## PROJECT MUSE®

The Influence of Changes in Fertility Related Norms on Contraceptive Use in Egypt, 1995–2005

J. Douglas Storey, Esther B. Kaggwa

➡ *For additional information about this article*
   https://muse.jhu.edu/article/264739

# Population Review

## Volume 48, Number 1, 2009
### Type: Article pp. 1-19

## The Influence of Changes in Fertility Related Norms on Contraceptive Use in Egypt, 1995-2005

**Authors:** J. Douglas Storey and Esther B. Kaggwa
**Affiliations:** Center for Communication Programs, Bloomberg School of Public Health,  Johns Hopkins University (Storey); Department of Population, Family and Reproductive Health, Bloomberg School of Public Health,  Johns Hopkins University (Kaggwa)
**Corresponding author/address:**  J. Douglas Storey, Center for Communication Programs, Bloomberg School of Public Health, Johns Hopkins University, Baltimore, MD, USA; E-mail: dstorey@jhuccp.org

### Abstract

The debate around the relative influence of ideation versus development on fertility reduction has been on-going at least since Cleland & Wilson's "iconoclastic view" of fertility transition was published in 1987.  While there is fairly wide recognition that the diffusion of new behaviors through a community can play an important role in fertility transitions, there is relatively little research on the effect of changes in the normative environment—a predictable consequence of the ideational process—on a woman's fertility decisions.  For the current study, we focus on collective or group norms, which have been defined as "regularities in attitudes and behavior that characterize a social group and differentiate it from other groups."  We infer these regularities in behavior and attitudes by aggregating across individual reports to calculate the objective prevalence of these phenomena within groups. Using multilevel analysis of consecutive 1995, 2000 and 2005 Egypt Demographic and Health Surveys (EDHS), we test the effect of changes in the norms related to the desire for a large family and the use of family planning at parity 0 or 1 on self-reported contraceptive use among married women in Egypt.  The analysis included 2432 married women 15-49 years for the 1995-2000 period and 5285 women for the 2000-2005 period. Norms are defined at the cluster level, which serves as our community-level unit of analysis. After controlling for individual and other community factors, including changes in literacy, we found that women residing in communities where the desire for large families increased from 1995-2000 were more than 70% less likely to use a contraceptive method. While the trend was similar, no such effect of desired family size was observed from 2000-2005. Instead, residence in a community where use of family planning after the first child increased from 2000-2005 resulted in a more than three-fold increase in contraceptive use in 2005. Results indicate that changes in norms measured at the collective level affect individual contraceptive use. Specific attitudinal and behavioral changes that influenced individual action, however, changed over time, consistent with shifts in the emphasis of the national family planning program.

### Keywords

Family planning, contraceptive use, fertility, norms, ideal family size, Egypt

1

**Introduction**

It is well documented that adoption of family planning methods results in fertility decline, but the causes of contraceptive adoption and continued use are vigorously debated (Montgomery & Casterline, 1996). Classical demographic transition theory (Teitelbaum, 1984; Wrigley, 1969) argues in favor of socioeconomic and structural factors such as declining economic value of children and increased education (Bongaarts, 2003) over social psychological factors such as communication and attitude change. However, historical evidence from European countries (Coale & Watkins, 1986; Hirschman, 1994) shows that fertility decline spread from one region to another with similar language or culture even when the latter region was less developed (Coale & Watkins, 1986). Conversely, Tolnay (1995) explained persistently high fertility levels in the American South before 1940 as a function of high fertility in adjacent counties, even after controlling for a variety of structural and cultural variables. Cleland and Wilson's (1987) "iconoclastic view"—that fertility decline was the result of social interaction and ideational (i.e., social cognitive) change rather than socioeconomic progress—challenged the field of demography to examine this possibility. Montgomery and Casterline (1996) carried the line of reasoning further, applying aspects of social learning and social influence theories to explain fertility changes.

Numerous studies have found effects of social influence on contraceptive use decisions, including spouse approval of contraception, discussion of family planning with one's spouse and with others, and subjective norms surrounding family planning (see, for example, Kim & Lee, 1973; Piotrow, Kincaid, Rimon & Rinehart, 1997; Storey, Boulay, Karki, Heckert & Karmacharya, 1999; and Kincaid, 2000). Even so, the mechanism by which *societal* shifts in behavior occur and are sustained is still a matter of debate in the field of communication. For example, international reviews of mass media and fertility studies (Hornik & McAnany, 2001, 2002) have raised questions about the extent to which existing data allow us to attribute changes in fertility to individual level effects of communication, in particular mass communication. Hornik and McAnany examined the evidence for a variety of paths to change in fertility and concluded that communication programs, consisting of "multiple channels, providing reinforcing messages, over time, producing interpersonal discussion and a slow change in values, and *working at a level of social aggregation higher than the individual*" (2002:234-235, emphasis ours) may exert important influence on individual ideation and behavior. Their call for greater attention to longer term and social level effects of communication suggests the need for a focus on collective norms. While there is significant literature exploring the effect of a woman's demographic characteristics, attitudes and desires on family planning use, the literature has not fully explored the effect of changes in these characteristics, attitudes and desires at the community level.

To what extent does a more progressive environment influence the adoption of contraception by a particular woman, above and beyond the other individual factors that have been known to influence family planning use? The interaction between communication messages and these normative changes also has not been fully explored. And yet, understanding the barriers and opportunities presented by the normative environment is critical to programs seeking to increase family planning in both low and high prevalence countries. In addition, changes in fertility related norms could provide an explanation by which societal shifts and behaviors occur. These changes also could explain residual differences between women with seemingly similar individual characteristics.

Social norms have been defined as the perceived standards of attitudes and behaviors prevalent among members of a community (Perkins & Berkowitz, 1986). The power that norms exert over

behavior stems from various sources, including the desire for social support and positive self-image (Sherif, 1935; Cialdini, 1993; Cialdini & Goldstein, 2004) and the desire to avoid social sanctions (Bendor & Swistak, 2001). Hogg & Reid (2006) view the acquisition of normative beliefs through the lens of social identity theory (Tajfel & Turner, 1979; Turner et al., 1987), arguing that perceived norms are derived from collective norms through the exchange of information within groups. Through this exchange, social actors reach conclusions about the prevalence of and support for behaviors or beliefs within a group to which they feel affinity, such that those characteristics of the group become linked with self identity, thereby influencing behavioral decisions.

