The Relationship between Male Outmigration and Maternal Depression in Rural Pakistan

by

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Thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in the Duke Global Health Institute in the Graduate School of Duke University

2015
ABSTRACT

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Abstract

**Background:** Pakistan has a large and increasing burden of maternal depression which has important repercussions for both maternal and child health. This was an exploratory study with the aims to assess the differences in the prevalence proportion of maternal depression between households with an out-migrating male and those without and to further explore how family structure, perceived social support, and marital satisfaction affect the relationship between male migration and maternal depression.

**Methods:** The sample used for this study originates from a cross-sectional follow up study in 2013 to the Thinking Health Programme (THP) originally implemented in rural Rawalpindi in 2007. 860 women were included in the final sample and multivariate regression modeling was used to assess the relationship between male outmigration and the presence of maternal depression with the covariates perceived social support, marital support, and joint family status.

**Results:** Initially, there was no significant association between male outmigration and maternal depression. Once stratified by socioeconomic status, there was an association among the poor women with husband out-migration being associated with higher prevalence of depression ($p=0.002$) (PR = 1.63; 95% CI:1.19, 2.22), but not the non-poor women ($p=0.696$) (PR = 1.10; 95% CI:0.68, 1.79). Models further adjusting for
perceived social support, marital support, and joint family status did not yield any significant differences.

**Conclusions:** Male outmigration is a predictor of maternal depression among poor families in rural Pakistan even after adjustments for social and marital support.
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Acknowledgements

I am incredibly grateful for the support of my defense committee. My chair, Joanna Maselko, has guided me through this project with endless patience and support and I am honored to have had the opportunity to work so closely with such a talented and accomplished individual.

I would also like to acknowledge Lysa MacKeen, who worked endlessly to help arrange this project and field experience. My appreciation extends to the Duke Global Health Institute for funding this opportunity and continuing to support student growth and learning.

Most of all, thank you to my parents, family and friends who have supported me throughout this entire process. I could not have done it without your constant encouragement and perspective.
1. Introduction

Maternal depression is a disorder that affects approximately 10-15% of women worldwide. However, these estimates are not cross-culturally representative and are likely an underestimation of true global prevalence (Halbreich & Karkun, 2006). Within South Asia, estimates are reportedly twice as high and in Pakistan, estimates suggest that anywhere from 28-66% of women experience maternal depression and anxiety during their lifetime (Mirza & Jenkins, 2004; Rahman et al. 2003). Depression occurs over the life course, though women of childbearing age are at a particularly high risk due to hormonal fluctuations and newfound stressors associated with parenting a newborn (Surkan et al. 2011). Symptoms include fatigue, changes in eating and sleeping patterns, anxiety, guilt, melancholy and suicidal thoughts. Women who have experienced maternal depression are more likely to suffer from a relapse later in their life (Llewellyn et al. 1997).

Maternal depression has wide-ranging effects for the woman herself and her family and can be especially problematic for child outcomes. Research from Pakistan shows that depression can lead to child malnutrition and poor growth outcomes in the first five years of life (Rahman et al. 2004; Rahman et al. 2004). Literature suggests that the relationship identified between antenatal depression and poor birth outcomes may be indicative of poor health-seeking behavior and increased risk taking behaviors that could potentially harm the fetus (Hedegaard et al. 1993; Pagel et al. 1990). Within the
postpartum period, depressed mothers may not be able to provide the same level or quality of care as mentally healthy mothers and may be less responsive to their infant’s needs (Bettes, 1988). Maternal depression can also foster detachment from the child that hinders physical and emotional development in both the early years and as the child matures into adulthood (Hamadani et al. 2012). This is a large problem worldwide, so understanding maternal depression is critically important to improve global health outcomes.

There are many well-documented risk factors for maternal depression. History of depression is a major risk factor as are history or depressive symptoms and family history of mental health disorders furthers this risk. Certain stressful components of family life, including poor marital relationships, low levels of social support, disagreements with extended family or caring for ill or elderly relatives have also been associated with an increased risk for depression. Changes in the family patterns or major life events also put women at a heightened risk. Husband outmigration is an important life event that may affect many components of a woman’s family life, though little research has been done to link the two.

