribed verbatim in Bambara or French and then translated into English by a second RA who was fluent in all three languages. Clarity of meaning was sought from both RAs on various words and expressions within the cultural context.

Data analysis

QN data was analyzed using IBM Statistical Package for Social Sciences Version 22[®]. GHS, PET, and demographic data were computed using descriptive statistics such as means, standard deviations, frequencies, and percentages. The point biserial correlation was used to examine the association between infertility status (primary vs. secondary) and outcomes (PET and GHS subcategories). The alpha was set at .05.

For QL data, conventional content analysis was used to generate categories and themes⁴⁰. The transcripts were analysed independently as a whole and then key words were noted during line-by-line reviews. Categories and themes were discussed for consensus. These findings were reviewed and the categories and themes were found to be reflective of Malian women's general infertility experiences. The QL and QN results for mixed methods interpretation were subsequently merged.

Results

Study participants

The QN arm included 58 infertile participants. Table 1 displays detailed demographics of the participants.

Table 1: Demographics of Infertile Malian Women that completed PET Questionnaire (n = 52*)

Variable	n (%)
Years of Age (years old)	
Mean (SD) = 33.42 (6.3)	
Range = 17-48	
16-34	28 (53.8)
35-50	24 (46.2)
Education	
Mean (SD) = 5.58 years (6.6)	
Range = 0-15	
No schooling	22 (42.3)
Primary school	11 (21.2)
Secondary school	9 (17.3)
Post-secondary	10 (19.2)
Religion	
Muslim	36 (69)
Christian	16 (31)
Marital status	
Married	40 (98.2)
Divorced	3 (5.8)
Years married	
Mean (SD) = 10.12 (6.4)	
Range = 0.5-23.0	
Type of marriage	
Monogamous	14 (28.0)
Polygamous	36 (72.0)

*6 women did not complete the PET

Table 2: Frequencies of Pregnancy History, Infertility, and Causes of Infertility of Malian Women

Variable	n (%)
Pregnancy history	
Years since pregnant	
Mean (SD) = 8.5 (6.27)	
Range: 1 - 23	
Never pregnant	25 (48.1)
Miscarriages	20 (38.5)
Induced abortion	8 (15.4)
Type of infertility	
Primary	25 (48.1)
Secondary	27 (51.9)
Perceived cause(s) of infertility*	
Disease/blockage/infection	15 (51.7)
God's will	4 (13.8)
Husband's problem	5 (17.2)
Unknown	4 (13.8)
Other	1 (0.03)

*more than one answer possible

Approximately, half of the infertile women (48%) had primary infertility and the other half (52%) secondary infertility with a mean of 8.5 years

(range 1- 24 years) since the most recent pregnancy, if there ever had been one. The number of pregnancies the women had ranged from 0 to 3 except for one woman who had 10 pregnancies including six miscarriages. Over 38% had a history of miscarriage and 15% a history of induced abortion. Approximately, three-quarters (72%) were in polygynous marriages. Over 70% believed that their infertility was caused by an infection. Details are in Table 2.

QN Results

General Health Status - Based on frequency distributions, one out of two participants (48.1%) reported their overall health status as poor. Sample mean was 1.58 (SD = .605). Slightly more women with secondary infertility self-reported poor health compared to those with primary infertility. Because one participant with primary infertility and two participants with secondary infertility rated their health as excellent, they were grouped with those who rated their health as good. See Table 3 for details. Using point biserial correlation analysis, GHS and infertility type was not significant ($r = -.037$, $p = .794$).

Psychological Evaluation Test (PET)

Fifty-two infertile women completed the PET. Scores ranged from 16 to 42. The sample mean was 26.1 (SD = 5.82). Women with primary infertility had only a slightly higher mean (26.3, SD = 5.90) than those with secondary infertility (25.9 SD= 5.90). The point biserial correlation result showed no statistical difference between infertility status and PET ($r = -.037$, $p = .794$). One out of five participants (21.1%) had a PET score above 30, indicative of psychological distress. Over half (53.8%) of the women indicated they thought daily or almost daily about their childlessness. Forty percent of the women were always or often depressed at the onset of their monthly menstrual period. Five out of ten women (51.9%) experienced feelings of inferiority. Almost 30% always or often felt

Table 3: Frequencies of GHS and PET by Infertility Classification among Malian Women

