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DETERMINANTS OF CURRENT CONTRACEPTIVE USE AND METHOD CHOICE IN MONGOLIA

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Summary. This study examines the determinants of current contraceptive use and method choice in Mongolia using data from the 1998 Mongolian Reproductive Health Survey and 2000 Mongolian Population and Housing Census. Since 1976, access to modern contraceptives has been liberalized and all restrictions on the use, distribution and import of contraceptives were removed in 1989. There were some increases in the use of modern contraceptives among married women in the 1990s; however, at the start of the twenty-first century the IUD and periodic abstinence remain the most widely used methods. Women with higher levels of education are more likely to be current users of contraception, and if they are current users, they are more likely to choose the IUD and traditional methods. Women living in rural areas have a higher probability of using contraception and are more likely to choose the IUD and traditional methods. Significant variations exist between primary sampling units in current contraceptive use and in the choice of modern methods. Community-level variables were important predictors in reducing variation between primary sampling unit, when other modern methods were compared with traditional methods.

Introduction

Before 1990, Mongolia exhibited the generic socialist pattern of reproduction. Women married early and had their first child soon after marriage (Aassve & Gereltuya, 2002). Figure 1 shows changes in population policies and in total fertility rate (TFR) in the period from 1963 to 1998.

Between 1963 and 1975, total fertility fluctuated between seven and eight children per woman. However, from 1975 onwards, there has been a continuous decline in total fertility, reaching 2·8 children per woman in 1993. A slight rise occurred in fertility in 1993–1997 before it resumed its decline. In 1998, the TFR was 2·3. These changes in period fertility are consistent with the various population policies

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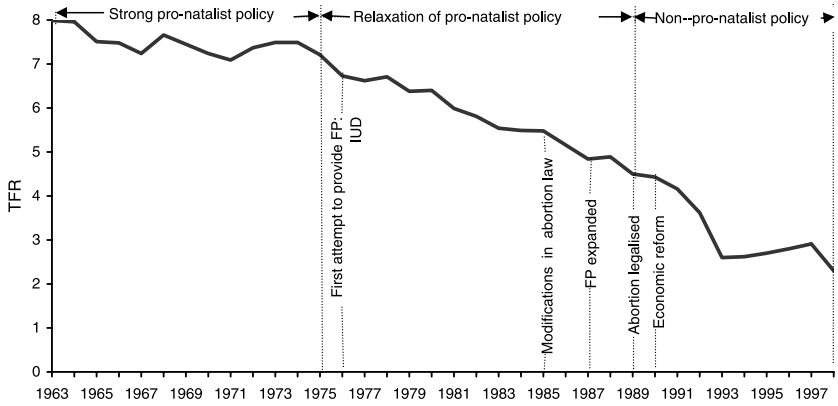


Fig. 1. Population policies and total fertility rates (TFR), Mongolia. Sources: *Population of Mongolia, 1994* (National Statistical Office of Mongolia, 1995) and *Statistical Yearbook, 2000* (National Statistical Office of Mongolia, 2001).

implemented in Mongolia over the period 1960 to 1998. Up until the middle of the 1970s Mongolia followed a strong pronatalist population policy, the impact of which is evident in the high sustained level of fertility in the 1960s. In 1976, a first attempt was made to provide family planning, and the IUD became legal in cases when pregnancy was not recommended, either because of the woman's health or age, or because the woman had experienced more than five pregnancies. From 1976 onwards, access to contraceptives was progressively liberalized. Strict restrictions on abortion lasted until 1985, when a decree of the Ikh Khural Presidium allowed abortions to be performed upon the women's request. Between 1985 and 1988, the existing limited family planning services were expanded. The availability of the IUD and abortion services was extended to all women older than 35 with more than five children, single women with more than three children, women pregnant less than one year after the previous birth, women who had three or more children whose husband was either disabled or in prison, and women who were in prison or in an orphanage (National Centre for Health Development of Mongolia & UNFPA, 2001).

Further new population policy measures were outlined in the Health Law, which was amended at the end of 1989. The amended Health Law stated that 'a woman has the right to decide herself on her motherhood' and thus abortion and use of contraceptives were legalized (National Centre for Health Development of Mongolia & UNFPA, 2001). The new population policy removed all restrictions on the use, distribution and import of contraceptives. With the exception of a continuing prohibition on vasectomies, the last restrictions were lifted in 1989 and oral contraceptives became available. By the end of 1989, abortion was fully legalized, allowing every woman to have an induced abortion if she did not want to carry on with a pregnancy (Neupert, 1996; National Centre for Health Development of Mongolia & UNFPA, 2001; Pandey, 2002).