Perceived norms tend to operate within social subsystems where the prevalence of behaviors is most readily observable and regularly reinforced. Kincaid (2004) calls this "bounded normative influence" (BNI) or "the tendency of social norms to influence behavior within relatively bounded local subgroups of a social system rather than the system as a whole" (2004:38). Communication plays an essential role in the BNI process, because social networks consist of "interconnected individuals linked by patterned flows of information" (Rogers & Kincaid, 1981). Social networks are themselves composed of sub-networks or cliques, within which the links and interactions are more dense and frequent, and within which more uniform information is exchanged, compared to the social network as a whole. More intensive flow of more homogeneous information within the subsystem results in convergence of knowledge, attitudes, values, and behaviors, and to differentiation between the subsystem and the larger social system as a whole (Kincaid, 2004). Accordingly, women in a particular community may be motivated to have a small family if they observe the benefits of a small family in those around them or are exposed to a more homogenized flow of information through interpersonal and media channels. A change in the perceived consequences of having a large or small family as observed or communicated among women in one's social network also could increase or decrease adoption of a modern family planning method depending on which perceived consequences become most common. In the same vein, the motivation to use family planning earlier (at lower rather than higher parity) would increase if women in a particular social network discuss the benefits of this practice or see these benefits more often in the media such that the behavior is seen as normative.

For the current study, we focus on collective (Lapinski & Rimal, 2005) or group norms, which Hogg & Reid (2006:7) define as "regularities in attitudes and behavior that characterize a social group and differentiate it from other groups." However, we make explicit the distinction between collective *attitudinal* norms (group regularities in attitudes or preferences) and collective *behavioral* norms (group regularities in behavior). We infer these regularities in behavior and attitudes by aggregating across individual reports to calculate the objective prevalence of these phenomena within groups. Because the publicly available data sets we used for this analysis include limited direct measurement of individual perceptions of the normative environment, our analysis focuses on the objective prevalence of behaviors and attitudes at the group level. This research specifically seeks to answer the following questions:

> Research question 1: Does a change in fertility-related norms influence an individual's likelihood of contraceptive use?

> Research question 2: Do existing social norms measured at the aggregate level at the time of use influence an individual's decision to use modern contraceptives?

> Research question 3: Does exposure to family planning messages influence a woman's decision to use contraceptives adjusting for all individual and normative factors?

*The Egyptian context*

Based on national census figures (CAPMAS, 1976), the population of Egypt nearly doubled from 18.9 million in 1947 to 36.6 million in 1976. By the mid-1970s, the effects of this rapid population growth were being felt throughout the country; overcrowding, resource depletion, and poverty threatened modest progress toward development. As a result, the Information, Education and Communication Center of the State Information Services (SIS-IEC Center) within the Ministry of Information was created in 1979 and mandated to work together with the Ministry of Health and Population (MOHP) to develop and support strategic communication programs on health and family planning (Kemprecos, Mackie, Hess & Youssef, 2002; Robinson & Zanaty, 2006). The SIS-IEC Center launched the country's first family health campaign in 1980, aimed at heightening the public's awareness of the population problem and the benefits of family planning to limit one's fertility and achieve smaller families. This family planning media blitz was unprecedented in the country and helped elevate family planning on the national political and social agenda. All communication channels were used, with mass media taking the lead, as television ownership was high in both urban and rural areas.

Results of the Egypt Demographic and Health Survey (EDHS, 1992) over the course of the campaign showed that 96% of the target audience had seen family planning messages on television, making such messages a prominent feature in the symbolic environment. The resulting reduction in total fertility rate (TFR—the average number of lifetime births per woman) was dramatic: it declined from 5.3 in 1980 to 3.1 in 2005 (EDHS, 2005). If the fertility rate had remained at 5.3, Egypt would have a population of 127 million by the year 2017. However, with the current fertility decline, researchers now project that Egypt will have a population of around 88 million by the year 2017.  At the time of this writing in early 2009, the population of Egypt stands at 75.9 million (CAPMAS, 2009).

Until the late 1990s, family planning supplies and services were provided mainly through public sector services and programs emphasizing limiting one's family size. Although total fertility was declining, many couples still rushed to have children quickly in the early years of their marriage, after which they would adopt a long term family planning method such as the IUD to limit future pregnancies. This resulted in too many closely spaced births with negative consequences for the health of both mothers and their infants. So, beginning in 1998, a new campaign theme was introduced: earlier initiation of family planning to space births, ideally after the first child was born (Kemprecos, Mackie, Hess & Youssef, 2002). A national media campaign named for Zeinab and Zaki, a fictional married couple who were the main characters of a television drama, explicitly promoted the use of contraceptives after the first birth to space subsequent pregnancies further apart. This national entertainment-education campaign became part of a larger Private Sector Provider (PSP) program which was composed of five intensive national media campaigns over a three-year period, featuring television and radio messages, the development of a national network of "Ask-Consult" private pharmacies that sold hormonal contraceptives and other family health products over the counter, local and regional  public relations events, national scientific meetings with hospital staff, and national and regional workshops with journalists.

National surveys showed that by 2002 recognition of the "Ask-Consult" network of pharmacies had reached 92 percent of adults over the age of 15 years and that sales of short-term hormonal contraceptives through pharmacies had increased dramatically between 1998-2002 (ten-fold for injectable contraceptives and four-fold for oral contraceptive pills) (Kemprecos, Mackie, Hess & Youssef, 2002; EIDHS, 2003). Increased sales of shorter term spacing methods of contraception was accompanied by an increase in the use of contraception after the first child, from 29 percent

of married women in 1995 to 35 percent in 2000 (a five percentage point increase over five years) to 60 percent in 2008 (a 25 percentage point increase over eight years) (EDHS, 1995, 2000, 2005, 2008). This research endeavors to explore the influence of some of the above changes on contraceptive use.