Migration is a worldwide phenomenon with significant repercussions for global health. Thus far, most global health literature on migration has focused on the health of migrants, but recent literature suggests there may be marked health effects of migration on the women left-behind as well. Studies in Eastern Europe have shown that when
spouses migrate, the risk for heart disease among wives left behind increases (Burazeri, 2007). Additional studies have found that women left behind are at an increased risk for sexually transmitted diseases. Getting ill in the absence of their out-migrating husbands is exacerbated by the reduced access to health services many women experience (Aajeevika, 2006). Thus, in a time where global migration continues to rise, understanding the health effects that this life event may have on the larger family is critically important (OECD, 2013).

In Pakistan, migration is a commonly utilized household strategy to diversify household income and risk (Gioli, 2014; Lu, 2012). Male outmigration, both internal and international, dominates in the patriarchal society where women do not commonly work or leave the home to work. Education level typically dictates the type of work he is able to secure as a labor migrant. Outmigration benefits the home communities in two major ways, through social and financial remittances (Gioli, 2014). However, access to these benefits are typically limited by the skills and education of the migrant and thus poor, uneducated families often have trouble accessing these benefits. Analyses of data from the Federal Bureau of Statistics in Pakistan supports this by suggesting that remittances are disproportionately received by families from upper income levels (Gazdar, 2003). Further, in the absence of their husband, women left at home may experience a newfound source of stress, become more vulnerable to abuse from other family members and may feel lonely or depressed. Studies show that male outmigration
typically leads to an increased workload for women while simultaneously removing a source of social support (Akhtar, 2010; Lu, 2012; Qadir, 2013).

The stressful environment often fostered by male outmigration may lead to diminished physical and psychological well-being among their wives (Lu, 2012). Literature from several developing countries suggests this may be true, though mechanisms are not well understood (Qadir, 2013). Research suggest that support received from family may mitigate some of the stress and that a joint household may buffer some of the social support that is lost. This is supported by the findings Akhter et al. report from Pakistan where they found that perceived social support is best measured as an aggregate measure due to the communal nature of support (2010). The degree to which women experience a loss in social support may also depend on the size of the family she is left to care for and the amount of additional work she experiences in the absence of her husband. This may also depend greatly on the level of support women report in the marriage. Migration can impact marriage as it can weaken marital relationships, but can also be a positive force for relationships that are poor or abusive (Lu, 2012).

In Pakistan, major depressive disorder is among the top ten disability-adjusted life years (DALYs) for females within Pakistan and this rate is an estimated double from what it was in 1990. The effects of maternal depression on both maternal and child outcomes have been well-documented and make clear the need for better understanding
of the mechanisms driving the high levels of depression. With this in mind, our goal was to identify when male out migration affects maternal mental health with the hypothesis that male out-migration would be associated with a higher prevalence of depression and that social factors including social support, marital support and family structure may in part explain the association. We conducted an exploratory study that aimed to assess differences in the prevalence proportion of maternal depression between migrant sending and non-migrant sending households and to further explore how family structure, perceived social support, and marital support affect the relationship between male migration and maternal depression.
2. Methods

2.1 Setting

Pakistan is a South Asian country located between India, Iran, Afghanistan and China with a diverse geography ranging from the flat Indus plains to the Himalayan Mountains. Pakistan has a population of over 196 million people, a quarter of which live below the poverty line (Central Intelligence Agency, 2014). Almost half of the population is employed in agriculture though most of Pakistan’s export earnings are from the textile industry. Remittances from migrant workers overseas are also a robust part of the economy accounting for the largest portion of foreign exchange earnings in the country (Gazdar, 2013). A long history of political disputes and slow economic growth have left the country largely underdeveloped as is evidenced by poor social and health indicators. Education expenditures in Pakistan are low and 45% of the population is illiterate. Total life expectancy is only 67 years old and a third of children under the age of five are underweight (Central Intelligence Agency, 2014). Pakistan also remains the country with the second worst gender equality score (World Economic Forum, 2014).

The women from this sample were drawn from two rural areas that are located approximately 65km southeast of Rawalpindi city: Gujar Khan and Kallar Syedan. The two areas have a combined estimated population of 600,000. Subsistence farming is the main household strategy though many families also rely on one or more male members
to work in the government, armed forces, or as migrant labors in larger cities. However, the percentage of out-migrating males in rural areas for work are not known as an accurate census has not been conducted in Pakistan since 1998.

