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**Relationship Between Couple's Acquaintance at Time of Marriage
and Subsequent Female Autonomy Among Newly Married Couples
in Urban Slums of Pune, India**

By

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Degree to be awarded: MPH

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2016

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An abstract of
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Abstract

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By Sandhya Subramanian

Background: Female autonomy is a critical component of gender equality, and the focus of the United Nation's Sustainable Development Goal 5. To date, in India, few potential predictors of women's autonomy have been studied beyond demographic characteristics. We aimed to examine whether acquaintance with one's spouse at the time of marriage is associated with early marital female autonomy in Pune, India, as it could serve as a point of intervention.

Methods: This thesis is a secondary analysis of data collected for a parent study that examined correlates of intimate partner violence among 200 newly-married men and women residing in slums in Pune, India. Marital acquaintance was measured as how well the participant felt as though he or she knew his or her partner at the time of marriage. Female autonomy was measured using five dimensions of autonomy: 1) financial autonomy 2) relationship autonomy 3) sexual and reproductive autonomy 4) mobility autonomy and 5) lifestyle autonomy. Bivariate analyses and logistic regression were conducted to assess the association between the marital acquaintance and overall female autonomy, controlling for marriage type.

Results: In the bivariate analysis, marital acquaintance was positively associated with female autonomy ($p < .05$). In multivariate analysis, after controlling for marital type, marital acquaintance remained associated with female autonomy ($p < .05$). However, examination of the large odds ratio estimate and 95% confidence interval suggested that the data suffers from quasi-complete separation, or sparse data bias.

Conclusions: Our results suggest that acquaintance with spouse at the time of marriage may be associated with increased female autonomy in early marriage; however, our results require validation on a larger scale. If such large scale studies confirm the association, future interventions that aim to increase female autonomy might consider workshops for couples that foster trust, support, and communication skills between partners before or around the time of marriage and immediately after marriage.

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Introduction

In 2015, the United Nations set forth a new sustainable development agenda including 17 overarching goals to eliminate poverty, ensure prosperity for all, and establish environmental protections for the planet (United Nations, 2015). One of the most critical, yet perhaps difficult to reach, goals has been Sustainable Development Goal (SDG) 5: to “achieve gender equality and empower all women and girls.” Female autonomy is a critical component of gender equality. In addition to being a fundamental human right, high female autonomy has been associated with numerous positive socio-economic and health outcomes (Mehra & Agarwal, 2004, Bloom, Wypij, & Gupta, 2001). Emerging literature has begun to identify predictors of autonomy, although much work has yet to be done.

In India, the correlates of female autonomy that have been identified include age, education, occupation, and sociocultural norms (along with several other demographic factors). A major gap in our understanding of factors that determine a woman’s autonomy in her marital life is how well she knew her spouse at the time of marriage. Specific study of this factor is particularly important in the Indian context because in India 90 % of marriages are arranged (UNICEF, 2010). Therefore, individuals may not have a chance to become acquainted until post-marriage (Banerjee, 2008, Desai & Andrist, 2010). Considering this aspect of marriage delves beyond presently-identified demographic factors and deeper into a potential predictor of female autonomy that could serve as a point for intervention.

The alternative hypothesis for this thesis study is that level of marital acquaintance is associated with female marital autonomy among newly-married slum-dwelling couples in Pune, India. The null hypothesis for this study is that there is not a significant effect of marital acquaintance on

whether or not woman has female marital autonomy among newly-married slum-dwelling couples in Pune, India. The directionality of the association of marital acquaintance on overall female autonomy in this hypothesis has intentionally been left undefined because contextual reasoning and relevant literature shows that having both higher and lower marital acquaintance could be associated with having overall female marital autonomy.

Lower marital acquaintance might be associated with having female autonomy because there could be fewer and perhaps less rigid expectations for a partner whom you do not have much knowledge about or with whom you do not have an existing relationship with prior to marriage. With low marital acquaintance there is likely very little to no pre-marital communication between the future wife and husband surrounding the relative power dynamics of their relationship. This could leave open more space for the woman to negotiate her autonomy and voice herself early on in her marriage.

It is also quite possible that higher marital acquaintance could be associated with having female autonomy. For example, a couple who knew each other for a long time might have developed mutual respect for one another before their marriage therefore leading to higher female autonomy. Additionally, a woman might feel more open voicing her right to autonomy with a man whom she knows and has already communicated with in the past. Perhaps, she would have less uncertainty surrounding how her husband would react, and stronger communication would exist between the two of them. Additionally, couples who knew and communicated with each other before marriage might have families who also know and respect one another and who might be interested in maintaining the happiness of both the newly married husband and wife.

The uncertainty of the directionality of this hypothesis has driven the study question for this thesis study to be: “Is greater marital acquaintance among spouses at the time of marriage associated with a woman having autonomy early on in her marriage?” This study aims to explore this association. The heightened understanding of this association could inform intervention activities aimed at increasing female autonomy in India as a critical component of national programs that promote gender equality.

Systematic Literature Review

Through this literature review, I will first 1) discuss the complexities of defining autonomy and establish an operational definition of autonomy for the thesis work, 2) summarize tools for measuring autonomy, 3) examine the public health significance of autonomy, 4) review the known predictors of autonomy, 5) discuss the cultural context of traditional Indian marriage, 6) discuss why examining marital acquaintance is critical to our understanding of female autonomy in marriage in the Indian context, and 7) discuss the setting and sociocultural and geographic context of the study.

Female Autonomy Definition in Literature

The numerous, different operational definitions of autonomy used by researchers highlight that autonomy is a broad multidimensional concept that is difficult to quantify and conceptualize. Thapa and Neihof in their 2013 study of female autonomy in Nepal assert that “autonomy relates to the distribution of decision-making power and resources among members of the household in particular between husband and wife” (Thapa & Neihof, 2013). Thapa and Neihof go on to conceptualize female autonomy as a five-dimensional concept consisting of knowledge autonomy, household decision-making autonomy, movement autonomy, economic autonomy, and emotional autonomy. Jejeebhoy and Sathar, in their study of women’s autonomy in India and Pakistan, define female autonomy as “the control women have over their own lives—the extent to which they have an equal voice with their husbands in matters affecting themselves and their families, control over material and other resources, access to knowledge and information, the authority to make independent decisions, freedom from constraints on physical mobility, and the ability to forge equitable power relationships within families”(Jejeebhoy & Sathar, 2001). In their 2013 article exploring women’s autonomy and experience of physical marital violence in

India, Sabarwal, Santhya and Jejeebhoy define female autonomy as “the capacity to manipulate one’s personal environment through control over material and social resources” (Sabarwal, Santhya, & Jejeebhoy, 2013). In this study female autonomy is explored in three dimensions: financial autonomy, freedom of movement, and household decision-making. In their 2002 study exploring the relationship between women’s household position and maternal health care use, Furuta and Salway recognize that there are various dimensions to a women’s position in the household and that these dimensions must be understood in a socio-culturally appropriate manner. For example, they mention that men are often the direct avenue to household resources in South Asia, that conjugal intimacy is often discouraged, and that contraception is widely promoted in Nepal. Consequently, the dimensions of female autonomy that they focus on in their study include: participation in household decision-making, whether they were employed and had influence over their earnings, and whether they discussed family planning with their husbands (Furuta & Salway, 2002).

Operational Definition of Female Autonomy

The operational definition of “female autonomy” used in this thesis is inclusive of five dimensions: 1) financial autonomy 2) relationship autonomy 3) sexual and reproductive autonomy 4) lifestyle autonomy and 5) mobility autonomy. The selection of these dimensions of female autonomy was based on the reviewed literature and ultimately, on the questions in the Healthy Relationships Survey from where the data was obtained. It is important to note that the Healthy Relationships Survey was not designed for this particular research question. Further details of the items used to assess this operational definition are included in the Methods section of this secondary analysis thesis study.

Financial Autonomy

Research indicates that women's financial dependency on men is a major factor that drives the inequalities between men and women (Standing, 1991). Several studies emphasize that a women's financial autonomy in India increases her decision-making autonomy regarding her own reproductive health (Reed et al., 2016). Thus, increased financial autonomy among women in India can improve maternal and child health outcomes, including greater control over pregnancy and pregnancy timing (Mehra & Agarwal, 2004). Additionally, research in India and Nepal shows that financial control is associated with a reduced risk of experiencing marital violence (Lamichhane et al., 2011). In a study of female autonomy across Indian states, Banerjee and Roy emphasize that major indicators of female autonomy in India include the "percentage of women's access to money that they can decide how to use" and the percentage of women who alone or jointly with their husband decide how their own earnings are used" (Banerjee & Roy, 2015). In their 2006 study of female autonomy and mental health outcomes in India, Patel and colleagues found common mental disorders (CMDs) were significantly and independently associated with reduced decision-making autonomy. In this study, one of the measures of decision-making autonomy included a women's ability to keep aside money for personal use. The study results do not state whether is particular measure was independently associated with CMDs. Based on support from recent and relevant literature (i.e. the relationship between financial autonomy and marital violence, maternal and child health outcomes, and perhaps CMDs), financial autonomy in included as a critical domain of female autonomy in this thesis project.

Relationship Autonomy

The power to develop and maintain relationships with family, friends, coworkers, and relatives is critical not only to one's happiness in marriage, but also for social support, coping, and resilience. Dyson and Moore define autonomy as the "technical, social, and psychological ability for making decisions about one's private concerns as well as that of one's intimates" (Dyson & Moore, 1983). A huge part of being autonomous is being able to maintain interpersonal relationships with those who you care about and/or who you are close to. Dyson and Moore also call attention to the fact that kin relationships are the prime avenue of access to social resources for married women in India. They go on to say that Indian marital practices often restrict the development and/or maintenance of the relationship between a married woman and her natal kin, thus restricting her personal autonomy (Dyson & Moore, 1983). Bloom, Wypij and Gupta suggest the importance of relationship autonomy as a category of female autonomy by highlighting that "the frequency of contact with natal kin after marriage is a powerful mediator of the extent of women's autonomy. Women with close ties to their parents and brothers have greater ability to realize their needs and desires" (Bloom, Wypij, & Gupta, 2001). In their 2006 study on gender disadvantage and mental health among women in India, Patel and colleagues found that having low levels of support from one's family was independently associated with having common mental disorder (OR, 2.2; 95% CI, 1.4-3.3) (Patel et al., 2006). Thus, being able to gain support from family is critical for women to attain and maintain positive mental health outcomes.

It is important to note that before women are married their social standing is based on that of their families. "After marriage, natal kin provide both material and emotional support to their daughters" (Bloom, Wypij, & Gupta, 2001). Bloom and colleagues' study results revealed that

women with more frequent contact with their families showed a higher probability of interpersonal control in their power to make decisions, freely leave their homes, and control their household finances. It is also important to note that in India, natal kin are a source of income and financial support for married women who lack financial autonomy (Bloom, Wypij, & Gupta, 2001). Thus, the current literature supports the inclusion of relationship autonomy as a key aspect of female autonomy in my study.

Sexual and Reproductive Autonomy

According to the NFHS- 4 data from 2015-2016, 20.4% of young women aged 20-24 in urban India are married prior to the legal age of 18 (International Institute for Population Sciences, 2017). These young wives, who are often between the age of 15 and 24, are more likely than older wives to engage in non-contraceptive use and have unplanned and/or early pregnancies (Mehra & Agrawal, 2004). Failure to use contraceptives is in part due to the fact that husbands typically have the power to decide how many children to have, when and how they want to have sex, and whether or not contraception is used (Reed et al., 2016). Banerjee and Roy highlight that an important aspect of female autonomy is “the extent of their control over refusing sexual intercourse with their husbands” (Banerjee & Roy, 2015). Low condom use negotiation capacity is particularly concerning as it is linked to increased STIs/HIV (Go et al., 2003). Fear of retribution from her husband may prevent a woman from engaging in condom use negotiation when she suspects that her husband may be infected with HIV/AIDS (Go et al., 2003). In their 2012 study of maternal health care service utilization among adolescents in India rural India, Singh and colleagues found that among those who had had at least one live birth in their adolescence, 80% self-reported low autonomy and decision-making power regarding their own health (Singh et al, 2012). Thus, the derivation of sexual and reproductive autonomy as a key

dimension of female autonomy in my study is based on support from recent and relevant literature as well as the significant implications it has for women's health and demographic outcomes.

