Effects of conjugal marriage on fertility

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Submission to Session 102 (James H. Jones), PAA 2013

Abstract

Using multiple waves of data from Demographic and Health Surveys in Egypt, Jordan, Turkey, and Yemen, we compare how more and less conjugal types of marital relationships affect fertility across multiple births? In particular, we compare the length of different parity-specific birth intervals across two discrete types of marriage: marriages to patrilateral parallel cousins (PPCs) or first cousins in general *versus* marriages to unrelated husbands; and own-choice marriages *versus* those completely arranged by their families. Results show that birth intervals are significantly longer in first cousin marriages than in marriages where spouses are unrelated in Turkey, Egypt, and Jordan, but in Yemen, the average marriage to first birth interval is significantly shorter. This pattern does not hold for arranged marriages in Turkey. Here, birth intervals are not significantly different than those arranged primarily by the couple themselves.

Introduction

Over the last half century, marriage in developing societies has become increasingly conjugal. That is, it has come to reflect the fact that people today are more likely to choose their own spouse than their counterparts were in prior generations, and that they make their selection in more heterogeneous marriage markets. This is a phenomenon that spans the globe, encompassing societies in sub-Saharan Africa (Bledsoe 1990; Smith 2001), Arab countries (Mernissi 1975; Shaaban 1988), East and South Asia.

The study of this marital transition within demography has focused primarily on its relationship to fertility. The literature highlights two somewhat different effects. On one hand, conjugal marriage is seen to depress fertility overall. The reason is that emotional intimacy and companionship, both of which underlie what Goode (1963: 19) referred to as the "ideology of the conjugal family," substitute an individual-oriented personal relationship between husband and wife for the more corporate, kin-centered forms of marriage (Reher 1998). As a result, men and women in a true conjugal relationship are empowered to make a range of choices beyond who their partner should be. Early in the marital transition they decide how to marry, where to live after marriage, and how many children to have – giving rise to more civil marriage, more neolocal residence after marriage, and fewer children within marriage. Later in the marital transition – in the "marriage-" and "fertility-bust" stages – they get to decide whether or not to formally marry, and whether or not to decouple marriage and reproduction altogether (Billari and Kohler 2004).

In contrast to these fertility-depressing effects, a second set of demographic studies have identified the fertility-*increasing* potential of conjugal marriage. The key argument here builds on established models of fertility behavior (Davis and Blake 1956; Bongaarts and Potter 1978). Since conjugality is associated with intimacy it should be positively associated with coital frequency, a key "proximate determinant" of fertility. Consequently, conjugal marriage should be associated with higher fertility, at least in the absence of contraceptive use. Here, too, there is some empirical support. Not only is the relationship between romantic love and fertility said to underlie increases in premarital fertility in western societies (Reiss 1967; Regnerus 2007). It is also associated with shorter first-birth intervals in China (Hong 2006) and Nepal (Fricke and Teachman 1993). And Rindfuss and Morgan (1983) argue that it underlies the remarkable increases in early marital fertility in Korea, Malaysia and Taiwan observed from the 1950s to 1970s.

This paper builds directly on these two somewhat different effects, while also trying to address weaknesses in the associated literatures. The weakness of the former – which deals with conjugal marriage's fertility-depressing effect – lies in its unstated premise. That is: Fertility-depressing effects will be found where an emotionally intimate couple both *wants* to limit family size and *acts* together in accordance with those fertility desires by, for example, using effective methods of contraception. This may well be true. But it leaves the larger question unaddressed. For example, what are the effects of conjugal marriage on fertility where an equally intimate couple either wants a larger family, or where they have limited access to effective contraception? This suggests that the overall effect of conjugal marriage on fertility is conditional on contraceptive use and the desired level of fertility. The negative effect that we find in the literature is therefore an artifact of group-level association between contraceptive prevalence and overall fertility levels. At the individual level, things may look different.