2.2 Study Sample

The sample used for this study originates from a follow up study in 2013 to the Thinking Health Programme (THP), a Cognitive Behavioral Therapy (CBT) based intervention that was initially implemented in Pakistan in 2007. The program and results of both the initial and follow up trial are published elsewhere (Rahman et al. 2008 & Maselko et al. in press). In short, Union Councils (UC), the smallest geo-political administrative units in Pakistan, were the unit of randomization for the original THP trial. 40 UCs were included in the trial; 20 were randomized for the intervention and another 20 were randomized to the control arm. All married women in their third trimester of pregnancy who had no significant illness and met Diagnostic and Statistical Manual of Mental Disorders, IV-TR (DSM-IV) diagnostic criteria for Major Depressive Episode were eligible for the trial. 463 and 440 depressed women were enrolled in the intervention and control arms, respectively. Lady Health Workers (LHWs), Pakistani community-based agents, delivered the THP intervention through 16 home visits.

There was no follow-up with the women after the initial trial until 2013. The follow-up study aimed to re-enroll the mother-child pairs from the original study and assess the developmental outcomes of the children at age 7. The sampling frame was the
list of contact information from the initial screening assessments which included both women who were prenatally depressed and non-depressed. Women were relocated and re-enrolled by field supervisors and local LHWs who were blind to the women’s original depression and treatment status. Fieldwork was conducted between March 2013 and January 2014 and 83% (n=584) of women-child pairs from the original 2007 trial were successfully re-enrolled. Of these 584 pairs, 295 were from the control arm and 289 were from the intervention arm. Additionally, 300 village-matched mother-child pairs were also enrolled from those prenatally non-depressed in 2007.

The study received ethical approval from the IRBs of the Human Development Research Foundation, Pakistan and the Duke University, USA. The original THP cRCT was registered as ISRCTN65316374.

2.3 Measures

As previously stated, this study was primarily interested in the relationship between male migration and maternal depression so depression is the main outcome variable of interest. However, family structure, self-perceived social support, and marital support were measured as potential moderators for the migration-depression relationship. Additionally, age, education level, poverty status, and family size were measured.
2.3.1 Migration

The major predictor, household migration status, was determined through the employment and income component of the survey. The survey asked if the husband was currently employed, and if so, the number of months he remains away from home for employment purposes. Options for migration duration were less than 3 months, 3-4 months, and greater than 6 months. Cell sizes became too small when performing analysis by duration, so migration was measured as a dichotomous variable that considered a husband a labor migrant if he remained away from the home for work purposes for any period of time. Households were considered migrant households if the husband was a labor migrant. Women whose husbands were not currently working were included in the sample as non-migrants (n=160). Exclusion of these individuals did not affect analysis so they were maintained to preserve sample size.

2.3.2 Maternal Depression

The major outcome variable, maternal depression, was assessed using the semi-structured Clinical Interview (SCID) for Diagnostic and Statistical Manual of Mental Disorders, IV (DSM-IV) (First et al. 1994). The SCID has been used extensively in cross-cultural epidemiologic research and has been translated into Urdu and culturally adapted for use in Pakistan (Rahman et al. 2008). Women in this study were considered depressed if they had ‘depressed mood’ and their ‘symptoms cause significant distress or impairment’, had five additional symptoms within two weeks of assessment, and the
symptoms were not due to the effects of substance use, medical condition, or better accounted for by bereavement. A full version of the scale can be found in Appendix A.

2.3.3 Self-Perceived Social Support

Perceived social support was measured using the Multidimensional Scale of Perceived Social Support (MSPSS). It is a twelve-question survey with a 1-5 Likert response scale for each question meant to measure support from three subcategories: friends, family, and significant others. Total scores are a sum of responses and range from 12-60 with higher scores representing higher levels of perceived social support. This measure has been adapted and translated into Urdu for use in the Pakistani context in prior studies. Good construct validity and internal consistency (Cronbach’s alpha = 0.92) have been reported (Akhtar, 2010). The scale can be found in Appendix B.

2.3.4 Marital Support

Marital support was measured using a scale containing 7 dichotomous questions about the subject’s relationship with her husband. The scores ranged from 0 to 7 with higher scores representing higher levels of marital support and was evaluated on a continuous scale. Questions included: ‘does your husband look after your basic needs (food, clothes, healthcare)? and ‘do you feel that your husband understands your feelings?’ The full questionnaire can be found in Appendix C.
2.3.5 Family Structure

Family structure was determined through the demographic section of the survey. Based on participant response, families were stratified into the three categories: nuclear, joint/extended, and multiple households.