Lifestyle Autonomy

A key aspect of lifestyle autonomy that was assessed in this thesis study is whether or not a woman has the ability to relax when she wants to. Chorghade and colleagues' study of unhealthy weight among rural women in northern India revealed that young brides were often not given much, if any, time to relax. Women were found to be tasked with several household duties as well as farm work, and many were expected to deliver children early-on in their marriage (Chorghade et al., 2006). This evidence supports my inclusion of the assessment of a woman's ability to relax as a component of lifestyle autonomy.

The second component of lifestyle autonomy that was included in my study is a woman's ability to wear what she wants to wear. In their 2013 assessment of female agency, Jejeebhoy and colleagues assessed decision-making power of Indian women, and included a measure of ability to decide what clothes to buy for herself. Their results found the women in self-arranged marriages had more decision-making power regarding clothing choice than did women in family-arranged marriages (Jejeebhoy et al., 2013). Other than this study, no other studies consider clothing choice as a key factor when exploring female autonomy. This gap in the literature supports my consideration of clothing choice as a key part of exploring female lifestyle autonomy.

Mobility Autonomy

Several studies illuminate the importance of assessing a married woman's autonomy of mobility when assessing her overall autonomy. For example, in Singh and colleagues' assessment of the utilization of maternal health care services among married adolescents in rural India, they analyzed a woman's freedom to go out as an important component of female autonomy (Singh et al., 2012). The results found that women who reported low mobility autonomy had significantly poorer sexual and reproductive health outcomes after controlling for decision-making autonomy and access to economic resources (Singh et al., 2012). In their 2013 study of women's autonomy and experience of marital violence in rural India, Sabarwal and colleagues found that freedom of movement reduced the risk of marital violence in their overall model. In this study, freedom of movement was one of three key dimensions that defined female autonomy. The other forms of autonomy that were controlled for in the overall model included financial autonomy and decision-making autonomy (Sabarwal, Santhya, & Jejeebhoy, 2013). In 2016 Raman and colleagues further explored mobility of autonomy as a key dimension of female autonomy in their research on female autonomy and reproductive health in rural India. Their qualitative results showed that "women who worked outside the home were out of necessity more mobile, and women who were confident in the social sphere were also confident in their ability to negotiate independent mobility" (Raman et al, 2016). They also noted that women who were more mobile had better access to maternal health care services (Raman et al., 2016). Desai and Andrist, in their 2010 study of gender scripts and age of marriage in India assert that "restrictions on women's physical mobility is yet another marker of gender segregation in which women must seek permission from family elders before venturing outside the home to visit health centers, friends' homes, or the local bazaar, and often must be accompanied" (Desai & Andrist, 2010).

Thus, due to literature-based support and face validity, mobility autonomy was included as a key dimension of female autonomy in my thesis study.

Measurement/Tools for Female Autonomy

Female autonomy is a highly variable concept that is difficult to conceptualize and measure. The following studies provide a few examples of the methods used to measure female autonomy in recent, relevant literature.

In 2016 Bhandari and colleagues investigated women's autonomy and its correlates in western Nepal using a population-based cross-sectional survey that they developed themselves. The survey received authorization from the Institute Ethical Committee of Sree Chitra and the Tirunal Institute for Medical Sciences and Technology (SCTIMST) and followed the guidelines of the Indian Council of Medical Research (ICMR). The survey measured autonomy using three dimensions: 1) decision-making autonomy 2) financial autonomy and 3) freedom of movement autonomy. After conducting a thorough literature review and consulting with subject matter experts, they prepared a 24-item survey. Each item had a three-point Likert scale measurement including 0, or dependent/always, 1, or joint/sometimes and 2, or independent/never (Bhandari et al., 2016). A Cronbach's alpha coefficient was calculated to assess how closely related the set of items used were as a group. This scale has a Cronbach's alpha coefficient of 0.84 suggesting strong internal consistency. Additionally, the average content validity ratio/index was 0.8 and overall agreement, as measured through a Kappa statistic, was 0.83, both of which were acceptable (Bhandari et al., 2016).

In their 2005 study, Saleem and Bobak investigated women's autonomy, education and contraception use in Pakistan. The dimensions of women's autonomy that were explored in this

study were 1) decision autonomy and 2) movement autonomy. Decision autonomy measured using nine questions on decision-making. Examples of some of the topics for which decision making was assessed included health care, education, buying and selling property, and cooking choices. The responses were given a score of 2 if decisions were made by the woman, 1 if decisions were made jointly by both the woman and her husband, and 0 if decisions were made by others. A Cronbach's alpha coefficient was derived to assess whether individual questions in the scale measured the same one underlying factor. The Cronbach's alpha was 0.78, indicating good internal consistency. The movement autonomy scale was based on six questions on whether permission by husband or a senior family member was required for the woman to go out. The Cronbach's alpha of these six questions was 0.87, suggesting high internal consistency. For both scales, the questions were very similar to those used in previous studies. The responses in this study were not weighted (Saleem & Bobak, 2005).

In 2013 Sabarwal, Santhya and Jejeebhoy investigated the role of changes in women's autonomy over time in influencing the risk of marital violence using prospective data with a sample of 4,904 rural Indian women. Three dimensions of female autonomy were explored in this study: 1) financial autonomy 2) freedom of movement and 3) decision-making autonomy. Women's financial autonomy was assessed by asking a yes/no question regarding whether or not they were allowed to set aside and use money as they desired. Women's freedom of movement autonomy was assessed through two yes/no questions regarding whether or not 1) she could go to the market and 2) visit friends or relatives. Women were coded as having freedom of movement if they responded with not needing permission for either of these acts. Women's household decision-making autonomy was assessed by asking if she could 1) see healthcare for herself 2) purchase jewelry and 3) visit relatives and/or friends. Response options included: took the

decision independently, took the decision jointly with her husband, took the decision jointly with others in the family, others in the family took the decision and finally husband alone took the decision. The Cronbach's alpha coefficient for the household decision-making questions were .72 at baseline and .77 at follow-up (Sabarwal, Santhya, & Jejeebhoy, 2013).

Table 1. Summary Table: Measurement/Tools for Female Autonomy

Reference	Form(s) of Autonomy Measured	Study Population	Psychometric Properties
Bhandari, T. R., Kutty, V. R., & Ravindran, T. K. S. (2016). Women's Autonomy and Its Correlates in Western Nepal: A Demographic Study. <i>PLoS ONE</i> , 11(1), e0147473. http://doi.org/10.1371/journal.pone.0147473	Decision-making autonomy, financial autonomy, freedom of movement autonomy	500 women from 10 village department communities in the Kapilvastu district of the Western Development Region in Nepal	Cronbach's alpha= 0.84, Content validity ratio/index=0.8, Kappa statistic= 0.83
Sabarwal, S., Santhya, K. G., & Jejeebhoy, S. J. (2013). Women's Autonomy and Experience of Physical Violence Within Marriage in Rural India. <i>Journal of Interpersonal Violence</i> , 29(2), 332-347. doi:10.1177/0886260513505144	Decision-making autonomy, financial autonomy, freedom of movement autonomy	4,904 rural women drawn from two linked studies: the NFHS-2, conducted during 1998-1999 and a follow-up study for a subgroup of women carried out during 2002-2003	Cronbach's alpha= 0.72 at baseline and 0.77 at follow-up
Saleem, S., & Bobak, M. (2005). Womens autonomy, education and contraception use in Pakistan: a national study. <i>Reproductive Health</i> , 2(1). doi:10.1186/1742-4755-2-8	Decision autonomy, movement autonomy	National sample of ever married women aged 15-49 years (n=6,579) in Pakistan	Cronbach's alpha= 0.78, Movement autonomy scale Cronbach's alpha=0.87

Known Predictors of Female Autonomy in South Asia

Age, Spouse Age & Spousal Age Difference

Gupta (1995) provided an overview of women's autonomy and health outcomes from a life-course perspective. He concluded that women of childbearing age have the lowest level of autonomy, which had negative implications for their own health and the health of their children.

Additionally, Bloom, Wypij and Gupta's study of the dimensions of women's autonomy in

relation to maternal health care utilization revealed that older women are more autonomous than younger women in Northern India (Bloom, Wypij, & Gupta, 2001). In their research of intra-marital age disparity as a determinant of status, Kaliappan and Reddy assert that “greater age gives the husband a considerable advantage in status, experience and power” (Kaliappan & Reddy, 1987). Jejeebhoy’s study of women’s fertility and societal status in Tamil Nadu India showed that husbands who were considerably older than their wives exerted greater marital authority, and that their wives experienced less domestic autonomy than women whose husbands were closer to them in age (Jejeebhoy, 1991).

Education Level & Spouse Education Level

In 2016, Bhandari and colleagues found that women’s education (OR = 8.14, CI = 3.77–17.57), husband’s education (OR = 2.63, CI = 1.69–4.10) and economic status of household (OR = 1.42, CI = 1.01–2.03) were key predictors of women’s autonomy in the Kapilvastu district of Nepal. Using multivariate models, they also assessed whether a woman’s education independently influenced her autonomy, or if the relationship was due to interaction with other socioeconomic status variables. The modeling results revealed that a woman’s education was independently correlated with high self-reported autonomy, after controlling for her spouse’s education status and economic status of household (Bhandari et al., 2016). In 2006 Bloom and colleagues conducted a study that explored various dimensions of women’s autonomy and its influence on maternal health care utilization in Varanasi, India. The study results revealed that wife’s education was positively associated with all the dimensions of her autonomy, but reached statistical significance only for the high freedom of movement dimension of women’s autonomy. “Highly educated women were more likely to have high freedom of movement (OR = 2.44, 95% CI = 1.22, 4.88) than less educated wives” (Bloom, Wypij, & Gupta, 2001).

Employment & Spouse Employment

In 2006 Bloom and colleagues' study of women's autonomy and use of maternal healthcare services showed that "employed women were much more likely to have high control over finances (OR = 3.04, 95% CI = 1.63, 5.68), high decision-making power (OR = 4.06, 95% CI = 2.24, 7.37), and a tendency toward high freedom of movement (OR = 1.95, 95% CI = 0.88, 4.34)" (Bloom, Wypij, & Gupta, 2001). In 2016, Bhandari and colleagues explored correlates of women's autonomy in the Kapilvastu district of Nepal. In 2010 Acharya and colleagues' study of women's autonomy in household decision-making in Nepal revealed that "women working for cash are more likely to participate in decision making ($p < 0.001$) compared to women who are unemployed" (Acharya et al., 2010). In this study decision-making was categorized into four dimensions: 1) own health care 2) major household purchases 3) daily household purchases and 4) visits to family and friends (Acharya et al., 2010). In a study of young married women's sexual agency in South India, results found that women who were exposed to workplace and earning money before marriage had greater confidence to negotiate sex and having children. In fact, women who worked before getting married were showed higher odds of effective sexual communication than their pre-marital unemployed counterparts (OR 1.38; $p=0.038$) (Pande et al., 2011).

Religion

Jejeebhoy and Sathar's study of women's autonomy in India and Pakistan showed that religion is not a significant correlate of female autonomy in their study sample of 800 married women. They found that in Tamil Nadu Hindu women experienced more autonomy than Muslim women in certain individual dimensions of autonomy such as decision-making autonomy and mobility autonomy, but not overall female autonomy. "In Uttar Pradesh, by contrast, Hindu and Muslim

women are equally constrained in terms of decision-making ability and mobility.” (Jejeebhoy & Sathar, 2001). Similarly, Morgan and colleagues comparatively studied four rural Asian population groups of Muslims and non-Muslims and failed to demonstrate a link between religion and female autonomy (Morgan et al., 2002). As a result, since 2002, very few studies consider religion when studying female autonomy.

Number of Pregnancies

In 2010 Acharya and colleagues’ study of women’s autonomy in household decision-making in Nepal revealed that women's autonomy in decision-making is positively associated with the number of living children they have, with the majority of women having five or more children. The areas of decision-making that were considered include: 1) making decisions regarding her own healthcare, 2) making decisions regarding major household purchases, 3) making daily household purchases, and 4) deciding when to visit her family or relatives. All four areas of decision-making autonomy were associated with the number of living children the woman had (Acharya et al., 2010). In 2009 Senarath and Gunawardena studied the women’s autonomy in healthcare decision-making in Nepal and Bangladesh. Their study results revealed that women’s participation in making decisions regarding their own healthcare, a crucial aspect of female autonomy, significantly increased with the number of children that she had (Senarath & Gunawardena, 2009). This could be due to the fact that the women who had more children were older. It should be noted that it is very common for women in India to gain more respect and agency as they age and when they have children, especially male children (Gupta, 1995).