**Methods**

Our primary data sources are the consecutive 1995, 2000 and 2005 Egypt Demographic and Health Surveys (EDHS), from which we derive our measures of individual and community normative factors. Our community-level unit of analysis is the cluster, which in Egypt is equivalent to a *shiakhas* (town) in the urban areas and a village in the rural areas. The percentages of individuals in a particular cluster that report certain behaviors or express certain opinions constitute our measures of norms within that community. Our individual-level unit of analysis is currently married women of reproductive age, 15-49 years old. All three surveys used independent multistage random samples of households. Sample sizes were large (1995 *n* = 14,779; 2000 *n* = 15,573; 2005 n = 19,474) to allow population estimates representative at the governorate level. The surveys used the same sampling methodology and sampling frames. We treat clusters as proxies for bounded social networks. Even though residents in a given sampling area may have little or no direct contact with one another, our hypotheses are based on the assumption that they are part of a contiguous social network, members of which share similar values and aspirations and are subject to similar socio-cultural and normative influences. Since the sample consists of census enumeration areas that cluster households close to each other, it is also reasonable to assume that within a cluster there may well be frequent instances of respondents having direct contact with one another. While the second and third research questions focus on the influence of norms aggregated from variables measured during the 2000 and 2005 surveys, the first research question looks at changes in the normative environment from 1995 to 2000 and 2000 to 2005. Therefore, comparisons are made between two consecutive surveys; no comparisons between the 1995 and 2005 periods are included. For all research questions, use of modern contraceptives at the later period is defined as the dependent variable. Because we sought to examine the influence of change in norms between 1995 and 2005, regressions were not run for the 1995 survey wave, as this would have had to reflect change in the normative environment from a previous period that was outside the study's scope. We believe however that an understanding of the environment that existed in 1995 is necessary in order to understand the changes that occurred during the 2000 period. We therefore present individual and community descriptive characteristics for the 1995 wave.

The first step in the analysis involved matching clusters that were included in consecutive surveys. Clusters that were not represented in two consecutive surveys were dropped from the analysis. For the 1995 to 2000 analysis, 129 of the 500 clusters included in the 2000 survey and 127 of the 934 clusters in the 1995 survey were matched. Due to population growth, some clusters in the 1995 survey were split for the 2000 survey, resulting in a higher number of matching clusters in the 2000 survey. The number of clusters was further reduced to 78 after excluding any matching clusters with less than 10 respondents. Maintaining clusters at this size was necessary to ensure more stable cluster means. For 2000-2005, 200 of the 500 clusters matched. As for the earlier period, several clusters from 2000 had been split in 2005, so after excluding clusters with less than 10 people, a total of n = 141 clusters were retained for the 2000-2005 portion of the study.

From the two EDHS surveys we created three types of variables. The first set of variables included individual level variables for each woman, derived from the later surveys (i.e., 2000 and

5

2005) for each analysis. The second set of variables were community-level variables, also derived from the 2000 and 2005 surveys, created by aggregating individual data into non-self means and proportions at the cluster level. Non-self means were calculated by averaging cluster data for each respondent with the reference case (the respondent) excluded. This method has been used to reduce the problem of confounding when both individual and cluster level variables are included in the same equation (Kaufman, Clark, Manzini & May, 2004). The third set of variables represented changes in the normative environment. Two specific changes were operationalized: change in the desire for a large family between 1995 and 2000 and between 2000 and 2005 and change in the proportion of women using a modern contraceptive method before having two children. The first change variable was created by subtracting in each cluster the mean proportion of women reporting desire for a family size equal to or greater than 3.6 for the 1995-2000 period and 3.5 for the 2000-2005 period. We used the total fertility rate for the beginning period—3.6 for 1995 and 3.5 for 2000—that was reported in the Egypt Demographic Health Survey (EDHS, 1995, 2002, 2005) as the definition of desire for a large family. The second change variable was created by subtracting the proportion of women reporting use of a family planning before having two children between the two reference periods. The analysis for the 1995-2000 period included 2432 married women 15-49 years, while the analysis for the 2000-2005 period included 5285 women. We excluded women not currently married from this analysis because the main variable of interest is current contraceptive use, which is negligible among non-married women in Egypt.


*Measurement of variables*

Modern contraceptive users were defined as women using oral contraceptives, IUDs, injectables, condoms, implants, diaphragm, foam, jelly or sterilization at the time of the survey. The measure for the desire of a large family (Yes/No) was obtained from the question, "If you could go back to the time you did not have any children and could choose exactly the number of children to have in your whole life, how many would that be?" Respondents providing a non numeric answer such as, "as Allah wills' where considered to desire a large family. Norms around involvement of women in decision making were derived from the question " Who in your family usually has the final say on the following decisions: your own health care; making large household purchases; making household purchases for daily needs; visits to family, friends, or relatives, what food should be cooked each day". Decisions on food were excluded in the creation of the decision-making variable due to lack of variability. The level of family planning exposure was measured by the number of reported sources (ranging from 0 to 5) through which a woman had received family planning messages and was derived from the following three questions "During the past six months have you heard about family planning on television, on radio, in a newspaper, from a poster, from leaflets or brochures, from billboards or signboards, at a community meeting, from other sources?". In addition, the question was asked, "In the past six months did a health worker, a *raeda rafia* (outreach worker) or anyone else visit you to talk about family planning.". Also, among those who reported visiting a health facility in the past six months, the question was asked, "Did any staff member at the health facility speak to you about family planning during any of your visits?" The analysis also controlled for a number of other community characteristics that could be associated with access to health care or general attitudes on issues influencing women. These variables provide additional information on the type of environment in which a woman resides, including: the proportion of women visiting a health facility in the past 12 months; the proportion of women who are literate; the proportion of women who think female genital mutilation (circumcision) should continue; and the proportion of women experiencing a problem in accessing medical help in the past. We also included a number of individual level variables known to influence contraceptive use. These variables included: the number of children ever born (continuous); women's approval of family planning (Approves/Doesn't Approve), desire for a

6

large family (Yes/No), age (broken down in five year intervals), partner's education (No primary education/At least a primary education); visiting a health facility in the past six months (Yes/No) and region.

To remove any possibility of overlap between individual and cluster-level measures, all aggregated cluster variables are non-self means or proportions, calculated for each individual case separately. The non-self mean measures for given individual respondent are obtained by calculating aggregate measures for the cluster, excluding that particular individual.