The weakness of the second effect – conjugal marriage enhancing fertility – has more to do with the scope of existing empirical studies. Thus far, these have uniformly targeted the early stages of marriage, typically the interval between marriage and first-birth (e.g., Rindfuss and Morgan 1983; Fricke and Teachman 1993; Hong 2006), and ignored any effects on higher order births. Instead, scholars suggest that the differences between conjugal and non-conjugal marriages can attenuate, and that this occurs due to increased intimacy.[1] This suggestion is problematic since it stands in contrast to a large body of literature that directly addresses constraints on intimacy. Chief amongst these is literature on what, since Freud's *Totem and Taboo*, has been referred to as the "Westermarck hypothesis," the argument that early childhood association inhibits sexual attraction (Wolf 1995). Again, it leaves the overall question unanswered. What does the effect of conjugal marriage on fertility look like in the long-term? Put differently, how do more and less conjugal types of marital relationships affect fertility across multiple births?

[1] Rindfuss and Morgan (1983), for example, suggest that even if non-conjugal marriage begins more awkwardly, with less intimacy, and with lower coital frequency, "the "honeymoon" may come later" (p.273). Fricke and Teachman (1993) point to a more specific mechanism underlying this effect. They argue that allowing newly married women to periodically return to their natal homes enables them to build better relationships with their husbands and affinal families. They also argue that the differences between conjugal and non-conjugal marriages can also attenuate due to marital dissolution amongst the least successful (and least intimate) of the non-conjugal marriages.

This is the primary question that we address in this paper. Using data from Demographic and Health Surveys conducted in the Middle East, we compare the length of different parity-specific birth intervals across two discrete types of marriage: own-choice marriages *versus* those completely arranged by their families; and marriages to patrilateral parallel cousins (PPCs) *versus* marriages to unrelated husbands. This dual comparison allows us to build on existing research conceptually – by specifying conjugality in relation to both own-choice/arranged marriage, and consanguineous/non-consanguineous marriage. It also allows us to build on it in terms of scope – by focusing on birth intervals at higher parities as well as low ones – and geographically – since there is no extant research on this topic in Arab societies that we are aware of.

Our paper proceeds in three sections. In the first, we review the relationship between different types of marriage and sexual frequency in the social science literature in general and demographic literature in particular. In the second section we introduce our data and explore birth intervals empirically. In the third, we estimate differential coital frequency rates by marriage types across cumulative parities.

Literature review

Despite evidence of decreases in fertility rates worldwide, there remains some disagreement in demographic science on the micro-processes underlying these trends (Bongaarts 2002). Part of the problem is that the apparent predictability of correlated decreases in fertility and aspects of modernization, including increasing education for women and their involvement in the formal economy, masks stark differences in historical familial behavior patterns (Cain 1982). Comparisons between countries of Northern Europe and the Mediterranean show persistent differences in the familial context of marriage and in the strength of extended family ties (Reher 1998). In Middle Eastern societies, the conjugal unit has historically been considered secondary in importance to the extended kin grouping. Husbands and wives often live with extended family members and children are often raised in the same households – or set of households – as their cousins, usually on the father's side (Charrad 2001; Grief 1994; McCabe 1983). Marriage between these patrilineal parallel cousins (PPCs) and other cousins remains popular, despite some evidence from the region that individuals may be now more likely to choose their own marriage partners (Mernissi 1975; Shaaban 1988). These marriage practices have deep historical roots in political structure but, with some exceptions (Bittles 1992; Weinreb 2008), have often been glossed over in studies of modern demographic trends.

One frequently theorized link between social change and fertility patterns is the advancement of personal "choice," specifically that of women as it relates to childbearing. Caldwell's (1976, 1978, 1982) extensive work on fertility decline specifies that the social transformation of the family, which results in increased decision-making power for both the conjugal couple and the woman within the marriage, is a prerequisite to the mass decline of fertility. He argues that both greater equality between men and women in the family, as well as greater freedom of the conjugal unit from the extended family network, leads to lower fertility. Yet taking increased empowerment in decision-making as the driving factor behind fertility transitions can be misleading, to the degree that it treats pre-transition fertility as governed wholly by social constraint and post-transition fertility as the pure product of individuals' or couples' decisions (Mason, 1997; Cain, 1982). It can also tend to ignore the continuum of possible

marriage types in lieu of an over-simplified own-choice vs. "blind marriage" dichotomy (Rindfuss and Morgan 1983: 271). Further, the spread of contraceptive access, of education and occupational status for women, and of the conjugal marriage model are usually co-occurring processes that are easy to conflate.