2.3.6 Poverty Status

Poverty status was determined by the Lady Health Working household rating. In areas or populations where income is hard to capture, research has shown that this is a more accurate measure of poverty status (Rahman, 2008). Families that were rated as ‘poor’ or ‘very poor’ were considered poor in this study. Families that were rated as ‘moderate’, ‘rich’, or ‘very rich’ were considered non-poor.

2.4 Analysis

Twenty five of the 885 women were excluded from analysis as they were divorced or widowed. Descriptive statistics were generated for all demographic characteristics of the sample and all variables of interest. T-tests were used to examine basic correlations between outcomes and variables of interest. We then built a multivariate logistic regression model to look at the main association of interest. This model sequentially incorporated the covariates perceived social support, marital support, and joint family status which were included in the final model and stratified by socioeconomic categories. Prevalence ratios, 95% CIs and p-values were calculated. Stata 13 (StataCorps, 2013) was used for all analyses. An α level $P<0.05$ was used to indicate
statistical significance, but given the small sample size, an α level $P<0.10$ was used to indicate results trending towards significance.
3. Results

Data was collected from a total of 860 women with a mean (± SD) maternal age of 34.5 ± 5.7 years. Background characteristics of all participants are summarized in Table 1. All women were married and had a mean of 4.4 ± 2.08 children. Mean household size was 8.23 ± 3.54 representing a variety of household structures. Most women lived in nuclear households (46.3%) or joint households (42.8%) and the remaining 10.9% of women lived in multiple households. Most (67.91%) of women had <5 years of schooling, 40.9% of women were considered poor and the remaining 59.1% were considered non-poor. Overall, women reported a mean perceived social support score of 39.38 ± 11.73 and high levels of marital satisfaction with a mean of 5.96 ± 1.72.
Table 1: Demographic characteristics of participants according to migration status