With the lifting of restrictions on supply and distribution, the uptake of modern contraception was rapid. In 1990, about one in ten women of reproductive age used a modern method (Mongolian Ministry of Health, 1991). By 1992, it had risen to 15%

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(Mongolian Ministry of Health & UNFPA, 2000), i.e. a 50% increase in just two years. Following the implementation of the UNFPA Maternal and Child Health Project, the contraceptive prevalence rate among women of reproductive age increased to 25% in 1994 (Mongolian National University, 1996) and to 33·4% in 1998 (National Statistical Office of Mongolia, 1999). In contrast, the proportion of traditional method users declined from 35·7% in 1994 to 10% in 1998. The use of some methods increased more than others, with significant increases in the use of the pill, injection and female sterilization, although from a low base. Despite their absolute growth, in 1998 just 4% of women were using oral contraceptives, whilst injection and female sterilization accounted for 3% and 2·4% respectively. The IUD and periodic abstinence remain the most widely used methods among married women. Mongolia is one of just twelve countries where IUD prevalence is 32 or higher; and one of only four countries where the share of periodic abstinence in the overall contraceptive prevalence is 13% and more (United Nations, 2001).

A revised Program on Reproductive Health was developed and approved by Government Resolution No. 288 in December 2001. The new programme aims to contribute to the improvement of the quality of life of the Mongolian people through better reproductive health, a harmonious relationship between population and development, and the promotion of gender equity (Reproductive Health Sub-program of Mongolia & UNFPA, 2002). Despite the attention by policy-makers, there remains very little evidence on contraceptive practices amongst Mongolian women. Some studies (Neupert, 1996; Pandey, 1997, 2002) have looked at contraceptive use. However, these have been based on aggregate measures and have largely been confined to descriptive statistics. Some researchers, research institutions and government departments in Mongolia (Mongolian National University, 1996; National Statistical Office of Mongolia, 1999; Mongolian Ministry of Health & UNFPA, 2000) have carried out studies on contraceptive use as part of reproductive health project activity, but again these have tended to be confined to descriptive measures.

The purpose of this paper is twofold. First, the paper examines trends and patterns of contraceptive use and method choice alongside a history of contraceptive availability in the country. Second, an attempt is made to identify factors that may have played a role in determining contraceptive use and method choice in Mongolia at the individual as well as at the community level. This represents the first investigation of contraceptive practices in Mongolia using multivariate analysis and the first analysis to contrast individual-level and community-level determinants.

Data and Methods

The analysis is based on data from the Mongolian Reproductive Health Survey (MRHS) conducted in October–December 1998. *Bags* (the first administrative unit in rural area) and *horoos* (the first administrative unit in urban area) were the primary sampling units (PSUs). The MRHS interviewed a total of 7461 women between the ages of 15 and 49, regardless of their marital status, who were present in the household the night prior to the date of survey. In addition, interviews were attempted with six husbands from each PSU resulting in 1557 interviewed husbands in total (National Statistical Office of Mongolia, 1999). Data were collected using

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face-to-face interviews and include individual birth histories, child mortality histories and socioeconomic variables at the individual level. For this analysis, the MRHS has been supplemented with a series of contextual community variables constructed from the 2000 Population and Housing Census.

The analysis consists of two parts: (1) current contraceptive use and (2) contraceptive method choice. In the first part of the analysis, the dependent variable is contraceptive use status at the time of the survey. The analysis is restricted to those women who were married and not pregnant or sterilized at the time of the survey: a total of 4500 women. In the second part of the analysis, which examines the probability of choosing the IUD or other modern method over a traditional method, the sample is further restricted to 2845 women currently using contraception.

Independent variables or background characteristics have been selected for inclusion in the analysis based on their significance in previous studies of contraceptive behaviour or on their hypothesized association with contraceptive use and its choice (Allman *et al.*, 1991; Popov *et al.*, 1993; Dang, 1995; Goodkind, 1995; Barbieri *et al.*, 1996; Phai *et al.*, 1996; Diamond *et al.*, 1997; Pandey, 1997; Sajeda *et al.*, 1997, 2002; National Statistical Office of Mongolia, 1999; Elwood & Lamb, 2001; Steele *et al.*, 2001; Tsui, 2001; Guilkey & Jayne, 2002; Magadi & Curtis, 2003; Suran & Guilkey, 2003). Four sets of independent variables are identified in the analysis of current contraceptive use: (1) intention to have another child; (2) demographic characteristics; (3) couples' communication/attitude to family planning; (4) socioeconomic (Table 1). Similarly, four sets of independent variables (Table 2) are considered to analyse method choice among women at the time of the survey. These are: (1) contraceptive goals; (2) couples' ability to use a method effectively; (3) contraceptive evaluation; (4) infrastructural or economic.