Arguments for the depressing effects of conjugal marriage on fertility tend to take choice and ideology as their starting point, describing conjugal marriage as a model in which the man and woman are both empowered to make choices about family size and are therefore likely to choose smaller families, or sometimes not to formally marry or to have children at all (Billari and Kohler 2004). This perspective relies, however, on the assumption that more freedom to choose leads to the "obvious" choice, smaller families, and that contraceptive use merely mediates this pathway. It can also overstate, as Cain (1982) argues about Caldwell's (1976) work, the amount of control over fertility and the household economy that individuals outside of the conjugal unit actually exert in pre-transition societies. The assumed negative association between group-level fertility rates and the spread of the conjugal marriage model thus oversimplifies the relationship between choice, contraceptive use, and desired levels of fertility. If such an association is evidenced at the individual-level, then it is just as possible that change in contraceptive use and in desired fertility are the driving factors, rather than the spread of conjugal marriage.

Since this has been the dominant perspective in the socio-demographic literature, any separate effect of coital frequency is usually assumed to be neutralized by contraceptive intentions, choices, and practices (Rindfuss and Morgan 1983). Even the classic article by Davis and Blake (1956) that first identified coital frequency as a proximate determinant of fertility suggested that it was a relatively unimportant variable, given the lack of evidence that it varies significantly across time periods and societies (see also Bongaarts, 1978). Yet several recent case studies have brought coital frequency back in as an explanatory factor, based on evidence that birth intervals are actually shorter within conjugal marriages than within traditional types of marriage in the same societies (Hong 2006; Fricke and Teachman 1993; McCabe 1983). One study from India has argued that the effect of age at first marriage, which is more frequently attended to as a predictor of high fertility, is potentially suppressed by coital frequency in societies where early marriage, arranged marriage, and presumably lower coital frequency are the norm (Basu 1993). As Rindfuss and Morgan (1983) argue using indirect and ethnographic evidence from three Asian countries, the marriage-to-first-birth interval has decreased remarkably in the past several decades, and the increase in romantic marriages and in coital frequency within marriage is a highly plausible explanation for this. Unfortunately, with one exception (Fricke and Teachman 1993), these studies have focused on populations where contraception is not widely used and so they have not been able to control for contraceptive use as a key covariate. Further, none of them have looked beyond the first birth interval to higher parities. It is therefore unclear what the broader, more long-term effects of increasing conjugal marriage on fertility might be for couples and larger populations.

This research has, however, offered new fuel to an ongoing debate on the potential sources of incest taboos in extended family structures and residential patterns. The "Westermarck hypothesis," based on the work of an early 20th century sociologist, states that early childhood association inhibits sexual attraction (Wolf 1995). The hypothesis is grounded in his larger conceptual view of marriage as

being rooted in the family, rather than family being rooted in the marriage relationship (Pipping 1984; 320). In his view, family structure defines both sexual attraction and marriage patterns, acting through ‘‘an *instinct* (italics in original) which under normal circumstances makes sexual love between the nearest kin a psychological impossibility” (Westermarck 1903; 319). Although the idea of such a biological instinct has been heavily scrutinized by later research (Smith 2007), a substantial amount of evidence supports his conceptual focus on sexual attraction and coital frequency within marriage as an important predictor of fertility, when similar conjugal and non-conjugal marriages are compared (McCabe 1983; Wolf 1995). The relationship between early childhood association and later sexual attraction has also been shown to be negative in diverse contexts, both where childhood associates are biologically related, as in the case of consanguineous marriage (McCabe 1983; Khuri 1970), and in cases where they are not, as in Wolf’s study from China and Shepner’s (1971) study of mate selection within Israeli *kibbutzim.*