<table>
<thead>
<tr>
<th></th>
<th>All Women (n=860)</th>
<th>No Migration (n=643)</th>
<th>Migration (n=217)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n or mean % or SD</td>
<td>n or mean % or SD</td>
<td>n or mean % or SD</td>
</tr>
<tr>
<td>Maternal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal age (mean)</td>
<td>34.47 5.73</td>
<td>34.47 5.89</td>
<td>34.45 5.24</td>
</tr>
<tr>
<td>20-24</td>
<td>9 1.0%</td>
<td>8 1.2%</td>
<td>1 0.5%</td>
</tr>
<tr>
<td>25-29</td>
<td>129 15.0%</td>
<td>105 16.3%</td>
<td>24 11.0%</td>
</tr>
<tr>
<td>30-34</td>
<td>294 34.2%</td>
<td>209 32.5%</td>
<td>85 39.2%</td>
</tr>
<tr>
<td>35-39</td>
<td>246 28.6%</td>
<td>179 27.8%</td>
<td>67 30.9%</td>
</tr>
<tr>
<td>40-44</td>
<td>114 13.3%</td>
<td>86 13.9%</td>
<td>28 12.9%</td>
</tr>
<tr>
<td>45+</td>
<td>68 7.9%</td>
<td>56 8.7%</td>
<td>12 15.5%</td>
</tr>
<tr>
<td>Schooling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>4.56 4.2</td>
<td>4.41 4.22</td>
<td>5.00 4.05</td>
</tr>
<tr>
<td>1-6 (primary)</td>
<td>310 36.0%</td>
<td>244 38.0%</td>
<td>66 30.4%</td>
</tr>
<tr>
<td>7-10 (secondary)</td>
<td>274 31.9%</td>
<td>203 31.6%</td>
<td>71 32.7%</td>
</tr>
<tr>
<td>&gt;10</td>
<td>48 5.6%</td>
<td>35 5.4%</td>
<td>13 6.0%</td>
</tr>
<tr>
<td>Perceived Social Support</td>
<td>39.38 11.73</td>
<td>39.38 12.02</td>
<td>39.36 10.87</td>
</tr>
<tr>
<td>Marital Satisfaction</td>
<td>5.96 1.72</td>
<td>5.85 1.79</td>
<td>6.29 1.48</td>
</tr>
<tr>
<td>Family/household Structure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuclear</td>
<td>398 46.3%</td>
<td>312 48.5%</td>
<td>86 39.6%</td>
</tr>
<tr>
<td>Joint/extended</td>
<td>368 42.8%</td>
<td>266 41.4%</td>
<td>102 47.0%</td>
</tr>
<tr>
<td>Multiple households</td>
<td>94 8.7%</td>
<td>35 10.1%</td>
<td>29 13.4%</td>
</tr>
<tr>
<td></td>
<td>Rich</td>
<td>Moderate</td>
<td>Poor</td>
</tr>
<tr>
<td>--------------------------------</td>
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<td>----------</td>
</tr>
<tr>
<td>SES rating by LHW (mean)</td>
<td>3.42</td>
<td>3.4</td>
<td>3.21</td>
</tr>
<tr>
<td></td>
<td>62</td>
<td>446</td>
<td>280</td>
</tr>
<tr>
<td></td>
<td>0.75</td>
<td>51.9%</td>
<td>32.5%</td>
</tr>
<tr>
<td></td>
<td>3.4</td>
<td>313</td>
<td>226</td>
</tr>
<tr>
<td></td>
<td>0.76</td>
<td>48.7%</td>
<td>35.1%</td>
</tr>
<tr>
<td></td>
<td>3.21</td>
<td>133</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>.067</td>
<td>61.6%</td>
<td>24.9%</td>
</tr>
<tr>
<td>Number of children (mean)</td>
<td>4.40</td>
<td>4.45</td>
<td>4.23</td>
</tr>
<tr>
<td></td>
<td>2.08</td>
<td>2.18</td>
<td>1.71</td>
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<tr>
<td></td>
<td>4.45</td>
<td>3.4</td>
<td>3.21</td>
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<tr>
<td></td>
<td>2.18</td>
<td>0.76</td>
<td>3.21</td>
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<td></td>
<td>4.23</td>
<td>3.21</td>
<td>8.01</td>
</tr>
<tr>
<td></td>
<td>1.71</td>
<td>.067</td>
<td>3.55</td>
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<td>1</td>
<td>12</td>
<td>62</td>
<td>280</td>
</tr>
<tr>
<td></td>
<td>1.4%</td>
<td>7.2%</td>
<td>32.5%</td>
</tr>
<tr>
<td>2 to 3</td>
<td>272</td>
<td>446</td>
<td>280</td>
</tr>
<tr>
<td></td>
<td>31.6%</td>
<td>51.9%</td>
<td>32.5%</td>
</tr>
<tr>
<td>4 to 5</td>
<td>421</td>
<td>446</td>
<td>280</td>
</tr>
<tr>
<td></td>
<td>49.0%</td>
<td>51.9%</td>
<td>32.5%</td>
</tr>
<tr>
<td>More than 5</td>
<td>155</td>
<td>155</td>
<td>155</td>
</tr>
<tr>
<td></td>
<td>18.0%</td>
<td>18.0%</td>
<td>18.0%</td>
</tr>
</tbody>
</table>
Husband outmigration occurred in 25% of all households. Analysis revealed that women in migrant families were more educated by an average of 0.6 years \((p=0.07)\) and were married to husbands that were more educated by an average of 0.9 years \((p=0.002)\). Women also reported higher levels of marital satisfaction by an average of 0.44 points \((p=0.001)\). Migrant families tended to be of higher socioeconomic status; less than 30% of migrating families were considered poor compared to only 45% of non-migrating families. In all, husband outmigration occurred in 17.3% of poor households compared to 30.7% of non-poor households. Poor families were different from non-poor families in several key areas of interest. Women from poor families received less education by an average of 2.24 years \((p\leq0.001)\), were married to husbands with an average of 2.1 years less education \((p\leq0.001)\), had lower levels of perceived social support by 6.46 points \((p\leq0.001)\) and lower levels of marital satisfaction by 1.14 points \((p\leq0.001)\).

The prevalence of depression was 182 (21.2%) among the 860 women included in the study. Analysis showed that depressed women were slightly older, less educated, of lower socioeconomic status, and had lower levels of social support and marital satisfaction.

There was no initial significant association between husband migration and maternal depression. Among families with no male outmigration, 20.4% of women were depressed compared to 23.5% in families reporting outmigration \((p=0.33)\) \((PR = 1.15; 95\% CI: 0.87, 1.53)\). Once stratified by socioeconomic status into non-poor and poor
groupings, there was an association between husband migration and maternal
depression in the poor group ($p=0.002$) (PR = 1.63; 95% CI:1.19, 2.22), but not the non-
poor group ($p=0.696$) (PR = 1.10; 95% CI:0.68, 1.79).

