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Fertility Desire Achievements and Women's Mental Health in Rural India

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Fertility Desire Achievements and Women's Mental Health in Rural India

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B.A., University of Pennsylvania, 2004

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An abstract of
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Abstract

Fertility Desire Achievements and Women's Mental Health in Rural India

By Emily Rose Hillman

Although India is experiencing a demographic transition, an emphasis on fertility continues to shape a woman's value in society. This study examines the association between self-reported fertility intentions and mental health symptoms among 4245 married women aged 15-49 in Bihar, Jharkhand, Maharashtra, and Tamil Nadu India as reported in the National Family Health Survey-2 and the National Family Health Survey Follow-up Survey. After adjusting for covariates, regression models indicate an association between unmet fertility desires and mental health, whether through a wanted pregnancy in the next two years which does not come to fruition and the respondent becomes sterilized (mental health problem OR 2.13, 95% CI 1.22-3.69; any mental health symptom OR 1.65, 95% CI 1.19-2.29) or an unwanted pregnancy and poor mental health (any mental health symptom OR 1.43, 95% CI 1.09-1.87). These results provide support for accurate, quality, and a choice of affordable family planning services to women and their partners. Screening for mental health in primary care and reproductive health settings can identify women at-risk for poor mental health who could benefit from integrated mental health and family planning interventions. Finally, continued research can inform programs and policies designed to empower women and increase mental health awareness.

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Finally, this thesis is dedicated to the women who participated in the study and shared their views for the benefit of our increased understanding of fertility and mental health linkages. In some small way, I hope that these words inspire awareness and support for those who suffer needlessly around the world. It is the courage, kindness, and strength of women like those whose responses are reflected in this thesis which provide hope and optimism to us all.

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CHAPTER 1: INTRODUCTION

According to the World Health Organization, mental health disorders affect

hundreds of millions of people globally. In fact, the WHO estimates that one person in

four will develop a mental or behavioral disorder throughout life (WHO, 2004). The

current Diagnostic and Statistical Manual states that for most mental health disorders,

symptoms must be sufficient to cause "clinically significant distress or impairment in

social, occupational, or other important areas of functioning" (DSM-IV-TR, 2000).

Globally, the burden of mental health illness is an increasingly recognized and alarming

public health problem. If mental health disorders are left untreated, suffering, disability,

and economic loss proliferate (WHO, 2008). Five of the leading ten causes of disability

and early death are a result of psychiatric conditions (WHO, 2004). The psychological,

economic, and social burden is large, and disorders also increase the risk of physical

illness (WHO, 2004). Prevalence estimates of common mental health disorders, such as

depression and anxiety, range worldwide: the prevalence of having a WMH-CIDI[1]/

DSM-IV disorder in the past year surveying a sample of 60,434 people across 14

countries around the world resulted in 4.3% to 26.4% of the population; from 33% to

80% of these cases were considered mild (WHO World Mental Health Survey

Consortium, 2004). Estimates in India point to prevalence of anxiety and depression

ranging between 10-30% (Trivedi and Gupta, 2010; Poongothai et al., 2009; Muzammil

et al., 2009).

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[1] WMH version of the WHO Composite International Diagnostic Interview: structured, lay-administered psychiatric diagnostic interview.

People who suffer a disproportionately large mental health burden are usually marginalized and vulnerable in some way (WHO, 2010). This is especially the case for women who represent a marginalized population in India. Lack of female autonomy translates into significant gender inequalities nation-wide, as reflected in the UN gender development index for India in 2007 as 0.594 (UN Human Development Report, 2009). In general, the desired fertility rate (1.9 children per woman) and actual fertility rate (2.7 children per woman) decline is translating to fewer children. The social environment for women is distinguished by an early marriage and inability to make decisions about fertility independently. Marriage is nearly universal; and it is expected that couples begin childbearing immediately (NFHS-3, 2005). Newly-married women move into their husband's home and will then occupy the lowest position in the household (Mehta and Kapadia, 2008). The median age at first birth is 20 among women 20-49 years old. Age-specific fertility peaks at 20-24 years old and then declines. Typically, a newly-married woman will have two children in succession early into the marriage and in age. By mid-twenty, sterilization is common (median age: 25.5). In 2005, 37% of married women report being sterilized (NFHS-3, 2005).

In an environment which places a premium on fertility, women face considerable stress if they are not able to achieve her fertility desires in their lifetime. A woman's status is determined if she is able to fulfill her procreative role. Children are of great value to a couple, in both psychological and economic terms (Mehta and Kapadia, 2008). The gendering of reproductive identity affects the way in which power is manifested by individuals, family, health staff, religion, and state (Unnithan, 2010). In India, women are seen as vehicles of procreation: her value, in large part, is manifested through her

reproductive health. Bearing and raising children fulfills an important cultural function in a hierarchical society such as India and provides a certain power to women which otherwise would not be available and determines the strength of her marriage (Mehta and Kapadia, 2007; Gupta, 2000).

On one level, problems can arise if these desires are not met either by under-fulfillment (no or fewer children than desired) or over-fulfillment (one or more unwanted children). For instance, women who desire to have a child and are unable may become depressed, as they are unable to accomplish their role expectations (Mehta and Kapadia, 2008). Women who are infertile, for example, are seen as deviant from the cultural norm and this renders a woman useless and gives the partner cause for divorce (Sayeed, 2000). Under-fulfilling fertility expectations is both a physical and social concern for the woman (Mehta and Kapadia, 2008). Conversely, women who experience an unwanted pregnancy may also be likely to experience a greater mental health burden, particularly maternal depression and anxiety (Najman et al., 1991; Barber et al., 1999; Lara et al., 2006; Nakku et al., 2006; Lau and Keung, 2007). Hardee and colleagues (2004) examined psychosocial well-being among women in Indonesia who had experienced both intended and unintended pregnancies. Results reveal that women who ever experienced an unintended pregnancy were almost three times more likely to rank in the low well-being group as opposed to the middle or high well-being cluster. The physical health burden of pregnancy alone, social pressure to bear children, and self-identity of a woman due to ability to bear children all have mental health consequences. It can be hypothesized that completing fertility desires or not will play a role in determining a woman's identity and self-esteem.

Using longitudinal data collected from four diverse Indian states: Bihar, Jharkhand, Maharastra, and Tamil Nadu, the relationship between mental health symptoms and achieving or failing to achieve fertility goals will be examined. It is hypothesized that poor mental health is likely to be found among women unable to achieve fertility aspirations in areas where there is a strong link between woman's identity and her ability to achieve fertility desires. The methodology employed consists of a quantitative approach using logistic regression on data from two time-points. Understanding the risk factors, protective factors, underlying context, mental health symptom and problem prevalence, fertility goal achievements, and any possible fertility-mental health association is essential in order to theorize the pathways of effect. Program interventions and public health recommendations are then evidence-based and more likely to succeed given the cultural context. This intersection of fertility and mental health has rarely been examined. To the author's knowledge, no such study exists in India to date. This research will contribute to the reproductive and mental health literature, and the limited evidence base of research combining fertility goal attainment and psychosocial indicators. More research is needed to assess the potential burden of mental health symptoms and illness among females who have completed or did not complete their fertility desires in India.

OBJECTIVE
- Examine the association between achievements of fertility intentions and mental health symptoms in Bihar, Jharkhand, Maharashtra, and Tamil Nadu India

AIMS

- Examine the prevalence of achieving fertility intentions among rural women and prevalence of mental health symptoms after four years according to the follow-up survey conducted in Bihar, Jharkhand, Maharashtra, and Tamil Nadu states, India

- Identify the statistical relationship between meeting or failing to meet fertility goals and mental health as reported by rural women in Bihar, Jharkhand, Maharashtra, and Tamil Nadu states, India

- Describe the pathways of influence between meeting or failing to meet fertility goals and mental health

- Identify public health implications and intervention points for family planning programs for women who report poor mental health and mental health promotion in the general population in India

STUDY SETTING: WOMEN IN BIHAR, JHARKHAND, MAHARASHTRA, TAMIL NADU

With a population of 1,189,172,906 (2011 estimate, CIA 2011), India is the second most populous country behind China. Situated in Southeast Asia, India is made up of 28 diverse states and 7 union territories. Over 80% of the population is Hindu, 13.4% are Muslim, 2.3% Christian, and 1.9% Sikh. Hindi is spoken by 41% of people as the primary language. However, there are 14 other official languages, numerous ethnic groups, and religions. In addition, socio-cultural norms, economic status, education, political beliefs vary considerably by state. The majority of the population's age falls within the 15-64 range, at 64.9%. An additional 29.7% are aged 0-14 and 5.5% are 65 years and older. The gradually smaller percentage of the population aged 0-14 is evidence of the fertility decline in India. Approximately 30% of the population live in an urban

setting (2010 estimate) (CIA, 2011). Among women, 41.5% have received no education; whereas 21.9% of men have not received any education. A high proportion, 87.9% have access to an improved water source, yet only 29.1% report access to a non-shared, improved toilet/latrine facility. Overall, 67.9% of Indian households have electricity. The Indian economy is rapidly expanding, the GDP growth rate is 8.3%. However, economic gains in some regions have not translated to improved health and social indicators nationally. A large disparity in states translates to diverse concerns and priorities.

This study seeks to understand fertility goal attainment and mental health in four diverse and representative Indian states: Bihar, Jharkhand, Maharashtra, and Tamil Nadu. The four states from which the rural, married female study participants reside were selected due to their differential representativeness of economic, cultural, and demographic contexts (Arokiasamy and Gautman, 2008; Government of India; Griffiths, Hinde, and Matthews, 2001). The differences are striking. Bihar and Jharkhand are both predominantly rural and located in north India. Maharashtra is located in the West and Tamil Nadu in the south. In terms of GDP per Indian state, Bihar ranks the lowest, Jharkhand, Tamil Nadu and Maharashtra reported the highest amount of GDP reflecting the fact that Maharashtra is considered the richest state in India (ORC Macro, 2005). Data was collected from rural, married women in four states, selected due to their differential representativeness of economic, cultural, and demographic contexts (Arokiasamy and Gautman, 2008; Government of India; Griffiths, Hinde, and Matthews, 2001). Bihar and Jharkhand are located in the north and rank lower than average on the majority of health and development indicators. On the other hand, Maharashtra in the west, and Tamil Nadu in the south rank above the national average for health and development indicators.

Nationally, Bihar has the highest total fertility rate of 4.0; whereas Tamil Nadu has the lowest fertility rate of 1.8 children per woman. Maharashtra is the most populated state, with over 96 million people; Jharkhand reports the lowest population of nearly 27 million people according to the 2001 Indian census (Government of India, 2008). Women in Bihar and Jharkhand fare worse compared to women in Maharashtra and Tamil Nadu, according to indicators of education, employment, age of marriage and age of beginning childbearing, exposure to mass media, use of family planning, and infant mortality rate (NHFS-3, 2005). These data clearly delineate the striking cultural, economic, and societal differences according to the Indian state. A final and noteworthy point is that of the nearly universal acceptance of the practice of a dowry. Although the Dowry Prohibition Act of 1961 bans the payment and receipt of dowries; the practice is common and results in a heavy burden placed on the family if a girl is born (Umar, 1998).

CHAPTER 2: COMPRENSIVE REVIEW OF THE LITERATURE

MENTAL HEALTH

The World Health Organization defines health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 1948). Mental health refers to a multitude of activities related to the promotion of mental well-being, prevention of mental health disorders, and the treatment and rehabilitation of those who suffer from disorders. However, mental health is often neglected. This is particularly the case in resource-poor settings, where the focus has traditionally been on the attainment of basic necessities and communicable diseases. As attention shifts from communicable disease to chronic disease, the burden of chronic disease is increasingly the focus of attention. As a chronic disease, mental health illness consistently rank as leading causes of disability, morbidity, and mortality. The WHO estimates that approximately 450 million people suffer from a mental or behavioral disorder around the world (WHO, 2004). Many more of these cases are unreported, particularly cases of depression and anxiety which are ranked as top causes for daily adjusted life years (WHO, 2004).

