An Exploration Of Individual And Contextual Factors Affecting The Use Of Contraceptives In Urban Slums Of Pakistan: A Socio-Ecological Analysis

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Abstract

We examined determinants of ever use of contraceptives among women living in urban slums of Pakistan. Data were drawn from a nationwide study, "Living Conditions in Urban Slums of Selected Cities of Pakistan," jointly conducted by University of Gujrat; UNFPA, Islamabad; and UN Habitat, Islamabad, Pakistan. The sample consisted of 2420 married women from six cites. The study was conducted within the socio-ecological framework and examined individual, social, and geographic contextual factors. Multivariate logistic regression model with robust standard errors was used to estimate the contribution of different socio-ecologic factors for use of contraception. Results of logistic regression showed that individual, social, and geographic factors affect use of contraceptives among women in Pakistani urban slums. The socio-ecologic model can help to identify correlates of contraceptive use, especially among developing nations.

تلخیصِ مقالہ

ہم نے پاکستان کی کچی آبادیوں میں رہنے والی خواتین کے مانع حمل طریقوں کو مقرر کرنے والے عوامل کا مطالعہ کیا ہے۔ اس مطالعہ کے لئے مواد ایک تحقیقی پراجیکٹ "پاکستان کے منتخبشہروں کی کچی آبادیوں کے حالات زندگی" سے لیا گیا جو کہ جامعہ گجرات اور یو۔این۔ایف۔پی۔اے اسلام آباد کے مشترکہ تعاون سے جمع کروایا گیا۔ اس مطالعے کی نمونہ بندی ۲۴۲۰ شادی شدہ خواتین پر مشتمل ہے جو ۶ مختلف شہروں سے لی گئی ہیں اس تحقیق میں سماجی، ماحولیاتی فریم ورک کے تحت انفرادی، سماجی اور جغرافیائی عوامل کا تجزیہ کیا گیا۔ مانع حمل طریقوں کے استعمال پر سماجی و ماحولیاتی عوامل کا اثر دیکھنے کے لئے Multivariate Logistic Regressionماڈل استعمال کیا گیا۔Logistic Regression کے نتیجے سے پتہ چلا کے انفرادی، سماجی اور جغرافیائی عوامل کچی آبادیوں میں رہنے والی خواتین کے مانع حمل طریقوں کے استعمال پر اثر انداز ہوتے ہیں۔ یہ سماجی و ماحولیاتی ماڈل ترقی پذیر ممالک میں مانع حمل طریقوں پر اثر انداز ہونے والے عوامل کو سمجھنے میں مدد دے سکتا ہے۔

Key Words: Contraception, Social Environment, Socioeconomic Status

Introduction and Background

Although Pakistan has supported family planning for more than five decades, fertility rates remain high compared to other South Asian countries. Pakistan is projected by the United Nations to be fifth in population by 2050 with 292 million people, after India, China, the United States, and Indonesia (UN 2009).

Research has focused on the limited success of Pakistan's family planning program. One explanation involves social and cultural values that do not favor use of contraceptives. Use of family planning services conflicts with religious values (Fikree et al 2001). Other research suggests that the family planning program has not been well implemented and remained inaccessible to millions of Pakistanis (Hardy and Leahy 2008), resulting in increased pregnancies (Westoff and Bankole2000).

Many predictors of contraceptive use have been identified, such as spousal communication on family size (Hamid, Stephenson & Rubenson 2011; Fikree et al 2001), education level of the wife, socio-economic status, number of living children (Agha 2001; Casterline, Sathar & Haque 2001; Axinn and Barber 2001; Axinn and Yabiku 2001; Sultan, Cleland & Ali 2002; Douthwaite and Ward 2005; Saleem and Bobak 2005; Schultz 2008; Agha 2010; Kamal and Islam 2010), exposure to family planning messages on electronic media[3],social exclusion of women, and region and residences (Ali and White2005).Other factors include preferences for bearing sons, fear of side effects of contraceptive use, women's autonomy, and husband and in-law opposition (Stephenson & Hennink 2004; Durrant and Sathar 2000; Winkvist and Akhtar 2000). Men's attitudes were also studied (Casterline et al 2001; Mason 2000; Bhatti & Hakim 1996) and indicate male preference to limit family size because of economic reasons.

Pakistan's family planning program has been evaluated by several researchers (Hakim 2001; Hakim and Miller 2001), who found greater use of contraception associated with the Lady Health Worker Program (Douthwaite and Ward 2005), political support (Sultan et al 2002), Green Star franchised clinics(McBride and Ahmed 2001; Toll and Agha 1999) and clinical family planning services in urban Pakistan (McBride and Ahmed 2001).