![Figure 1: Percentage of depressed women according to migration status, stratified by socioeconomic status](image)

We next examined whether migration remained associated with depression
among poor women after adjusting for factors such as social support, marital
satisfaction, and family structure. Multivariate regression analyses showed that
migration status remained a significant predictor of depression among poor families
after adjustment for perceived social support, marital satisfaction, and family structure
(see Table 2a). This relationship was not seen among non-poor families (see Table 2b).

Model 2 adjusted for maternal perceived social support. As can be seen in both
poor and non-poor families, the PRs did not significantly decrease suggesting that social
support does not overly affect the migration-depression relationship. Both migration and perceived social support remained independent predictors for maternal depression. Women from poor households reported much lower perceived social support (35.56 ± 0.61) than their non-poor counterparts (42.02 ± 0.49) and when broken down into the three sources of support, analyses showed that poor women receive less support from their families and significant others than non-poor women (but no difference in support from friends). However, there was no difference in the breakdown of perceived social support between poor families that did migrate and did not in any of the categories. There was a slight difference in the average perceived social support among poor women between nuclear families (33.9) and joint families (37.2).

Model 3 adjusted for marital support. Similarly to social support, marital support did not significantly impact the migration depression relationship. Women in poor households also reported lower marital satisfaction (5.29 ± 0.11) than their non-poor counterparts (6.43 ± 0.05). Interestingly, among poor women whose husbands migrate, marital satisfaction increased (5.73 ± 0.24) compared to poor women whose husbands do not (5.20 ± 0.12).

Model 4 adjusted for joint family structure. Joint and multiple family households were more slightly likely to have a husband migrate than nuclear families (PR = 1.21; 95% CI: 1.03, 1.43). However, family structure did not significantly affect the depression outcomes of women in this cohort regardless of migration or socioeconomic status.
Among poor families, 50% of the migrant-sending households were nuclear households compared to only 36% among non-poor families.

Model 5 adjusted for all aforementioned covariates. Among the poor households, cell sizes became too small to adjust for joint family status. However, it is clear that among the poor, migration remained an independent risk for maternal depression despite adjustment for social support, marital support, and family status.
Table 2a: Multiple regression models with depression status regressed on migration status, social support, marital support and family structure among poor families (n=352)

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migration</td>
<td>1.63 (1.19, 2.21)**</td>
<td>1.47 (1.12, 1.91)**</td>
<td>1.73 (1.29, 2.32)**</td>
<td>1.57 (1.15, 2.13)**</td>
<td>1.49 (1.14, 1.95)**</td>
</tr>
<tr>
<td>Perceived Social Support</td>
<td>0.97 (0.96, 0.97)**</td>
<td>0.97 (0.96, 0.98)**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital Satisfaction</td>
<td>0.91 (0.86, 0.96)**</td>
<td>0.98 (0.92, 1.04)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joint Family Structure</td>
<td>0.75 (0.55, 1.00)*</td>
<td>n/a</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Model 1 = Regression analysis with migration status as predictor; Model 2 = Regression analysis with perceived social support as additional predictor variable; Model 3 = Regression analysis with marital support as additional predictor variable; Model 4 = Regression analysis with family structure as additional predictor variable; Model 5 = Regression analysis with all included variables of interest

**p value < 0.01; *p value < 0.05; †p value < 0.19

Table 3: Multiple regression models with depression status regressed on migration status, social support, marital support and family structure among non-poor families (n=508)

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migration</td>
<td>1.10 (0.68, 1.79)</td>
<td>1.04 (0.65, 1.65)</td>
<td>1.13 (0.70, 1.84)</td>
<td>1.07 (0.66, 1.74)</td>
<td>0.98 (0.61, 1.55)</td>
</tr>
<tr>
<td>Perceived Social Support</td>
<td>0.95 (0.93, 0.97)**</td>
<td></td>
<td></td>
<td></td>
<td>0.95 (0.93, 0.97)**</td>
</tr>
<tr>
<td>Marital Satisfaction</td>
<td>0.82 (0.73, 0.93)**</td>
<td></td>
<td></td>
<td>0.95 (0.82, 1.09)</td>
<td></td>
</tr>
<tr>
<td>Joint Family Structure</td>
<td>1.27 (0.79, 2.05)</td>
<td></td>
<td></td>
<td>1.49 (0.94, 2.36) †</td>
<td></td>
</tr>
</tbody>
</table>

Model 1 = Regression analysis with migration status as predictor; Model 2 = Regression analysis with perceived social support as additional predictor variable; Model 3 = Regression analysis with marital support as additional predictor variable; Model 4 = Regression analysis with family structure as additional predictor variable; Model 5 = Regression analysis with all included variables of interest

**p value < 0.01; *p value < 0.05; †p value < 0.19
4. Discussion

This paper aimed to elucidate the relationship between male outmigration and the prevalence of maternal depression in our sample drawn from pregnant women in Rawalpindi, Pakistan. The overall prevalence of depression was 21.2% among the women included in the study which is similar to the reported prevalence levels in existing studies throughout rural Pakistan of 8.3-28.8% (Mirza & Jenkins, 2004).