The WHO defines depression as "a common mental disorder that presents with depressed mood, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, low energy, and poor concentration" (WHO, 2004). Severe depression may lead to disability, suicide, workplace absenteeism; although more commonly, it leads to chronic and frequent productivity declines, impairment in the ability to complete daily

responsibilities (WHO, 2004). Depression is the most common psychiatric disorder seen in general and primary care practice (Berardi, 2002). Chronic depression is recurring and may significantly impair an individual over the long-term; while situational depression is particularly common and may occur after a death, as an example. According to the Diagnostic and Statistical Manual of Mental Disorders, there are nine types of depression: major depressive episode, major depressive disorder, hypomanic episode, bipolar I disorder, bipolar II disorder, manic episode, mixed episode, dysthymic disorder, and cyclothymic disorder. As a second major type of impairment, anxiety is generally categorized in five major types: generalized anxiety disorders (GAD), obsessive compulsive disorder, panic disorder, post-traumatic stress disorder, and social phobia. The National Institute of Mental Health defines GAD as "an anxiety disorder characterized by chronic anxiety, exaggerated worry and tension, even when there is little or nothing to provoke it" (NIMH, 2011).

Research on the magnitude and prevalence of mental health disorders in high resource settings has shed light on the importance of the MH burden; however, there is a dearth of research conducted in low resource settings. Difficulties with validated diagnostic instruments, relatively few resources, lack of trained personnel, different priorities, reporting bias, and different cultural manifestations of mental health problems are among many obstacles to research (WHO, 2008). Despite these difficulties, there have been several studies conducted around the world contributing figures which explain varying prevalence rates of mental health problems. Findings from the U.S. Behavioral Risk Factor Surveillance System report that the overall current prevalence of depressive symptoms is 8.7% (ranging from 5.4% to 17.2%) and 15.7% as a lifetime diagnosis of

depression, and 11.3% lifetime diagnosis of anxiety (Strine et al., 2008). Where mental

health is less stigmatized, such as in the U.S., higher rates are reported as compared to

other countries around the world where poor mental health symptoms are not

acknowledged or reported. Research from Egypt point to lower reported mental health

problem prevalence: all mental health problem prevalence is estimated at 16.93%.

However, mood disorders comprised 6.43% and anxiety disorders at 4.75% and multiple

disorders at 4.72% (Ghanem et al., 2009).

Rates of depression and anxiety differ by country and within country, largely

according to ethnicity (Ruiz, 2001). Ethnic groups acknowledge, interpret, teach, value,

and understand mental health symptoms in a myriad of ways which influence the

reported rates of mental health symptoms. As an example, a population-based survey in

urban Pakistan found the prevalence of depression to be 45.9% (Muhammad and

Mugford, 2007), in Bangladesh 29% (Asghar et al., 2007), and in peri-urban clinic in

Uganda 6.1% (Nakku et al., 2006). The differences in prevalence rates from one country

to another are likely a result of underreporting and/or different understandings and

expressions of mental health problems which vary culturally (WHO, 2008). The

relatively few studies conducted in India estimate a prevalence of major mental and

behavioral disorders at 65 per 1000 population. Neurotic disorders, including anxiety,

have an estimated prevalence according to self-report of 20.7% (Trivedi and Gupta,

2010) and depression prevalence is estimated at 15.1% among urban south Indians.

Among females, 16.3% reported depression and 13.9% of males reported depression,

with the most common symptoms as depressed mood and tiredness (Poongothai et al.,

2009). In Uttarakhand, the overall prevalence of psychosocial problems among female

adolescents was 27.6% (Muzammil et al., 2009). Additionally, each state in India is markedly different; therefore national figures mask inter-state variation (Math et al, 2007). Studies from primary-care clinics in India report depression prevalence ranging from 21%-83% (Kishore et al., 1996; Amin et al., 1998; Pothen et al., 2003; Nambi et al., 2002). There is high comorbidity among mental health disorders and are interrelated with physical illness and social problems (WHO, 2004). These latter estimates are likely high, since they are measured in people who are already seeking health care and may be suffering from physical as well as psychological distress. Yet, no matter what the true number of people suffering from a mental health problem, a significant number are in distress.

Mental health disorder prevalence is highly asymmetric (WHO, 2000): females experience a significantly greater mental health distress due to personal, social, cultural, and political factors (Lorber, 1997). Globally, women report more anxiety and mood disorders than men (Seedat et al., 2009; Bener et al. 2011; Vesga-Lopez et al, 2008; Poongothai et al., 2009). This difference, to some degree, is likely attributed to the idea that women tend to report more health problems and seek more health care generally (Cornally and McCarthy, 2011); whereas, perhaps men conceal their problems until it is no longer possible. Research indicates that women, whether due to socio-cultural upbringing, cultural permission to express their ill health, or biological reasons, experience a higher frequency and greater intensity of emotions (Brebner, 2002). Few studies have attempted to quantify the prevalence of depression and anxiety among pregnant women and women through the lifetime. It is important to recognize that pregnancy in general may produce serious physical, as well as mental health, effects.

Hormone fluctuations, weight gain, difficult deliveries, abortion, and other physical effects may affect how a woman feels (Lobel et al., 2008). This perception may be transitory or become longer-term effects. There is an interplay between physical health which can affect mental health, and vice versa.

The majority of studies that have been conducted examining depression in women are primarily related to concerns about post-partum depression. A worldwide problem, postpartum depression affects not only the woman but also the child. As depression can manifest itself in poor parenting, the welfare of the child is also at stake. Therefore, this disorder has received additional attention. A systematic review conducted on pre and postnatal psychological wellbeing in Africa revealed depression to be the most commonly assessed mental health disorder with a weighted mean prevalence of 11.3% during pregnancy and 18.3% after birth. Prevalence rates of anxiety were 14.8% during pregnancy and 14.0% after birth (Sawyer et al., 2010). In fact, a study in Germany also reports that young mothers and mothers with low education have an increased risk of developing depression after giving birth (Reck et al., 2008). Biologically, hormone fluctuations, weight gain, and the experience of a difficult delivery can affect a woman's mental health. Young mothers may be particularly at risk due to physiological reasons that the body is not prepared for a birth or due to social reasons such as the lack of a well-paying job, incomplete education, or lack of support may present increased incidence of depression. A study conducted in Italy found that one in 5 women presented with a current Axis 1 disorder in their third month of pregnancy and that over 50% of women reported a lifetime prevalence of an Axis 1 disorder (Borri et al., 2008). Many of the feelings during the third semester of pregnancy may be a result of more temporary

feelings of depression or anxiety; however the high prevalence of mental health disorders over the lifetime point to a more systemic mental health problem among women.

In India, a study in Tamil Nadu found that post-partum depression incidence among a cohort of rural women was estimated at 11%. Low income, birth of a daughter when a son is desired, relationship troubles with the extended family and in-laws, adverse life events, and lack of physical help during pregnancy were risk factors for poor mental health (Chandran and Tharyan, 2002). Birth of a daughter when a son is desired (or no child at all) may manifest itself as a mental health problem. A daughter represents a significantly greater financial burden as compared to a son whose role is to support the parents in old age and whose birth does not incur an expense later in life. Lack of help during pregnancy, problems at home and in life, and low income may put a strain on the woman. In India, a study among mothers at 6 weeks after delivery and again at 6 months later found a prevalence of depressive disorder in 23% of the patients' 78% of whom had psychological morbidity prior to giving birth. It can be expected that women who had psychological morbidity before birth would continue to face problems afterwards, especially given the physical and emotional toll of childbirth. Over 50% of the sampled respondents were diagnosed as depressed at 6 months following delivery. Risk factors include economic deprivation and a poor marital relationship. The infant's gender was associated with postnatal depression, modifying the relationship between other risk factors such as violence and hunger (Patel et al., 2002).

An important perceived and actual risk factor for mental health disorders in India is socioeconomic status. Among all women in the state of Maharashtra, a study examining community beliefs about causes and risks of mental disorders found that

commonly acknowledged causes were mostly socioeconomic; poor and unemployed women were determined to be the most vulnerable (Kermode et al, 2010). Whereas a factor such as socioeconomic status is more likely to be noted by community members, other factors inside the home such as the marital relationship also have influence but may not be as easily noticed by others. Research from women in Kerala found that the household economic situation provokes high levels of stress and anxiety among women. Mental status declines as women grow older. Protective factors include education, having employment or being a student, better economic status. The effect of marriage is inconclusive; although it appears that divorced, widowed, and separated women fare worse. While not significant, caste divisions are better predictors of mental health than religion, (Mukhopadhyay, 2004).

Poor mental health contributes to long-term disability, morbidity, mortality, and interacts with other health conditions (Prince et al., 2007). Feeling depressed, worthless, anxious, and/or constantly tired can have physiological consequences; and may also produce feelings of indifference towards managing existing or new health problems. Research from India suggests that older age, being female, being divorced or widowed as opposed to being currently married, and reporting a lower SES, are among factors associated with depression (Poongothai et al., 2009). A study conducted in China concluded that being older than 25 years old, having a low educational level, being unemployed, and either reporting low or high monthly income were associated with an elevated risk of generalized anxiety disorder (Ma et al., 2009). Not having a job, earning a low monthly income and difficulty in making ends meet may contribute to worries and anxiety over livelihood. However, a high income may also produce anxiety if the

workload is intense and pressure exists to maintain a certain level of status. A study in Qatar found that being a female, married, middle-age, and highly educated described the characteristics of the majority of the high risk group (Bener et al., 2011). Research suggests that women are more vulnerable to mental health disorders at an early age and at a later age. In Pakistan, odds of depression in women were elevated for women who were married for more than 5 years, being abused by their in-laws, spending less than 3 hours per day with their spouses, and reporting being "just satisfied" or not satisfied with their married life (Amir Ali and Zuberi, 2011). The research is inconclusive with regards to marriage, which may be a protective factor or risk factor, depending on the cultural context. It is evident, however, that family conflict produces negative mental health effects. Lack of support and marital/family conflict were correlated with poor mental health in the systematic review in Africa (Sawyer et al., 2010), negative life events, relationship problems, physical partner violence, childhood adversity, marriage status (Seedat et al., 2009). In addition to many of these factors, studies from high resource settings reveal adverse health behaviors, chronic health conditions, and other sociodemographic characteristics (such as being a woman, young, previously or never married, not working) to also be risk factors for depression and anxiety (Strine et al., 2008).

UNWANTED PREGNANCY

Social and cultural influences are associated with how individuals perceive pregnancy around the world (Fischer et al. 1999). Pregnancies that are unwanted or mistimed (unintended) may have serious health, social, and economic consequences for the child, mother, father, and family. It is not only a public health problem; but a human

rights problem (Gipson et al., 2008). Consequences from unintended pregnancies are "serious, imposing appreciable burdens on children, women, men, and families" (Brown and Eisenberg, 1995). Women who have an unintended child may be less likely to realize the pregnancy, seek prenatal care, and follow all of the pregnancy recommendations (Gipson et al., 2008). If this occurs in a young woman, her body may not be physiologically prepared for pregnancy. While all pregnancies incur a financial burden, unintended pregnancies are an unexpected and unplanned expense which may place an additional burden on the couple or parent.