The debates over the Westermarck hypothesis and over the importance of coital frequency as a predictor of population-level fertility patterns have both suffered from a lack of large-N and longitudinal analyses, a lack of attention to the role of contraceptive use, and a focus on type of marriage as a dichotomy rather than a continuum. Most of the cases cited above look at local practices as ideal cases or “natural experiments” of the Westermarck hypothesis, due to their grounding in anthropological and historical methods, and thus the extensibility of their findings to other societies is unclear. Our study’s use of multiple waves of Demographic and Health Survey data from Middle Eastern countries where both patrilineal parallel cousin marriage and other types of cousin marriage are still practiced, and where marriages are also at times arranged by families, is a strategic way to speak to these larger issues. It also follows directly from suggestions made by Fricke and Teachman (1993). In their data, kin relationship is a key correlate of spousal familiarity, making PPC marriage an analytically important type of marriage that may illustrate similar or different patterns to arranged marriages. In this study, we are able to look at both, exploring methodologically whether type of marriage can be used as a reverse proximate determinants calculator for coital frequency. We first compare birth intervals at both low and high parities within patrilineal parallel cousin marriages to marriages where spouses are unrelated, using data from four countries; and secondly we do the same for arranged marriages as compared to own-choice marriages, using data from Turkey. This study is therefore the first, that we are aware of, to attempt to show with representative survey data whether an individual-level relationship between various types of marriage and fertility exists, whether it persists net of contraceptive use and social context predictors, and whether it holds across multiple countries and time points. Finally, by looking at two types of marriages that have been juxtaposed with conjugal, own-choice marriage, the study is also the first to attempt to show whether such a relationship, if evidenced, is more likely due to the influence of increasing choice in marriage or to other socio-biological factors, such as those suggested by the Westermarck hypothesis.

Data and Methods

Our study makes use of eleven Demographic and Health Surveys from four countries: Egypt (1992, 1995, 2000), Jordan (1990, 1997, 2002, 2007), Turkey (1993, 1998, 2003), and Yemen (1992). All draw on

nationally representative sampling frames and, as is typical of surveys in non-western settings, have high response rates (in excess of 85% in all cases).

We use these data for two reasons. First, cross-country analysis provides variation in prevalence of cousin marriage, which has implications for mechanisms underlying the type of marriage/coital frequency relationship. Second, using multiple rounds of data for each country – with the exception of Yemen, which only had one available round of data that included necessary variables – allows us to explore temporal trends in marriage-fertility relationship.

Descriptive Statistics

We present descriptive statistics from all surveys on the prevalence of cousin marriage, contraceptive use, and urban residence in childhood, a key predictor of cousin marriage in later models. We also compare mean age at first marriage, mean birth intervals from marriage to 8th parity, and percentages of women completing parities 1 through 8, in order to examine patterns in both *tempo* and *quantum* dimensions of fertility. This gives us a comparative overview of the context of marriage and fertility in each country and at each time point, which then informs our later modeling strategy and interpretation of results.

Of the four countries for which we have data, we discuss Yemen separately from the other three countries both because we are limited to one year of data from 1992 and also because we expect Yemen to illustrate very different patterns of fertility and co-factors. We begin therefore with a summary of the data from Egypt, Jordan, and Turkey and afterwards assess trends for the Yemen 1992 DHS.

----------Table 1 about here----------

Using our data which cover a period of seventeen years, we find some find evidence from Egypt, Jordan, and Turkey of significant changes but also stability in fertility and fertility co-factors across time points. Contraceptive use is reported by 60 to 80 percent of each sample and is higher in the more recent surveys (see Table 1). Yet divorce remains rare, indicated by the stable and high—at least 94 percent in all three countries—percentage of women still in their first marriage. Although Egypt shows a stable percentage of those who lived in urban areas in childhood, this percentage is larger in more recent surveys for both Turkey and Jordan, though unfortunately these data are not available for Jordan in either 2002 or 2007.