Research on the relationship between environment and population growth gave mixed results (Dunlap, Gallup & Gallup 1993). Researchers argue that people prefer to have small family size with declining environment (Haq, Vanwing & Hens 2010). Ghimire and Mohai (2005) reported that with environmental degradation (for example, crop reduction, reduced level of ground water table, and water quality), contraceptive use increases. However, Biddlecom, Axinn, and Barber (2005) found that environmental degradation was associated with a preference for larger families.

Given these conflicting results, the proposed study examines use of contraceptives in urban slums of Pakistan using a socio-ecologic framework and a multilevel analysis. We examined individual, social, and community factors. An important question is whether community or area-level factors explain variance in contraception use after adjustment for individual and social factors typically assessed in survey research. These geographic factors suggest a need for policy and environmental change to support family planning.

Socio-Ecological Model

There are a number of versions of the socio-ecologic model, but for this study we included three major components: individual, social, and geographic factors. Each level (and also cross-level interactions) may impact the behavior of the individual (Stokols 1996). In the model, relationships between people and their environments are reciprocal. Social and physical environments influence the behavior of the individual, while the behavior of the individual, group, or organization may also affect environments (Stokols et al 2003). Full assessment of socio-ecologic relationships requires longitudinal data, which was unavailable for this research. However, the model is also useful for specifying the different factors and their relationships that should be used to assess behavior.

In the social ecology model, behavior is influenced by personal traits, social environment, and physical environment. An individual is at the center of the model, demonstrating that individual traits interact with the social and physical environment of a community. The individual component includes personal factors, for instance, gender, age, ethnicity, and personal preferences and attitudes that may influence a particular behavior. The social environment consists of relationships or attributes of individuals and those with whom they interact, as well as influences from culture and society. The physical environment consists of a community's resources and services available to members of that community. These resources help to modify, change, or influence individual behavior by limiting or encouraging opportunities to engage in the behavior.

Measurement of Variables

The purpose of this study was to determine factors associated with ever use of contraceptives. The social-ecological variables being used in this study consisted of the following:
Individual factors included the age of respondents measured in six categories (age 15-24, 25-29, 30-34, 35-39, 40-45, and 46-49) and education based on the number of completed years (none, 1-5, 6-9, and 10+).

The social environment was determined by the husband's education (measured in the same way as respondents), number of children (none, 1-2, 3-4, 5-6, 7+), household

income (less than 10,000, 10,001-15,000,15,001-20,000, above 20,000 rupees), and Living Index, which was a count of the presence of eight household items: radio/radio cassette, television, landline telephone, cellular phone, washing machine, sewing machine, refrigerator/freezer, CD/VCD/DVD player, air conditioner (room cooler), clock, motorcycle, bicycle, and car/jeep/van. These household items have been used in various national and international household surveys to compute a composite living index. The living index was a sum, and the median score in the sample was 6. Respondents with <= 6 items were considered low in socioeconomic status.

The physical environment was composed of two categories: distance from community services(postal service, banks, firefighting unit, emergency hospital, recreational facilities) and the quality of environmental services (waste water disposal, solid waste disposal, water supply, electricity, cooking fuel, and access to roads). Distance from community services ranged from within 1 kilometer to more than 5 kilometers, and a composite score (none, 1-2, 3-4, and 5) was created to represent the number of community services within 5 km. Respondents also reported on the quality of these community services. We created a subjective quality index based on a summed score (range of 2–11). This index was then categorized as poor (a score of less than 6), fair (a score between 6 and 7), good (a score equal to 8), and excellent (a score of 9 or greater).

Material and Methods

Data of the present study were drawn from a nationwide study, "Living Conditions in Urban Slums of Selected Cities of Pakistan" jointly conducted by University of Gujrat, Gujrat; UNFPA, Islamabad; UN Habitat, Islamabad. This study was part of UN Habitat project of "Sustainable Urbanization." UN Habitat selected six cities, namely Mansehra, Muzaffarabad, Gilgit, Mingora, Sialkot, and Sukkur. UN Habitat also selected urban slum localities in the cities. The localities were seventeen in all, two from Gilgit and three from each other city. The target population consisted of all house holds that had at least one married woman of age 15-49 years. It was assumed that every household had at least one woman of childbearing age. At least 400 low-income households defined the sampling unit selected for each city. For drawing the sample, all households of the small settlements meeting the inclusion criteria were selected. In settlement shaving more than 400 households and sufficiently large sample size, systematic sampling was used to draw the sample.