Caste & Spouse's Caste

In Bhandari and colleagues' 2016 study of potential correlates of women's autonomy, they found that more advantaged/higher level caste was significantly and positively associated with higher women's autonomy. In this study the dimensions of autonomy that were studied included freedom of movement autonomy, decisions making autonomy, and financial autonomy. All 250 women who participated in the study were married and of reproductive age. The level of caste was only measured for women in the study, their husband's caste was not measured.

Additionally, Deshpande's 2002 study of gender-caste overlap suggests that the economic condition of women in India continues to be defined and constrained by their caste status (Self & Grabowski, 2013). "The Dalit (low caste) women are the worst off, as they belong to a group that is materially at the bottom of the ladder; their relative deprivation is compounded by low levels of autonomy and greater exposure to domestic violence" (Deshpande, 2011). There is a current gap in the literature regarding caste difference between spouses as related to female marital autonomy. Thus, the relationship between caste and female autonomy required further exploration.

Rural vs. Urban Setting

Senarath and Gunawardena's 2009 study of women's autonomy and health care decision-making showed that rural women were less likely to be involved in household decision making regarding their own healthcare than their urban counterparts in Bangladesh (OR= 1.48 , 95% CI= 1.35-1.62) India (OR=1.49 , 95% CI= 1.45-1.54) and Nepal (CI=1.69, 95% CI= 1.45-1.96).

Public Health Importance/Outcomes of Female Autonomy

Maternal Healthcare Utilization

In 2001 Bloom and colleagues conducted a study that explored various dimensions of women's autonomy and its influence on maternal health care utilization in Varanasi, India. The study results revealed that female autonomy was a major determinant of maternal health care utilization. Specifically, freedom of movement showed significant association with the likelihood of using a health professional at birth (OR = 1.36, 95% CI = 1.05, 1.76) (Bloom, Wypij, & Gupta, 2001). Study results also showed that the estimated odds of using trained assistance at birth was three times higher (OR = 3.07, 95% CI = 1.04, 9.00) among women with high freedom of movement than those with low freedom of movement after controlling for all other factors in the model. Using survey data from 855 married couples in rural Maharashtra, Reed and colleagues studied women's access to money, an important aspect of women's autonomy, and its relation to women's use of family planning methods. Results showed that access to money was significantly associated with use of contraceptives, including condoms (AORs ranged 1.5-1.8). These findings remained significant after adjusting for mobility to seek family planning services and power to make family planning decision-making within the household (Reed et al., 2016).

Sexually Transmitted Diseases

Ghosh, Wadhwa and Kalipeni's 2009 study of vulnerability to HIV/AIDS among women of reproductive age in slums of Hyderabad and Delhi India showed that limited sexual autonomy in their marriage was a key factor in determining a woman's vulnerability to HIV (Ghosh, Wadhwa & Kalipeni, 2009). In addition to HIV, limited sexual autonomy in India and other developing countries has also shown to be associated with an increased risk of contracting sexually transmitted infections and having unintended pregnancies (Jejeebhoy & Bott, 2005, Erulkar,

2004, Koenig et al., 2004). In addition to STD prevalence, knowledge about STDs such as HIV/AIDS is significantly related to female autonomy in India. For example, Bloom and Griffiths' 2007 study of female autonomy and HIV-related knowledge showed that "women with greater autonomy were more likely to be knowledgeable about AIDS and condoms and to use condoms, after controlling for socio-demographic factors" (Bloom & Griffiths, 2007). This study was conducted using a nationally representative sample in India and included women participants aged 15-49 (Bloom & Griffiths, 2007).

Child Health Outcomes

In 2009 Shroff and colleagues studied the relationship between child stunting and maternal autonomy in Andhra Pradesh, India. The researchers defined maternal autonomy as "a woman's personal power in the household and her ability to influence and change her environment" (Shroff et al., 2009). The dimensions of autonomy that were considered in this study included decision making, permission to travel, attitude towards domestic violence and financial autonomy, which were constructed using seven binary variables. "Logistic regression models were used to test associations between indicators of female autonomy and the risk of having a stunted child. Women with higher autonomy {indicated by access to money} and freedom to choose to go to the market were significantly less likely to have a stunted child, after controlling for household socio-economic status and mother's education [odds ratio (OR) = 0.731; 95% confidence interval (CI) 0.546, 0.981 and OR = 0.593; 95% CI 0.376, 0.933, respectively]" (Shroff et al., 2009). Malhotra and colleagues' 2014 study of maternal autonomy and child healthcare utilization in India found that "children of mothers with low freedom of movement had 20% higher odds of being incompletely immunized and those of mothers with low financial access had 14% higher odds of being incompletely immunized" (Malhotra et al., 2014). The

study also found that mothers with low freedom of movement, a key measure of female autonomy, had “39% higher odds of not having sought treatment for an acute respiratory illness episode their child faced” (Malhotra et al., 2014). These studies show how low female mobility autonomy can lead to detrimental impacts for their children’s health.

Intimate Partner Violence

Abundant literature highlights the association between intimate partner violence and violence against women and low female autonomy. Sabarwal and colleagues’ 2014 study of women’s autonomy and experience of physical violence in rural India showed that “women’s control over financial resources played a protective role against marital violence” (Sabarwal, Santhya, & Jejeebhoy, 2013). This study used a nationally representative set of data and found that hitting was the most common form of violence that the participants reported facing. Specifically, the results found that women who maintained financial autonomy (OR = 0.66; 95% CI [0.52, 0.85]) and women who gained more financial autonomy (OR = 0.69; 95% CI [0.53, 0.89]) reported facing less marital violence (Sabarwal, Santhya, & Jejeebhoy, 2013). In 2013, Bourey and colleagues studied the changing experience of intimate partner violence among married women in rural India. Prospective data was collected from 4,749 married women first in 1998-1999 and then in 2002-2003. The researchers found that women with continued freedom of movement autonomy (Relative Risk Ratio =0.7) and women with continued financial autonomy and increased freedom of movement autonomy (Relative Risk Ratio =0.7) faced a lower risk of violence initiation than the other women in the sample (Bourey, Stephenson & Hindin, 2014). In contrast, 2009 Krishnan and colleagues’ study of spousal employment and marital violence in Bangalore India found that women who gained employment between study visits had an 80%

higher odds of facing marital violence, as compared to women who maintained unemployment between study visits (Krishnan et al., 2009). This study was the first study in a developing country that found that changes in spousal employment status were associated with subsequent changes in violence risk (Krishnan et al., 2009). It should be noted that Bourey and colleagues' study explores financial autonomy, while Krishnan and colleagues' study explores employment autonomy. Bourey and colleagues measured financial autonomy through a single yes/no question asking whether or not the woman was allowed to set aside money sample (Bourey, Stephenson & Hindin, 2014). Krishnan and colleagues measured employment autonomy by asking if the women was employed or unemployed (Krishnan et al., 2009). Thus, marital violence and certain aspects of financial autonomy have been shown to be both inversely and positively linked in recent and relevant literature.

Indian Marriage Customs

Arranged Marriages

In collectivist societies such as India in which priority is given to the group over the individual, marriage is understood as a means by which to maintain social order and bind two families together (Medora, 2007). This togetherness is then understood as a way to further their joint growth, cooperation, and success. (Regan, Lakhapal, & Anguiano, 2012). "These marriage practices are deeply embedded in a largely patriarchal cultural system in which families' exchanges of daughters and sons through marriage result from, and further solidify, familial, community, and kinship bonds" (Fuller & Narasimhan, 2008, Mason, 1995). Arranged marriages account for 90 % of marriages in India today (UNICEF, 2010). In India, parents and other adults in the family are responsible for selecting a mate for their children, sometimes when their children are very young. Parents usually select potential spouses for their child on the basis of an

array of criteria that include their caste, ethnicity, religion, physical appearance (including fairness of skin color), occupation, income level, social standing, and family (Allendorf & Pandian, 2016, Fuller & Narasimhan, 2008). In some cases, especially for males, the child (i.e. potential bride/groom) has the power to approve or disapprove of their parents' choice (Allendorf & Pandian, 2016). In other cases, the potential bride/groom is prohibited from being involved in spouse choice (Ghimire, Yabiku, & Thornton, 2006). It should be noted that in some cases, individuals consider parental marriage choices to be positive and beneficial in sustaining long-term marriages. For example, Allendorf and Pandian's study results revealed that potential newlyweds often felt as though arranged marriages make parents happy, facilitate wives getting along with in-laws, reinforce women's ties with natal family, preserve caste culture and traditions, are honorable and prestigious, and take place when the couple is ready and mature enough to get married (Allendorf & Pandian, 2016). Contrastingly, Allendorf and Pandian state that "in an arranged marriage the couple is neither expected nor encouraged to love each other before marriage" (Allendorf & Pandian, 2016). In some cases of arranged marriage, the prospective couples are given photographs of each other before marriage. In most cases, there is little or no contact between the prospective spouses prior to marriage (Allendorf & Pandian, 2016). It should also be noted that in certain parts of India the use of horoscopes is a key practice for determining the appropriateness of one's spouse and feasibility of the marriage sustaining over time (Thara & Srinivasan, 1997). Typically, the horoscope of the bride and groom are shared between families to assess the future couple's compatibility (Fuller & Narasimhan, 2008).

Arranged Marriage Proceedings

Dowries, or bridal payments/offerings given from the bride's family to the groom's family, are another historically-rooted Indian culture practice that reinforces patriarchal norms and the

commoditization of women. “The practice of dowry is an expected part of marriage in cultures where arranged marriages are the norm” (Banerjee, 2014). Rastogi and Therly state that “dowry is the ‘wealth’ or property a bride brings with her into the marriage in the form of cash, jewelry, household goods, and so on” (Rastogi & Therly, 2006). Ramifications of dowry practices can be extremely dangerous, ranging from the bride experiencing IPV to the most extreme, “dowry deaths,” in which the husband or husband’s family kills the bride due to dissatisfaction with her dowry (Rastogi & Therly, 2006). In addition, dowry practices impact mental health. Banerjee’s 2014 study of dowry in the 21st century reports that “research points to a direct relationship between the practice of dowry and the harassment, maltreatment, poor mental health, and homicides of women in India” (Banerjee, 2014).

Dowry practices vary significantly across India. It should be noted that dowry has been historically and dominantly practiced among those who belong to upper castes and have higher economic standing, in which women are often restricted or excluded entirely from participating in the labor market (Srinivasan & Lee, 2004, Dalmia & Lawrence, 2005). Additionally, there is a greater adherence to dowry customs in North India than there is in South India. Dowries in the north also tend to be in the form of material and movable goods (Dalmia & Lawrence, 2005).

Post-Marital Lifestyle

The role and position of a newly-married woman in an Indian household is evolving with time and varies by region among other factors. In her book on the life-course perspective on women’s autonomy and health outcomes in India, Das Gupta describes that historically, newly-married brides were at the “bottom of the household hierarchy” (Gupta, 1995) with “more onerous household tasks being given to her” (Gupta, 1995). She also asserts the stringent control under

which newly married women were forced to live, “a young bride’s personal and public behavior is monitored by a whole array of women, including her husband’s mother, aunts, grandmother, sisters and sisters-in-law. This is not to mention all the men in the household older than her husband, who are in a position of remote authority over her, and in whose presence, she cannot speak” (Gupta, 1995). Although published over 20 years ago, Gupta’s book describes the situation some new brides continue to face today.

“More than 90% of the new couples in India begin their married life living with the groom’s parents. An incoming daughter-in-law is expected to conform to the lifestyle of a new family” (Desai & Andrist, 2010). Newly married women’s relationships with their natal kin become much more limited and mediated by family which she newly becomes a part of, especially her new mother in-law. Bloom and colleagues further explain how mother in-laws limit newly married women’s autonomy in India because they control their duties and responsibilities within the household (Bloom, Wypij, & Gupta, 2001).