Evidence for changing patterns of cousin marriage is inconclusive. The overall prevalence of first cousin marriage has declined only slightly, paternal first cousin marriage remains more common than maternal first cousin marriage, and marriage to more distant relatives is as prevalent as paternal first cousin marriage. In Egypt, there is an eleven-point difference between the percent of women married to a paternal first cousin between 1992 and 2000, but no noticeable difference in the percentage of those

married to their maternal first cousins or to more distant relatives. The percentage of women married to non-relatives is actually lowest in 1995, and is only three points higher in 2000 than in 1992.

The data for Jordan cover the longest period of time, from 1990 to 2007. Yet the data show only a two-point difference in the percentage of paternal first cousin marriages between the earliest and the most recent survey. The largest difference appears among women married to more distant relatives, who are 26 percent of the sample in 1990 but only 16 percent in 2007. Yet even as recently as 2007, just under half of women surveyed are married to a relative, and 27 percent are married to a first cousin. Overall, marriage to relatives is the most common in Jordan than in any other country, and this appears to be changing very little over time.

The data from Turkey show the lowest initial prevalence of marriage to relatives of any country, and yet illustrate even less evidence that cousin marriage in becoming less common. The percent of women in patrilineal paternal first cousin marriages is actually one and a half points higher in 2003 than in 1993. The percentage of women married to non-relatives is almost exactly the same in 2003 as in 1993, roughly 76 percent.

Finally, the data from Yemen show much lower low rates of contraceptive use, and only about 17 percent of the sample report living in an urban area in childhood. The percentage of the sample still in the their first marriage is a bit lower than the other three countries, though is more likely to be due to lower life expectancies for men than to higher rates of marital dissolution. It is the only country in which paternal first cousin marriage is clearly more common than other types of marriage to relatives. Yet overall, the prevalence of marriage to a relative is not as high as it is in either Egypt or Jordan.

----------Table 2 about here----------

Table 2 shows the mean age at first marriage and mean birth intervals at parities 1 through 8, as well as the percent completing each birth for each of the eleven DHS surveys. For both Turkey and Jordan, slightly higher means for age at first marriage in the more recent surveys indicate a possible trend towards delaying marriage, usually a key indicator of an ongoing fertility transition. For Egypt, however, the difference between early and later surveys is slight, and Yemen in 1992 shows a very young mean age at marriage of 16.25 years. However, the impact of early marriage on overall fertility may potentially be attenuated by the much larger average interval between marriage and first birth in Yemen, as other studies have suggested in cases where very early marriage is common (CITE). At higher parities, birth intervals for the Yemen sample are slightly shorter, indicating that those women who have commenced childbearing will proceed more quickly to having more children.

The data from Yemen also show a much higher percentage of women completing 8 births than all of the other surveys except for Jordan in 1990. At almost all parities, the percentage of women completing in Jordan 1990 is very similar to Yemen in 1992. Yet the more recent waves of Jordan data show quite different patterns. While it is clearly the country with the largest percentage of women completing higher-order births, and where the majority of women reported at least three births, the percent of women with eight children in 2007 is only 7.39 percent, compared with 19.27 percent in 1990.

Lastly, both the Egypt and Turkey data indicate possible trends toward fewer births. In Turkey, at all time points very few women have more than four births, and the percentages of women completing births at all parities are slightly lower for the later surveys. For Egypt, the percentages of women completing higher-order births are higher, but there is a similar decline in percentages of births at all parities in the more recent data. This suggest that overall, there seems to be decline in the number of women having large families in Turkey, Egypt, and Jordan, and that Turkey is likely to be the furthest along in the fertility transition. Even there, however, the vast majority of women in the sample have at least one child, and a significant number have at least three, indicating that the childless family is still an uncommon phenomenon in all of these countries. In sum, these data show that marriage to relatives and cousins in particular remains common in all four countries and that they show very similar patterns of potential fertility decline and contraceptive use (with Yemen as the exception). They therefore support our choice of surveys and our use of type of marriage as a predictor in the following section.