A set of contextual variables is used in both analyses. The variables include: proportion of women, proportion of women of reproductive age, proportion of married women, women's literacy rate (only for current contraceptive use) and women's unemployment rate. Each set of independent variables consisting of individual predictors is taken from the MRHS, whereas contextual variables were calculated from the 2000 Population and Housing Census data at the *som* (the second administrative unit in rural area) and at district (in urban area) level. A *som* may contain more than one *bag* and similarly a district may contain more than one *horoo.*

It can be seen from the Introduction that the supply side of contraceptives has improved during the last decade. Supply side or variables related to the provision of contraceptives are not considered in both analyses as it is assumed that the provision of contraceptives was adequate in Mongolia at the time of the survey (1998) due to the assistance of UNFPA and other donor agencies.

Current contraceptive use and method choice among women in the same *bag* or *horoo* (i.e. PSU) is likely to be correlated as a result of unobserved factors such as availability of family planning services, the method of distribution of contraceptives, the degree of economic deprivation within the *bags* and *horoos* and some factors that relate to the development of infrastructure. Therefore, multilevel logistic and multilevel multinomial logistic models are used for the multivariate analysis of the current contraceptive use and method choice accordingly. These specified models take into account effects at the individual level and the unobserved effects at the PSU level.

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Table 1. Parameter estimates, confidence intervals and odds ratios for current contraceptive use of married women by selected variables, Mongolia, 1998

	Estimates	95% CI	Odds ratio[a]
Intention to have another child			
Do not want	0·00		1·00
Want soon	− 0·273	(− 0·498 to − 0·048)**	0·76
Want – wait for more than 2 years	0·021	(− 0·218 to 0·260)	1·02
Demographic			
Age of women			
15–24	0·000		1·00
25–34	0·380	(0·149 to 0·611)***	1·46
35–44	0·257	(− 0·064 to 0·578)	1·29
45–49	− 0·957	(− 1·398 to − 0·516)****	0·38
Number of living children			
0–1	0·000		1·00
2	0·248	(0·003 to 0·493)**	1·28
3	0·074	(− 0·283 to 0·431)	1·08
4+	− 0·244	(− 0·895 to 0·407)	0·78
Marriage duration			
0–9	0·000		1·00
10–19	− 0·905	(− 1·381 to − 0·429)****	0·40
20+	− 1·831	(− 3·001 to − 0·661)***	0·16
Couples' communication/attitude to FP			
Discussion with husband on number of children			
Never discussed	0·000		1·00
Ever discussed	0·152	(− 0·028 to 0·332)*	1·16
Wife's attitude to FP			
Approve	0·000		1·00
Disapprove	− 0·647	(− 0·910 to − 0·384)****	0·52
Husband's attitude to FP			
Approve	0·000		1·00
Disapprove	− 0·501	(− 0·681 to − 0·321)****	0·61
Socioeconomic			
Women's highest level of education			
Primary	0·000		1·00
Grade 8	0·029	(− 0·240 to 0·298)	1·03
Completed secondary	0·222	(− 0·058 to 0·502)	1·25
Professional	0·276	(− 0·004 to 0·556)*	1·32
Higher	0·547	(0·218 to 0·876)***	1·73
Women's employment sector			
Unemployed	0·000		1·00
Private/self-employment	0·439	(0·274 to 0·604)****	1·55
Public sector	0·509	(0·315 to 0·703)****	1·66