Recent Trends

Recent and relevant literature reveals that the traditional institution of arranged marriage is declining throughout India. It should be noted that an increase in the commonality of what are known as “love marriages,” in which couples seek each other and fall in love before marriage, are prevalently described in modern ethnographic studies across North India (Still, 2011, Mody, 2008). In their 2014 study of changing mate selection in India, Prakash and Singh note that “modern education has brought greater access to economic resources as well as media exposure among men and women of the present generation” (Prakash & Singh, 2014) and that this has exposed them to more westernized courting practices. According to the 2015-2016 National

Family Health Survey (NFHS-4) data, 81% of urban female women over the age of 6 in India have attended school, with an 81% literacy rate. Among their rural counterparts, 63% have attended school and 62% are literate. The total number of females over the age of 6 (in India, and in Maharashtra specifically), who have ever attended school has risen by over 10% from 2005-2006 to 2015-2016. The data also shows that in 2005-2006 only 22% of women in India had 10 or more years of schooling, which has risen to 36% in 2015-2016. Currently married women in Maharashtra who usually participate in household decisions has increased from 85 % in 2005-2006 to 89% in 2015-2016. Additionally, Maharashtrian women having a bank or savings account that they themselves use has risen from 20% in 2005-2006 to 45% in 2015-2016. Another important finding in the NFHS-4 data is that the percent of women in India between the ages of 20 and 24 who were married before the age of 18 has dropped from 47% in 2005-2006 to 27% in 2015-2016 (International Institute for Population Sciences, 2017). These trends underscore the need to study autonomy and the determinants of autonomy in the present context.

Marital Acquaintance

“Evidence on the nature of pre-marital relationships in India is sparse and comes from small and unrepresentative studies” (Alexander et al., 2006). Desai and Andrist’s 2010 study of gender scripts and age of marriage in India showed that about 66 % of women in a sample of 27,365 ever-married women aged 25-49 met their husbands on or around the day of the wedding. This study also showed that less than 5 % of women in this sample had the primary role in choosing their husband and only 22 % knew their husband for a month or more before they got married. This data was gathered from the Indian Human Development Survey (IDHS), the only source of nationally representative data on arranged marriage in India (Desai & Andrist, 2010, Allendorf & Pandian, 2016). This study emphasized that both men and women in India rarely have an

opportunity to become familiar with their potential partners through a longer or more intimate acquaintance (Desai & Andrist, 2010). Furthermore, in Banerjee and colleagues' exploration of education and autonomy among married people in India, they found that "even among women who claim to have a self-arranged marriage, a significant proportion had no real contact with their husbands prior to their marriage and substantial proportion met husbands only on or around the wedding day" (Banerjee, 2008). This demonstrates that the opportunity to get to know a potential spouse is left for after marriage and that in most cases, both spouses have very limited knowledge about one another before getting married. In fact, according to the qualitative results of Allendorf's 2013 study of schemas of marital change, Indian couples often characterize arranged marriages by the inability to develop love before marriage and having parents lead introductions between the potential spouses, and characterize love marriages and elopement by the opportunity to develop love before marriage and meet on their own. (Allendorf, 2013).

Measurement of Marital Acquaintance

In their 2016 study of marital change and continuity in India, Allendorf and Pandian measured marital acquaintanceship through the following quantitative question: "How long had you known your husband before you married him?" Response options included: 1) [met] on wedding or *gauna* (day of cohabitation) only, 2) less than one month, 3) more than one month, but less than one year, 4) more than one year, and 5) since childhood. (Allendorf & Pandian, 2016). The women were also asked whether they had talked on the phone, seen a photograph, or sent an email or internet chat before her marriage was fixed. Among those who said they met on their wedding day, "8 % talked on the phone, 1 % exchanged e-mail or internet chat, and 18 % had seen her potential husband's photo" (Allendorf & Pandian, 2016). Some limitations of this study include differing interpretations of survey terminology, differing conceptualizations of questions

based on linguistic background, and social desirability bias. Specific to their study, the authors recognize that some women in their sample could have interpreted “knowing” as meeting their future husband in person, while others could have meant communication only via phone, e-mail, or social media. They go on to say that the ambiguity of acquaintanceship could have been heightened because the surveys were translated into several different languages that conceptualize and interpret “knowing” in very different ways. The authors also noted that there was a possibility that “social desirability bias motivated some women to report meeting on their wedding day when they actually met earlier” (Allendorf & Pandian, 2016).

Besides the Allendorf study, most of the recent literature studies premarital acquaintance rather than acquaintance at the time of marriage with their future spouse. For example, in 2007 Alexander and colleagues explored the correlates of premarital relationships among unmarried youth in Pune, India from the ages of 15-24. Alexander and colleagues found that 17–24 % of the young men had a romantic relationship, 20–26 % had engaged in some form of physical intimacy and 16–18 % had had sex. Among young women, 5–8 % had a romantic relationship, 4–6 % had engaged in some form of physical intimacy and 1–2 %, had a romantic relationship. Their results also revealed that the majority of unmarried participants expected to marry their premarital romantic partner (Alexander et al., 2007).

In her 2012 study of age, education level, and length of courtship in relation to marital satisfaction in the United States, Alder measured length of courtship by dividing it into pre-engagement and post-engagement time periods. She notes that this method has not been used in previous research and that length of courtship has been very infrequently studied in recent literature. To measure pre-engagement and post-engagement time periods Alder developed the

Marital Information Survey. Questions for this survey were selected based on their high face validity. The questions related to pre-engagement included: “How long (in months) were you engaged before becoming married?”, “How long (in months) did you date your current partner before becoming engaged?”, “Did you live together before becoming engaged?” and “Did you live together before becoming married?” (Alder, 2012).

In 2016, South and colleagues explored the process of mate selection in India by merging individual-level data from the 2004–2005 India Human Development Survey (IHDS) with district-level data derived from the 1991 and 2001 Indian population censuses. To measure courtship duration the researchers “constructed a four-category variable based on the length of time the IHDS women knew their husband prior to marrying him. The women were asked: “How long had you known your husband before marrying him?” Response categories included: “on wedding/*gauna* day only”; “less than one month”; “more than one month but less than one year”; “more than one year”; and “since childhood.””(South, Trent & Bose, 2016).

In 2017, Chatterjee and Kastor studied the extent to which pre-marital communication affected post-marital fertility behavior in India. The researchers measured pre-marital communication by asking them questions about who chose their husband, what say they had in choosing their husband, if they got to meet, talk, or communicate, with their husband before marriage, and if they got to look at his photograph before marriage (Chatterjee & Kastor, 2017).

Known Predictors of Marital Acquaintance

Rural vs. Urban Setting

In 2016, South and colleagues' study of mate selection processes in India showed that urban women were more likely than rural women to have known their spouse for more than a year, as opposed to meeting him for the first time on her wedding day (South, Trent & Bose, 2016).

Spouse Choice

In 2016 Allendorf and Pandian studied marital change and continuity in India. In their results, they found that women with a greater say in the choice of their spouse were acquainted with their husbands for longer periods of time (Allendorf & Pandian, 2016). Specifically, they found that "42% of women who chose on their own met their husbands more than a year before marriage. In contrast, only 13% of women who chose jointly with their parents and 5% of women whose parents chose met their husbands more than a year prior to marriage" (Allendorf & Pandian, 2016). South and colleagues' 2016 study results of mate selection processes in India further support this finding. They found that "85 % of women who had no say in the selection of their husband met him for the first time on the wedding day, compared to 30 % of women in self-arranged marriages. And almost half of women in self-arranged marriages knew their husband for more than a year before marrying him, compared to less than 6 % of women whose husband was selected entirely by their parents" (South, Trent & Bose 2016). In this study, the authors describe self-arranged marriages as synonymous to "love" or "companionate," as opposed to marriage arranged by parents and other elders in the family. (South, Trent & Bose, 2016).

Education Level

In 2016, South and colleagues' study of mate selection processes in India revealed that higher levels of education significantly increased the likelihood that women will have known their husband prior to their wedding day (South, Trent & Bose, 2016).

Age

South and colleagues' 2016 study of mate selection processes in India revealed that longer courtships, especially those that lasted for more than a year, were more common among the study's younger birth cohorts (South, Trent & Bose, 2016).

Religion

In 2016 South and colleagues conducted a survey-based study of mate selection processes in India among ever-married woman between the ages of 15 to 49 (N = 33,510). The nationally-representative data analysis results showed that "Hindu women were significantly less likely than (non-Muslim) women of other religions to have known their husband for between one month and a year, and Muslim women were more likely than (non-Hindu) women of other religions to have known their husband for more than a year" (South, Trent & Bose, 2016). Thus, in this study longer courtship duration is highest among Muslim women, and lowest among Hindu women, with women of other religions falling in between. It should be noted however, other aspects of culture and marital practices within these religious communities may have driven this result. South and colleagues specifically emphasize that marriages practices in India vary highly by geographic region of residence, patriarchal structure of the culture, and women's culturally-specific roles in traditional households. In certain parts of India in which Hinduism is the dominant religion it is very common for young people to marry consanguineously (Nitin et al., 2014).

Caste

In 2016 South and colleagues conducted a large-scale study of mate selection processes in India and found that “women belonging to scheduled tribes and other backward castes (OBCs) are generally more likely than women of other castes and tribes to have known their husband prior to the wedding day” (South, Trent & Bose, 2016). This study shows a positive association between belonging to an OBC or scheduled tribe and longer courtship duration, which is a key aspect of marital acquaintance at the time of marriage.

The Gap in Literature: Is Marital Acquaintance Associated with Female Autonomy?

In 2017 Chatterjee and Kastor conducted a study that explored the extent to which pre-marital communication affected post-marital fertility decision-making power in India. Data from this study was drawn from the India Human Development Survey II 2011–12 (IHDS-II), allowing for a nationally representative sample. The study focused solely on currently married women of reproductive age (15–49 years old) (n=31,276). Results showed a significant positive association between high levels pre-marital communication and increased female decision-making power regarding the number of children the couple should have (Chatterjee & Kastor, 2017). The impact of Indian couples’ acquaintance at the time of marriage on other aspects of female autonomy (financial autonomy, mobility autonomy, etc.) is currently unstudied. Additionally, this study’s focus on pre-marital communication only encompasses the act of communicating, as opposed to a true understanding of how well the partners felt like they knew each other before marriage.

The literature gap for this research question is further widened due to the fact that marriage type (love marriage or arranged marriage) is often used as a proxy indicator for marital acquaintance.

It should be noted however that marriage type is surface level indicator, while marital acquaintance aims at understanding the deeper and more complex nature of the couples' relationship before marriage. For example, it is possible that couple knew each other for a day before having an arranged marriage without their consent, and it is possible that a couple knew each other for a year before having an arranged marriage, communicated daily via SMS, and had an arranged marriage with their consent. These two situations are very different but would nonetheless both be reduced to having an "arranged marriage" if marital type was the categorical predictor variable of interest. Therefore, examining the levels of marital acquaintance at the time of marriage could unearth aspects of marriage that are more complex and multi-dimensional.

Background of Pune, India

After Mumbai, Pune is the second largest city in the Indian state of Maharashtra and also the seventh most populous city in the entire country. Pune is located on the Mutha River and it was once the power center of the Maratha Empire. Today, the city is considered Maharashtra's culture capital and had an estimated population of 3.99 million. The Pune District holds 8.39 % of the total Maharashtra population, as reported by the 2011 census, demonstrating growth since the 2001 census, when Pune District held 7.47 % of Maharashtra's population (Government of Maharashtra State, 2005-2006, Registrar General of India, 2001).



Primary Industries

Pune is now emerging as a manufacturing and information technology hub, with the sixth highest per capita income in India. It also has a large automotive industry and is the headquarters for the Automotive Research Association of India. Additionally, Pune is known for its plethora of educational and research institutions, with nearly half of the total international students in the country studying in the city, which is partially due to the fact that it has numerous student exchange programs with European universities (Government of Maharashtra State, 2005-2006).

Age & Sex Breakdown

India as a whole has a young population with a median age of just 24 years. In Pune, 62 % of the population is under 30. The literacy rate in Pune is 86 %, with a higher literacy rate of 90 % for men and 81 % for women. Like many cities in India, there is a larger share of men than women in Pune. The child sex ratio is 883 girls to every 1,000 boys, compared to 902 girls for every 1,000 boys at the 2011 census. (Office of the Registrar General & Census Commissioner, Government of India, 2011).