Most of the research regarding unintended pregnancies has been conducted in the U.S. and other developed settings. After controlling for socio-demographic factors, one study indicated a relationship between unhealthy pre and perinatal behaviors and conditions of the mother including postpartum depression, when examined with unintended pregnancy (Cheng et al. 2009). Similarly, research has shown that women with unwanted pregnancies or women who were ambivalent about their pregnancies have an increased risk of mistimed pregnancies. Inconsistent or lack of family planning utilization may also contribute to the higher prevalence of mistimed pregnancies. In turn, women with unwanted pregnancies or women ambivalent about their pregnancies have been associated with an increased risk for some poor birth and maternal outcomes (Mohllajee et al. 2007). Women with unwanted pregnancies in the U.S. were less likely to initiate or continue breastfeeding than women with intended pregnancies (Taylor and Cabral, 2002; Kost et al. 1998; Dye et al. 1997). Women with an unwanted pregnancy may have less likelihood to connect with their child, be less educated about the benefits of breastfeeding, feelings of ill-will or have an unsupportive partner, and/or have less

time to take off of work. Additionally, women with unwanted pregnancies likely had less access to family planning and therefore, likely have less resources to support the child. Poor child outcomes, such as stunting (Shapiro-Mendoza et al. 2005), preterm delivery (Orr et al. 2000) were also found among women who reported mistimed or unwanted pregnancy. Reduced frequency of prenatal healthcare visits, care for pregnancy, and care of newborn may contribute to these adverse health outcomes. Conversely, other studies report no adverse perinatal outcome among women who reported that their pregnancy was unintended (Gadow et al. 1998). A review of the literature on the effect of unintended pregnancy report mixed or no effects on maternal pregnant behavior, antenatal care, birth outcomes, preventive/curative child care, child development but general negative effects on breastfeeding, child mortality, nutrition, child abuse, maternal mortality, unsafe abortion, mental health, childrearing, domestic abuse (Gipson et al., 2008).

Socio-cultural influences play a large role in the perception and care of a child. Receipt of antenatal care among rural women in Bihar and Jharkhand was not significantly associated with prospective pregnancy intention; however only among women who reported their pregnancy as unwanted before and after birth were more than two times more likely to delay antenatal care (Barrick and Koenig, 2008). Distress about an unwanted child may contribute to feelings of indifference about the child which may manifest itself through the woman not expending the effort to receive healthcare for the child.

Among the many factors which predict unintended pregnancies, there is substantial evidence that physical and sexual violence are associated with an increased

risk (Gazmararian et al., 1995; Stewart and Cecutti 1993; Campbell et al., 1995; Cripe et al., 2008). Physical and sexual violence reduce the ability of women to negotiate and make decisions regarding family planning with their partner. The most common method of contraceptive use in India is sterilization (NFHS-3, 2005), which in most states requires the woman to have permission from the husband (Begum et al., 2010). An abusive partner may not be willing to agree to any form of family planning, including female sterilization. Additionally, females who experience physical and sexual violence may be more likely to report a pregnancy as unintended or unwanted. An analysis of data from the NFHS-2 in India showed that women who were physically abused were 47% more likely to experience unintended pregnancies (Begum et al., 2010). Research from North India demonstrates a strong and systematic correlation between partner physical and sexual abuse and men's reports that their wives had at least one unintended pregnancy (Martin et al., 1998). Although research is limited, evidence suggests an association that exists globally. The association between physical violence and unintended pregnancy has also been verified in Colombia (Pallitto and O'Campo 2004, 2005). In the U.S., 45% of women visiting a clinic in CA reported their first pregnancy to be unintended and 65.8% revealed two or more types of childhood abuse or household dysfunction exposure. Frequent psychological abuse, physical abuse, and physical abuse of the mother were the strongest predictors of experiencing an unintended pregnancy (Dietz et al., 1999).

Research also indicates sexual violence to be a predictor: coerced first sexual experience has been associated with higher risk of unintended pregnancy. In the circumstance of a coerced sexual experience, contraceptive methods are unlikely to be

used; thereby increasing the risk of pregnancy, as well as numerous other health problems such as sexually-transmitted disease. In South Africa, a study of adolescents report there to be a correlation between forced sexual initiation and unintended pregnancy. Adolescents having experienced forced sexual initiation were found to be less likely to discuss relationship issues with their partner. Unequal power dynamics are hypothesized to affect female negotiating power (Jewkes et al., 2001). In an environment in which women already face significant gender inequalities, forced sexual initiation compounds an already unequal partner dynamic.

Causative factors, such as age, SES, and marital status, may be responsible for unintended pregnancy. A study conducted in New York City found that risk factors for unintended pregnancy among the urban poor were being an adolescent, not being married, and alcohol use. These risk factors were found to be better predictors as risk factors than race/ethnicity, number of previous pregnancies, and frequency of contraceptive use (Besculides and Laraque, 2004). Females who are married may feel greater social pressure to report the pregnancy as intended. In addition, there may be a true difference between the desire to be pregnant among married females and unmarried females. Adolescents are less likely to be married or have a serious partner, have the supportive resources for a child, not be as knowledgeable about contraceptive methods and be mentally and physically prepared for a child. Therefore, there is less taboo in reporting a pregnancy as unwanted. Finally, alcohol use may interfere with the utilization of family planning methods and it also serves as a mechanism for externalizing the blame of an unintended pregnancy instead of taking ownership of a conscious decision. There is also an association between unintended pregnancies and shorter birth intervals

(Gazmararian et al., 1996; Stewart and Cecutti 1993), likely reflecting the inability of women to negotiate contraceptive use due to unequal power dynamics. Varying cultural contexts, education, and female empowerment may contribute to similar risk factors seen globally, such as age and poverty. Due to the myriad of methods and ways in which to measure utilization and frequency of family planning, some studies report it as a direct risk factor for a woman to experience an unintended birth (Williams, Abma, Piccinino 1999), while other research indicates risk factors such as education and poverty are also associated with family planning utilization and frequency (NFHS-3, 2005). For women experiencing a birth in one of 18 South American hospitals, Gadow et al. found that 49.8% of over 5,000 mothers reported an unintended pregnancy. The high prevalence of reported unintended pregnancies may reflect a more accepting cultural context of unintended pregnancies. Among other characteristics, these women were more frequently multiparous, had a higher mean age, conceived easily, and had less education (Gadow et al., 1998). Having already fulfilled the female obligation to have children and being of an older age may mean that these women are less afraid of reporting an unintended pregnancy. A lack of education may translate to less knowledge and use of family planning methods and birth spacing.

DEFINITION AND MEASUREMENT OF UNINTENDED PREGNANCY

The measurement of unintended pregnancies presents many methodological challenges. The wording of the question, the terms used, and the timeframe before or after pregnancy vary in each study. Typically, surveys ask women to classify the pregnancy according to distinct categorical responses such as wanted, unwanted, or mistimed. Concerns have been raised that perhaps a continuum or range of feelings may

be more appropriate (Bachrach and Newcomer, 1999; Luker 1999). In the data analysis phase, some studies combine unwanted and mistimed, even though the distinction between the two categories is important. Grouping the two together likely overestimates the prevalence of mistimed pregnancies and underestimates the effect of an unwanted pregnancy. The characterization between a mistimed pregnancy versus an unwanted pregnancy will differ based on study location and population (Gipson et al., 2008).

Studies designed to measure pregnancy intention are typically cross-sectional and will either ask prospectively or retrospectively. Asking a respondent about pregnancy intention before-hand may be problematic because of the changing nature of childbearing choices. Prospective measures do not account for a woman who perhaps changed her mind later on. Measuring pregnancy intention before-hand among women also does not take into account the partner's desires. Research from the U.S. suggests that fertility preference is relatively stable over time (Schoen, 1999); yet, personal and living conditions will affect a woman's desire for children (Williams et al., 1999). In lower-resource countries, especially those undergoing fertility transitions such as India, fertility goals are more subject to change and reliant on external influences. These influences may be partner differences in childbearing motivations, family composition, and child mortality (Gipson and Hindin, 2007).

Retrospectively, surveys ask mothers to remember their feelings at the time of conception or most recent live birth. Birth rationalization is also a concern in measuring unintended pregnancy, as women may report their originally-unwanted child as a wanted birth. In fact, panel studies in India reveal that women were more likely to shift from "unwanted" to "wanted." (Koenig et al., 2006). Respondents may not categorize births as

unwanted; instead, regardless of intention, they may categorize the birth as wanted or mistimed. Evidence from resource-poor settings is limited, but suggests that this tendency towards birth rationalization occurs frequently (Koenig et al., 2005). There also exists the possibility that women may report a child as unwanted when the child had been wanted on conception. This could occur if the child's attributes did not meet parental expectations (Rosenzweig and Wolpin, 1993), or if the partner desired the child but the woman did not. Most studies, such as the DHS and others, measure unwanted childbearing retrospectively; whereas this study attempts to look prospectively without the issue of rationalization bias.

FERTILITY GOALS AND FAILURE TO MEET THESE GOALS

For many women around the world, her destiny, value, and role will be closely linked to her ability to bear children. The ability to complete fertility desires will therefore influence a woman's identity and self-perception. In India, as in many countries, a woman's reproductive health is prized and bearing children is important in achieving social status (Mehta and Kapadia, 2008). Regardless of privately-held fertility desires, societal pressures may provoke feelings of worthlessness and negatively affect self-esteem and identity in women who are not able to have children. Gossip from community members and particularly from extended family may lead to stress on the woman if she is not able to attain the number of desired children. Similarly, partner pressure to have a certain number of children will impact a woman's mental health. Having too few children may affect the marriage as partner pressure and blame can lead to marital stress, especially if sons are not born. It can be hypothesized that partner dissatisfaction resulting from incomplete fertility desires may manifest itself in increased

alcohol abuse, partner violence, or other actions of frustration from incomplete fertility desires which all have an impact on the female partner. In a situation in which men dominate decision-making (Yadav et al., 2010), it may be difficult to understand a woman's own desires.

Although there is a dearth of research on wanting a child and not having a child in low-resource settings, there have been studies which have quantified a probable association among infertile or subfertile women who want a child in high-resource settings and are having trouble conceiving. Infertile or subfertile women undergoing in-vitro fertilization report statistically significant worse mental health (Carter et al., 2011). In this case, women are facing difficulties meeting their expressed fertility goals.

In the 1980's and 1990's, researchers postulated that attitudinal data on pregnancy intention predict eventual behavior and fertility. Over time, the evidence supporting the link between attitudes and behavior has been mixed. Considerable inconsistency has been found between women's birth intentions and later reports about wantedness of a child (Williams and Abma, 2000). Research into pregnancy intentions as a measure for maternal and child health presents mixed results (Gipson, 2008). In some studies, pregnancy intention has been shown to be associated with health behaviors before pregnancy and in early pregnancy which may affect change in the pregnancy and birth (Hellerstedt et al., 1998). It is possible that failure to meet fertility goals not only affects the woman's mental health; but also has impacts on the child. It can be hypothesized that women who have unwanted children and consequently face depression or anxiety may be more prone to poor parenting, increased stress due to number of children in the household, and children may be neglected. However, birth intention may have an

important role in the mental health of the woman/mother and therefore is worthwhile of study to assess the role of fertility in shaping women's mental health.