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Table 1. *Continued*

	Estimates	95% CI	Odds ratio[a]
Family planning message on media			
Yes	0·000		1·00
No	− 0·135	(− 0·276 to 0·006)*	0·87
Residence			
Urban	0·000		1·00
Rural	0·387	(0·038 to 0·736)**	1·47
Adequacy of income			
Enough	0·000		1·00
Not enough	− 0·197	(− 0·336 to − 0·058)***	0·82
Electricity supply			
No electricity	0·000		1·00
Central	0·166	(− 0·140 to 0·472)	1·18
Diesel/generator	0·266	(0·007 to 0·525)**	1·30
Time to get emergency treatment			
<30 minutes	0·000		1·00
30–60 minutes	− 0·109	(− 0·287 to 0·069)	0·90
60 minutes or more	− 0·084	(− 0·268 to 0·100)	0·92
Contextual variables			
Proportion of women	0·030	(− 0·054 to 0·114)	1·03
Proportion of women of reproductive age	0·051	(0·010 to 0·092)**	1·05
Proportion of married women	0·017	(− 0·007 to 0·041)	1·02
Women's literacy rate	0·007	(− 0·056 to 0·070)	1·01
Women's unemployment rate	0·000	(− 0·010 to 0·010)	1·00
Living child × marriage duration			
Living child (2) × Marriage duration (2)	1·328	(0·791 to 1·865)****	3·77
Living child (2) × Marriage duration (3)	1·207	(− 0·043 to 2·457)*	3·34
Living child (3) × Marriage duration (2)	1·303	(0·729 to 1·877)****	3·68
Living child (3) × Marriage duration (3)	2·021	(0·792 to 3·250)***	7·55
Living child (4) × Marriage duration (2)	1·594	(0·816 to 2·372)****	4·92
Living child (4) × Marriage duration (3)	2·047	(0·740 to 3·354)***	7·74
Constant	− 0·345	(− 0·837 to 0·147)	—
Community effect (variance)	0·106	(0·067 to 0·154)***	—

*Significant at $p<0·10$; **$p<0·05$; ***$p<0·01$; ****$p<0·001$.
[a]For contextual variables they are 'odds'.

The models have a hierarchical structure, such that the current contraceptive use and contraceptive choice are allowed to vary between *bags* and *horoos*. This variation is known as the random effect. The size and significance of these random effects represents the extent to which current contraceptive use and contraceptive choice is correlated within *bags* and *horoos* after the range of individual, attitudinal and contextual variables are controlled for in the models. In other word, *bags* and *horoos*

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Table 2. Parameter estimates, confidence intervals and odds ratios for married women's choice of IUD or other modern methods relative to traditional methods, by selected variables, Mongolia, 1998

	IUD vs traditional methods			Other modern methods vs traditional methods		
	Coef.	95% CI	Odds ratio[a]	Coef.	95% CI	Odds ratio[a]
Contraceptive goals						
Number of living children						
0–1	0·000		1·00	0·000		1·00
2	0·392	(0·133 to 0·651)***	1·48	0·101	(−0·189 to 0·391)	1·11
3	0·565	(0·263 to 0·867)****	1·76	0·412	(0·075 to 0·749)**	1·51
4+	0·596	(0·263 to 0·929)****	1·81	0·388	(0·012 to 0·764)**	1·47
Couples' ability to use a method effectively						
Age of women						
15–24	0·000		1·00	0·000		1·00
25–34	0·115	(−0·171 to 0·401)	1·12	−0·272	(−0·588 to 0·044)*	0·76
35–44	−0·406	(−0·749 to −0·063)**	0·67	−0·933	(−1·317 to −0·549)****	0·39
45–49	−0·544	(−1·095 to 0·007)*	0·58	−1·706	(−2·398 to −1·014)****	0·18
Wife's highest level of education						
Primary	0·000		1·00	0·000		1·00
Grade 8	−0·272	(−0·715 to 0·171)	0·76	−0·409	(−0·899 to 0·081)	0·66
Completed secondary	−0·389	(−0·838 to 0·060)*	0·68	−0·661	(−1·161 to −0·161)***	0·52
Professional	−0·609	(−1·062 to −0·156)***	0·54	−1·103	(−1·611 to −0·595)****	0·33
Higher	−0·713	(−1·207 to −0·219)***	0·49	−1·008	(−1·561 to −0·455)****	0·36