Religious Breakdown

India is the most prominently Hindu country in the world. Seventy-nine percent (79 %) of the total population in Pune is reported to be Hindu. Islam is the second largest religion in Pune, making up about 11.0 % of the total population. Buddhists make up for nearly 4.0 % of the population, Jains make up almost 2.5 % of the population, and Christians make up 2.2 % of the population. All other religions are reported to constitute for less than 1.0 % of the total population (Office of the Registrar General & Census Commissioner, Government of India, 2011).

Language Breakdown

Marathi remains the most widely spoken language in Pune, and Hindi and English are also widely spoken (Office of the Registrar General & Census Commissioner, Government of India, 2011).

Population Growth & Slum-Dwelling Populations

Pune is one of the fastest-growing cities in the Asian-Pacific. The decadal growth rate of Pune for the last 40 years has been at least 40 % and it's estimated that population will hit 5.6 million by 2031 if this trend continues. The Pune Municipal Corporation (PMC)'s Environmental Status Report shows that about 40 % of the city's population was living in slums in 2011. Of the 244 square km which come under the PMC limits, about 6% of the total land consists of slums. These dwellings fail to provide basic human needs including access to clean water, proper sanitation, and quality housing. Tenants also struggle with overcrowding and securing residential status on their properties. The PMC estimates that 88,000 people migrated to the city in 2006, of which

45,000 settled in the slums. The PMC also predicts that every year the number of people migrating to the city will continue to increase (Pune Municipal Corporation, 2017).

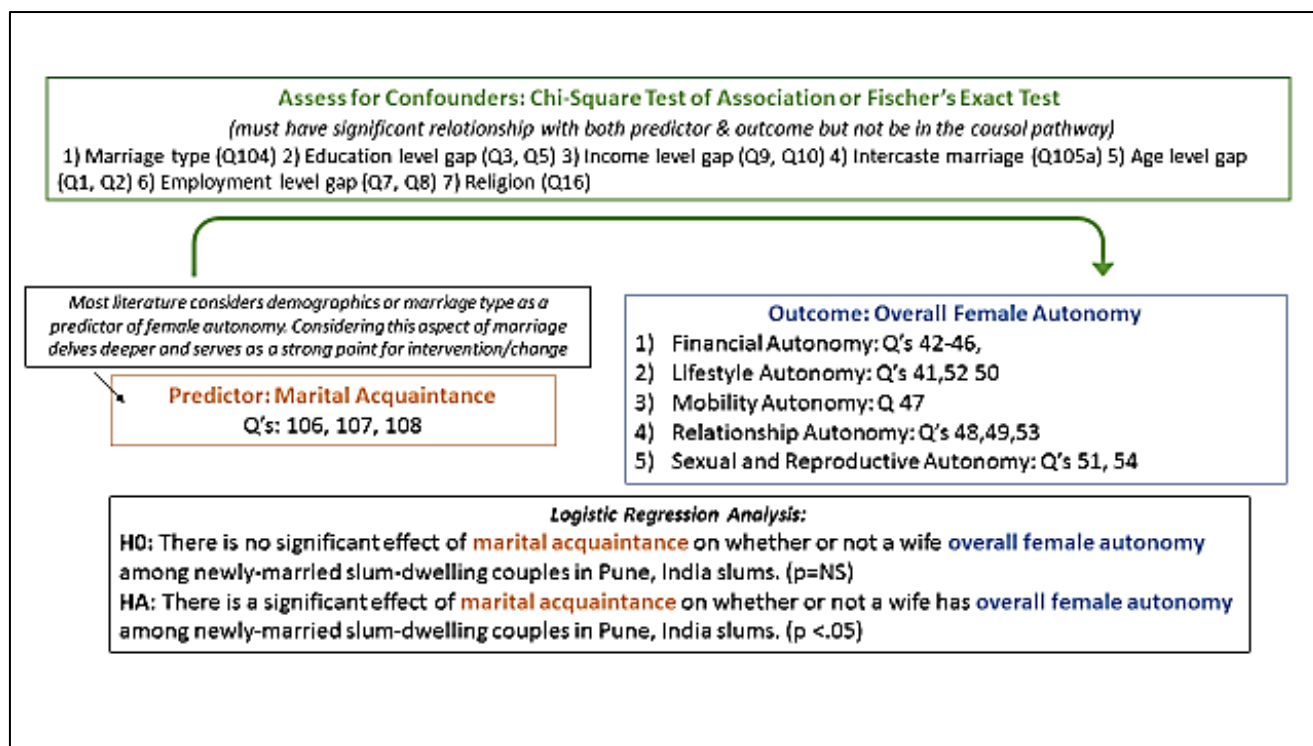
Methods

Overview

The work presented in this thesis is a sub-analysis of survey data collected through a joint study between the National AIDS Research Institute (NARI) located in Pune, India and Emory University's Rollins School of Public Health in Atlanta, Georgia. The surveys of the study for which the Healthy Relationships Survey was designed for aimed to identify correlates of intimate partner violence experience and perpetration among independent samples of recently married women (n=100) and men (n=100) in the Pune, India. This study also collected data on female autonomy as reported by both males and females, which enabled this sub-analysis thesis study. The Healthy Relationships Survey is a 182-item semi-structured questionnaire that was administered one-on-one in private by a trained study team member. In line with World Health Organization domestic violence research guidelines, only female study team members administered the questions to female participants (World Health Organization, 2001).

In this thesis study, we aimed to evaluate whether level of acquaintance with partner at time of marriage (marital acquaintance) was associated with women having greater overall autonomy in marriage (female autonomy). Female autonomy was explored in five dimensions: 1) lifestyle autonomy 2) financial autonomy 3) sexual and reproductive autonomy 4) relationship autonomy, and 5) mobility autonomy.

Figure 1: Study Methods Diagram



Ethical Approvals

This study was approved by the ethics committee of the National AIDS Research Institute (Pune, India, NARI-EC/2013-28) and the institutional review board of Emory University (Atlanta, USA, IRB00069846). All participants provided written informed consent prior to enrollment.

Eligibility Criteria, Sampling, and Recruitment

To be eligible for the study, participants had to be: 1) over 18 years of age, 2) recently married (i.e. for 3-15 months), 3) in a first marriage, 4) residing with his/her spouse in a slum in Pune or Pimpri-Chinchwad (the two adjacent municipalities of Pune city), India, 5) planning to reside in the area for the majority of the following year, and 6) having oral fluency in either English, Marathi, or Hindi.

Geographically-clustered random sampling was employed to sample slum areas from Pune and Pimpri-Chinchwad wards and convenience sampling to sample 4-5 women from within each slum area. Pune consists of 21 geographic wards (15 governed by the Pune Municipal Corporation and 6 governed by the Pimpri-Chinchwad Municipal Corporation). One slum was randomly chosen from each of these wards. If there were not enough participants who were willing and able to participate in the planned slum community, additional participants were recruited from a slum in the adjacent ward. Within slum communities, participants were sampled using convenience sampling. Newly-married individuals were most often identified in collaboration with key community members who knew the families within the slums well, such as members of community based organizations or community health workers. Recruitment for the study was conducted in-person door-to-door during which families were asked whether they had a newly-married woman in the household. This study also utilized snow ball sampling, in which family members in a particular household were asked about if they knew of other newly-married individuals in their community who would possibly be interested in participating in the study.

Study Measures

Measure for Predictor

Marital acquaintance at the time of marriage was assessed in both men and women using the following question: “How well did you feel like you knew your partner (current spouse) at the time of marriage?” The answer options included: Not at all, Very little, Somewhat, To a great extent, and Refuse to answer.

Measures for Outcomes

For the five dimensions of female autonomy explored in this thesis study, women are asked the following umbrella question:

“Thinking about the past three months of your married life how often have you been able to [insert question-specific scenario] without your husband or his family bothering you?”

While men are asked the following umbrella question:

“Thinking about the past 3 months of your married life how often has your wife been able to [insert scenario] without you or your family bothering her?”

The questions form the control subscale of the Indian Family Violence and Control Scale (Kalokhe et al., 2016). All questions were measured using a 4-point Likert scale, which includes: 1= “Never” 2= “Rarely”, 3= “Sometimes”, 4= “Often”, 97= “I don’t know”, 98= “N/A”, and 99 = “Refuse to answer” as the possible responses.

Financial Autonomy

The financial autonomy dimension of female autonomy assessed the extent to which a woman could: “Spend her own or self-earned money on natal family”, “Spend her or her self-earned money on her children,” “Spend her or her self-earned money on her friends,” “Spend her or her self-earned money on her personal things,” “Take up a new job or remain in her current job if she wants to,” and “Seek medical care for herself”. Because the item “Spend her or her self-earned money on her children,” had a low response rate (10%) as few respondents had children, it was ultimately omitted from the analysis. Thus, financial autonomy was defined as a dichotomous variable (1=yes, 0=no), where presence of autonomy required reporting “often” on the majority of ($\geq 3/5$) financial autonomy indicators.

Relationship Autonomy

The relationship autonomy dimension of female autonomy examined the extent to which a woman could: “Visit her natal family, friends, coworkers, relatives, or other acquaintances”, “Talk freely on the phone, send SMS (text) messages, or use social media (like Facebook and WhatsApp),” and “Freely invite her natal family members and friends to visit her matrimonial home”. Having relationship autonomy (also a dichotomous yes/no variable) was defined by reporting of “Often” on the majority ($\geq 2/3$) of relationship autonomy indicators.

Sexual and Reproductive Autonomy

The sexual and reproductive autonomy dimension of female autonomy was measured using the questions about the extent to which a woman could “Make her own decisions about family-planning such as getting pregnant, using contraception, spacing between children, and permanent sterilization,” and “Have sex how and when she wants to”. Having sexual and reproductive autonomy was defined by reporting “Often” on the majority (2/2) of sexual and reproductive autonomy indicators.

Lifestyle Autonomy

The lifestyle autonomy dimension of female autonomy was measured using the questions about the extent to which a woman could: “Rest and relax when she wants to,” and “Wear any type of dress and have any style that she wants to besides *sari*” (*Saris* are a traditional form of clothing worn by married women, typically draped around the waist and over a shoulder, in all parts of India). Having lifestyle autonomy was defined by reporting “Often” on the majority (2/2) of lifestyle autonomy indicators.

Mobility Autonomy

The mobility autonomy dimension of female autonomy was measured by the extent to which a woman could “Go out of the house”. Having mobility autonomy was defined as reporting “often” to this item.

Overall Female Autonomy

Overall female autonomy was defined by a woman having the majority ($\geq 3/5$) of the forms of female autonomy described above.

Measures for Covariates

Marriage Type

Marriage type was a categorical variable assessed as a potential confounder in the relationship between female autonomy and acquaintance at the time of marriage. This covariate was assessed by the following question: “Of the following which describes your marriage?” The answer options included: “Arranged marriage”, “Love with acceptance by family”, “Love without acceptance of family”, and “Refuse to Answer.” The Missing/Unable to answer categorical level contained both those who had missing responses and those who reported “Refuse to Answer”

Intercaste Marriage

Whether a participant had an intercaste or within-caste marriage was assessed through a multi-level categorical variable. Answer choices included: “Within-caste”, “Intercaste”, “I don’t know” and “Refuse to Answer.” The Missing/Unable to answer categorical level contained both those who had missing responses and those who reported “Refuse to Answer” or “I don’t know”.

Education Level Gap

Education level gap was assessed by measuring if the husband or wife had the higher education level, or if there was no education level gap. Education level and spouse's education level were assessed using a 6-level ordinal variable. Potential responses included: "Illiterate", "Functional literate", "Primary education" (up to 7th standard), "Secondary education" (8th-10th standard), "Higher secondary education" (11th-12th standard), "Beyond graduate (12th pass) education", and "Refuse to Answer". Education gap, a 3-level variable, was created using the participant and his/her spouse's education level. Education level was then assessed by grouping male respondents with an education level's higher than his female spouse's education level and female respondents with a lower education level than her male spouse into the "Husband Education Level > Wife Education Level" category. Female respondents with an education level higher than her male's spouse's education level and male respondent's with an education level lower than his female spouse's education level were group into the "Wife Education Level > Husband Education Level" category. Those who reported that his or her education level was the same as his or her spouse were grouped into the "No Education Level Gap" category. The "Missing/Unable to answer" categorical level contained both those who has missing responses to either their own education level or their spouse's education level and those who reported "Refuse to Answer" or "I don't know".