Fertility, wanted or unwanted births can be predicted from ideal family size, son preference, social and economic development. Longitudinal research from India concludes that 82% of women who state that they do not want more children responded similarly in 2002, although approximately half had given birth in this inter-survey period. For women who had at least one son, 79% of those who achieved or surpassed their ideal family size said they no longer wanted children, relative to 18% of those who had not (Roy et al., 2008). Indian culture is gradually embracing the idea of two children as the ideal, with at least one child as a son. Whereas a son may provide stability, daughters represent an increased economic burden because of the dowry and therefore son preference plays a role in explaining fertility desires (NFHS-3, 2005). In South Korea, where a TFR of 1.08 was reported in 2005, women's age, number of living children, job type, housing type, and social group participation predicted whether or not a woman would desire to have additional children (Park et al., 2008). In many high resource-settings, the total fertility rate is declining. Employment in paid work, along with economic and social development, explain the declining fertility rates (Lee and Gramotnev, 2006; Myrskyla et al., 2009). Other studies site the importance of partner's desire having a strong influence on pregnancy desires (Stanford et al. 2000).

INTERSECTION OF MENTAL HEALTH AND FERTILITY

In high resource settings, there is evidence suggesting an association between fertility and mental health. The association is most evident among infertile or subfertile women who experience statistically significantly poorer mental health (Carter et al.,

2011; Chachamovich et al., 2010). In this instance, women have a strong desire for children and are unable to conceive resulting in poor mental health. Many other studies examine the relationship of fertility intentions among individuals living with HIV/AIDS. Relatively little data on fertility desires among women who do not have HIV and/or fertile women, including wanting a child now or later, not wanting a child, or ambivalence exists in relation to mental health consequences. Separately, both factors have been studied; but, no study exists linking the two in India. The relationship between fertility and mental health is unknown; but the ramifications of this knowledge could greatly help to improve women's health.

The pathways of influence between fertility desires and mental health are not well understood. It could be hypothesized that where women's identity is manifested through her reproductive health, her mental health will be more closely tied to her reproductive abilities. Few studies have attempted to link unintended pregnancy with depression; however several examples from around the world point towards an association. In a review of the literature on mood disorders and fertility in women in the U.S., Williams and colleagues report that women seeking treatment for infertility have elevated risk of depressive symptoms (2007). While many studies examining this link in the U.S. exist, the authors conclude that due to the many confounding variables and limited scope of studies that there is likely a complex connection between fertility and mood disorders (Williams et al., 2007). In Iran, researchers found a higher prevalence of depression among women who reported unintended pregnancy at 37 weeks gestation and at ten days postpartum (Iranfar et al., 2005). Data from the U.S. National Longitudinal Study of Youth linking fertility intentions and depressive symptoms yielded no association among

women between unplanned births and psychological distress (Maximova and Quesnel-Valée, 2009).

Indirectly, there are factors mediating the relationship between fertility and poor mental health, these include: maternal education (Gadow et al. 1998), poverty, IPV partner's alcohol use (Nayak et al., 2010; Stephenson et al., 2011). In Goa, India results from a population-based survey reveal that excessive partner alcohol use increases the risk for common mental disorders two or three fold. Both partner violence and alcohol-related problems each mediated the association between partner's intake of alcohol and mental disorders. Women's attitudes on condoning violence remained significantly associated with poor mental health, after controlling for other variables. Women who condone male violence possibly consider themselves less important. Perceiving oneself to be subordinate is an indication of male domination and gender inequality which may also reflect itself in a woman feeling as if she has few choices with which to handle any problems. This could in turn increase "learned helplessness" (Nayak et al., 2010).

Not achieving personal fertility desires is frustrating and stressful; and stress is associated with poor mental health (Fleisher et al., 2007). For example, a study found that infertile Thai women experienced a significant negative correlation between global stress and social support (Sreshthaputra et al., 2008). A cross-national study measuring general population suicide rates and national fertility rates found that general population suicide rates in males and females were correlated with fertility rates, the relation appears curvilinear (Bhandarkar and Shah, 2008). In Nigeria, women with unfulfilled desire for pregnancy reported a higher anxiety and depression score than their husbands, although they were positively correlated. Emotional burden in the family was correlated with low

religious inclinations, strained relationship, family pressure on the husband, husband's

negative attitude about child adoption, and lower age of wife (Fatoye et al., 2008).

Therefore, the sparse literature which exists suggests an association between unmet

fertility desires and poor mental health. This study seeks to quantify a link between two

important variables which help to explain how a woman views herself and societal role.

This study examines the relationship of self-reported fertility desires and

subsequent possible symptoms of depression and anxiety (poor mental health symptoms)

as an outcome in rural Indian women from four states: Tamil Nadu, Jharkhand, Bihar,

and Maharastra using longitudinal data. Marked inter-state differences are assessed in

demographic information, yet the association is measured between exposure and outcome

is assessed among all respondents regardless of state of residence. The demographic

transition of India, continued emphasis on fertility, increased attention on poor mental

health consequences, and gender inequalities in India are all factors which make this

study timely and informative for policies, programs, and interventions designed to allow

couples to achieve their fertility desires and enjoy a high quality of life.

CHAPTER 3: MANUSCRIPT

Fertility Desire Achievements and Women's Mental Health in Rural India

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Contribution of Student

Dr. Stephenson and I collaborated from the start, beginning with brainstorming an appropriate thesis question. Dr. Stephenson provided the data that I utilized in the analysis, from the National Family Health Survey-2 and the National Family Health Follow-up Survey conducted in 2002/3. Dr. Hindin was involved in the selection and approval of the thesis question and the original follow-up survey data collection. I conducted the analysis, created the tables and figure, and wrote up the literature review, manuscript, public health recommendations and all other writing featured in this thesis. Dr. Stephenson met with me weekly and provided regular support in all stages of the process including edits to all drafts of the thesis.

ABSTRACT

Although India is experiencing a demographic transition, an emphasis on fertility continues to shape a woman's value in society. This study examines the association between self-reported fertility intentions and mental health symptoms among 4245 married women aged 15-49 in Bihar, Jharkhand, Maharashtra, and Tamil Nadu India as reported in the National Family Health Survey-2 and the National Family Health Survey Follow-up Survey. After adjusting for covariates, regression models indicate an association between unmet fertility desires and mental health, whether through a wanted pregnancy in the next two years which does not come to fruition and the respondent becomes sterilized (mental health problem OR 2.13, 95% CI 1.22-3.69; any mental health symptom OR 1.65, 95% CI 1.19-2.29) or an unwanted pregnancy and poor mental health (any mental health symptom OR 1.43, 95% CI 1.09-1.87). These results provide support for accurate, quality, and a choice of affordable family planning services to women and their partners. Screening for mental health in primary care and reproductive health settings can identify women at-risk for poor mental health who could benefit from integrated mental health and family planning interventions. Finally, continued research can inform programs and policies designed to empower women and increase mental health awareness.

INTRODUCTION

India is experiencing a demographic transition as the fertility rate (2.7 children per woman) decline translates to fewer children born than ever before (NFHS-3, 2005). However, an emphasis on fertility remains. A woman's value is largely manifested through her ability to fulfill her reproductive health expectations which traditionally include bearing two children, at least one of which is a son. Bearing and raising children fulfills an important cultural function in hierarchical societies, instilling psychological and economic value to couples, providing a certain power to women who are seen as vehicles of procreation which otherwise would not be available, and determining the strength of marriage (Mehta and Kapadia, 2007; Gupta, 2000). In environments which place a premium on fertility, women face stress if they are not able to achieve fertility desires. Fertility under-fulfillment is a physical, social, and mental health concern due to the inability to accomplish role expectations (Mehta and Kapadia, 2008). Women who are infertile are seen as cultural deviants, rendering a woman useless and giving the partner cause for divorce (Sayeed, 2000). Conversely, women who experience an unwanted pregnancy may also experience a greater risk of maternal depression and anxiety (Najman et al., 1991; Barber et al., 1999; Nakku et al., 2006; Lau and Keung, 2007).

Although there is a dearth of mental health research conducted in resource-poor settings, globally, the burden of mental health illness is an increasingly recognized public health problem, as an estimated one person in four will develop a mental or behavioral

disorder throughout life (WHO, 2004). The psychological, economic, and social burden is large, and disorders also increase the risk of physical illness (WHO, 2004). The prevalence of having a WMH-CIDI[2]/ DSM-IV disorder in the past year among a sample of 60,434 people across 14 countries worldwide was 4.3% to 26.4% of the population; 33% to 80% of these cases were considered mild (WHO World Mental Health Survey Consortium, 2004). Estimates in India point to a prevalence of common mental health disorders, anxiety and depression, ranging between 10-30% (Trivedi and Gupta, 2010; Poongothai et al., 2009; Muzammil et al., 2009). A marginalized population, women suffer a disproportionately large mental health burden. Lack of female autonomy translates into significant gender inequalities, as reflected in the UN gender development index for India in 2007 as 0.594 (UN Human Development Report, 2009). The social environment for women is distinguished by a nearly-universal early marriage, inability to make decisions independently (NFHS-3, 2005), and occupation of the lowest position in the husband's household (Mehta and Kapadia, 2008), and begin childbearing immediately (NFHS-3, 2005). In India, the self-reported desired number of children is 1.9 (NFHS-3, 2005). The physical burden of pregnancy, social pressure to bear the appropriate number of children, and cultural link of self-perception and ability to bear children have important mental health consequences.

This analysis uses longitudinal population-based data collected on rural married women aged 15-49 from four diverse Indian states: Bihar, Jharkhand, Maharashtra, and

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[2] WMH version of the WHO Composite International Diagnostic Interview: structured, lay-administered psychiatric diagnostic interview.

Tamil Nadu, to examine the association between mental health symptoms and fertility intention achievements. It is hypothesized that poor mental health is likely to be found among women unable to achieve fertility aspirations. Understanding the potential relationship, according to the cultural context will contribute to the limited evidence-base of research combining fertility goal attainment and psychosocial indicators, inform recommendations and program interventions. To the author's knowledge, no study examining the fertility and mental health intersection exists in India to date.

BACKGROUND

Traditionally neglected, the mental health burden and risk factors predisposing individuals to poor health outcomes are increasingly the focus of attention (WHO, 2004). Globally, females report more anxiety and mood disorders due to personal, social, and political factors than men (Lorber, 1997; Seedat et al., 2009; Bener et al. 2011; Vesga-Lopez et al, 2008; Poongothai et al., 2009). In India, the prevalence of neurotic disorders, including anxiety, is estimated at 20.7% (Trivedi and Gupta, 2010). Estimates of depression among women ranges from 15.1% (Trivedi and Gupta, 2010) to 16.3% (Poongothai et al., 2009). In Uttarakhand, the overall prevalence of psychosocial problems among female adolescents was 27.6% (Muzammil, Kishore, Semwal 2009). Common symptoms were reported to be depressed mood and tiredness (Poongothai et al., 2009). Among rural women in Tamil Nadu, post-partum depression incidence was estimated at 11%. Low income, birth of a daughter when a son is desired, relationship and extended family troubles, adverse life events, and lack of physical help during pregnancy were risk factors for depression (Chandran and Tharyan, 2002). Additional research from India suggests that older age, being female, not currently married, and low

SES, are among factors associated with depression (Poongothai et al., 2009). In Kerala, women report that the household economic situation provokes high levels of stress and anxiety (Mukhopadhyay, 2004). Poor mental health contributes to long-term disability, morbidity, mortality, and interacts with other health conditions (Prince et al., 2007) and may cause a lack of effort to manage health problems.