*Analysis techniques*

All statistical analyses were conducted using STATA version 9 (StataCorp. 2005. *Stata Statistical Software: Release 9.* College Station, TX: StataCorp LP). First, descriptive statistics were calculated. We then performed bivariate and multivariate analyses to assess the effect of norms and family planning exposure on individual contraceptive use. Three multivariate models were tested: the first model included all individual level factors, the second added the change in the proportion of women desiring a large family and all non-family planning social norms, and the third model added the change in the prevalence of women using family planning before having two children. All community level variables were entered as continuous variables and represent the proportion of women in each cluster exhibiting the targeted behavior or attitude. Change in the desire for a large family also was entered as a change variable. Weights were applied to all models to account for the complex survey design.

**Results**

*Descriptive characteristics*

Table 1 shows the sample distributions for the three survey periods. In all three periods, more than 50% of married women reported using a modern contraceptive method. A slightly higher proportion of women (58.9%) reported using a modern method in the 2005 survey. The mean number of children ranged from 2.8 to 3.5 with the 2005 survey having the lowest mean. Approval of family planning was nearly universal in all survey periods with more than 90% of women approving of the use of contraceptives. The proportion of women desiring a large family size—defined as a family size above the median fertility rate—increased between 1995 and 2000 and declined slightly in 2005. The proportion of women who reported working outside the home ranged from 21.4% in 1995 to 19.6% in 2000. A majority of women (74.4% to 82.4%) in all surveys had at least a secondary education.

**Table 1. Percent Distribution of Women by Selected Characteristics: Egypt, 1995-2005**

| | 1995 | 2000 | 2005 |
|---|---|---|---|
| **INDIVIDUAL LEVEL VARIABLES** | | | |
| **Current use of modern contraception** | | | |
| Not Using a method | 47.4 | 44.7 | 41.1 |
| Using a method | 52.6 | 55.3 | 58.9 |
| **Number of children ever born**(Mean/SE) | 3.5 | 3.4 | 2.8 |
| **Woman's family planning approval** | | | |
| Doesn't approve/other | 7.7 | 3.5 | 5.0 |
| Approves | 92.3 | 96.5 | 95.0 |
| **Desire for large Family**[*1] | | | |
| No | 81.2 | 70.7 | 73.1 |
| Yes | 18.8 | 29.3 | 26.9 |
| **Number of Sources of Family Planning Exposure** (Mean/SE) | 1.8 | 2.2 | 1.9 |
| **Literacy** | | | |
| illiterate | -- | 36.7 | 28.3 |
| Literate | -- | 63.3 | 71.7 |
| **Visiting a health facility in past 6 months** | | | |
| No | 72.1 | 68.2 | 80.3 |
| Yes | 27.9 | 31.8 | 19.7 |
| **Working outside the home** | | | |
| No | 78.6 | 80.4 | 80.3 |
| Yes | 21.4 | 19.6 | 19.7 |
| **Woman's age** | | | |
| 15-19 | 3.8 | 3.9 | 3.5 |
| 20-24 | 13.0 | 12.7 | 13.8 |
| 25-29 | 18.7 | 20.1 | 19.6 |
| 30-34 | 17.5 | 18.4 | 17.5 |
| 35-39 | 18.4 | 17.4 | 16.7 |
| 40-44 | 15.8 | 14.2 | 16.3 |
| 45-49 | 12.9 | 13.2 | 12.6 |
| **Partner's Education** | | | |
| No primary Education | 25.6 | 22.2 | 17.6 |
| At least a primary education | 74.4 | 77.8 | 82.4 |
| **Region** | | | |
| Urban Governorates | - | 20.1 | 32.4 |
| Lower Egypt-urban | - | 11.2 | 17.9 |
| Lower Egypt-rural | - | 17.9 | 8.25 |
| Upper Egypt-urban | - | 32.5 | 31.4 |
| Upper Egypt-rural | - | 13.6 | 7.8 |
| Frontier Governorates | - | 4.7 | 2.2 |
| **Region** | | | |
| Urban Governorates | 44.9 | | |
| Lower Egypt-urban | 13.7 | | |
| Lower Egypt-rural | 41.4 | | |

*** Notes: Regions were specified differently in the 1995 survey.**

Table 2 shows the distribution of the community level variables for all 3 survey waves. The table presents evidence of a more progressive environment on factors related to family planning and women's autonomy, especially between 2000 and 2005. As an example, the proportion of women using a modern contraceptive method before having two children increased from 0.41 in 1995 to 0.51 in 2000 to 0.71 in 2005. The proportion of women desiring a large family decreased from 0.32 in 2000 to 0.27 in 2005. However, an increase in desire for large families was observed between 1995 and 2000. Involvement of women in the decision making process increased from 0.87 in 2000 to 0.95 in 2005. Increases also were observed in the proportion of women visiting a health facility and women reporting a barrier in accessing health care. In 1995, the questions on access to health care and women's involvement in the decision making process were framed differently. Therefore, these data could not be used for comparison purposes. As indicated by the standard deviation and ranges of the community variables, the data show considerable variations in the normative environment by community.

**Table 2. Means and ranges of community level characteristics across matched clusters containing at least 10 women: Egypt, 1995-2005**

| | 1995 | | 2000 | | 2005 | |
|---|---|---|---|---|---|---|
| **Characteristic** | **Mean (SD)[*1]** | **Range[*2]** | **Mean (SD)[*1]** | **Range[*2]** | **Mean (SD)[*1]** | **Range[*2]** |
| Cluster non-self proportion of women visiting a health facility in past six months | 0.27(0.16) | 0.0- 0.83 | 0.32(0.15) | 0.0- 0.83 | 0.46(0.13) | 0.1-0.94 |
| Cluster non-self proportion of women who are literate | 0.56(0.26) | 0.0-1.00 | 0.63(0.22) | 0.08-1.00 | 0.72(0.18) | 0.05-0.97 |
| Cluster non-self proportion of women with a problem accessing medical help | na | na | 0.48(0.20) | 0.0-1.00 | 0.65(0.19) | 0.08-0.96 |
| Cluster non-self proportion of women involved in decision making | na | na | 0.91(0.15) | 0.18-0.1.00 | 0.96(0.06) | 0.68-0.99 |
| Community proportion of women using family planning before having two children | 0.41(0.18) | 0.0-0.92 | 0.51(0.17) | 0.0-1.00 | 0.72(0.14) | 0.0-96 |
| Proportion of women desiring a large family size[2] | 0.17(0.10) | 0.0-0.50 | 0.32(0.17) | 0.03-0.77 | 0.26(0.14) | 0.0-0.74 |
| Change in cluster proportion desiring a large family | na | na | 0.15(0.19) | -0.35-0.78 | -.02(0.15) | -0.45 –0.32 |