Initially, there was no association found between male outmigration and maternal depression in this study. This finding was similar to that found in a study on depression in rural Pakistan by Rahman et al. which reported no increased risk of depression when a husband was away for six months or longer (2003). However, stratification by socioeconomic level revealed that migration became significantly associated with maternal depression when women and their families are poor. The observed socioeconomic difference may be attributed to different experiences between poor and non-poor women when their husbands migrate and may be indicative of different reasons for migration.

Our study revealed that non-poor households are more likely to be migrant-sending than poor households. A study by Gioli et al. similarly found a similar relationship in the northern provinces of Pakistan. Studies by the World Bank found this as well and suggest that it is not typically the poorest who migrate, but families who have enough capital, financial or social, to migrate (Tacoli, 2009; Banjerjee et al. 2013).
Thus, it may be possible that households that are less poor are able to send their educated, male members in pursuit of more lucrative business ventures that typically increase household income and are able to take advantage of both the social and financial benefits of migration.

In contrast, poorer households may be forced to send their male members who are less educated than their rich counterparts in search of jobs that do not pay more and that may not increase household income or even potentially decrease income due to challenges with remittances. In these situations, the women who remain home are not only in the same dire economic situation, but are also in a situation where they receive little to no support from their husbands, may have an increased workload, and become subject to abuse from extended family or de-facto heads of households in a very patriarchal society where they have little to no power. All these factors might potentially lead to depression though we did not have a mechanism with which to measure them during this study. Other studies have suggested that low income or low education levels create environments that are more vulnerable to social problems that in turn lead to psychological morbidities (Kidwai, 2012). Though causation cannot be determined in our study, this may be the case as the women from low income households all had lower levels of social and marital support.

Lack of social support has been well documented in the literature as a risk factor for maternal depression. We hypothesized that support levels may change when a
husband migrates, but this was not the case in either poor or non-poor groups. Women in poor households received less social support from family and significant others which may be significant. Results from a study by Akhtar et al. suggest that in Pakistan, social support is perceived as one source of support rather than the three found in Western societies, family, friends, and significant others. It is hypothesized that this is due to the communal nature of Pakistani society and high likeliness of inter-family marriages (2010). Women may find that their friends, family, and husband are all in the same larger familial network and thus do not differentiate support sources. Thus, higher rates of depression among poor women may in part be explained by the lower levels of social support received from their family.

Family structure may also play an important role in this phenomenon as more poor women with migrating husbands lived in nuclear households than non-poor women. Among poor women, joint family structure was protective suggesting that joint family members may step in to provide social support that may be missing from the husband (Akhtar, 2010). This difference was not seen among non-poor women. It is unclear why joint family structure is protective among poor families, but slightly harmful among non-poor families (Table 2).

Interestingly, marital support was the only predictor of depression that varied between poor women with migrating husbands and non-migrating husbands. Women whose husbands migrate reported an overall higher level of marital satisfaction. This
could be explained in part by the social structures that dominate Pakistan – males are the primary breadwinners for the family and masculinity is thus defined as an ability to provide for one’s family. If a husband is able to do so better by migrating, it is not surprising that women feel increased satisfaction in their marriage.

Our results suggest that male outmigration is a predictor of maternal depression among poor families even after adjustments for social and marital support. We hypothesize that the choice to migrate among poor families may be indicative of a particularly desperate situation. Thus, poor women, who are already at an increased risk for depression, may be particularly vulnerable to depression.