Few studies have attempted to quantify an association between fertility and mental health. Evidence from high-resource settings suggest that infertile or subfertile women who desire children but are unable to conceive experience significantly poorer mental health (Carter et al., 2011; Chachamovich et al., 2010; Williams et al., 2007). Research linking unintended births and depression is inconclusive. While data from the U.S. National Longitudinal Study of Youth yielded no association among women between unplanned births and psychological distress (Maximova and Quesnel-Valée, 2009); other studies suggest a possible association. In Iran, researchers found a higher prevalence of depression among women who reported unintended pregnancy at 37 weeks gestation and at ten days postpartum (Iranfar et al. 2005). Experiences of unwanted pregnancy may produce symptoms of depression and anxiety in women (Najman et al., 1991; Barber et al., 1999; Nakku et al., 2006; Lau and Keung, 2007). Hardee and colleagues (2004) report that women in Indonesia who ever experienced an unintended pregnancy were almost three times more likely to rank in the low psychosocial well-being group as opposed to the middle or high well-being group. Cheng and colleagues (2009) report a relationship between unhealthy pre and perinatal behaviors and conditions of the mother including postpartum depression, when examined with unintended pregnancy. A review of the literature on the effect of unintended pregnancy report mixed

or no effects on maternal pregnant behavior, antenatal care, birth outcomes, preventive/curative child care, child development but general negative effects on breastfeeding, child mortality, nutrition, child abuse, maternal mortality, unsafe abortion, mental health, childrearing, domestic abuse (Gipson et al., 2008).

Indirectly, there are factors mediating the relationship between fertility and poor mental health, these include: maternal education (Gadow et al. 1998), poverty, IPV, partner's alcohol use (Nayak et al., 2010; Stephenson et al., 2011). Evidence suggests that physical and sexual violence is associated with an increased risk for unintended pregnancy (Gazmararian et al., 1995; Stewart and Cecutti 1993; Campbell et al., 1995; Cripe et al., 2008; Jewkes et al., 2001). Physical and sexual violence further reduces the ability of women living in gender-unequal societies to negotiate and make fertility-related decisions with their partner (Jewkes et al., 2001). In turn, many studies report associations of IPV and poor mental health (Chandra et al., 2009; Chen et al., 2009; Ellsberg et al., 2008; Vizcarra et al., 2004). Regardless of privately-held fertility desires, partner, community and societal pressures may negatively affect a woman's self-esteem if she was not able to have the desired number of children. This may also lead to marital stress, especially if sons are not born.

STUDY SETTING

The four states from which the rural, married female study participants reside were selected due to their differential representativeness of economic, cultural, and demographic contexts (Arokiasamy and Gautman, 2008; Government of India, 2008; Griffiths, Matthews and Hinde 2000). Bihar and Jharkhand are located in the north and rank lower than average on the majority of health and development indicators. On the

other hand, Maharashtra in the west, and Tamil Nadu in the south rank above the national average for health and development indicators. Nationally, Bihar has the highest total fertility rate of 4.0; whereas Tamil Nadu has the lowest fertility rate of 1.8 children per woman. Women in Bihar and Jharkhand fare worse compared to women in Maharashtra and Tamil Nadu, according to indicators of education, employment, age of marriage and age of beginning childbearing, exposure to mass media, use of family planning, and infant mortality rate (NHFS-3, 2005). These data clearly delineate the striking state-level cultural, economic, and societal differences. Although the Dowry Prohibition Act of 1961 bans the payment and receipt of dowries; the practice is common and results in a heavy burden placed on the family if a girl is born (Umar, 1998).

[TABLE 1]

DATA AND METHODS

The International Institute Population Sciences (IIPS) conducted the second of India's equivalent for the Demographic and Health Survey, the National Family Health Survey-2 (NFHS-2) in 1998 and 1999. The NFHS-2 employed a cluster sampling methodology using three questionnaires: the household, village, and women's, to reach 99% of India's population. The total ever-married women sample, aged 15-49, was 89,199. Following the NFHS-2, the Johns Hopkins Bloomberg School of Public Health and the IIPS collaborated to prospectively follow-up survey a subset of the same women surveyed from the NFHS-2. Conducted in 2002 and 2003, the NFHS-2 Follow-up survey employed trained female interviewers who questioned the NFHS-2 original rural respondents (n=6303) from four Indian states: Bihar, Jharkhand, Maharashtra, and Tamil Nadu. The present analysis utilized data from the NFHS-2 pertaining to future fertility

desires. The remaining data utilized originated from the NFHS-2 Follow-up survey in 2002-2003. This follow-up survey included questions related to demographics, fertility and family planning, intimate partner violence, maternal and child health. Women who were sterilized at the baseline year 1998 or reported that they were infecund were excluded from the analysis. The total sample analyzed was 4245 married rural women.

The NFHS-2 Follow-up survey incorporated the 12-item General Health Questionnaire (GHQ-12), designed to assess the current mental health status among the respondents (Goldberg, 1978). The GHQ is one of the most widely used screening questionnaires for common mental health disorders in primary and community settings, and also reports high validity and ease of use (Goldberg et al. 1997; Jackson, 2007). Each of the 12 questions could be answered by "not at all," "no more than usual," "rather more than usual," and "much more than usual." Goldberg's (1988) recommended a binary scoring system of 0-0-1-1 allowed the researchers to assess the reported symptoms on a 0-12 scale (the higher number indicating poorer mental health). Both the 60-item and 12-item GHQ has been field tested and used in India (Bagadia, Ayyar, Lakdawala, Susainathan, & Pradhan, 1985; Gautam, Nijhawan, & Kamal, 1987; John et al., 2006; Kermode et al., 2009; Patel et al., 2008; Patel, Pereira, & Mann, 1998). In this analysis, two binary outcomes utilized the GHQ: either with one as the cut-off (0, 1-12) or with three-fourths of the cut-off (0-8, 9-12). According to studies conducted in India, the ¾ cut-off of the GHQ-12 provided the optimal balance of sensitivity and specificity and can be used to define a mental health problem (Patel & Oomman, 1998). In this analysis, the binary outcome using 1 as the cut-off will be referred to as any mental health symptom and the binary outcome using 9 as the cut-off will be referred to as mental health

problem. The continuous score for each individual is referred to as the number of mental

health symptoms.

Numerous other variables related to this analysis of fertility desires and mental

health were included to control for confounding: demographics, such as age, education,

state of residence, partner's age; media exposure; decision-making; financial situation;

marriage; experiences of sexual or physical or verbal abuse in the past 12 months; and

husband's alcohol use. Two variables from the NFHS-2 were combined in order to create

the main exposure variable: fertility preferences and fertility outcome. At time point one,

fertility desires in 1998-1999 were assessed by asking respondents if and when they

would prefer to have their next child. At time point two, in 2002, women were asked

whether or not they had a child in the interim period. Sterilization status was also

ascertained. Using these two questions, we created a variable measuring fertility intention

and achievement. The main exposure variable was created based on the original six-

category question, having a birth or not, and becoming sterilized or not. [TABLE 2]

Logistic regression models were fitted to both of the binary outcomes of any

mental health symptom (0,1) and mental health problem (0,1). The key covariate is the

seventeen category variable assessing fertility desire and outcome. Factors previously

reported to be associated with poor mental health symptoms were assessed univariately

with the outcome: state, education, age, total children ever born (0, 1-2, 3-4, 5+), abortion

since the baseline survey, number of children who have died, number of years married,

presence of a living son, whether the respondent is currently working. Additional control

variables include economic situation over the past four years (same, better, worse),

witnessed physical parental violence (yes, no), financial autonomy (has a bank account

and is allowed to set money aside, no), media exposure (reads a newspaper, listens to the radio, watches TV at least once a week, no), standard of living (low, medium, high), husband consumes alcohol (yes, no), husband's age (<30, 31-35, 36-40, 41-45, 46+), age at current union (<18, >18), number of years married (<10, 11-15, 16-20, 21+), experience of an episode of violence in the past 12 months (yes, no).

RESULTS

The follow-up survey results of self-reported mental health status are presented in Table 3, with differences based on state of residence. Losing sleep over worry (35.85%), feeling constantly under strain (39.86%), and feeling unhappy or depressed (38.83%) were the most common poor mental health symptoms in all four states. Most all respondents agreed with the statement that they play a useful part in things; only 8.03% reported the contrary.

[TABLE 3]

Overall, 67.09% of respondents reported any mental health symptom. More respondents in Maharashtra reported any mental health symptom (75.80%) compared to the other states (Bihar: 70.77%; Jharkhand: 62.79%; Tamil Nadu: 55.02%). In total, 5.36% of respondents have a mental health problem. Respondents from Jharkhand have the highest prevalence of a mental health problem, 16.90% (Bihar: 4.16%; Maharashtra: 2.13%; Tamil Nadu: 1.47%). The mean number of poor mental health symptoms is 2.64 out of the 12 symptoms; however this differs by state (Bihar: 2.59; Jharkhand: 3.32; Maharashtra: 2.92; Tamil Nadu: 1.97).

[FIGURE 1]

The frequency distribution of fertility desires matched with fertility outcome is presented in Table 4. Among this population, 37.34% of respondents reported not wanting another child in 1998, 26.73% wanted another child in the next two years, and 22.96% of respondents reported wanting another child after two years. A relatively small proportion of the sample reported that it was up to God (3.75%) or were undecided about their fertility preferences (1.08%). Disregarding sterilization status and excluding respondents who answered that whether or not they desire a child is "Up to God" or "Undecided," 64.7% of the sample met their fertility desires.

[TABLE 4]

Independent covariates are also listed in Table 5. Of note, the majority of respondents are aged 25-29 (30.44%), 65.72% received no education, 54.49% are from Bihar, 67.18% were less than 18 when they married their husbands, 35.38% have 3-4 children, 79.41% have a living son at home or elsewhere, 10.32% had an abortion in the inter-survey period, 42.40% have no exposure to media, 56.20% report a low standard of living, 57.08% of respondents are currently working, 53.68% have either money set aside or have a bank account, make relatively few decisions independently (74.49% make none or one decision independently), 26.33% need permission from their husband in all questioned scenarios, 41.10% report that their husband consumes alcohol, 24.62% report experiencing violence in the past 12 months, and 22.03% report that their father beat their mother.

[TABLE 5]

Logistic regression models for any mental health symptom and mental health problem are presented in Table 6. Controlling for demographic and socioeconomic

variables, four significant relationships of a total of 16 measured were found. Relative to women who desire to have a child in the next two years and have a child, women who express an interest in having a child in the next two years and do not have a child report greater likelihood of a mental health symptom (OR 1.65; 95% CI: 1.19, 2.29) and more than twice as likely to have a mental health problem (OR 2.13; 95% CI: 1.22, 3.69). Conversely, women who reported that they did not want a child but had one also have increased odds of having a mental health symptom (OR 1.43; 95% CI: 1.09, 1.87) as do women who reported that they did not want a child and did not have a child (OR 1.36; 95% CI 1.01, 1.83). Women who reported that it was up to God and had a child also had higher odds of a mental health symptom (OR 1.65; 95% CI 1.00, 2.70). No significant relationships were found for the remaining categories.

[TABLE 6]

Relative to women from Bihar, women from Maharashtra were more likely to report more mental health symptoms (OR 2.14; 95% CI 1.63, 2.08), but less likely to report a mental health problem (OR 0.78; 95% CI 0.38, 1.57). The reverse is true for women from Jharkhand: women were less likely to have a mental health symptom (OR 0.60; 95% CI 0.49, 0.73) and more likely to have a mental health problem (OR 4.33; 95% CI 3.15, 5.97). Women from Tamil Nadu were less likely to have a mental health symptom (OR 0.43, 95% CI 0.35, 0.53) and a mental health problem (OR 0.30; 95% CI 0.15, 0.60).

Compared to women who have no children, women who have at least one child report lower odds of a mental health symptom (one or two children OR 0.40; 95% CI 0.24-0.66). No significant associations were found when examining parity as the main

exposure for a mental health problem (one or two children, OR 0.61; 95% CI 0.31-1.20).

Relative to women who received no education, the odds of a mental health symptom is

1.31 (1.02-1.68); but education is protective with increased education with odds of 0.71

(0.56-0.89) and then with greatest education 0.64 (0.49-0.83). The results for a mental

health problem are only significant as protective, relative to women with no education, at

the middle-education level 0.46 (0.23, 0.92).