*** Proportions refer to mean of cluster mean. Standard deviation refers to the average standard deviations across all clusters. Questions on problems accessing health care and involvement of women in the decision making were categorized differently in the 1995, so those have been left out. Change in the cluster proportion of women desiring a large family is not included because that would have necessitated using data from a period out of scope for this study*

*Bivariate and multivariate regression analysis*

Table 3 shows the unadjusted odds ratio associated with the use of a modern method.

**Table 3: Unadjusted regressions of individual and community level factors associated with use of modern family planning among women in Egypt, 2000 and 2005**

| | 2000 | 2005 |
|---|---|---|
| | Odds Ratio | Odds Ratio |
| **INDIVIDUAL LEVEL VARIABLES** | | |
| **Number of children ever born** | 1.11*** | 1.28*** |
| **Woman's family planning approval** | | |
| Doesn't approve/other | 1.00 | 1.00 |
| Approves | 4.92*** | 2.30*** |
| **Desire for large Family[1]** | | |
| No | 1.00 | 1.00 |
| Yes | 0.78* | 0.88 |
| **Number of Sources of Family Planning Exposure** | 1.21*** | 1.11** |
| **Visiting a health facility in past 6 months** | | |
| No | 1.00 | 1.00 |
| Yes | 0.99 | 0.83** |
| **Woman's age** | | |
| 15-19 | 1.00 | 1.00 |
| 20-24 | 2.24** | 1.59* |
| 25-29 | 3.00*** | 2.80*** |
| 30-34 | 3.91*** | 4.47*** |
| 35-39 | 4.64*** | 5.49*** |
| 40-44 | 4.56*** | 4.59*** |
| 45-49 | 1.45 | 1.96** |
| **Partner's Education** | | |
| No primary Education | 1.00 | 1.00 |
| At least a primary education | 1.30* | 1.21* |
| **Region** | | |
| Urban Governorates | 1.00 | 1.00 |
| Lower Egypt-urban | 1.59* | 1.15 |
| Lower Egypt-rural | 1.04 | 1.22 |
| Upper Egypt-urban | 0.89 | 0.80* |
| Upper Egypt-rural | 0.43*** | 0.37*** |
| Frontier Governorates | 0.59** | 0.64*** |
| **CLUSTER LEVEL CHANGE VARIABLES** | | |
| Change in the proportion of women desiring a large family size[2] | 0.24* | 0.62* |
| Change in the proportion of women using family planning before having two children[3] | 2.48** | 3.63** |
| **CLUSTER LEVEL NON-CHANGE VARIABLES[4]** | | |
| County non-self proportion of women visiting a health facility in past six months | 0.86 | 1.35 |
| Cluster non-self proportion of women with a problem accessing medical help | 0.50** | 0.71 |
| Cluster non-self proportion of women involved in decision making | 6.77*** | 21.2*** |

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

With the exception of the change variables, all odds ratios refer to associations between use of a modern method and factors at the later survey, that is, 2000 or 2005. Before controlling for other factors, the number of children ever born (live births) was associated with higher likelihood of use of a modern method in the 2000 and 2005 surveys (OR=1.11-1.28). Women who approved of

a method (OR 2.30-4.92), those with higher exposure to family planning media (OR1.1-1.21), and those with at least a primary education (OR1.21-1.30) were more likely to use a method. Individual desire for a large family was associated significantly with a lower likelihood of use in 2000 but not in 2005. Before controlling for other factors, a significant association was observed between visiting a health facility and lower use of a method in the 2005 but not the 2000 survey. The unadjusted results show that older women were more likely to use a method when compared to women between 15 and 19 years.

We hypothesized that women residing in communities where the desire for a large family increased would be less likely to adopt a contraceptive method while women residing in communities where use of a method after the first child is more prevalent will be more likely to use a method. The unadjusted results provide preliminary evidence of this. Looking at the normative environment, we observe that for both the 2000 and 2005 surveys, women residing in communities where norms favored large families were less likely to use a modern method (OR: 0.24-0.62). In addition, for both survey periods, residence in communities where use of a method after the first birth was more prevalent (compared to the previous period) was associated with a higher likelihood of use during the period following this change in the normative environment (OR; 2.48 –3.68).

Examination of the normative environment at the time of the survey indicates that in the unadjusted models, individuals residing in communities where involvement of women in the decision-making process was more prevalent at the time of survey also were more likely to use a modern method in both 2000 and 2005 (OR; 6.77 to 21.2). In 2000, a lower probability of use was observed among women reporting a problem accessing medical care.

Table 4 shows the results of the multivariate regression analysis. As was the case with the unadjusted results, all odds ratios with the exception of those associated with the change variables refer to associations between use of a modern method and factors at the later surveys, that is, in 2000 or 2005. We discuss first the adjusted associations of changes in the normative environment as reflected by the changes in the proportion of women desiring a large family size and the proportion of women using family planning before having two children. As hypothesized, after controlling for individual and other normative factors, residence in communities where the desire for a large family was more normative (compared to the previous survey) remained negatively associated with use of a contraceptive method in 2000. Women residing in communities where the desire for large families increased were more than 70% less likely to use a method in 2000. The implication is that residence in a community where this attitude was less common between 1995 and 2000 was associated with a higher likelihood of contraceptive use. In 2005, however, the negative association between contraceptive use and a more normative community desire for large family observed in the unadjusted results was eliminated after adjusting for other factors (Models II and III). Further exploration of the data showed that adjusting for either region, the number of family planning information sources, or individual desire for a large family weakened the association between increased support for large families and use of a modern contraceptive method. These results suggest that a more progressive environment that favored smaller families had an independent effect on family planning use in 2000 but not in 2005. In the later survey, however, the association between changes in the normative environment regarding family size was in part attributed to the region the person was residing in, the number of family planning information sources an individual was exposed to and individual desire for a large family. These three factors explain 29% of the variation in the change of the normative environment related to family size.