Variable	Primary infertility n (%)	Secondary infertility n (%)	Chi-square
GHS			
Poor	11 (21.2)	14 (26.9)	$p = .571$
Good/Excellent	14 (26.9)	13 (25.0)	
PET			
No Distress	20 (38.5)	21 (40.4)	$p = .845$
With Distress	5 (9.6)	6 (11.5)	

Table 4: Frequencies of Responses to PET Questions

Question	1 Never/Rarely n (%)	2 Sometimes n (%)	3 Often n (%)	4 Always n (%)
1. Are you irritated (troubled) by the fact of not having children?	15(28.8)	17 (32.7)	11 (21.2)	9 (17.3)
2. Relatives & friends usually ask about the fact that we don't have children and I don't feel well in this situation.	15 (28.8)	23 (44.2)	11(21.2)	3(5.8)
3. I am upset (sad) when I am invited to a children's birthday party (baby naming ceremony).	34 (65.4)	10 (19.2)	5(9.6)	3 (5.8)
4. I am annoyed when a friend or relative becomes pregnant.	45(86.5)	2(3.8)	3(5.8)	2(3.8)
5. Are you depressed each time you get your period?	12(23.1)	14(26.9)	6(11.5)	20(28.5)
6. Is your sexual relationship being impaired by the fact that you have not become pregnant up to now?	37(71.2)	11(21.2)	4(7.7)	0(0)
7. Is your professional activity being impaired due to the lack of children? (going to the market, to work, to mosque/church, is life spoiled...)	40 (76.9)	8(15.4)	4 (7.7)	0(0)
8. Do you feel inferior to other women due to the fact of not having children / getting pregnant?	25 (48.1)	13 (25.0)	10 (19.2)	4 (7.7)
9. Are you a person who is always suspicious or afraid of treatment?	43 (82.7)	5(9.6)	4(7.7)	0(0)
10. Do you think you might go crazy if you don't have children?	48 (92.3)	1(1.9)	2 (3.8)	1(1.9)
11. Do you feel tachycardia (rapid heartbeat) or shortness of breath (suffocating) when thinking about the fact of not having children?	25 (48.1)	16 (30.8)	10 (19.2)	1 (1.9)
12. Do you feel a sensation of emptiness due to the fact of not having children?	12 (23.1)	24(46.2)	11(21.2)	5(9.6)
13. Is your daily relationship with your husband impaired by the fact of not having children?	36 (69.2)	10 (19.2)	5 (9.6)	1 (1.9)
14. Does the difficulty in having children make you want not to leave home as you used to do and to think that it is better to be isolated from others?	40 (76.9)	6 (11.5)	5 (9.6)	1 (1.9)
15. Do you think about your difficulty in having children during daily life / every day?	6 (11.5)	18 (34.6)	15 (28.8)	13(25.0)

uneasy when relatives or friends commented on the fact that they did not have children. Over 75% felt empty because of not having children. Details are in Table 4.

QL Results

The 26 infertile women interviewed in the QL arm

ranged in age from 17 to 44. About half of these participants experienced primary infertility. While about three out of four of the Muslim infertile women (71.4%) expressed interpersonal problems, one out of three (33.3%) non-Muslim women reported this. One woman explained infertility in Mali this way:

“When a Malian woman does not have a child, she is inferior to all fertile women. She is not a true woman. She feels a void. Some women feel that life is useless without having a child. Some even say that it was useless to come into the world; that if God knew that he would not give them a child, it was useless to come”.

Most participants described marital and family conflicts; some spoke of stigmatization from neighbors. Approximately three out of four (73%) used words and phrases that also revealed psychological distress related to infertility.

Tensions with husband

About two out of five women (38%) spoke about marital conflicts because of their infertility. They described marriages of tension, strife and neglect. A 25-year old woman with secondary infertility of five years said, “The effects of not getting pregnant can bring disagreement between my husband and me.” A participant divorced by her husband because she could not get pregnant explained,

“At the beginning, the man can help the woman pay for treatments but if it takes too long and a child doesn’t come quickly, the man will resist and say that he doesn’t have any more money, because he thinks that having a child is the woman’s problem”.