Cousin Marriage

We now use all eleven datasets to look at differences in birth intervals for parities 1 through 8 by type of marriage: whether the respondent's spouse is a first cousin, a more distant relative, or not a relative. Our sample is limited to those women who are still in their first marriage, which in all surveys is at least 88 percent of the overall sample. We combine patrilineal first cousins and matrilineal first cousins into a single category, after preliminary analyses showed insignificant differences between these two categories. Since our main interest is in contrasting spouses who are close relatives to those who are unrelated, this also makes the models more parsimonious. We also group the surveys into three time periods rather than strictly by year: time 1 (Egypt 1992, Jordan 1990, Turkey 1993), time 2 (Egypt 1995, Jordan 1997, Turkey 1998), and time 3 (Egypt 2000, Jordan 2002/07, Turkey 2003).

In order to account for endogenous factors that influence both type of marriage and fertility timing, we calculate heckman selection models. We analyze the marriage to first birth interval separately by country, showing the full model results. For each succeeding birth interval, we then combine all eleven datasets together and perform the analysis on the combined full dataset. All coefficients show within-cluster differences between groups.

----------Table 3 about here----------

Table 3 shows the results from the heckman selection models predicting the marriage to first birth interval, calculated separately by country. For both Jordan and Turkey, the first birth interval is at least one month shorter for unrelated spouses than for those married to first cousins. For Egypt, there is a significant difference of about one third of one month. Yemen shows a very different pattern, where there is no significant difference between first cousins and unrelated spouses, but a four-month difference between first cousins and other relatives.

Use of contraception is a strong predictor of first birth intervals in all four countries, with significantly shorter first birth intervals for those who have used contraception at some point prior to the survey. It should be noted that their use of contraception does not necessarily coincide with the period in which they report giving birth, and thus it should not be extrapolated that use of contraception

is associated with overall increases in fertility in these cases. Years of education is a strong correlate of ever use of contraception, and the coefficient for years of education in these models is also negative, indicating that those women with more years of education report shorter first birth intervals. Thus, it seems that for a certain group of women, who are more educated and more likely to have used contraception, there is a tendency to have shorter first birth intervals, but fewer births overall. Since age at first marriage is a strong positive correlate with both contraceptive use and years of education, marrying later may also be a crucial factor in shortening these intervals significantly, such that there is a larger difference between these women and their counterparts in when they marry than in when they first give birth.

The selection equation shows more variability by country in who enters into cousin marriage. In the Egypt sample, the proportion in cousin marriages among those who worked before marriage and those who were raised in urban areas is not significantly different than their counterparts. However, those who married younger, have fewer years of education, and who were older at the time of the survey report higher rates of cousin marriages than others. Significantly fewer of those surveyed in 1995 reported marrying their cousin than those in the 1992 survey. The results for Jordan, which as mentioned before are limited to the 1997 data, echo those for Egypt with two major differences. A woman's number years of education is not significantly related to being in a cousin marriage, while age of the partner is negatively related to that outcome. The coefficients for age at marriage and age at time of survey are also quite large, indicating that both men and women in cousin marriages marry younger than their counterparts, and that younger women in the survey were less likely to be in cousin marriages.

In Turkey, where cousin marriage is the least common, there is the strongest overall selection into cousin marriage, as we would expect. Interestingly, though, as the summary statistics above suggested, cousin marriage is more prevalent in the more recent surveys, with a particularly strong difference between the 1993 and 2003 DHS. While childhood place of residence is insignificant, having worked before marriage, having an older partner, and marrying later all negatively predict cousin marriage. Having more education, however, positively predicts cousin marriage, as does the woman's age at the time of the survey.