Married women age 15-49 were interviewed from sampled households. Households having no married women within the age range were disqualified. In households with more than one married woman, the one, having longest marital status was selected. Response rate of approached respondents was 99 % and a total sample of 2420 married women was recruited across the six cities.

We developed logistic and multilevel models to assess the strength of association between socio-ecologic indicators and contraceptive use. Analyses were conducted in SPSS and STATA.

Results

Table 1
Features of Married Women in Urban Slums, Selected Cities, Pakistan

City N		Age of the respondent Mean (SD)	Completed years of education Mean (SD)	Husband years of education Mean (SD)	Total children Mean(SD)	Living index Mean (SD)	Environment Quality Index Mean (SD)
Mansehra	410	32.9(8.5)	2.4(4.7)	3.0 (5.2)	4.2(2.4)	4.6(1.8)	8.0(1.7)
Muzaffarabad	408	32.6(8.5)	5.2(5.0)	7.6(4.8)	3.7(2.1)	4.7(2.4)	6.9(2.1)
Gilgit	401	34.5(8.1)	5.7(5.8)	8.6(5.6)	4.4(2.2)	5.1(2.5)	6.8(1.5)
Mingora	401	31.9(8.5)	1.0(2.7)	2.7(4.3)	4.9(2.8)	2.7(1.2)	6.7(2.0)
Sialkot	385	33.8(8.0)	5.6(4.6)	5.9(4.9)	3.8(2.0)	6.0(2.2)	7.2(2.4)
Sukkur	415	34.3(8.3)	3.2(4.8)	6.0(6.1)	4.9(2.5)	4.8(2.3)	7.5(2.1)
Total	2420	33.4(8.4)	3.8(5.0)	5.6(5.6)	4.3(2.4)	4.6(2.3)	7.2(2.0)

Descriptive statistics for the six cities showed that Mingora had the lowest mean age (31.9). Mingora also had the lowest level of education, with a mean of 1 year. Gilgit had the highest mean education,witha mean of 5.7 completed years. Gilgit also showed the highest mean education of respondents' husbands, 8.6 years. Sialkot showed the highest living index score (6.0), whereas Mansehra had the highest environment quality (8.0).

Table 2
Respondents' ever use of Contraceptive

City	**Percentage of respondents ever used contraceptive**
Mansehra	35.9%
Muzaffarabad	41.7%
Gilgit	44.1%
Mingora	2.7%
Sialkot	33.8%
Sukkur	19.5%

In regard to use of contraceptives Mingora showed the lowest percentage (2.7%) of ever use of contraceptives whereas Gilgit showed the highest percentage (44.1%).

Table 3
Unadjusted Bivariate Odds Ratios for the use of Contraceptives by Individual and Social-level Variables.

Use of Contraceptive	Odds Ratio	Robust Std. Err	Z	P>Z	95% CI	
Age						
15-24						
25-29	2.21246	0.2581042	6.81	0	1.760252	2.780841
30-34	2.585015	0.3991246	6.15	0	1.910021	3.498549
35-39	2.241443	0.5918374	3.06	0.002	1.3359	3.760812
40-45	1.75301	0.4068606	2.42	0.016	1.112313	2.762753
46-50	0.9928315	0.1554994	-0.05	0.963	0.7303963	1.349561
Education of Women						
None						
Less than Secondary	2.048785	0.7058722	2.08	0.037	1.042869	4.02497
Secondary and above	1.793582	0.6768673	1.55	0.122	0.8560368	3.75943
Education of Husband						
None						
Less than Secondary	1.433017	0.4902133	1.05	0.293	0.7329394	2.801782
Secondary and above	1.571427	0.6314395	1.12	0.261	0.7149241	3.454051
Total number of Children						
None						
1-2	4.207298	3.44539	1.75	0.079	0.8451766	20.94397
3-4	5.600538	4.700104	2.05	0.04	1.081139	29.01204
5-6	5.616972	4.704642	2.06	0.039	1.087818	29.00336
7+	3.107538	2.643226	1.33	0.183	0.586674	16.46023
Household Income (PK RS)						
Less than 10,000						
10,001-15,000	2.412846	0.6600172	3.22	0.001	1.411527	4.124486
15,001-20,000	1.970885	0.6773958	1.97	0.048	1.004852	3.865631
Above 20,000	2.346452	1.090351	1.84	0.066	0.9437888	5.833762
Living Index						
Low						
High	1.738028	0.588757	1.63	0.103	0.8947715	3.375991
Environment Quality Index						
Poor						
Fair	1.097951	0.1937676	0.53	0.596	0.7768946	1.551687
Good	1.366008	0.2941399	1.45	0.147	0.8957062	2.083247
Excellent	2.323257	0.6627251	2.96	0.003	1.32827	4.063576
Access to Community Services						
No Service within 5KM						
1-2 Services within 5KM	3.22973	1.95347	1.94	0.053	0.9870189	10.56834
3-4 Services within 5KM	3.490627	2.539919	1.72	0.086	0.8385622	14.5302
5services within 5km	3.487752	2.630091	1.66	0.098	0.7955364	15.29083