Income Level Gap

Income level gap was assessed by measuring if the husband or wife had a higher monthly income level. Monthly income level and spouse's monthly income level were assessed using a 7-level ordinal variable. The answer responses included: "NIL," "less than 2000," "Rs. 2000-4000," "Rs. 4000-6000," "Rs. 6000-8000," "Rs. 8000-10000," "More than Rs. 10000," "I don't know," and

“Refuse to answer.” These responses were collapsed into: “Unemployed (0 Rs.)”, “Low Income (≤ 4000 Rs.)”, “Middle Income (4001-8000 Rs.)”, “High Income (≥ 8001 Rs.)” and “Missing/Unable to answer”. Income Gap was assessed by calculating if the husband had a higher monthly income level than the wife. “If a female respondent had a higher monthly income level than her male spouse or if a male respondent had a lower monthly income level than his female spouse then “Female Income Level $>$ Male Income Level” was reported. If a male respondent reported that his monthly income level was higher than that of his female spouse or if a female respondent reported that her monthly income level was lower than that of her male spouse then “Male Income Level $>$ Female Income Level” was reported. If a respondent reported that his or her income level was the same as his or her spouse then “No Income Level Gap” was reported. If a respondent had a missing response, answered with “Refuse to Answer” or “I don’t know” for either their own income level or their spouse’s income level, then “Missing/Unable to answer” was reported.

Age Level Gap

Age and spouse age were collected as continuous measures in the survey. To measure age level gap, a categorical variable was created that grouped each participant’s age and each participant’s spouse’s age into one of the following levels: “18 to 0 years old”, “21 to 25 years old”, “25 to 30 years old”, “30 to 33 years old” and “Missing/Unable to Answer”. 18 was the youngest age any of the participant’s reported either their age or their spouse’s age to be, and 33 was the oldest age any of the participant’s reported either their age or their spouse’s age to be. The category of “Missing/Unable to Answer” included those who reported either “Refuse to Answer”, “I don’t know”, or those who have missing responses to either their age or their spouse’s age. Next, age level gap was measured by comparing the categorical level that the participant reported for their

own age and that of their spouse's age. If the categorical level matched then "No Age Level Gap" was reported. If the participant was a female and her age level was higher than that of her male spouse or if a participant was a male and his spouse's age level was higher than his age level then "Female Age Level > Male Age Level" was reported. If the participant was a male and his age level was higher than that of his female spouse or if a participant was a female and her age level was lower than that of her male spouse, then "Male Age Level > Female Age Level" was reported.

Employment Gap

Employment gap was assessed by measuring if the husband or wife had a higher employment status. Employment status and spouse employment status were assessed by dichotomous categorical variables with "Yes", "No" and "Refuse to answer" as the response options.

Employment gap was assessed by determining if only the husband worked, only the wife worked, or if there was no employment gap between the husband and wife. The categorical levels included: "Male Only Employed", "Female Only Employed", "No Employment Gap", and "Missing/Unable to answer". The category of "Missing/Unable to Answer" included those who reported either "Refuse to Answer" or those who has missing responses to either their employment status or their spouse's employment status.

Statistical Analysis

All statistical analyses for this study were done in SAS version 9.0. Chi-square tests of association were run to assess the relationship between the potential covariates and marital acquaintance (predictor) and potential covariates and overall autonomy (outcome). Those covariates with a statistically significant association with both the predictor and the outcome, and

those that did not belong in the causal pathway were considered to be confounders (epidemiologic criteria for a confounder). Some of the chi-square tests of association had cell counts less than five, in which case Fisher's exact tests were run to assess associations. The p-value the Chi-Square test statistic or the two-sided p-value of the Fisher's exact test statistic were used to assess the statistical significance of the associations. Those associations with test statistics having p values $< .05$ were considered to be statistically significant. To study the effect of marital acquaintance on having overall autonomy, multivariate logistic regression analyses were run. First, a crude model was run to assess the effect of marital acquaintance on having overall autonomy without considering potential confounders. Next, adjusted models were run to assess the effect of marital acquaintance on having overall autonomy with the consideration of confounder(s).

Results

Descriptive Statistics

Sample Demographics (Table 2)

The study sample consisted of 100 male and 100 females. The majority of males were between 21 and 35 years of age (51% or 51/100) and the majority of females 18 and 20 years of age (n51% or 51/100). The majority of male participants reported that their female spouses were between 18 and 20 years of age (50% or 50/100), while the majority of female participants reported their male spouses were between 21 and 25 years of age (52% or 52/100). The majority of male participants self-reported their highest education level to be secondary education (43% or 43/100%), while the majority of female respondents self-reported their education level to be beyond graduate education (42% or 42/100). The majority of male respondents reported their female spouse's highest education level to be secondary education (39% or 39/100), while the majority of female respondent's reported their male spouse's highest education level to be either secondary education (39% or 39/100) and beyond graduate education (39% or 39/100). The majority of male respondents reported that their employment status was employed (93% or 93/100), while only 5% (5/100) of female respondents reported being employed. The majority of males reported that their spouse was unemployed (92% or 92/100), and the majority of females reported that their spouse was employed (99 or 99/100). The majority of male participants reported their own income to be greater than or equal to 8001 Rs. (79% or 79/100) and that their spouses had no income (91% or 91/100) (0 Rs.). The majority of female respondents reported that they had no income (0 Rs.) (95% or 95/100) and that their spouses had an income greater than or equal to 80001 Rs. (70% or 70/100). The spread of religion in the same was the same for males and females. The majority of males (71% or 71/100) and females (77% or 77/100) were

Hindu, with the second most common religion being Bodh, the third most common religion being Muslim, and the fourth most common religion being Christian. No other religions were represented in the study sample. The majority of males (68% or 68/100) and females (73% or 73/100) reported having arranged marriages. The rest of the sample had love marriages, and only 3 females (3% or 3/100) and 1 male (1% or 1/100) did not have the acceptance of their family in their love marriage. In terms of caste, the majority of male (88% or 88/100) and females (84% or 84/100) respondents married within their caste.

Predictor (Table 3)

The majority of males reported that at the time of marriage they felt like they knew their spouse to a great extent (53% or 53/100), while the female participants reported that they somewhat knew their spouses at the time of marriage (35% or 35/100). Only 25 % (25/100) female respondents reported knowing their husband to a great extent at the time of marriage. On the other end of the scale, 12% (12/100) male respondents and 20% (20/100) female respondents reported not knowing their spouse at all at the time of marriage. 3% (3/100) of male respondents either refused to answer or reported “I don’t know” to this question.

Outcomes (Table 4)

The final outcome for this study was overall autonomy, which was calculated based on the values for relationship autonomy, lifestyle autonomy, sexual and reproductive autonomy, mobility autonomy and financial autonomy. The majority of males reported that their female spouses’ have relationship autonomy (65% or 65/100), mobility autonomy (58% or 58/100) and overall autonomy (53% or 53/100) and do not have lifestyle autonomy (51% or 51/100), sexual and reproductive autonomy (54% or 54/100), and financial autonomy (57% or 57/100) in their

marriage. Contrastingly, the majority of female respondents reported that they have mobility autonomy (56% or 56/100) and do not have relationship autonomy (56% or 56/100), lifestyle autonomy (52% or 52/100), sexual and reproductive autonomy (76% or 76/100), financial autonomy (68% or 68/100) and overall autonomy (59% or 59/100).

Potential Confounders (Table 5)

The majority of male (76% or 76/100) and female (75% or 75/100) participants reported that the males are older than the female in their relationships. Only 1 male (1%, 1/100) and 1 female (1% or 1/100) participant reported that the female was older than the male in the relationship. 2% or 2/100 males responded with either “Refuse to answer” or “I don’t know” to this question. The education gap between participants and their spouses had a wide spread, with the majority of both male (46% or 46/100) and female (61% or 61/100) respondents reporting no education gap in their marriages. Approximately one-fourth (24% or 24/100) of male participants reported that their education status was lower than that of their spouse, and 20% (20/100) of female participants reported that their education status was lower that of their spouses. In the case of both male (90% or 90/100) and female (82% or 82/100) respondents, the majority reported that the male’s income level was higher than the female’s income level in their marriage. Similarly, the majority of male (85% or 85/100) and female (94% or 94/100) respondents reported that only the male was employed. No respondents reported that only the female in the marriage was employed. The majority of male (68% or 68/100) and female (73% or 73/100) participants had arranged marriages, and the majority of male (88% or 88/100) and female (84% or 84/100) participants married within their caste. In terms of the sample’s religious background, 71% (71/100) of male respondents and 77% (77/100) of female respondents reported being Hindu.

Bivariate Analyses

Bivariate Analysis between Marital Acquaintance and Potential Confounders (Table 6)

Bivariate analyses between marital acquaintance (predictor), and each of the multi-level potential confounders of the marital acquaintance-autonomy pathway was conducted using Wald chi-square tests of association. When cell counts were less than 5, a Fisher's exact two-sided p-value was used to determine statistical significance of the association between marital acquaintance and individual covariates. Employment gap, marriage type, and intercaste marriage had chi-square test statistics or Fischer's exact test statistics with p-values less than .05, indicating that they are statistically significantly associated with marital acquaintance. Income level gap, education level gap, religion, and age level gap had chi-square test statistics or Fischer's exact test statistics with p-values greater than .05, indicating that they are not statistically significantly associated with marital acquaintance.

Bivariate Analysis between Overall Autonomy and Potential Confounders (Table 7)

Bivariate analyses between overall autonomy (outcome), and each of the multi-level potential confounders of the marital acquaintance-autonomy pathway was conducted using Wald chi-square tests of association. When cell counts were less than 5, a Fisher's exact two-sided p-value was used to determine statistical significance of the association between overall autonomy and individual covariates. Marriage type and religion had chi-square test statistics or Fischer's exact test statistics with p-values less than .05, indicating that they are statistically significantly associated with marital acquaintance. Income level gap, education level gap, age level gap, religion, employment level gap and intercaste marriage had chi-square test statistics or Fischer's exact test statistics with p-values greater than .05, indicating that they are not statistically significantly associated with overall autonomy.

Logistic Regression

Crude Model (Table 8)

A logistic regression for the crude model assessed the effect of marital acquaintance on overall autonomy without the consideration of covariates. The Wald chi-square had a p-value <0.05 , indicating that at least one beta was statistically significantly different from 0. The reference group for marital acquaintance was “Not at all” and the reference group for overall autonomy was “Have.”

The odds ratio estimate for very little marital acquaintance, as compared to those with no marital acquaintance at all, was 2.347 (95% CI 0.701-7.863). This reveals that the odds of having overall autonomy is 2.347 higher for those who have very little marital acquaintance as compared to those who have no marital acquaintance at all, however this association is not statistically significant at an alpha level of 0.05 because it crosses the null value of 1 and is highly imprecise because of the large width of the 95% confidence interval.

The odds ratio estimate for somewhat knowing your partner at the time of marriage, as compared to those with no marital acquaintance at all, was 7.853 (95% CI 2.620 - 23.547). This reveals that the odds of having overall autonomy is 7.853 times higher for those who somewhat know their partner at the time of marriage as compared to those who have no marital acquaintance at all, however, this association is highly imprecise because of large width of the 95% confidence interval. This association is however statistically significant because the confidence interval does not contain the null value of 1.

The odds ratio estimate for those with a great extent of marital acquaintance, as compared to those with no marital acquaintance at all was 7.362 (95% CI 2.564 - 21.134). This reveals that the odds of having overall autonomy is 7.362 times higher for those who have a great extent marital acquaintance as compared to those who have no marital acquaintance at all, however this association is highly imprecise because of the large width of the 95% confidence interval. This association is however statistically significant because the confidence interval does not contain the null value of 1.

Model Adjusted for Marriage Type (Table 8)

Marriage type was the only covariate that met the epidemiological criteria for a confounder, as it was associated with marital acquaintance and autonomy but not in the causal pathway. An adjusted model was run to assess the effect of marital acquaintance on having overall autonomy with the consideration of marriage type. The type 3 analysis of effects revealed that the Wald chi-square had a p-value $<.05$, indicating that at least one beta was statistically significantly different from 0. The reference group for marital acquaintance was “Not at all” and the reference group for overall autonomy was “Have.”

The adjusted odds ratio estimate for very little marital acquaintance, as compared to those with no marital acquaintance at all, was 2.268 (95% CI 0.675 to 7.625). This reveals that the odds of having overall autonomy is 2.268 higher for those who have very little marital acquaintance as compared to those who have to marital acquaintance at all, however this association is not statistically significant at an alpha level of 0.05 because it crosses the null value of 1 and is highly imprecise because of the large width of the 95% confidence interval.