Criticism from in-laws

Six women (23%) described emotional distress because of criticism from their husband’s family. A 21-year old saleswoman with secondary infertility revealed,

“My husband’s mother and his older sister, they keep saying these little things. They criticize because my husband has another child but it’s not mine. My husband says that when Allah makes it better, [a pregnancy] will happen. He says I shouldn’t listen to their words. His older sister and mother, they [criticize] me”.

Men are told by their families to get a divorce or take another wife. A woman with primary infertility (age unknown) explained, “Recently his family pushed him until he took another wife. That time was difficult”.

Stigmatization by community

About one out of four women (23%) provided information about stigmatization or discrimination they experienced from people in their neighborhood. Several women described hurtful interactions with neighbors (usually women living in the same courtyard) because they did not have children of their own. A 35-year old housewife, the first wife in a polygynous marriage, and without a pregnancy for 15 years said, “It troubles me. My husband doesn’t talk about it, but among my neighbors there are a lot of murmurs about [me not having a child].” A nurse-midwife participant explained,

“There is a kind of accusation, especially by neighbors. The neighbour [woman] tells the infertile woman to not ask her child to do something; [it’s] because she did not have her own child. [The infertile woman] will be frustrated when she hears those words”.

A 25-year old shop keeper whose only pregnancy ended in miscarriage five years previous said, “Neighbors call me ‘childless one’, and say, ‘You haven’t birthed a child, so get away from us. We’re tired of you being around us like that”.

Infertility-related psychological distress

It was apparent during the interviews that many women were reluctant to say critical things about their husbands, in-laws or neighbors; they were careful with their words. But three-quarters (73%) of the infertile women readily described personal sufferings related to their infertility in terms of psychological distress. They spoke of hurt, sadness, isolation, longing, and worry as well as resignation. A 44-year old woman with primary infertility said, “Sometimes it makes me tired,

sometimes my heart cries [it makes me sad]." A 29-year old teacher with primary infertility said,

"The effects of not getting pregnant... it leaves a bad taste in your mouth. Whenever there's talk about a baby, you find your body dies because there is no baby in your arms. You ask yourself, 'What happened that I am unable to get pregnant?'"

A woman (age unknown) who had two miscarriages and no living children said, "Sometimes it really troubles me. Sometimes when I am thinking about [not being able to get pregnant], I cannot sleep." A 24-year old woman, married for five years, with a history of a miscarriage, shared this.

"I cry. It's the desire [to have a child] that kills. When one is married, one desires a child. When my husband sees me crying he says I think too much about having a child; he says, 'It's not the end of the world. It is God who gives so if he has not given, it's okay.'" Then I say "it is okay. It's not a problem". My husband does not talk about taking another wife but I am afraid of that. I think about that".

A 30-year old woman whose only pregnancy ended in a miscarriage 15 years before had attained a certain level of acceptance. She said,

"At times I feel alone. But it does not keep me from doing anything [I want to do]. I always have hope."

Another woman called infertility a type of oppression but added,

"This matter of a child, I put it on God, but really, truly, if I get medicine for it, that would please me a lot".

Strategies used by participants to cope with infertility

The 26 Malian women who were interviewed dealt with their infertility in various ways: with traditional African and/or biomedical treatments,

religion, and isolation. One out of four used traditional African medicine; 71% had infertility treatments using traditional African medicine and Western medicine, sometimes concurrently. Several women mentioned that their husbands were also examined and treated for infertility. Some utilized religious practices to cope with their inability to bear children.

Traditional therapies

To treat infertility with traditional African methods the women used rituals, sacrifices, and medicines made from plants, roots, tree bark, and branches. Treatments included topical applications and brews. A 43-year old woman who had never been pregnant tried numerous traditional treatments for over 20 years. She scored a 36 on the PET. She said,

"I lived too far away from the hospital to try the white man's medicine. We did all the medicines, Bambara medicine. Some is cooked and washed and [I] drink it. Some is put in a chicken or beef and cooked and then eaten. Some is a medicine in a rope that is tied around your waist".

Biomedical treatments

Infertile women described procedures and treatments they had at hospitals and clinics including ultrasounds, x-rays, vaginal and uterine washes, insufflation of the fallopian tubes, pills and injections, and artificial insemination. Some explained that they had spent a lot of money to find a cure. Several travelled far and wide to get treatment from traditional healers or medical doctors. A woman with primary infertility (age unknown) said,

"I have had, how do you say it, artificial insemination. I did that three times. Twice I did it here. And once in [name of another North African country]. But it didn't succeed. And I paid lots for pills, medications, [laboratory] analyses, and insufflation. Many things".