Relative to women who had a worse economic condition over the past four years,

respondents reporting the same or better economic condition reported lower odds of a

mental health symptom (same condition; OR 0.57; 95% CI 0.47, 0.68; better condition;

OR 0.53; 95% CI 0.43-0.65) and problem (same condition; OR 0.70; 95% CI 0.49, 0.99;

better condition; OR 0.68; 95% CI 0.45-1.03). Women who reported experiencing abuse

in the past 12 months (MH symptom OR 2.34; 95% CI 1.73, 3.17; MH problem OR 2.25;

95% CI 1.88, 2.69), witnessing her father beat her mother had greater odds of a mental

health symptom (MH symptom OR 1.34, 95% CI 1.10, 1.62; MH problem OR 1.23; 95%

CI 0.86, 1.75, and women who report partners who drink alcohol (MH symptom OR

1.39; 95% CI 1.20, 1.62; MH problem OR 1.12; 95% CI 0.82, 1.51). Variables

representing autonomy and empowerment were measured as statistically significant:

decision-making abilities (MH symptom OR 1.04, 95% CI 0.97, 1.12; MH problem OR

0.67; 95% CI 0.55, 0.82), financial autonomy (MH symptom OR 0.85, 95% CI 0.76,

0.96; MH problem OR 0.70, 0.55, 0.89), permission needed (MH symptom OR 0.95;

95% CI 0.92, 0.98; MH problem OR 0.80, 95% CI 0.74, 0.87). Age at marriage, current

employment, media exposure, having an abortion or a child die, and age of partner do not

reveal a statistically significant association in mental health symptoms and problems.

DISCUSSION

In an environment where societal pressures to bear children and female-gendered reproductive identity influences the manifestation of power (Unnithan, 2010), women who are not able to achieve their fertility desires are disproportionately and negatively affected. Results from this population-based study demonstrate an association between fertility desire achievements and mental health among women in rural India. It is not surprising that the most striking significant associations between fertility goals and mental health were found in women with unmet fertility expectations which represents 35.3% of the population.

The most common method of family planning in India is sterilization: in 2005, 37% of married women report being sterilized (NFHS-3, 2005). The incorporation of female sterilization helps to clarify the pathways in which fertility may affect mental health. Research points to an association between sterilization and mental distress (Pereira et al., 2006).

The greatest odds of a mental health symptom and problem occur in women who do not meet their fertility expectations because they desire to have a child and then do not. Women who wanted a child in the next two years but did not have a child and then became sterilized were found to have significantly poorer mental health through their reports of a mental health symptom and mental health problem. Previous research suggests a significant association among subfertile women who want to conceive but face difficulties and poor mental health (Carter et al., 2011) support this study's results in that women with strong fertility desires who were unable to fulfill their desires have worse mental health. In addition to not fulfilling fertility desires, becoming sterilized

permanently removes the option of children. In assessing the relationship between fertility and mental health problem, this is the only association which remained significant.

A second way in which fertility expectations are not met occurs in women who do not want a child and then have a child. The relationship between unintended/ unwanted pregnancy and any mental health symptom corroborates results from the majority of previous studies linking the two factors (Najman et al., 1991; Barber et al., 1999; Nakku et al., 2006; Lau and Keung, 2007). It is not surprising that results from this study demonstrate a greater likelihood of a mental health symptom among women experiencing an unwanted pregnancy. Surprisingly, this relationship did not remain significant when analyzing an unwanted child and a mental health problem. Interestingly, this relationship is no longer significant if a woman becomes sterilized in the inter-survey period. Although her fertility desires are not met in the sense that she has an unwanted pregnancy; she ultimately meets her fertility desire through the permanent family planning method of female sterilization.

Most intriguing is the statistically significant relationship between women who did not want a child and then did not have one. In this situation, women technically meet their underlying fertility desires. Perhaps these women changed their mind in the interim period or women more likely to not want a child in India were more likely to already have poor mental health or women report not wanting a child since they already had the expected number of children but privately desired more children. Whatever the reason, these findings have not been reported in other studies. Further research on the achievement of fertility desires and mental health is needed to explain this association.

Interestingly, this research reports an association among women who reported that their fertility is up to God and subsequently had a child, regardless of whether she underwent sterilization or not. In this scenario, it is unclear if women's personal fertility expectations are met or unmet. Numerous factors may explain this situation. Perhaps, women who reported "Up to God" were actually more likely to not want children but felt it was more socially acceptable to say "Up to God." Or, these women were ambivalent in 1998 and either developed a preference for no children or remained ambivalent.

After controlling for socioeconomic, demographic, and partnership factors, several important risk factors remained significant for both a mental health symptom and mental health problem, and corroborate findings from previous studies: partner physical, sexual, or psychological abuse in the past 12 months (Chandra et al., 2009; Chen et al., 2009; Stephenson et al., 2011; Vizcarra et al., 2004), witnessing parental violence (Jeyaseelan et al., 2007; Widom & Maxfield, 2001), and permission needed to go out (Patel et al., 2006). Witnessing or experiencing violence and having limited autonomy may translate to poor self-esteem. Other covariates, such as age, partner alcohol use, economic condition, parity, state of residence, demonstrate a significant association, or partial significance depending on the level, with mental health symptom.

Upon analysis of any mental health symptom, protective factors include parity and education beyond grade five. Research from Pakistan demonstrates a protective effect from depression in women having four or more children (Husain et al., 2004), providing evidence of poor mental health among women with fewer children in a society which values childbearing. From India, research demonstrates that increased education (V. Patel et al., 1999; Lee and Hadeed, 2009) is associated with positive mental health.

Limitations in this analysis must be acknowledged. All data rely on self-report for pregnancy intention, mental health symptom. Given the possible stigma, most of these variables may be under-reported. According to age, number of children born, and cultural pressures women may report variable fertility desires which may or may not be reflective of personal desires. In the case of mental health, GHQ-12 has been validated for collecting mental health data in India (Bagadia et al., 1985; Kermode et al., 2009; V. Patel et al., 2008). Additionally, it is possible that women who have mental health symptoms or a problem are more likely to report less autonomy or a lack of desire to have a child. Therefore, the direction of the relationship is not clear. Research indicates that the partner has a strong influence on preconception and postconception desire for pregnancy (Stanford et al. 2002; Fischer et al. 1999); however, this data was not available to analyze in this analysis. Confounding factors may also influence the relationship between fertility and mental health: women with unintended pregnancy are at increased risk of physical abuse around the time of pregnancy (Goodwin et al. 2000). Inherent group differences between those who reported wanting another child or not, whether in educational levels, age or parity, could also partially explain mental health differences. Contraceptive use is also not analyzed here, which may serve as a means to understand the autonomy, education, or economic situation of the mother.

By measuring pregnancy intention before-hand, rationalization bias to report births as wanted even if they were not on conception (Koenig et al., 2006), is not a problem. However, prospective measures do not account for a woman who changed her mind in the inter-survey period, nor does this take into account the partner's desires. Prospective interpretations of pregnancy intention may be misunderstood at the time.

Research from the U.S. suggests that fertility preference is relatively stable over time (Schoen et al., 1999); yet, personal and living conditions will affect a woman's desire for children (Williams et al., 1999). In lower-resource countries, especially those undergoing fertility transitions such as India, fertility goals are more subject to change and reliant on external influences. These influences may be partner differences in childbearing motivations, family composition, and child mortality (Gipson and Hindin, 2007).

CONCLUSION

As fertility desire achievements may influence women's mental health in low-resource settings, recommendations include educating populations about poor mental health consequences and multiple family planning methods, as well as the provision of integrated mental health care in the reproductive health and primary care setting. Mental health care screening, treatment, and prevention strategies can be provided through trainings to healthcare workers, community leaders, and NGOs providing care to the communities. Through the increased knowledge of the practitioners and leaders, raised awareness will contribute to the destigmatization of mental health at the community level. Family planning providers should incorporate men and women in family planning discussions, provide quality services, and government-subsidized family planning methods to couples who then may jointly choose the method most appropriate according to fertility desires. Ensuring access to a variety of family planning methods will allow women to take greater control of the spacing and number of children born, before more permanent methods of sterilization are employed. A simple and validated tool to screen for poor mental health can feasibly be implemented in the primary care and reproductive health setting. If a woman screens positive for a mental health problem, then holistic

treatment can be offered by the primary care healthcare professionals. Regardless of the screening outcome, it is essential that family planning providers be sensitive to fertility expectations for both men and women given its possible effect on mental health. Integrating mental health and family planning interventions, such as health education programs with self-esteem activities, designed to empower women will have far-reaching benefits.

Additionally, reproductive health concerns in general likely impact mental health; yet, many of these associations are yet to be determined. For this reason, more research is needed to assess the potential burden of mental health symptoms and illness among females who have completed or did not complete their fertility desires in India and in other populations. Continued qualitative and quantitative research can then inform programs and policies designed to rectify discrimination and promote informed efforts towards self-determination.

TABLES AND FIGURES

Table 1: Background characteristics of the population by state

Selected demographic characteristics	Bihar	Jharkhand	Maharashtra	Tamil Nadu
Population*	82,998,509	26,945,829	96,878,627	62,405,679
Total fertility rate**	4.00	3.31	2.11	1.8
Total wanted fertility rate**	2.4	2.1	1.7	1.4
% of women 15-19 who have begun childbearing**	25.0%	27.5%	13.8%	7.7%
% of women married by age 18**	63.7%	60.2%	40.2%	25.2%
Sexual, physical, or emotional violence**	60.8%	40.9%	33.4%	44.1%
Infant mortality rate (per 1000)**	61.7	68.7	37.5	30.4
% of women using any modern method (of those using modern method, % sterilized)**	28.9% (23.8%)	31.1% (23.4%)	64.9% (51.1%)	60.0% (55.0%)
Currently employed**	23.5%	29.2%	45.5%	46.2%
% of women who received no education**	60.3%	53.3%	29.4%	30.6%
% of women reporting no regular exposure to mass media**	58.2%	60.0%	23.6%	11.2%

*Population according to 2001 census

**National Family Health Survey-3, 2005

Table 2: Categorization of fertility desires and achievement among women aged 15-49 in rural India (n=4245)

Category	Frequency (%)
Wants a child within the next 2 years	
Had a child	657 (15.49)
Did not have a child and sterilized	345 (8.13)
Had a child and became sterilized	132 (3.11)
Wants a child after 2 years	
Had a child	617 (14.55)
Did not have a child and became sterilized	181 (4.27)
Had a child and became sterilized	176 (4.15)
Wants a child, but is unsure about timing	
Had a child	236 (5.56)
Did not have a child and/or became sterilized	78 (1.84)
Had a child and became sterilized	31 (0.73)
Undecided	
Had a child and/or became sterilized	35 (0.83)
Did not have a child and/or became sterilized	11 (0.26)
Does not want another child	
Had a child	569 (13.41)
Did not have a child	631 (14.88)
Had a child and became sterilized	252 (5.94)
Did not have a child and became sterilized	132 (3.11)
Up to God	
Had a child	106 (2.50)
Did not have a child	53 (1.25)

Disregarding sterilization, eight categories meet the definition of meeting immediate fertility desires and make up 64.7% of the population

Table 3: Self-reported mental health symptoms of women respondents, aged 15-49, from four states in India (n=4245)