**Table 4: Adjusted multivariate regression of individual and community level factors associated with use of modern family planning among women in Egypt, 2000 and 2005**

| | 2000 | | | 2005 | | |
|---|---|---|---|---|---|---|
| | Model I | Model II | Model III | Model 1 | Model II | Model III |
| | Odds Ratio | Odds Ratio | Odds Ratio | Odds Ratio | Odds Ratio | Odds Ratio |
| **INDIVIDUAL LEVEL VARIABLES** | | | | | | |
| **Number of children ever born** | 1.41*** | 1.45*** | 1.14** | 1.49*** | 1.50*** | 1.13** |
| **Woman's family planning approval** | | | | | | |
| Doesn't approve/other | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Approves | 3.37** | 3.03** | 1.89 | 2.38*** | 2.27*** | 1.21 |
| **Desire for large Family[1]** | | | | | | |
| No | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Yes | 0.58*** | 0.65** | 0.73* | 0.63*** | 0.64*** | 0.79* |
| **Number of Sources of Family Planning Exposure** | 1.21** | 1.21** | 1.26** | 1.16*** | 1.16*** | 1.15** |
| **Visiting a health facility in past 6 months** | | | | | | |
| No | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Yes | 0.78* | 0.76 | 0.68* | 0.83* | 0.84* | 0.78** |
| **Woman's age** | | | | | | |
| 15-19 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 20-24 | 1.51 | 1.48 | 0.94 | 1.13 | 1.12 | 0.45* |
| 25-29 | 1.58 | 1.52 | 0.62 | 1.45 | 1.42 | 0.49 |
| 30-34 | 1.61 | 1.59 | 0.76 | 1.83* | 1.76* | 0.65 |
| 35-39 | 1.41 | 1.33 | 0.64 | 1.83* | 1.76* | 0.75 |
| 40-44 | 1.33 | 1.29 | 0.82 | 1.33 | 1.28 | 0.63 |
| 45-49 | 0.34** | 0.31** | 0.19** | 0.47** | 0.44** | 0.21*** |
| **Partner's Education** | | | | | | |
| No primary Education | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| At least a primary education | 1.36 | 1.38 | 1.20 | 1.35* | 1.34* | 1.18 |
| **Region** | | | | | | |
| Urban Governorates | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lower Egypt-urban | 1.43 | 1.44 | 1.43 | 1.00 | 1.00 | 0.93 |
| Lower Egypt-rural | 1.02 | 0.90 | 1.02 | 1.21 | 1.23 | 1.21 |
| Upper Egypt-urban | 0.75 | 0.70* | 0.94 | 0.70** | 0.78* | 0.85 |
| Upper Egypt-rural | 0.34*** | 0.26*** | 0.50 | 0.29*** | 0.35*** | 0.49** |
| Frontier Governorates | 0.58** | 0.77 | 1.02 | 0.50*** | 0.53*** | 0.58** |
| **CLUSTER LEVEL CHANGE VARIABLES** | | | | | | |
| Change in the proportion of women desiring a large family size[2] | - | 0.26*** | 0.39* | | 0.69 | 0.57 |

12

| (Table 4 continued) | 2000 | | | 2005 | | |
|---|---|---|---|---|---|---|
| | Model I | Model II | Model III | Model I | Model II | Model III |
| | Odds Ratio | Odds Ratio | Odds Ratio | Odds Ratio | Odds Ratio | Odds Ratio |
| Change in the proportion of women using family planning before having two children[3] | | | 2.25 | | | 3.39** |
| **CLUSTER LEVEL NON CHANGE VARIABLES**[4] | | | | | | |
| County non-self proportion of women visiting a health facility in past six months | - | 0.25** | 0.45 | | 0.82 | 0.68 |
| Cluster non-self proportion of women with a problem accessing medical help | - | 0.44* | 0.84 | | 1.37 | 0.87 |
| Cluster non-self proportion of women involved in decision making | - | 5.99** | 1.99 | | 3.87 | 0.67 |
| Community proportion of women using family planning before having two children | | | 2.25 | | | 3.39** |
| | | | | | | |
| N | 2079 | 2073 | 1645 | 5254 | 5245 | 4316 |
| Prob X$^2$ | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.000 | 0.0000 |
| LR X$^2$ Psuedo R$^2$ | df=19,170.4 0.10 | df=25,195.4 0.12 | df=26,90.8 0.065 | df=19,381.1 0.10 | df=25,384.91 0.10 | df=26,159.6 0.04 |

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

*Notes: Also controlled for literacy at the individual and community level, working outside the home, and proportion of women who think female genital mutilation should continue.*

*[1] Desire for large family size is defined as desire for a family larger than or equal to the TFR for the previous survey period. For the 2000 analysis, desire for a large family was defined as desiring a family size of at least 3.6; for the 2005 analysis, desire for a large family was defined as desiring a family size of at least 3.5.*

*[2]. Reflects change in the proportion of women per cluster desiring a family of at least 3.6 between 1995 and 2000 and change in the proportion of women in a cluster desiring a family of at least 3.5 between 2000 and 2005*

*[4]Cluster level non change variables level variables are measured at the later survey. These variables represent non-self means/proportions of women in a particular cluster at a particular point in time.*

A reverse pattern was observed regarding the norm related to method use at low parity. Although this factor did not seem to influence contraceptive use in 2000 it did have a strong association in 2005. Residence in a community where use of family planning after the first child was more prevalent resulted in a more than three-fold increase in the odds for contraceptive use in 2005, even after controlling for a number of individual factors, including the number of ever born children, a woman's approval of family planning and visiting a health facility in the past six months. However, in the 2000 survey, the positive association between residing in a community where low parity contraceptive use was more common was weakened when either the community or individual desire for a large family was entered in the model. In the 2000 sample, individual and community desire for a large family explained 15% of the variation in the changes in the normative environment related to use of a method before having two children.