The adjusted odds ratio estimate for somewhat knowing your partner at the time of marriage, as compared to those with no marital acquaintance at all, was 7.514 (95% CI 2.500-22.584). This reveals that the odds of having overall autonomy is 7.514 times higher for those who somewhat know their partner at the time of marriage as compared to those who have no marital acquaintance at all, however, this association is highly imprecise because of large width of the 95% confidence interval. This association is statistically significant because the confidence interval does not contain the null value of 1.

The odds ratio estimate for those with a great extent of marital acquaintance, as compared to those with no marital acquaintance at all was 5.371 (95% CI 1.730-16.670). This reveals that the odds of having overall autonomy is 5.371 times higher for those who have a great extent marital acquaintance as compared to those who have no marital acquaintance at all, however this association is highly imprecise because of the large width of the 95% confidence interval. This association is statistically significant because the confidence interval does not contain the null value of 1.

Table 2. Sample Demographics by Gender

	Male (n=100) No. (%)	Female (n=100) No. (%)
Age Level		
18 to 20 years old	0 (0%)	51 (51%)
21 to 25 years old	51 (51%)	44 (44%)
25 to 30 years old	46 (46%)	5(5%)
30 to 33 years old	3 (3%)	0(%)
Missing/Unable to Answer	0 (0%)	0(0%)
Spouse Age Level		
18 to 20 years old	50 (50%)	1 (1%)
21 to 25 years old	41 (41%)	52 (52%)
25 to 30 years old	7 (7%)	41 (41%)
30 to 33 years old	0 (0%)	5 (5%)
Missing/Unable to Answer	2 (2%)	2 (2%)
Education Level		
Illiterate	0 (0%)	3 (3%)
Functional Literate	0 (0%)	2 (2%)
Primary Education	12 (12%)	10 (10%)
Secondary Education	43 (43%)	38 (38%)
Higher Secondary Education	16 (16%)	5 (5%)
Beyond Graduate Education	29 (29%)	42 (42%)
Missing/Unable to Answer	0 (0%)	0 (%)
Spouse Education Level		
Illiterate	1 (1%)	1 (1%)
Functional Literate	1 (1%)	1 (1%)
Primary Education	12 (12%)	12 (12%)
Secondary Education	39 (39%)	39 (39%)
Higher Secondary Education	20 (20%)	8 (8%)
Beyond Graduate Education	27 (27%)	39 (39%)
Missing/Unable to Answer	0 (0%)	0 (0%)
Employment		
Employed	93 (93%)	5 (5%)
Unemployed	7 (7%)	95 (95%)
Missing/Unable to Answer	0 (0%)	0 (0%)
Spouse Employment Level		
Employed	8 (8%)	99 (99%)
Unemployed	92 (92%)	1 (1%)
Missing/Unable to Answer	0 (0%)	0 (0%)
Income Level		
Unemployed (0 Rs.)	8 (8%)	95 (95%)
Low Income (<= 4000 Rs.)	0 (0%)	1 (1%)
Middle Income (4001-8000 Rs.)	13 (13%)	2 (2%)
High Income (>= 8001 Rs.)	79 (79%)	2 (2%)
Missing/Unable to Answer	0 (0%)	0 (0%)

Spouse Income Level		
Unemployed	91 (91%)	1 (1%)
Low Income	3 (3%)	1 (1%)
Middle Income	3 (3%)	13 (13%)
High Income	3 (3%)	70 (70%)
Missing/Unable to Answer	0 (0%)	15 (15%)
Religion		
Hindu	71 (71%)	77 (77%)
Bodh	16 (16%)	14 (14%)
Muslim	10 (10%)	5 (5%)
Christian	3 (3%)	4 (4%)
Missing/Unable to Answer	0 (0%)	0 (0%)
Marriage Type		
Arranged	68 (68%)	73 (73%)
Love With Family Acceptance	28 (28%)	24 (24%)
Love Without Family Acceptance	1 (1%)	3 (3%)
Missing/Unable to Answer	3 (3%)	0 (0%)
Intercaste Marriage		
Intercaste	9 (9%)	13 (13%)
Within Caste	88 (88%)	84 (84%)
Missing/Unable to Answer	3 (3%)	3 (3%)

Table 3. Descriptive Statistics of Marital Acquaintance by Gender

Predictor Variables	Male No. (%)	Female No. (%)
Marital Acquaintance		
Not at all	12 (12%)	20(20%)
Very little	13 (13%)	20 (20%)
Somewhat	19 (19%)	35 (35%)
To a great extent	53 (53%)	25 (25%)
Missing/Unable to answer	3 (3%)	0 (0%)

Table 4. Descriptive Statistics of Female Autonomy by Gender

Outcome Variables	Male No. (%)	Female No. (%)
Relationship Autonomy		
Have	65 (65%)	44 (44%)
Don't Have	35 (35%)	56 (56%)
Missing/Unable to answer	0 (0%)	0 (0%)
Lifestyle Autonomy		
Have	49 (49%)	48 (48%)
Don't Have	51 (51%)	52 (52%)
Missing/Unable to answer	0 (0%)	0 (0%)
Sexual and Reproductive Autonomy		
Have	46 (46%)	24 (24%)
Don't Have	54 (54%)	76 (76%)
Missing/Unable to answer	0 (0%)	0 (0%)
Mobility Autonomy		
Have	58 (58%)	56 (56%)
Don't Have	42 (42%)	44 (44%)
Missing/Unable to answer	0 (0%)	0 (0%)
Financial Autonomy		
Have	43 (43%)	32 (32%)
Don't Have	57 (57%)	68 (68%)
Missing/Unable to answer	0 (0%)	0 (0%)
Overall Autonomy		
Have	53 (53%)	41 (41%)
Don't Have	47 (47%)	59 (59%)
Missing/Unable to answer	0 (0%)	0 (0%)

Table 5. Descriptive Statistics of Potential Confounders by Gender

Potential Correlates	Male No. (%)	Female No. (%)
Age Level Gap		
Female Age Level > Male Age Level	1 (1%)	1 (1%)
Male Age Level > Female Age Level	76 (76%)	75 (75%)
No Age Level Gap	21 (21%)	24 (24%)
Missing/Unable to answer	2 (2%)	0 (0%)
Education Level Gap		
Female Education Level > Male Education Level	24 (24%)	19 (19%)
Male Education Level > Female Education Level	30 (30%)	20 (20%)
No Education Level Gap	46 (46%)	61 (61%)
Missing/Unable to answer	0 (0%)	0 (0%)
Income Level Gap		
Female Income Level > Male Income Level	1 (1%)	0 (0%)
Male Income Level > Female Income Level	90 (90%)	82 (82%)
No Income Level Gap	9 (9%)	3 (3%)
Missing/Unable to answer	0 (0%)	15 (15%)
Employment Gap		
Male Only Employed	85 (85%)	94 (94%)
Female Only Employed	0 (0%)	0 (0%)
No Employment Gap	15 (15%)	6 (6%)
Missing/Unable to answer	0 (0%)	0 (0%)
Marriage Type		
Arranged	68 (68%)	73 (73%)
Love with family approval	28 (28%)	24 (24%)
Love without family approval	1 (1%)	3 (3%)
Missing/Unable to answer	3 (3%)	0 (0%)
Intercaste Marriage		
Intercaste	9 (9%)	13 (13%)
Within Caste	88 (88%)	84 (84%)
Missing/Unable to answer	3 (3%)	3 (3%)
Religion		
Hindu	71 (71%)	77 (77%)
Bodh	16 (16%)	14 (14%)
Muslim	10 (10%)	5 (5%)
Christian	3 (3%)	4 (4%)
Missing Values/Unable to Calculate	0 (0%)	0 (0%)

Table 6. Bivariate Analysis of Marital Acquaintance vs. Potential Confounders

Potential Correlate	No. (%)	χ^2 test of association p-value
Age Level Gap		NS
Female Age Level > Male Age Level	2 (1.0%)	
Male Age Level > Female Age Level	151 (75.5%)	
No Age Level Gap	45 (22.5%)	
Missing Values/Unable to Calculate	2 (1.0%)	
Education Level Gap		NS
Female Education Level > Male Education Level	43 (21.0%)	
Male Education Level > Female Education Level	50 (26.0%)	
No Education Level Gap	107 (53.0%)	
Missing Values/Unable to Calculate	0 (0.0%)	
Income Level Gap		NS*
Female Income Level > Male Income Level	1 (0.5%)	
Male Income Level > Female Income Level	172 (86%)	
No Income Level Gap	12 (6.0%)	
Missing Values/Unable to Calculate	15 (7.5%)	
Employment Gap		p < .05*
Male Only Employed	179 (89.5%)	
Female Only Employed	0 (0.0%)	
No Employment Gap	21 (10.5%)	
Missing Values/Unable to Calculate	(0.0%)	
Marriage Type		p < .05*
Arranged	141 (70.5%)	
Love with family approval	52 (26%)	
Love without family approval	4 (2.0%)	
Missing Values/Unable to Calculate	3 (1.5%)	
Intercaste Marriage		p < .05*
Intercaste	172 (86.0%)	
Within Caste	22 (11.0%)	
Missing Values/Unable to Calculate	6 (3.0%)	
Religion		NS*
Hindu	148 (74.0%)	
Christian	15 (6.5%)	
Muslim	7 (3.5%)	
Bodh	30 (15.0%)	
Missing Values/Unable to Calculate	0 (0.0%)	

* Fischer's exact test two-sided p-value

Table 7. Bivariate Analysis of Overall Autonomy vs. Potential Confounders

Potential Correlate	No. (%)	χ^2 test of association p-value
Age Level Gap		NS*
Female Has Higher Age Level	2 (1.0%)	
Male Has Higher Age Level	151 (75.5%)	
No Age Level Gap	45 (22.5%)	
Missing Values/Unable to Calculate	2 (1.0%)	
Education Level Gap		NS
Female Education Level > Male Education Level	43 (21.0%)	
Male Education Level > Female Education Level	50 (26.0%)	
No Education Level Gap	107 (53.0%)	
Missing Values/Unable to Calculate	0 (0.0%)	
Income Level Gap		NS*
Female Income Level > Male Income Level	1 (0.5%)	
Male Income Level > Female Income Level	172 (86%)	
No Income Level Gap	12 (6.0%)	
Missing Values/Unable to Calculate	15 (7.5%)	
Employment Gap		NS *
Male Only Employed	179 (89.5%)	
Female Only Employed	0 (0.0%)	
No Employment Gap	21 (10.5%)	
Missing Values/Unable to Calculate	(0.0%)	
Marriage Type		p < .05*
Arranged	141 (70.5%)	
Love with family approval	52 (26%)	
Love without family approval	4 (2.0%)	
Missing Values/Unable to Calculate	3 (1.5%)	
Intercaste Marriage		NS
Intercaste	172 (86.0%)	
Within Caste	22 (11.0%)	
Missing Values/Unable to Calculate	6 (3.0%)	
Religion		p < .05
Hindu	148 (74.0%)	
Christian	15 (6.5%)	
Muslim	7 (3.5%)	
Bodh	30 (15.0%)	
Missing Values/Unable to Calculate	0 (0.0%)	

* Fischer's exact test two-sided p-value

Table 8. Logistic Regression Models Examining the Association between Acquaintance at Marriage and Female Autonomy

Model	Beta Estimate	Beta Estimate p-value	Odds Ratio Estimate	95% Confidence Interval
Crude Model^a				
Marital Acquaintance				
Very little	0.8532	NS	2.347	(0.701-7.863)
Somewhat	2.0608	p < .05	7.853	(2.620-23.547)
To a great extent	1.9963	p < .05	7.362	(2.564-21.134)
Model adjusting for Marriage Type				
Marital Acquaintance				
Very little	0.8194	NS	2.269	(0.675-7.265)
Somewhat	2.0167	p < .05	7.514	(2.500-22.584)
To a great extent	1.6809	p < .05	5.371	(1.730-16.670)

a The crude model only contains Overall Autonomy

Discussion

Study Significance

There is a gap in current literature surrounding the relationship between marital acquaintance and female autonomy among married couples in India. Current literature often focuses on studying female autonomy among married Indian women as a function of what type of marriage (love marriage or arranged marriage) she had. Although this relationship is highly important, it does not explore deeper dimensions of pre-marital relations regarding how well the couple felt they knew each other before getting married. It should be noted that literature shows that arranged marriages do not necessarily define how well a couple knew each other at the time of marriage nor do they definitively reveal how autonomous a woman is in her relationship. Additionally, predictors of female autonomy that are explored in current literature often focus solely on demographic characteristics. In this study, demographic factors do not serve as the predictor but rather are considered for confounding the relationship between marital acquaintance and female autonomy. Study of this marital acquaintance in relation to female autonomy is highly important in the Indian context due to modern changes in marital practices, the role of female autonomy in gender equality, and the rise of women's empowerment movements across India.