Finally, the data from Yemen in 1992 show some different patterns. Again, those in the sample who married earlier reported significantly more cousin marriages, as did the older women in the sample. As in Turkey, education predicts cousin marriage. Yet Yemen is the only case in which childhood residence is significant, showing that women raised in urban areas report fewer cousin marriages. Having worked before marriage shows a surprising positive relationship with cousin marriage, and the age of one's partner is not statistically significant.

We then ran a similar model for all parities up to 8, combining all countries and time periods into one larger dataset, in order to see if cousin marriages continue to show significantly longer birth intervals beyond just the marriage-to-first-birth interval. Table 4 shows the actual birth intervals for the three types of marriages at all parities, based on the results of the heckman model which controls for the same co-factors reported in table 3.

----------Table 4 about here----------

The net difference in birth intervals between first cousins and unrelated partners persists at all parities except for the 6th to 7th interval. This difference is significant at the .001 level at the 3rd and 6th parities, and is significant at the .01 level at the first, 2nd, 5th, and 8th parities. At the 2nd and 8th parities there is also a mildly significant difference between first cousins and other relatives.

----------Table 5 about here----------

Table 5 is calculated from the results of table 4 and shows the summed duration from marriage to 8 births by type of marriage, for the 5,815 women who reported completing 8 births. While only 5.67 percent of unrelated spouses reported 8 births, compared to 9.21 percent of first-cousin spouses, the average time to complete these births was a full five months shorter than for first cousins.

Arranged Marriage

We now use the same Heckman selection model to assess the relationship between arranged marriage and birth interval length. For this analysis we use only the three datasets from Turkey which included information on arranged marriage. Because of declining sample size at larger parities, we limit this analysis to parities 1 through 4. Again, coefficients show within-cluster differences between groups.

----------Table 6 about here----------

Clearly, being in an arranged marriage does not have the same effect on birth intervals as cousin marriage does in the same population, and controlling for the same factors. While in table 4 we saw a one-month difference between first cousin and unrelated marriages, significant at the .01 level, here there is virtually no difference for arranged marriages at the first birth interval and small differences that remain insignificant at the 2nd, 3rd, and 4th parities.

The results from the selection equation also suggest that there are very different co-factors and processes associated with arranged marriage than with cousin marriage. While childhood place of residence has no effect on cousin marriage, having lived in a rural area in childhood shows a strong positive association with being in an arranged marriage. Another difference is that while the relationship between partner's age and cousin marriage is negative, the relationship between partner's age and being in an arranged marriage is strong and positive. Years of education show no effect here, although both age at first marriage and having worked before marriage are both negative predictors of arranged marriage, as they are for cousin marriage.

Finally, the strong negative coefficients for the 1998 and 2003 surveys indicate that significantly fewer arranged marriages were reported among these later samples than in the 1993 sample. This is in contrast to cousin marriage, which was significantly more prevalent in the 2003 sample than in the 1993 sample. This suggests that not only do different co-factors determine entrance into an arranged marriage vs. marriage to a relative, but also that arranged marriage may be on the decline while marriage to relatives is not.

Discussion

In this study, we have used large-N survey data to address the question of whether type of marriage has an independent effect on fertility in the Middle East. In contrast to earlier studies on this topic, we have been able to assess this effect independent of contraceptive use, across four countries and multiple time points, and at all parities up to 8. Our strongest finding is that birth intervals are significantly longer in first cousin marriages than in marriages where spouses are unrelated in Turkey, Egypt, and Jordan, and in the overall sample at all parities except the 6^{th} to 7^{th} birth interval. In Yemen, the average marriage to first birth interval is significantly shorter, by about four months, for more distant relations than first cousins.

However, this pattern does not hold for arranged marriages in Turkey, in which birth intervals are not significantly different than those arranged primarily by the couple themselves. Thus, the evidence supports the assertion made earlier that to dichotomize marriages into "traditional" vs. "conjugal" categories oversimplifies changing patterns of marriage and fertility, at least in this context. Our data suggest that arranged marriages in Turkey may be on the way out, and that in accordance with fertility transition theory, couples are increasingly choosing their spouses for themselves and delaying marriage somewhat. In none of our cases, however, is there convincing evidence that cousin marriage is decreasing in prevalence at the same rate.