It is clear from this analysis that change in the norm related to family size had a stronger influence in 2000 than in 2005, while change in the norm related to low parity use was more important in the 2005 survey. This shift in the normative influence between the earlier and the later periods appears to coincide with the change in the focus of the Egyptian population program that began around 1998. As the program messages shifted attention from limiting one's family size and introduced the new norm of earlier initiation of family planning and spacing births, the latter norm appeared to take hold and become a strong factor in individual decisions to use family planning. We also hypothesized that other community norms besides those related to desired family size and timing of first use (namely visiting health facilities, accessing medical care, and women's decision-making autonomy) would have independent associations with use of a modern family planning method. These other norms where measured at the same time that contraceptive use was measured, thus reflecting normative environments at the time and were hypothesized to be more distal determinants. We find that although these normative factors had stronger association in the 2000 survey wave, they dropped out of the model when change in the proportion of women using a method before two births was included (Model III). The data therefore show a pattern in which more proximal family planning-related collective norms exert influence on contraceptive use while more distal collective norms do not when all are combined in a single predictive model.

*Individual level factors*

Looking at the individual level variables, the adjusted models (Table 4) show that for all models and for both the 2000 and 2005 surveys, women with a higher number of children are more likely to use a modern method (ORR 1.13-1.49). Adding the cluster level variables (Models II and III) reduces slightly the effect of number of children but does not eliminate it. Women who approve of family planning also are more likely to use a method (ORR 2.27-3.37) but the significance of this association is attenuated when the change in the proportion of women who use a method before having two children is added in Model III in both surveys. Desire for a large family is associated with lower odds of using a method (OR; 0.58-0.79) and this association is not changed by adding the community normative variables. Women who desire a large family are less likely to use a modern method (OR: 0.58-0.79). As hypothesized, exposure to family planning messages is associated with a 15-26% increase in the odds of using a modern method and these effects are retained even after controlling for all individual and cluster level variables. It is assumed that women with more frequent access to the medical system are more likely to acquire information about family planning and would be more likely to use a method, however our data show that for both the 2000 and 2005 waves, women who reported visiting a facility in the past 6 months were generally less likely to use a method as compared to those who did not (OR: 0.68-0.83). The EDHS did not ask why the last healthy facility visit was made, so it is not clear why women who had visited a facility in the past 6 months might be less likely to use a method. However, it is likely that these women may differ from those without a visit in terms of needing health care—perhaps due to illness—that would also reduce the likelihood of contraceptive use.

Use of a modern method differed by age: 45-49 year old women who were significantly less likely to use a method compared to women 15 to 19 years of age (OR: 0.19-0.44). In the later wave, women who were 30-34 years of age (OR: 1.76-1.83) as well as those aged 35-39 years (OR: 1.76-1.83) also were more likely to report use of a method compared to women aged 15-19 years, but this association was completely eliminated when change in the proportion of women using a method before the second birth was added in Model III. It should also be noted that the associations between age and contraceptive use reverse between the unadjusted and adjusted analyses. The unadjusted analysis (Table 3) generally indicates significantly higher probability of

use among older women. This reversal suggests that other characteristics and not one's age per say influence the adoption of a contraceptive method among Egyptian women.

The data also show that in the later wave, women in rural parts of Upper Egypt and the Frontier Governorates were less likely to use a modern method compared to women in the Urban Governorates (OR; 0.29-0.58). A similar trend is observed in the earlier period but these associations are not significant after controlling for the cluster level variables.

**Discussion**

All three of the study hypotheses were supported. Contraceptive use was lower where attitudinal norms favoring large families were stronger and higher where behavioral norms favoring earlier initiation of family planning after the first child were stronger. Individual level exposure to family planning messages was a consistently strong predictor of contraceptive use. These relationships were robust even after adjusting for a wide variety of individual and cluster level control variables, including a woman's personal preference for a large or small family. However, of the two main normative variables considered—desire for large family size and use of family planning after the first child—cluster level support for large family size was a significant negative predictor of contraceptive use in 1995-2000, but not in 2000-2005, while normative support for the use of family planning after the first child was a significant predictor in 2000-2005, but not in 1995-2000.

Considered against the historical record of the Egyptian population program (namely the use of intensive integrated multimedia strategies to reshape the symbolic environment, coupled with private sector structural interventions), the results of this study lend support to Hornik and McAnany's (2001, 2002) proposed pathways to change: "multiple channels, providing reinforcing messages, over time, producing interpersonal discussion and a slow change in values, and *working at a level of social aggregation higher than the individual*" (2002:234-235). These results also seem to suggest that while women's behavior and attitudes may be shaped by the normative environment around them, in the short term, the influence of these norms could be enhanced by media messages. As such, even in bounded social networks, the behavior of nearby others may not affect a particular woman's behavior in the short term if this behavior is not perceived as normative or beneficial. The media, therefore, tend to play an important role in establishing and spreading behavioral and attitudinal norms. In addition to providing information, media messages on family planning may serve to validate women's choices, making them more comfortable to practice these behaviors. In summary, public health programs that are able to introduce and reinforce social norms by mobilizing the symbolic environment are more likely to succeed in reaching their behavioral objectives.

*Study limitations*

This study had a number of limitations. First, it only included women who were married at the time of the 2000 or 2005 EDHS survey. The influence of norms or changes in norms on unmarried women could differ from those of married women. In addition, we eliminated a number of clusters that did not match in consecutive surveys, thus leaving out a large number of women, whose reaction to normative dynamics remains unknown. Second, the study was limited to variables included in the Demographic and Health Surveys data; no measures of perceptions of the normative environment were available. For this reason, analyses examined the effects of observed norms rather than perceived norms. It is possible that the later would have a stronger influence on family planning decisions than the former, because the influence of norms on

individual behavior to a large extent is based on an individual's perception of those norms. Individuals may live in an environment that is supportive of family planning but such norms may be of little consequence if the environment is not perceived as such, so the current analysis may actually represent a conservative estimate of the impact of norms on behavior.