Summary of Findings

In our study, having strong acquaintance with partner at the time of marriage was associated with a 5-fold higher odds (AOR=5.4, CI 1.7 -16.6) of the female partner experiencing autonomy in early marriage. This allows a rejection of the null hypothesis that “there is not a significant effect of marital acquaintance on whether or not woman has overall female autonomy in her marriage among newly-married slum-dwelling couples in Pune, India.” However, it should be noted that

all odds ratio estimates and confidence intervals are highly imprecise due to sparse data bias (explained below).

Study Strengths

This study is the first of its kind to explore the relationship between how well someone feels like they knew their spouse at the time of marriage (marital acquaintance) and overall female autonomy, which encompasses various dimensions of autonomy including: mobility autonomy, lifestyle autonomy, relationship autonomy, financial autonomy and sexual and reproductive autonomy. Additionally, this study explores how 1) males perceived their wives autonomy early on in their marriage as well as 2) how autonomous wives considered themselves to be early on in their own marriage. This provides a unique opportunity to comparatively analyze gender-specific conceptualizations of how these various aspects of autonomy play out in their own marriages.

In terms of statistical strengths of the study, there was very limited item non-response among participants. The highest item nonresponse rate among all survey items 15%, and was not used as a confounder, predictor, or outcome in the analysis. Additionally the control subscale of the Indian Family Violence and Control Scale (IFVCS) (Kalokhe et al., 2016), from which the autonomy data was derived, was developed and validated in Pune, and has been shown to have strong reliability, with the majority of items having high (>0.5) and significant factor loadings (Kalokhe et al., 2016).

In terms of study design strengths, the definition of autonomy in this study encompassed various dimensions of autonomy, some of which contain measures that have not been explored before.

For example, lifestyle autonomy included measure of a woman's ability to relax when she wants

to, which was not been studied in the Indian context before. The inclusion of five dimensions of autonomy allows for a holistic and inclusive assessment of overall female autonomy, which many other relevant studies have only partially been able to capture. Additionally, this study is the first of its kind to assess overall female autonomy or marital acquaintance in slum communities. Recent and relevant literature in slum communities tends to study only aspects of female autonomy, particularly sexual and reproductive autonomy exclusively. In terms of studying marital acquaintance, recent and relevant literature has not studied this variable in Indian slum communities at all. Thus, this study explores a huge gap in the literature on a growing and underserved sub-population in India (Pune Municipal Corporation, 2017). Lastly, this study explores marital acquaintance early on (three months or less) in marriage, while most other studies explore marital acquaintance among those who have been married for longer periods of time. This definition of marital acquaintance is useful in terms of developing follow-up studies. It also provides a unique perspective among newly-married couples that has not been exclusively studied in the Indian slum community context before.

Study Limitations

Sparse Data Bias

Although the beta estimate p-values for two levels of marital acquaintance revealed statistical significance, the large odds ratio estimates and confidence intervals at an alpha level of .05 suggest lack of precision and power in these estimates. The confidence intervals for these estimates were extremely wide, indicating that determining 1) a range in which the true value lies with a certain degree of probability and 2) the direction and 3) the strength of the demonstrated effect cannot truly be determined through this logistic regression analysis. The wide confidence intervals reflect high dispersion and disproportionately low cells counts. Specifically, those who

reported both “Have autonomy” and “No marital acquaintance at all” at the time of marriage had a cell count of five, while all the other cells had a minimum of ten participants. Vittinghoff and McCulloch reflect that the traditional rule of thumb of having a minimum of ten participants per cell for logistic regression analyses might even be “too conservative” (Vittinghoff & McCulloch, 2007), further showing the lack of power in this analysis. The statistical bias this can be classified as is called “sparse data bias”. In this particular study, the marital acquaintance variable had a narrow distribution and those responses of “no marital acquaintance at all” were very uncommon, especially in concordance with reporting having overall female autonomy. It should be noted that even though no statistical conclusion can be made from this data sparsity, it still reveals that very few women with autonomy early on in their marriages reported not knowing their husband at all. This response option in this sample was far less reported than the other response options that indicated higher marital acquaintance at the time of marriage.

Selection Bias

Recruitment of married women from the slums was performed through convenience sampling and snowball sampling methods. Both of these methods are highly vulnerable to selection bias and influences that are not controllable by the researcher. Additionally, these methods can produce a high level of sampling error in which the sample produces estimates that are not truly representative of the study population.

Social Desirability Bias

With questions regarding autonomy is it quite possible that female respondents could have wanted to appear more autonomous than they really felt as though they were, which could cause social desirability bias, and therefore cause some variance in the estimation of the true values.

This is because being autonomous is more socially desirable than not being autonomous.

Similarly, male respondents could have reported that their wives were more autonomous than they felt they were in reality because they wanted to appear like they were more reasonable and fair husbands, also creating social desirability bias in a way that overestimates the likelihood of the wife having autonomy rather than not having autonomy. It is also quite possible that social desirability bias affected how well participants reported knowing his or her spouse at the time of marriage. They could have reported knowing their spouse for longer than they did in reality to appeal to the rise in popularity of love marriages. In modern day this type of marriage is more “socially desirable”, which participants could also perceive as subsequently being more socially accepted. This would then of course bias the estimation of the true measure of marital acquaintance as the predictor in this study.

Participant Fatigue

The Healthy Relationships Survey consisted of 182 questions. Given the great length of this survey it is very much possible that participant fatigue over the course of participation could have occurred, leading participants to perhaps respond with “I don’t know” more often or give more trite responses to open-ended questions (Lavrakas, 2008). This is a very common issue for longer surveys, and could lead to measurement error and misclassification problems (Egleston, Miller & Meropol, 2011).

Future Considerations

The most important limitation for this study is the presence of sparse data bias. It should be noted that this issue is not simply solved by increasing the sample size, as sparse cells count is still very much possible, but likely to increase with a larger sample size because of an increased probability of reaching adequate cell counts. One way to detect and prevent sparse data bias from occurring, especially with small samples, is to conduct a preliminary sensitivity analysis, “especially when data displays are too cumbersome to capture multivariate relations” (Greenland, Schwartzbaum & Finkle, 2000).

In their 2004 Cooperative Agreement Project focused on statistical approaches for addressing small numbers the Centers for Disease Control and Prevention and the National Association of Health Data Organizations report that “there are a variety of approaches for increasing the reliability of statistical tests in situations where cell sizes are small; these statistical techniques address the issue with both modifications to existing data and the use of synthetic information to achieve larger cell or population sizes” (Centers for Disease Control and Prevention, National Association of Health Data Organizations, 2004). One of the suggested approaches is to aggregate or combine the results from several years, multiple geographic areas, or subgroups. This the most commonly used method and requires less statistical sophistication to implement. This method does cause a loss of information because it might hide between-group differences and inflate within-group differences. However, if data were to be aggregated from several years for example, more stable estimates would be produced. These estimates are less likely to be caused by random variation. In this study for example, those who reported not knowing one’s spouse at all the time of marriage might be aggregated with those who reported knowing their spouse very little at the time of marriage, and those who reported knowing their spouse

somewhat at the time of marriage might be aggregated with those who reported knowing their spouse to a great extent at the time of marriage. Thus, a four level categorical ordinal variable would be reduced to having two levels, and the problem with sparse data bias would be eliminated. However, this method was not implemented in this thesis study because combining those who reported not knowing their spouse at all at the time of marriage are indeed very different from those who reported knowing their spouse very little at the time of marriage. Combining these two values that imply highly differing levels of marital acquaintance would diminish the entire exploration of this variable's association with overall female autonomy. Aggregating these levels of marital acquaintance does not capture the true level of marital acquaintance and makes the results uninterpretable. Additionally, this could lead to falsification of claims depending on how the data is reported and interpreted. Thus, the aggregation method was not employed in this study. Another suggestion for tackling sparse data bias is to introduce uncertainty to all cell values by adding a certain standard cell count (10 is suggested) to each existing cell count. While this method does change the data, the data distributions and simple statistics should remain the same. In other words, proportional measures should remain undisturbed.

Marriage type was found to be significantly associated with both marital acquaintance and overall autonomy. It would be valuable to further examine and tease out the relationship between marriage type and marital acquaintance to help identify circumstances in which marriage type could be used as an accurate proxy indicator for marital acquaintance.

This study's generalizability is limited to newly-married couples residing in Pune slums or similar settings. It would also be very insightful to conduct a comparative study of marital

acquaintance and overall autonomy's relationship in both South and North India, especially considering the higher prevalence of arranged marriages in northern India. Another comparative analyses that would be useful to look at would be a temporal analyses comparing perceptions of female autonomy early-on in marriage (as in this study) and at a later stage of marriage. This could lead to a more holistic and comprehensive analysis of changes that occur in female autonomy over time. Although, follow-up would be an inherent challenge in this proposed study design.

It should be noted that overall autonomy was a binary outcome in this study. It could be highly insightful to study this variable as a multi-level ordinal variable, because this elicits more depth by which to explore the association between overall female autonomy and marital acquaintance. Another way in which this association could be studied would be to interview married couples. In this thesis study, female autonomy was determined through not only the female participant's perception of her own autonomy, but also male participants' perceptions of their wives' autonomy in their marriage. Studying married couples' perspectives could allow for a comparative analysis of wife autonomy from both the husband and wife perspective.

Lastly, this study is purely quantitative, but has an unanalyzed set of qualitative data that could supplement and add great value to the quantitative analyses conducted in this study. Qualitative analyses could provide more insight about the individual and unique perceptions of the participants and the ways in which they frame and conceptualize female autonomy within their marriage.

Public Health Implications

Marital acquaintance serves as a strong point of intervention for programs that aim to enhance female autonomy. One method of developing such an intervention would be to gather data from individuals who felt they had low levels of acquaintance with their partners at the time of marriage about what they knew and what additional they wanted to know about their partner at the time of marriage. This allows for a community-based participatory approach for integrating participant desires, concerns, and needs into intervention activities. Additionally, in-person marital acquaintance promotion activities could be conducted to foster greater trust, support, and understanding between spouses before agreeing or deciding to get married. Often, spouses only communicate via social media or SMS (texting) before marriage. An in-person interaction would likely allow both potential partners to feel more secure and equipped for their marriage. This sort of intervention empowers couples to develop communication skills with one another and learn how to best cater to one another's needs before marriage. It should also be noted that this sort of intervention could be employed during the first few months of marriage, to allow for couples to set standards for their marriage going forward and to decipher how to jointly tackle issues that arise immediately post-marriage. This sort of intervention is more pro-active and takes on a preventative approach to solving potential relationship issues, as opposed to curative and reactive approaches to solving marriage problems after they have occurred. As related to this study, this sort of intervention could serve to cement and establish the standard of high female autonomy early-on in marriage. As a part of these interventions activities, it would be highly beneficial to allow the couples to speak to one another, but also engage in gender-specific communication workshops. In these workshops partners could learn how to listen, cater to one another's needs, boundaries and opinions, and communicate in a way that allows them to assert

their own needs, boundaries and opinions. They could learn not only about how to engage in such behavior but also the importance and mutual benefit of engaging in such behavior. It should be noted that while individual control over marriage is important, parental approval or insight is often desired and beneficial to marriage as well. Thus, maintaining parental insight while simultaneously increasing pre-marriage communication between spouses alone, is highly important and challenging in developing interventions of this sort.

Conclusion

This thesis is the first study to explore marital acquaintance as a potential correlate of female autonomy among newly-married couples living in slums of Pune, India. This association is particularly important to study in the context of India because of the rise of women's empowerment movements across India and the World Health Organization's 2020 SDG "to achieve gender equality and empower all women and girls." This study can also serve to inform the National AIDS Research Institute of India (NARI)'s potential future interventions aimed at increasing female autonomy in India.

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