If the important issue for fertility change is the increase in choice exercised by those within the conjugal unit, as Caldwell's extensive work on fertility decline suggests, we would expect arranged marriage to exert a stronger effect on birth intervals than cousin marriage. The question on arranged marriage posits the clearest distinction between cases in which individuals chose their own spouses and those in which their spouses were chosen for them. Such is not what this data show, however. Being in an arranged marriage has no measurable effect on the timing of births after marriage. Yet cousin marriage, which does not necessarily indicate a greater or lesser degree of conjugal autonomy, shows a consistent and at times quite strong effect on fertility timing in marriage. Thus, it seems that something distinct about cousin marriage, separate from matters of choice or the increasing autonomy of the conjugal unit, is at play in influencing timing of births.

Even if freer to choose their own spouses, individuals may choose to marry relatives for reasons of familiarity and compatibility. In both Egypt and Turkey, we see an essentially stable rate of marriage to relatives at all time points, while in Jordan, there is some evidence of a very slight decrease in marriages to relatives. Nevertheless, as other evidence has suggested, what is gained in the area of compatibility may be lost in the area of sexual attraction. Given the persistent effect of cousin marriage on birth interval timing net of all controls, we posit that the most likely explanation for this is more infrequent sexual intercourse between married first cousins and married non-relatives. As a proximate determinant of fertility, frequency of intercourse is often considered to be of secondary importance. Yet it frequently goes unmeasured, or measured only indirectly. The evidence in this paper, however, combined with the other cases studies that suggest lower levels of sexual attraction between close relatives even where cousin marriage is culturally sanctioned, suggests that in those cases it may play a

major role in determining fertility timing. Further, it suggests that type of marriage could be a promising reverse proximate determinants calculator of sexual frequency.

It is important to note that although spacing between births is shorter for unrelated couples, they are also having smaller families. In terms of the size of families, then, the hypothesis that increasing conjugal marriage has a depressing effect on fertility may hold. Interestingly, in these countries where having some children is still the universal norm, fertility tempo and quantum appear to be responding in opposite directions to several important co-factors. As average age of marriage rises, for example, intervals between marriage and the first several births decrease. As contraceptive use becomes more widespread, those who have used contraception give birth to children more quickly once married. Women who have more education also have shorter birth intervals. Although we have not directly measured the impact of these factors on total number of births per woman, or looked at overall fertility rates, it is reasonable to suggest that they have had depressing effects on fertility rates, even as they speed up fertility timing.

The fertility transition, with its often associated changes in marriage patterns, frequently takes place in unpredictable ways with unpredictable results. Here we have used the example of the Middle East, where diverse types of marriage persist, to confound the assumption that increases in couples' decision-making, conjugal autonomy, sexual frequency, and contraceptive use necessarily go hand in hand and have unidirectional effects in all cases. If eventually cousin marriage sees a dramatic decline in the Middle East, there may initially be an increase in fertility timing and/or the number of births per woman. If overall rates do not increase in this instance, it would mean that couples are all the more reliant on contraception to keep families small. Nevertheless, it seems unlikely that in the Middle East the fertility transition is anywhere close to arriving at the childless, autonomous conjugal unit model now so prevalent in Europe and, to a lesser degree, North America. It is therefore still worth assessing the impact of changes in each proximate determinant of fertility separately in unique contexts, before assuming that all countries are likely to follow the Western model.

Conclusion

Yet to be written

Our results have implications for understanding the trajectory and pace of the fertility transition. For just as the modernization-related reduction in breastfeeding may have added augmented fertility in sub-Saharan Africa (. . .), so too has the transition from consanguineous to exogamous conjugal marriage. This means that the impact of contraception on overall fertility rates is all the greater since the increase in conjugal marriage places more women at risk of pregnancy more of the time.

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