	Bihar n=2313 (54.49%)	Jharkhand n=645 (15.19%)	Maharastra n=471 (11.10%)	Tamil Nadu n=816 (19.22%)	Total n (%)
Ability to concentrate***	316 (13.66)	159 (24.65)	57 (12.10)	136 (16.67)	668 (15.74)
Played a useful part in things***	190 (8.22)	107 (16.59)	29 (6.16)	15 (1.84)	341 (8.03)
Capable of making decisions***	385 (16.65)	165 (25.58)	128 (27.18)	56 (6.86)	734 (17.30)
Could overcome difficulties***	449 (19.41)	220 (34.11)	125 (26.60)	30 (3.68)	824 (19.42)
Able to enjoy the day-to-day activities***	350 (15.14)	169 (26.20)	93 (19.75)	210 (25.74)	822 (19.37)
Able to face up to problems***	390 (16.87)	198 (30.70)	123 (26.11)	45 (5.51)	756 (17.81)
Feeling reasonably happy, all things considered***	333 (14.41)	198 (30.70)	61 (12.95)	358 (43.87)	950 (22.39)
Lost sleep over worry***	908 (39.26)	239 (37.05)	175 (37.15)	200 (24.51)	1522 (35.85)
Constantly under strain***	1018 (44.01)	252 (39.07)	174 (36.94)	248 (30.39)	1692 (39.86)
Unhappy or depressed***	1001 (43.30)	241 (37.36)	171 (36.31)	235 (28.80)	1648 (38.83)
Losing confidence in oneself***	320 (13.83)	107 (16.59)	138 (29.30)	34 (4.17)	599 (14.11)
Thinking of oneself as worthless***	341 (14.74)	88 (13.64)	101 (21.44)	44 (5.39)	574 (13.52)

*** significant at p<0.001

Figure 1: Frequency Distribution of Mental Health Problem and Any Mental Health Symptom by State among women aged 15-49 (n=4245)
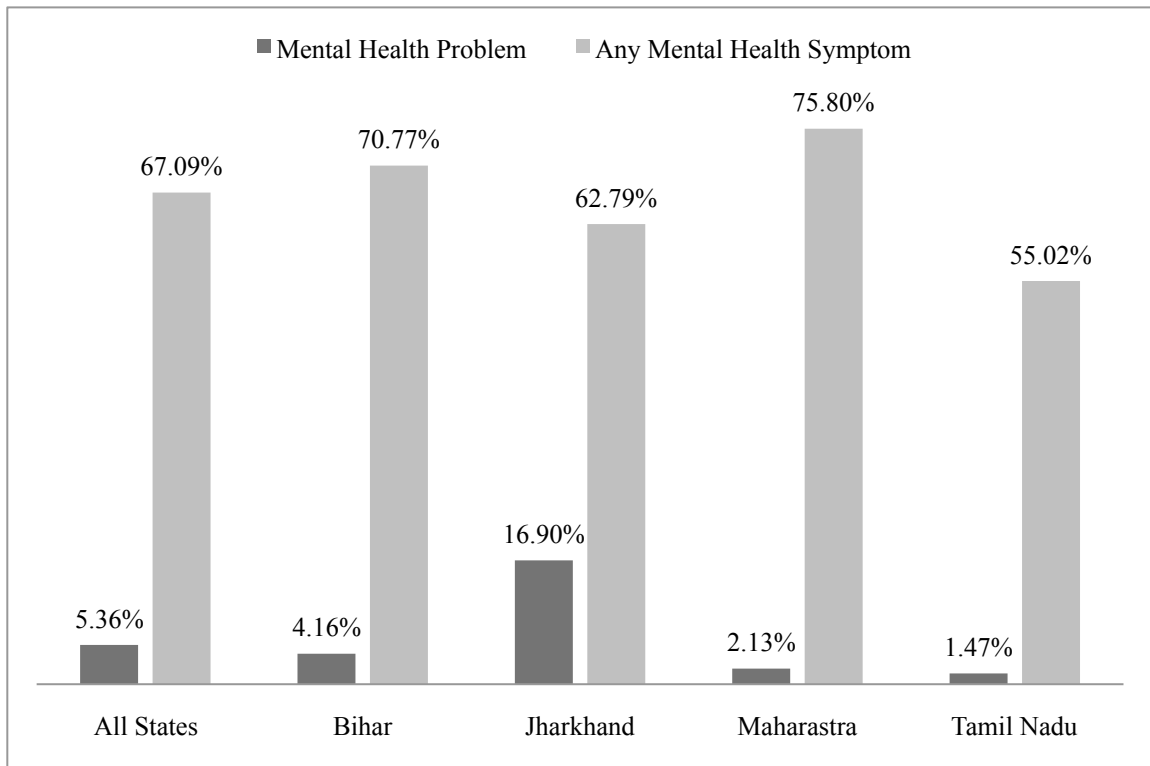
Table 4: Distribution of covariates considered in univariate analysis of mental health among women, aged 15-49, from four states in India (n=4245)

	Percent Distribution (n=4245)	Percent Experiencing MH Problem (n=227, 5.36%)	Percent Experiencing Any MH Symptom (n=2848, 67.09%)
Wants a child within the next 2 years			
Had a child	657 (15.49)	35 (5.33)***	427 (64.99)***
Did not have a child and sterilized	345 (8.13)	40 (11.59)***	265 (76.81)***
Had a child and/or became sterilized	132 (3.11)	2 (1.52)***	72 (54.55)***
Wants a child after 2 years			
Had a child	617 (14.55)	24 (3.91)***	400 (64.83)***
Did not have a child and/or became sterilized	181 (4.27)	11 (6.11)***	122 (67.40)***
Had a child and became sterilized	176 (4.15)	2 (1.14)***	96 (54.55)***
Wants a child, but is unsure about timing			
Had a child	236 (5.56)	13 (5.53)***	159 (67.37)***
Did not have a child and/or became sterilized	78 (1.84)	6 (7.69)***	55 (70.51)***
Had a child and became sterilized	31 (0.73)	0***	21 (67.74)***
Undecided			
Had a child and/or became sterilized	35 (0.83)	3 (8.57)***	22 (62.86)***
Did not have a child and/or became sterilized	11 (0.26)	0***	5 (45.45)***
Does not want another child			
Had a child	569 (13.41)	30 (5.29)***	417 (73.29)***
Did not have a child	631 (14.88)	35 (5.56)***	436 (69.10)***
Had a child and became sterilized	252 (5.94)	11 (4.38)***	150 (59.52)***
Did not have a child and became sterilized	132 (3.11)	4 (3.03)***	82 (62.12)***
Up to God			
Had a child	106 (2.50)	7 (6.60)***	79 (74.53)***
Did not have a child	53 (1.25)	4 (7.55)***	39 (73.58)***

* significant at 0.05
** significant at 0.01
*** significant at 0.001

Table 5: Distribution of selected independent variables considered in univariate analysis of mental health among women, aged 15-49, from four states in rural India (n=4245)

	Percent Distribution (n=4245)	Percent Experiencing MH Problem (n=227, 5.36%)	Percent Experiencing Any MH Symptom (n=2848, 67.09%)
Age			
<=24	1070 (25.21)	61 (5.71)	698 (65.23)***
25-29	1292 (30.44)	54 (4.19)	832 (64.40)***
30-34	976 (22.99)	54 (5.54)	663 (67.93)***
35-49	578 (13.62)	40 (6.93)	425 (73.53)***
40+	329 (7.75)	18 (5.47)	230 (69.91)***
Education			
None	2790 (65.72)	190 (6.83)***	1970 (70.61)***
Grade 1-4	435 (10.25)	17 (3.91)***	317 (72.87)***
Grade 5-8	556 (13.10)	10 (1.80)***	315 (56.65)***
Grade 9-17	464 (10.93)	10 (2.16)***	246 (53.02)***
State of Residence			
Bihar	2313 (54.49)	96 (4.16)***	1637 (70.77)***
Jharkhand	645 (15.19)	109 (16.90)***	405 (62.79)***
Maharastra	471 (11.10)	10 (2.13)***	357 (75.80)***
Tamil Nadu	816 (19.22)	12 (1.47)***	449 (55.02)***
Age at Current Union			
<18	2852 (67.18)	155 (5.45)	1976 (69.28)***
≥18	1393 (32.82)	72 (5.18)	872 (62.60)***
Partner's Age			
< 30	880 (20.82)	45 (5.13)	589 (66.93)*
31 - 35	1157 (27.38)	53 (4.59)	754 (65.17)*
36 - 40	979 (23.17)	55 (5.62)	639 (65.27)*
41 - 45	675 (15.97)	39 (5.79)	467 (69.19)*
46 +	535 (12.66)	34 (6.37)	385 (71.96)*
Parity			
0	202 (4.76)	27 (13.37)***	173 (85.64)***
1-2	1360 (32.04)	64 (4.71)***	841 (61.84)***
3-4	1502 (35.38)	65 (4.34)***	967 (64.38)***
5+	1181 (27.82)	71 (6.03)***	867 (73.41)***
Has a living son	3371 (79.41)	157 (4.67)***	2219 (65.83)***
Does not have a living son	874 (20.59)	70 (8.03)***	629 (71.97)***
Standard of Living			
low	2375 (56.20)	150 (6.33)***	1664 (70.06)***
medium	1531 (36.23)	71 (4.65)***	993 (64.86)***
high	320 (7.57)	5 (1.57)***	175 (54.69)***
Economic Condition in the past 4 years			
Worse	1077 (25.44)	59 (5.49)	807 (74.93)***
Same	2019 (47.70)	109 (5.41)	1321 (65.43)***
Better	1137 (26.86)	54 (4.75)	712 (62.62)***
Currently Working	2423 (57.08)	148 (6.12)*	1694 (69.91)***
Not currently working	1822 (42.92)	79 (4.34)*	1154 (63.34)***

Husband consumes alcohol	1743 (41.10)	124 (7.12)***	1254 (71.94)***
Husband does not consume alcohol	2498 (58.90)	102 (4.09)***	1591 (63.69)***
Episode of violence in the past 12 months	1045 (24.62)	102 (9.78)***	827 (79.14)***
Did not experience	3200 (75.38)	125 (3.91)***	2021 (63.16)***

* significant at 0.05

** significant at 0.01

*** significant at 0.001

Table 6: Adjusted fertility achievement and mental health Odds Ratios and Confidence Intervals among women age 15-49 (n=4245)

	MH Problem Odds Ratio*	OR 95% CI*	MH Symptom Odds Ratio*	OR 95% CI*
Wants a child within the next 2 years				
Had a child	reference			
Did not have a child and sterilized	2.13	(1.22, 3.69)	1.65	(1.19, 2.29)
Had a child and became sterilized	0.93	(0.21, 4.15)	0.79	(0.52, 1.21)
Wants a child after 2 years				
Had a child	0.88	(0.50, 1.55)	1.07	(0.84, 1.36)
Did not have a child and/or became sterilized	1.55	(0.74, 3.25)	1.35	(0.92, 1.98)
Had a child and became sterilized	0.67	(0.15, 2.91)	0.8	(0.55, 1.17)
Wants a child, but is unsure about timing				
Had a child	1.54	(0.77, 3.07)	0.99	(0.71, 1.38)
Did not have a child and/or became sterilized	2.04	(0.78, 5.33)	0.96	(0.56, 1.66)
Had a child and became sterilized	omitted		0.98	(0.44, 2.21)
Undecided				
Had a child and/or became sterilized	2.87	(0.78, 10.48)	0.95	(0.45, 2.02)
Did not have a child and/or became sterilized	omitted		0.44	(0.11, 1.71)
Does not want another child				
Had a child	1.23	(0.70, 2.17)	1.43	(1.09, 1.87)
Did not have a child	1.45	(0.80, 2.66)	1.36	(1.01, 1.83)
Had a child and became sterilized	1.33	(0.59, 2.98)	0.83	(0.60, 1.15)
Did not have a child and became sterilized	1.03	(0.34, 3.12)	0.95	(0.62, 1.44)
Up to God				
Had a child	1.64	(0.67, 3.99)	1.65	(1.00, 2.70)
Did not have a child	1.62	(0.51, 5.13)	1.57	(0.80, 3.06)

*Adjusted for employment, having a son, experience of abuse, husband alcohol use, education, state of residence, age, partner's age, economic condition, standard of living

CHAPTER 4: PUBLIC HEALTH RECOMMENDATIONS

Results from this study indicate an association between unmet fertility expectations and poor mental health. Six central recommendations for improved public health practice and policies designed to empower women emerge from this study. Policies targeting fertility desire achievements through family planning, integration of mental health screening and interventions in the reproductive health arena, and continued research to better understand the complex and dynamic relationship are essential to improving women's welfare in India.