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Table 2. *Continued*

	IUD vs traditional methods			Other modern methods vs traditional methods		
	Coef.	95% CI	Odds ratio[a]	Coef.	95% CI	Odds ratio[a]
Husband's highest level of education						
Primary	0·000		1·00	0·000		1·00
Grade 8	− 0·366	(− 0·711 to − 0·021)**	0·69	− 0·285	(− 0·671 to 0·101)	0·75
Completed secondary	− 0·389	(− 0·767 to − 0·011)**	0·68	− 0·517	(− 0·946 to − 0·088)**	0·60
Professional	− 0·553	(− 0·921 to − 0·185)***	0·58	− 0·409	(− 0·826 to 0·008)*	0·66
Higher	− 0·683	(− 1·102 to − 0·264)***	0·51	− 0·442	(− 0·914 to 0·030)*	0·64
Knowledge about the monthly cycle						
Yes	0·000		1·00	0·000		1·00
No	1·548	(1·311 to 1·785)****	4·70	1·157	(0·892 to 1·422)****	3·18
Contraceptive evaluation						
Is there problem with the method?						
Yes	0·000		1·00	0·000		1·00
No	− 0·440	(− 0·742 to − 0·138)***	0·64	− 0·672	(− 0·988 to − 0·356)****	0·51
Reasons for changing of the previous method						
Not changed previous method	0·000		1·00	0·000		1·00
Not effective	1·654	(1·417 to 1·891)****	5·23	1·981	(1·685 to 2·277)****	7·25
Health/side-effects	− 1·371	(− 1·636 to − 1·106)****	0·25	0·975	(0·685 to 1·265)****	2·65
Other reasons	0·297	(0·083 to 0·511)***	1·35	1·367	(1·095 to 1·639)****	3·92

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Table 2. *Continued*

	IUD vs traditional methods			Other modern methods vs traditional methods		
	Coef.	95% CI	Odds ratio[a]	Coef.	95% CI	Odds ratio[a]
Infrastructural or economic						
Electricity supply						
No electricity	0·000		1·00	0·000		1·00
Central	− 0·192	(− 0·539 to 0·155)	0·83	0·154	(− 0·220 to 0·528)	1·17
Diesel/generator	0·040	(− 0·256 to 0·336)	1·04	0·578	(0·259 to 0·897)****	1·78
Residence						
Urban	0·000		1·00	0·000		1·00
Rural	− 0·338	(− 0·734 to 0·058)	0·71	− 1·018	(− 1·414 to − 0·622)****	0·36
Contextual variables						
Proportion of women	− 0·068		0·93	− 0·233	(− 0·335 to − 0·131)****	0·79
Proportion of women of reproductive age	− 0·043	(− 0·084 to − 0·002)**	0·96	− 0·060	(− 0·101 to − 0·019)***	0·94
Proportion of married women	− 0·012	(− 0·039 to 0·015)	0·99	− 0·025	(− 0·052 to 0·002)*	0·98
Women's unemployment rate	− 0·009	(− 0·021 to 0·003)	0·99	− 0·014	(− 0·026 to − 0·002)**	0·99
Constant	1·795	(1·158 to 2·432)****	—	1·084	(0·394 to 1·774)***	—
Community effect (variance)	0·113	(0·061 to 0·182)**	—	0·002	(0·002 to 0·018)	—

*Significant at $p<0{\cdot}10$; **$p<0{\cdot}05$; ***$p<0{\cdot}01$; ****$p<0{\cdot}001$.
[a]For contextual variables they are 'odds'.

differ with respect to the average value of the probability of using any form of contraception and of the probability of choosing the IUD or other modern methods as opposed to traditional methods. These kinds of models are known as random intercept models (Snijders & Bosker, 2000). An ordinary logistic model assumes that all observations are independent. However, MRHS has a hierarchical structure, with women clustered within *bags* and *horoos*. Hence, the odds of women experiencing the outcome of interest are not independent, because women from the same *bag* or *horoo* may share common exposure to *bag* and *horoo* characteristics. A multilevel modelling strategy allows for the hierarchical nature of the data and corrects the estimated standard errors to allow for the clustering of observations (Goldstein, 2003).

A random intercept multilevel logistic regression is fitted using a binary response variable to determine the factors influencing any form of current contraceptive use. In this model, the response variable is coded '1' for all those women reporting the current use of any form of contraception, including modern and traditional, and '0' for those women not reporting any current use.

Next, a random intercept multilevel multinomial logistic regression is fitted where the dependent variable is multinomial with three categories: IUD, other modern contraceptives and traditional methods. The IUD and other modern methods are compared with traditional methods. Pill, injections, implant/Norplant, diaphragm/foam/jelly, condom are considered as other modern methods, while periodic abstinence and withdrawal are classified as traditional methods. Other contraceptive methods, which account only for 1·1%, are added to the category of traditional methods.

Models take the form of a two-level model, where the individual women (level 1) are nested within *bags* and *horoos* (level 2). Thus, the analysis of the current contraceptive use of any form of contraception applies a two-level random-effect logistic model, and contraceptive choice applies a two-level random-effect multinomial logistic regression.