Religious practices and personal faith

Forty-two percent of the women (n = 11) spoke of their faith or religious practices as a way to cope with their infertility. A 25-year old Muslim woman, with secondary infertility explained, “[The healer] writes words from the Koran and the name of Allah on a slate, and then washes it. And I drink the water [washed off the slate], in order to get a child.” A Christian participant acknowledged that infertile women ask for prayer at church women’s meetings. “I know of cases, many cases [of women] who pray; these women have had children. I know them. It is a reality. That happens frequently in the church.” A 40-year old Muslim homemaker, with one child, followed by 13 years of infertility said, “I decided to believe that it’s not yet Allah’s time [to give me a baby].” A 43-year old Muslim woman with primary infertility said, “If I had a child, it would please me. If not, I believe in Allah”.

Isolation

Several women expressed feeling alone or empty because they had no children. Two specifically mentioned isolating themselves from others. A 24-year old, with one previous pregnancy followed by six years of infertility, described herself this way. “I don’t have a calm mind. I only pray at home. I stay at home. I keep away from people. I cry”.

Mixed methods results

To illustrate a convergence of QN and QL results, findings from the PET scores and data from the interviews of infertile women were combined. The women who said they had no interpersonal problems (n = 8) due to infertility were likely to report lower PET scores and better GHS than women who described relational issues (n = 18). For example, a 39-year old Muslim woman, who had one pregnancy which ended in a miscarriage eight years prior to the interview, self-reported her GHS as good with a PET score of 19, well below the sample mean. She was the second wife in a polygynous marriage. Her comments

mirrored her GHS and PET scores. “I don’t think about it. Not having a child has not affected me. I left it with Allah. If Allah gives [a child] to me now, it will please me. If Allah doesn’t, it doesn’t ruin anything”.

A few women said they had no relational problems but scored above the mean on PET. A 33-year old homemaker who had never been pregnant said her GHS was poor. She scored 27 on the PET but indicated she had not had problems with her husband or others because of her infertility. After 10 years of marriage and six years of infertility treatments this woman expressed discouragement tinged with hope. “I think I will get well and have a child, though I get discouraged. I am tired of trying [to get pregnant] without success”.

Case exemplar

The woman with one of the highest PET scores (36/60) provides us with an example of the connection between psychological distress and personal, internal reactions to infertility, as evidenced by her comments. This 43-year old secretary, with 11 years of education, was the third wife in a polygynous household. She had never been pregnant during 13 years of marriage. She had tried a variety of traditional and biomedical infertility medicines over a span of 10 years. She did not specify any relational problems during the interview; rather, she expressed psychological distress. She said, “There are many consequences of infertility in my life. Infertility is bad. I feel sad. I feel misused even... I’m afraid of being alone in my life because of infertility. I am really afraid”.

Discussion

To our knowledge, this study is the first to examine general health, infertility-related psychological distress, and coping strategies among infertile women in Mali, West Africa. Our results showed that women who were unable to bear and birth children suffer physically, mentally, and socially. Half of the participants indicated their general health was poor. Based on the PET

cut-off score, almost one-quarter of the women's scores were indicative of psychological distress. This distress measure was reinforced by women's descriptions of marital tensions, criticism from family members, and stigmatization for childlessness from members of the community. Coping strategies included seeking treatments for infertility through traditional and biomedical means simultaneously, adhering to religious beliefs and practices, and sometimes self-isolation.

Poor health among infertile Malian women is like results in studies done in Iran and Turkey. Over half of infertile Iranian women seeking treatment ranked their general health or health-related quality of life as less than good^{25,41}; infertile women in Turkey likewise had poorer general health than fertile women⁴².

Malian infertile women experienced fertility-related stress/distress. This finding is consistent with studies of infertile women conducted in several other countries: the United Kingdom⁴³; South Africa¹⁵; Ghana^{16,29,44}; Cameroon⁴⁵; Brazil³⁹; Nigeria⁴⁶; India⁴⁷; Pakistan²²; Turkey⁴²; and the United States⁴⁸. Descriptions of deep sadness, emptiness, social isolation, and fear of a future without children in our study indicate that these women may be suffering from infertility-related stress or depression similar to women with infertility in other sub-Saharan countries^{1,23,44,49}.