*Study strengths*

The study also had a number of strengths. First, the study used non-self means to construct normative variables at the community level. This helped eliminate the confounding that can plague multilevel models. Second, the study matched clusters between the 1995 and 2000 surveys and between the 2000 and 2005 surveys and, while these clusters may not represent the entire range of Egyptian community life, the panel nature of the data increases confidence in the validity of the processes that were observed. Third, the use of aggregated data at the cluster level and the combination of community level and individual level measures more accurately captures the dynamics of normative influence than do the majority of norms studies that rely primarily on individual perceptual variables. Fertility transition cannot be understood from an individual choice perspective alone and the multilevel approach used in this study helps to overcome that gap, by responding to Hornik and McAnany's call to examine the effects of communication at a level of aggregation higher than the individual.

**References**

Bongaarts, J. (2003). <u>The end of the fertility transition in the developing world</u>. (Policy Research Division Working Paper Series #161). New York: Population Council.

Bendor, J. and Swistak, P. (2001). The evolution of norms. <u>American Journal of Scociology</u>, 106, 1493-1545.

CAPMAS (Central Agency for Public Mobilization & Statistics). (1976). National Census 1976. Cairo: Government of Egypt.

CAPMAS (Central Agency for Public Mobilization & Statistics). (2009). Current estimates. <u>http://www.capmas.gov.eg/</u>.  Cairo: Government of Egypt

Cialdini, R.C. (1993). Influence: Science and practice, 3<sup>rd</sup> Edition. New York: HarperCollins.

Cialdini, R.C.  and Goldstein, N.J. (2004). Social influence: Compliance and conformity. <u>Annual Review of Psychology</u>, 55, 591-621.

Cleland, J. and Wilson, C. (1987). Demand theories of fertility transition: An iconoclastic view. <u>Population Studies</u>, 41, 5-30.

Coale, A. and Watkins, S. (1986). <u>The decline in European fertility</u>. Princeton: Princeton University Press.

El-Zanaty, F., Sayed, H.A., Zaky, H.H. and Way, A. (1993). Egypt Demographic and Health Survey, 1992.  Calverton, Maryland. National Population Council & Macro International Inc.

El-Zanaty, F., Hussein, E.M., Shawky, G.A., Way, A. and Kishor, S. (1996). Egypt Demographic and Health Survey, 1995.  Calverton, Maryland. National Population Council & Macro International Inc.

El-Zanaty, F. and Way, A. (2004). Egypt Interim Demographic and Health Survey 2003. Calverton, Maryland. Ministry of Health and Population, National Population Council, El-Zanaty and Associates and ORC Macro.

El-Zanaty, F. and Way, A. (2006). Egypt Demographic and Health Survey 2005.  Calverton, Maryland. Ministry of Health and Population, National Population Council, El-Zanaty and Associates and ORC Macro.

El-Zanaty, F. and Way, A. (2008). Egypt Demographic and Health Survey 2007. Preliminary Report.  Calverton, Maryland. Ministry of Health and Population, National Population Council, El-Zanaty and Associates and ORC Macro.

Hirschman, C. (1994). Why fertility changes. <u>Annual Review of Sociology</u>, 20, 203-233.

Hogg, M.A. and Reid, S.A. (2006). Social identity, self-categorization and the communication of group norms. <u>Communication Theory</u>, 16(1), 7-30.

17

Hornik, R. and McAnany, E. (2001). Theories and evidence: Mass media effects and fertility change. Communication Theory, 11(4), 454-471.

Hornik, R. and McAnany, E. (2002). Mass media and fertility change. In B. Cohen and J. Casterline (Eds.), Diffusion processes and fertility transition: Selected perspectives. Washington, DC: National Research Council.

Kaufman, C., Clark, S., Manzini, N., and May, J. (2004). Communities, Opportunities and Adolescents' Sexual behavior in Kwazulu-Natal, South Africa. Studies in Family Planning, 35(4):261-274.

Kemprecos, L., Mackie W., Hess, R., and Youssef, M. (2002). Egypt's Private Sector project: Increasing demand for family planning in the private sector, March 1999-June 2002. Ministry of Health and Population & The Health Communication Partnership. Cairo, Egypt.

Kim, C.H. and Lee, S.J. (1973). The role of husbands in family planning behavior. Psychological Studies in Population/Family Planning, 1(5), 1-23.

Kincaid, D.L. (2004). From innovation to social norm: Bounded normative influence. Journal of Health Communication, 9(1), 37-57.

Lapinski, M.K. and Rimal, R.N. (2005). An explication of social norms. Communication Theory, 15(2),127-147.

Montgomery, M.R. and Casterline, J.B. (1996). Social learning, social influence and new models of fertility. Population and Development Review, 22 (Supplement), 151-175.

Perkins, H.W. and Berkowitz, A. D. (1986). Perceiving the community norms of alcohol use among students: Some research implications for campus alcohol education programming. International Journal of the Addictions, 21, 961-976.

Piotrow, P.T., Kincaid, D.L., Rimon, J.G. and Rinehart, W. (1997). Health communication: Lessons from family planning and reproductive health. Westport, CN: Praeger.

Robinson, W.C. and El-Zanaty, F. (2006). The Demographic Revolution in Modern Egypt Lanham, MD: Lexington Books.

Rogers, E.M. and Kincaid, D.L. (1981). Communication networks: Toward a new paradigm for research. New York: Free Press.

Sherif, M. (1935). The psychology of social norms. New York: Harper & Row.

Storey, J.D., Boulay, M., Karki, Y., Heckert, K. and Karmacharya, D. (1999). Impact of the integrated Radio Communication Project in Nepal, 1994-1997. Journal of Health Communication, 4(4), 271-294.

Tajfel, H. and Turner, J.C. (1979). An integrative theory of intergroup conflict. In W.G. Austin & S. Worchel. (Eds.). The social psychology of intergroup relations, pp. 33-47. Monterey, CA: Brooks/Cole.

Teitelbaum, M.S. (1984). <u>The British fertility decline: Demographic transition in the crucible of the industrial revolution</u>. Princeton: Princeton University Press.

Tolnay, S.E. (1995). The spatial diffusion of fertility: A cross-sectional analysis of counties in the American South, 1940. <u>American Sociological Review</u>, 60(2), 299-308.

Turner, J.C., <u>et.al.</u> (1987). <u>Rediscovering the social group: A self-categorization theory</u>. Oxford, UK: Blackwell.

Wrigley, E.A. (1969). <u>Population and history</u>. London: Weidenfeld and Nicolson.