I. RAISING AWARENESS & DE-STIGMATIZING MENTAL HEALTH AT THE COMMUNITY LEVEL

In numerous ways, poor mental health negatively affects an individual's life. In India, the effects of positive or negative mental health, as manifested in common non-debilitating conditions have yet to be understood at a community level. Women bear the consequences of poor mental health alone and in silence. Raising awareness about mental health benefits and linkages to physical well-being will foster a dialogue and begin to de-stigmatize poor mental health conditions, such as depression and anxiety. Through mandatory biannual mental health trainings to health care workers and integration of mental health topics at community meetings and among leaders, community members will begin to understand the importance of mental health. Mental health trainings should sensitize health care workers in the primary care setting to the challenges of care and prevention. Sensitivity trainings carried out by NGOs and healthcare workers could also help to inform community leaders and other health professionals in order to raise awareness, dispel misconceptions, and identify women who are suffering from a mental

health problem so that they may receive treatment and/or supportive care. Public information and discussions will help to shed light on the private problem. Addressing mental health promotion in the primary care setting, acknowledging the reality of mental health burdens, and resources allocated to fostering mental health promotion are important first steps to improving the quality of life and health in these four states of India.

II. COMPREHENSIVE EDUCATION AND PROVISION OF FAMILY PLANNING METHODS

In India, female sterilization is the most common method to regulate fertility. However, research suggests that women from different SES and demographic strata do not rely upon sterilization in the same proportion (Pradhan and Ram, 2009). It is possible that female sterilization will become synonymous with family planning since two-thirds of all women who report total use of contraceptive method use have been sterilized (NFHS-3, 2005); however, it is clear that this method may not be appropriate for all women who undergo the procedure. Over three-fourths of women reported being sterilized free of charge (NFHS-3, 2005). Sterilization represents an almost-permanent method of fertility regulation and is not the preferred option for a woman who may desire to have more children in the future. Fertility preferences are dynamic and linked to mental health, therefore informed choice is critical for women so that they may choose from among several methods and receive the highest of quality services. Family planning choices and quality services are needed. Unhurried counseling sessions led by knowledgeable healthcare providers who present unbiased information about alternative contraceptive methods will help couples' decide on the appropriate family planning or spacing method given fertility desires. The government of India has an important role to

play by improving the information education and communication about family planning so that couples can make informed and appropriate choice given fertility desires. The government family planning program offers three methods: pill, IUD, and condom; yet knowledge remains low as only 61% of women reported knowledge of all three methods (NFHS-3, 2005). Government subsidies of certain methods such as condoms, injection, IUD, or pill which can be offered at government-run health clinics so that multiple family planning options are affordable and feasible alternatives will increase the utilization of different methods according to the need. Given the association between unmet fertility desires and poor mental health, and range of documented consequences resulting from poor mental health, it is in the government's best interest to promote informed choice, alternative family planning methods, and quality services.

III. INCORPORATION OF MEN IN THE FAMILY PLANNING DISCUSSIONS

Decisions about fertility are made privately, at the household level, and typically dominated by men. In many instances, men and women may not share their personal fertility preferences with each other, further diminishing opportunities for transparent and honest communication. In this setting of unequal power dynamics which favors men, it is important that both men and women have a voice in all fertility-related decisions. Providing a forum for men and women to openly share their fertility goals will increase concordance and understanding of both possible parents. Although both men and women may not be fully informed about family planning options, typically, family planning is viewed as a female's concern. Health professionals, family planning service providers, and reproductive health program planners should be aware of females' and males' knowledge and perceptions about family planning. Initial assessments should be carried

out at the community-level and then strategies for incorporating men should be adapted according to the level of knowledge, education, SES, and power differential. By involving men in reproductive health and family planning discussions, men are encouraged to take an active role and informed healthy decisions about their wives reproductive health and family planning. It is recommended that family planning providers speak with husbands and wives together so as to ensure a greater possibility of dialogue and consistent information delivered to both partners. Family planning providers have a responsibility to provide correct information about the varied methods of contraceptives and health effects; which can, in turn, translate to informed uptake of the appropriate family planning method in order to best meet fertility desires of both the male and female.

Health worker training and education in current and temporary family planning methods and up-to-date health effects is needed in order for health workers to be able to provide accurate and high quality information. Understanding the beliefs, perceptions, and barriers to family planning will shape culturally appropriate communication strategies which can engage both men and women in the family planning method use discussion. Existing healthcare and family planning infrastructure can accommodate the training and patient visits, the emphasis to include husbands in contraceptive use is critical to the assistance of couples to meet their fertility desires.

IV. INTEGRATION OF MENTAL HEALTH SCREENING IN THE PRIMARY CARE & REPRODUCTIVE HEALTH SETTING

Primary care health providers are the frontline, and often only, professionals who have the opportunity to treat entire populations. Establishing mental health clinics,

staffing these clinics with training mental health workers, and raising awareness so that

these clinics are utilized will take many years and resources. In the interim, the most

viable cost-effective solution is to integrate mental health services into primary care and

reproductive health service delivery. In this way, the treatment gap will be closed and

people will receive access to the mental health care needed. Mental health care in the

primary care clinic is affordable; costs for which can be subsidized by the government or

agencies interested in the welfare of the population. Investments will bring benefits in

quality of life as mental disorders may be screened and treated in a culturally-appropriate,

holistic manner as early as possible. As primary care clinics are close to the patient's

home and community, limited time, travel, and resources are necessary. This economic

burden must not be shouldered by an-already resource-constrained population.

Integrating mental health services in this setting will lead to the best health outcomes, as

primary care can prevent disorders, educate individuals and communities, promote

positive mental well-being, and foster collaboration with other health sectors (WHO and

World Organization of Family Doctors). Through the primary care setting, it is

recommended that first a validated and simple screening tool be used for all women who

seek family planning information. This screening tool, such as the 12-question survey

utilized in this analysis, can be used to detect those suffering from possible clinical

mental health disorders. Whether a woman shows zero or one poor mental health

symptom, or is categorized as having a mental health disorder, there are interventions that

health care workers can implement through conversations which will increase self-

esteem. Regardless of the results, family planning providers must be sensitive to fertility

expectations for both men and women and strive to provide the most appropriate option so that mental health remains positive.

V. INTEGRATION OF MENTAL HEALTH AND FAMILY PLANNING INTERVENTIONS TO EMPOWER WOMEN

Formative research conducted through in-depth interviews, focus group discussions, and surveys, in each Indian state and community will serve to inform the type of intervention which would be best received among women of reproductive age. Research will build upon studies such as this one to identify key risk factors for poor mental health and evaluate psychosocial and family planning programs. After resources are secured, staff hired, and communities identified, psychosocial interventions have the capacity to prevent future problems and treat existing problems. On one level, preventive interventions can be designed and conducted among young women in order to instill resilience and buffer the effects of negative obstacles. Second, interventions housed within the primary care and family planning clinic setting to promote mental health, self-esteem, and gender equality will increase women's autonomy and ability to make fertility-related decisions according to fertility desires. With an emphasis on addressing risk factors for poor mental health, interventions which integrate both reproductive health and mental health will have positive and lasting effects among women in India.

VI. CONTINUED RESEARCH TRANSLATING INTO PROGRAMS AND POLICIES DESIGNED TO ADDRESS DISCRIMINATION AND PROMOTE WOMEN'S RIGHTS

Numerous difficulties exist when conducting research on sensitive and private topics such as fertility goals and mental health. Obtaining timely and accurate

information requires trust from the respondents as well as good data collection and

analysis. Additionally, there is limited attention and knowledge, and few resources

devoted to, the commonplace and detrimental effects of poor mental health.

Compounding this challenge to research, it is difficult for people to admit, acknowledge,

or recognize normalized behaviors and situations. In essence, women's mental health

improvement through realized fertility desires can only become a reality as women

become more empowered. Therefore, heightened awareness about the problem and

resources devoted to formative research, program development and implementation, and

monitoring and evaluation of the program will be necessary for success. Results from this

study provide some evidence about possible associations; however, further research in

varied populations from multiple locations are needed to confirm the findings. Secondly,

it is not clear if poor mental health is a precursor or follow-up factor for unmet fertility

expectations. Continued high quality quantitative and qualitative research is needed to

shed light on these complex relationships. In particular, qualitative research can explain

the role that partner desires plays in a woman's fertility goals, detail protective and risk

factors for meeting fertility desires and mental health, as well as better explain how

women and men take control over their fertility in order to best meet fertility goals.

Research could also better explain the degree to which the unequal power dynamic

influences decision-making in the household. Finally, understanding how reproductive

behaviors including sterilization are influenced by socio-cultural factors such as family

size, sex preferences, and family pressure will help health workers, policy-makers and

family planning programmers to help women achieve fertility desires and promote mental

health. With time, reproductive and mental health research informing policy and

programs has the ability to address discrimination against women and promote autonomy.

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LETTER OF APPROVAL FROM THE IRB

EMORY UNIVERSITY

FROM: LaShawn Martin
         Analyst Assistant
         Emory University IRB

TO: Robert Stephenson, PhD
         Global Health

DATE: August 18, 2009

RE: Notification of Submission Determination: No IRB Review Required
         IRB00026663

TITLE: CONSEQUENCES OF UNWANTED CHILDREN FOR THE HEALTH OF RURAL
         INDIAN MOTHERS AND CHILDREN

The above-referenced study has been vetted by the Institutional Review Board (IRB), and it was determined that it does not require IRB review because it does not meet the definition of "Research involving Human Subjects" or the definition of "Clinical Investigation" under applicable federal regulations. Accordingly, IRB review is not required.

45 CFR Section 46.102(f) defines "Research involving Human Subjects" as follows:

   Human Subject means a living individual about whom an investigator (whether professional or student) conducting research obtains:

   (1) data through intervention or interaction with the individual, or
   (2) identifiable private information

   Intervention includes both physical procedures by which data are gathered (for example, venipuncture) and manipulations of the subject or the subject's environment that are performed for research purposes. Interaction includes communication or interpersonal contact between investigator and subject. Private information includes information about behavior that occurs in a context in which an individual can reasonably expect that no observation or recording is taking place, and information which has been provided for specific purposes by an individual and which the individual can reasonably expect will not be made public (for example, a medical record). Private information must be individually identifiable (i.e., the identity of the subject is or may be ascertained by the investigator or associated with the information) in order for obtaining the information to constitute research involving human subjects.

In addition, the IRB has determined that the study is not a "Clinical Investigation" under applicable Food & Drug Administration regulations because it does not involve a test article and does not otherwise meet the requirements of the definition of "Clinical Investigation" as set forth in 21 CFR Section 50.3(c).

Please note that any changes to the protocol could conceivably alter the status of this research under the federal regulations cited above. Accordingly, any substantive changes in the protocol should be presented to the IRB for consideration prior to their implementation in the research.

Sincerely,

LaShawn Martin
Analyst Assistant
Emory University Institutional Review Board
This letter has been digitally signed