4.1 Implications for policy and practice

Results from this study suggest that migration is a major life event with the ability to significantly impact maternal mental health, particularly among poor populations. Women from poor households in a patriarchal society are a vulnerable group and the absence of the husband due to migration may make them increasingly at risk for mental health disorders. Women under these circumstances may be less likely or unable to leave the home to seek mental health treatment, so it is important that mental health treatments be made available in such a way to reach these women. The creation of a better diagnosis and referral system for mental health disorders is an important first step towards the ultimate need to strengthen local mental health care in rural communities.
4.2 Implications for further research

Further research is needed in this area to better understand the mechanisms leading to maternal depression among poor women when their husbands migrate. To do so, larger studies are needed that focus more specifically on the reasons for migration and resulting income streams. Cohort studies would be useful to understand how the migration event impacts women prior to migrant departure, during, and after the migrant returns.

4.3 Study strengths and limitations

Strengths of our study included the large sample size and number of responses. The assessments used are the current gold standard measurements in the field and were culturally adapted for use in rural Pakistan.

There were several limitations in our study of note. Firstly, our sample was biased towards women who have previously had an episode of depression as the majority of women included in this study were follow-ups from the 2008 Rahman study. Further, the sampling design of the study enabled us to make inferences about associations, but not about causality in the relationship of interest. The study also lacked a number of variables important for understanding the migration-depression relationship including remittances earned by the migrant and received by the family.
5. Conclusion

Despite the limitations of this study, it is clear that migration is a major life event that has the ability to affect maternal health among already vulnerable populations. Migration will continue to be a major survival strategy for many families and understanding the implications for families left behind is of critical importance. From a global health perspective, understanding this relationship may provide information that can better inform intervention strategies for migrant families.
Appendix A: SCID

Now I would like to ask you some questions about your mood.

9 = inadequate information

1 = No

2 = Sub-threshold

3 = Yes

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Depressed mood</td>
<td>9</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2.</td>
<td>Loss of interest</td>
<td>9</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>Weight/Appetite loss or gain</td>
<td>9</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Probes: Weight loss or decreased appetite, weight gain or increased appetite</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Sleep disturbance</td>
<td>9</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Probes: Insomnia, Hypersomnia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Psychomotor agitation or retardation</td>
<td>9</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Probes: Psychomotor agitation, Psychomotor retardation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Fatigue or loss of energy</td>
<td>9</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>7.</td>
<td>Feelings of worthlessness or inappropriate guilt</td>
<td>9</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>8.</td>
<td>Diminished ability to concentrate or indecisiveness</td>
<td>9</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Probes: Diminished ability to think, Indecisiveness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Recurrent thoughts of death or suicidal ideation</td>
<td>9</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Probes: Thoughts of own death, Suicidal ideation, Specific plan, Suicide attempt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Symptoms cause significant distress or impairment</td>
<td>9</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>11.</td>
<td>Not due to direct effects of a substance or medical condition</td>
<td>9</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>12.</td>
<td>Not better accounted for my bereavement</td>
<td>9</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>13.</td>
<td>MAJOR DEPRESSIVE EPISODE</td>
<td>9</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Probe: If respondent scores more than 5 symptoms, please refer to psychiatrist. Fill the referral form and ensure that the respondent understands the necessity to visit a mental health specialist.
Appendix B: Multidimensional Scale of Perceived Social Support

We are interested in how you feel about the following statements. Read each statement carefully. Indicate how you feel about each statement.

Circle the “1” if you Strongly Disagree

Circle the “2” if you Disagree

Circle the “3” if you Neither Agree nor Disagree

Circle the “4” if you Agree

Circle the “5” if you Strongly Agree

<table>
<thead>
<tr>
<th></th>
<th>Statement</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>There is a special person who is around when I am in need.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>There is a special person with whom I can share my joy &amp; sorrows.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>My family really tries to help me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>I get the emotional help and support I need from my family.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>I have a special person who is a real source of comfort to me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>My friends really try to help me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>I can count on my friends when things go wrong.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>I can talk about my problems with my family.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>I have friends with whom I can share my joys and sorrows.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>There is a special person in my life who cares about my feelings.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11</td>
<td>My family is willing to help me make decisions.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>I can talk about my problems with my friends.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Appendix C: Marital Support Scale

1. Does your husband look after your basic needs (food, clothes, healthcare)?
   
   YES   NO

2. If you wanted to go to a doctor, your husband helps you out?

   YES   NO

3. If you wanted to go to a doctor, your husband stops you from doing so?
   
   YES   NO

4. Do you feel that your husband understands your feelings?
   
   YES   NO

5. Does your husband support you in difficult situations/problems?
   
   YES   NO

6. Are you happy with your husband’s behavior towards you in general?
   
   YES   NO

7. Do arguments with your husband often lead to physical violence towards you?
   
   YES   NO
References