Consistent with our findings, women in Ghana¹⁶ and Nigeria⁵⁰ had similar psychological distress levels regardless of the type of infertility. However, our findings are inconsistent with another study in Nigeria⁵¹ and the United States⁴⁸ where women with primary infertility had higher levels of fertility-specific stress than those with secondary infertility. This difference in findings may exist because of cultural variations, intentionality to conceive, years of infertility, or perhaps the different instruments used to measure psychological distress. More research is needed to refine our understanding of Malian women.

Our findings substantiate the premise of the master status model; infertile Malian women may experience elevated levels of psychological distress because their self-identity and societal

status to be mothers is unfulfilled²⁷. They are stigmatized and outcast within their own culture, leading to or compounding psychological distress. The sources of psychological distress are often rooted in the socio-cultural pressures exerted on a woman, particularly by her in-laws. An infertile Malian woman lives with the possibility that her husband's family will pressure him to take another wife or divorce her if she does not produce a child^{52,53}. Similar to our findings, studies conducted in other SSA countries indicated that the husband's family members were the ones who exerted the most psychological pressure on infertile women. In Rwanda, focus group participants said that pressure and accompanying harassment of infertile women came almost exclusively from the husband's family⁵. In Tanzania, East Africa, a woman's in-laws will undoubtedly start to exert pressure on her if there is no pregnancy within the first year of marriage⁵⁴. Hollos and Whitehouse⁵⁵ found a similar sentiment in Nigeria where women who had never birthed a child were considered useless.

The search for pregnancy is motivated by cultural norms for womanhood and childbearing plus the psychological distress infertile women experience. Our findings that Malian women coped with infertility through a combination of traditional African and Western medicine as well as religious practices are consistent with results of other studies across SSA^{3,9,24,56}. Treatments from traditional healers and herbalists may be more credible, obtainable, and affordable than Western medicine. In the relentless search for remedies, many women continued to believe that the blessing of a child was beyond human control; that it is a matter for God to decide. For Christian and Muslim women alike, their personal faith was vital in sustaining them during the difficulties of infertility in a society where women are expected to have children^{5,18,47,57-59}.

Our mixed methods findings showed that QL results confirmed QN results and thus enhanced our understanding of Malian women's stress, perceived health status, and coping strategies related to infertility. Many women with high scores for psychological distress told us of their life difficulties generated from not being able

to bear children. Regardless of the relatively small sample size, the convergence of QN and QL results warrant that health care professionals act to holistically care for infertile women in Mali and develop needed and appropriate interventions to support them. An example of such intervention or support would include screening for psychological distress and social pressure for pregnancy among infertile Malian women, followed by appropriate counselling and referrals. Such a support system can be created gradually. First, our findings were shared at the HFE to increase awareness of the issue among health care professionals there. Our next step would be to establish a routine, hospital-based screening procedure for psychological distress and/or social pressure for pregnancy on infertile Malian women and to develop a support system for them. Such a support group using community-engaged participatory action research might be very beneficial for Malian women.

Our study had several limitations. First we collected data through a convenience sample of Malian women seeking infertility treatment at only one hospital. Findings therefore cannot be generalized or transferred to all Malian women, especially those unable or unwilling to seek infertility treatment⁴⁸, or those from other parts of the country. Second, the sample size was relatively small in comparison to other studies but this study does contribute to our knowledge of infertility-related psychological distress. Third, because participants in our study received the equivalent of 20 US dollars' worth of laboratory exams, selection bias could be another limitation. Lastly, specific ethnic factors were not explored in this study. Research comparing various Malian ethnicities is needed to clarify consequences of infertility on women in relation to social importance and power^{13,60} in the context of variations within their culture.

Conclusion

In summary, women in Mali are expected to conceive and bear children. The socio-cultural pressure for pregnancy affects women physically, mentally, and socially so that infertile Malian women seek help using a combination of

traditional and biomedical therapies, and religious practices. Lack of success leads to heightened psychological distress for many. Health care providers need to assess infertile women's general and psychological health and care for infertile women in a contextually and culturally appropriate manner to improve their health status and quality of life.

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Contribution of Authors

All authors took part in the design of the study, the first author supervised the data collection, the first and second authors analysed the data, all contributed to the preparation of the manuscript and approved the final version of the manuscript.

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