Note: Environment quality index was constructed based on subjective quality index (range of 2 – 11) based on perceived quality of services (waste water disposal, solid waste disposal, water supply, electricity,

cooking fuel, and access to roads) that were most important for community health. This index was then categorized into four categories: poor (a score of less than 6), fair (a score between 6 and 7), good (a score equal to 8), and excellent (a score of 9 or greater). [a]PK Rs represents Pakistani Rupees. [b]KM represents Kilometer

Results of Bivariate logistic analysis showed that age was significantly associated with use of contraceptives. Relative to women aged 15-24, there was an increase in use of contraceptives for married women aged 25-29 to 30-34;the odds ratio increased from 2.212 to 2.585.Among women aged 35-39, the odds ratio for contraceptive use was 2.241. At the age of 40-45 there was decrease in use of contraceptives with odds ratio 1.753. At 46-50,age was no longer associated with use of contraceptives. The education of respondents was also significantly associated with use of contraceptives. Respondents with less than secondary education compared to no education at all were 2.0487 times more likely to use contraceptives. Number of children was also associated with use of contraceptives. Women with 3-4 and 5-6 children are more likely to use contraceptives with odds 5.60 and 5.61 respectively. Income has always been associated with use of contraceptives and our analysis supports this finding, as respondents whose income was between Rs10,001to 15,000 were 2.412 times more likely to use contraceptives compared to respondents who had income less than Rs10,000. With further increase, however, contraceptive use declined.

The living index of respondents was not significantly associated with use of contraceptive methods, while the environmental quality index showed that respondents who reported excellent environmental quality index were 2.323times more likely to use contraceptives.

Women were three times more likely to use contraception if they had at least one service within five km compared to those with no service within five km.

Multivariate Analysis

The clustered nature of the data necessitated the application of a statistical modeling approach that can takes into account the fact that the observations with each of the six districts are not independent. We use multivariate logistic regressions and specify districts as clusters and then calculate robust standard errors. The dependent variable is "ever use of contraceptive' is a binary variable coded as "0" if the respondent had never used contraceptive and "1" if they had ever used contraceptives.

Table 4
Adjusted Odds Ratios for Contraceptive Use based on Multivariate Logistic Regression Model

Use of Contraceptives	Odds Ratio	Robust Std. Err.	z	P>z	95% CI	
Education of Women						
None						
Less than Secondary	1.700401	0.38203	2.36	0.018	1.094741	2.641139
Secondary and above	1.314025	0.2194946	1.63	0.102	0.9471509	1.823007
Education of Husband						
None						
Less than secondary	1.229414	0.1825924	1.39	0.164	0.9189206	1.644821
Secondary and above	1.204346	0.214176	1.05	0.296	0.8499177	1.706575
Total number of children						
None						
1-2	4.938244	4.317854	1.83	0.068	0.8898306	27.40551
3-4	6.960483	6321838	2.14	0.033	1.173649	41.28009
5-6	7.955282	7.118637	2.32	0.02	1.1377126	45.95551
7+	4.69577	4.375209	1.66	0.097	0.7561597	29.16085
Total Income PK RS						
Less than 10,000						
10,000-15,000	1.943332	0.3397568	3.8	0	1.379525	2.737564
15,001-20,000	1.529016	0.2302427	2.82	0.005	1.138246	2.053941
Above 20,000	1.433911	0.3275678	1.58	0.115	0.9163697	2.243746
Living Index						
Low						
High	1.181478	0.1764915	1.12	0.264	0.8816003	1.583361
Environment quality index						
Poor						
Fair	0.8495562	0.1650489	-0.84	0.401	0.5805285	1.243256
Good	0.9897508	0.3672859	-0.03	0.978	0.478249	2.048319
Excellent	1.66835	0.3365578	2.54	0.011	1.123501	2.477427
Access to Community Services in km						
No Service within 5 KM						
1-2 Services within 5 KM	2.972459	1.476437	2.19	0.028	1.122844	7.868869
3-4 Services within 5 KM	3.211684	1.901021	1.97	0.049	1.006699	10.24627
5 Services within 5KM	3.421879	2.166698	1.94	0.052	0.98922	11.83686

Table 3 presents unadjusted bivariate odds and table 4 present odds ratios that are adjusted for covariates. The odds ratios in both tables are based on robust standard errors calculated using STATA 12 software package (StataCorp. 2011. Statistical Software: Release 12. College Station, TX: StataCorp LP). The odds of using contraception are higher in age groups 25-29 and 30-34 compared to 15-19 age group. There are higher odds of ever using contraception among the women with less than secondary education compared to none. Husband's education is not significant related to contraceptive use.

Household income has a weak relationship with contraceptive use with women the 10,000-15,000 showing significant higher odds compared to those making less than 10,000 rupees. The total number of children in a family is strongly and significantly related to contraceptive use. The odds ratios of using contraception for those women with one or more children are at least three fold greater than those with no children.

The chances of using contraception for those women who reported excellent quality index are 1.668 times more compared to women with poor environment quality index. In regard to access to community services the odds ratio of using contraception for those women who reported 1-2 and 3-4 services within 5 km are at least two and three fold greater respectively than those who have no service within 5 km.

Discussion

In the current study married women between 15 to 50 years were interviewed from sampled households. Mingora had lowest mean age of 31.9 compared to other five cities. Regarding completed years of education of respondents, Mingora scored lowest with mean equals to one year. Highest mean education was found in Gilgit where respondents had a mean of 5.7 completed years of education. Gilgit also showed the highest mean education of respondents' husband's (8.6). On the other hand, Sialkot showed the highest mean (6.0) for living index and Mansehra carried the highest mean (8.0) for environment quality index.

In logistic regression models, individual and social factors were significant correlates of contraception practices, but community-level geographic factors also explained variance in contraception use. Ignoring area-level factors would be a mistake because even with adjustment for individual level factors, location remained a significant correlate of contraception use.

Results from this research are in accord with prior literature on correlates of ever use of contraception in developing counties. Older women were less likely to report use of contraception. This finding may represent a cohort effect, in which these women had less access to contraception than more recent cohorts. This finding was also validated by multilevel analysis, which confirmed the greater odds of using contraception among women aged 25-29 and 30-34 compared to older women.

Education of women has long been associated with use of contraceptives (Kora 2002). Our study supports this finding as results suggest that women with relatively low levels of education, such as less than secondary schooling, were more likely to use contraceptives compared to women with no education. Researchers argue that education helps to increase the status and autonomy of women, and that these gains in turn lead to greater use of contraceptives (Saleem & Bobak 2005). This reasoning may apply to the poor women surveyed here. Education seems to play an important role even in urban slums. It may make

these women aware of the advantages of limiting childbearing and help them appreciate the advantages of having fewer but better educated children (Okezie, Ogbel& Okezie 2010).

Socioeconomic status has also been associated with use of contraception. Results of both logistic and multilevel analysis support household income as a correlate of contraceptive use even in the generally low-income communities in this sample. In these urban slums, where all sampled respondents are of low socioeconomic status, household income still affects use of contraceptives.

Procreation is one of the most important objectives of marriage (Kridli & Libbus 2001) in most Muslim societies, and producing children is an important function of marriage. Notably, contraceptive use among women with children was three fold greater than among women without children. This suggests that contraception was mostly used to limit family size.

Overall, this analysis suggests the value of the socio-ecologic model in addressing correlates of contraceptive use. An important demonstration of the influence of different socio-ecologic levels is the key role of place, that is, area-level factors associated with the six different urban slums. Location remained a significant correlate even with adjustment for individual and social factors, and even after we included individual ratings of access to community services and environmental quality. If community or area-level factors explain variance in contraception use after adjustment for individual and social factors, as this research suggests, then increases in contraception use will likely require interventions at the level of the community, that is, policy and environmental change to support family planning.

Findings from this research should be interpreted within the limitations of our cross-sectional design. Response rates and survey quality were high, so bias is unlikely from this source. However, all data were self-reported and the key measure of contraceptive use was based on retrospective report. Still, the robust and consistent associations across the six sites suggest a key role for different levels of social ecology and the value of focusing on both individual and areal factors in contraception use.

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