Results

Determinants of current contraceptive use

Multilevel logistic regression modelling was employed to determine factors that affect the current use of contraception of married women and the results are displayed in Table 1. The four groups of variables were entered into the model in sequence. The majority of variables are strong and significant predictors of the current use of contraception. The results indicate that women who desire to have another additional child soon are less likely to be using a method as compared with women who do not want to have an additional child. Increasing age of women, parity and marriage duration are all associated with decreasing current contraceptive use. In particular, age and marriage duration have strong associations with the current use of contraception. Older women aged 45–49 are less likely to use contraception currently than are younger women. The odds of current contraceptive use peak among women aged between 25 and 34, who are more likely to use contraception currently than their younger counterparts.

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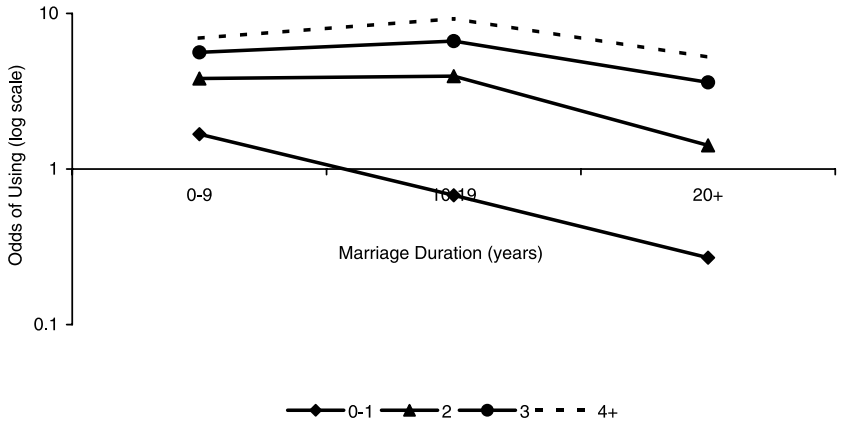


Fig. 2. Odds of current contraceptive use of married women by number of living children and marriage duration, Mongolia, 1998.

Couples' attitude towards family planning has a strong significant effect on women's current contraceptive practice. If the wife or husband disapproves of family planning, the odds of current contraceptive use are significantly lower compared with when they both approve of family planning. For the population, the MRHS 1998 estimates that over 79% of husbands and 92% of their wives approve of family planning methods. This indicates that husbands are generally less favourable of family planning than their wives, although for 76% of couples both spouses approve of family planning (National Statistical Office of Mongolia, 1999).

Contraceptive use increases with increasing levels of women's education but is only significant when comparing the two highest levels to primary. Employed women working in public or private sectors are more likely to be current users of contraception than are women who are unemployed. A number of studies (Dang, 1995; Elwood & Lamb, 2001; Sajeda, 2002; Magadi & Curtis, 2003) have found that urban women are more likely to use contraceptives than are women in rural areas. Given this, it is interesting that in the case of Mongolia rural women are more likely to practise contraception than their urban counterparts after controlling for other characteristics. Women living in households where income is insufficient are less likely to be current contraceptive users compared with women living in households where income is sufficient. Moreover, women living in areas where electricity is supplied through a generator have higher odds of being a current user of contraception than women living in areas where electricity is not available.

Figure 2 demonstrates the impact of the interaction between marriage duration and number of living children on the odds of a woman being a current user of contraception. It demonstrates that in general the odds of use reduce with long duration of marriage and increase with higher parity. However, the impact is more pronounced for those women with zero or one child than for those with higher parity.

In addition to these individual-level variables, certain community-level factors are considered. Among the five community-level variables, only the proportion of women of reproductive age has a significant effect on the use of contraceptives. A 1% rise in

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the proportion of women of reproductive age is associated with a 5% increase in the odds of a married woman in that community being a current contraceptive user after controlling for the couples' characteristics.

Intra-*bag* (in rural area) or intra-*horoo* (in urban area) correlations suggest that 3·1% of the total unexplained variations in current contraceptive use is attributable to unobserved *bag* or *horoo* factors. The inclusion of contextual variables has influenced unexplained variability or random effects of the regression slightly. There was a marginal fall in the variance of the random effects. For instance, the variance of random effects decreased from 0·114 (this number is not reported in Table 1, but is available from the authors on request) when multilevel logistic regression is fitted without contextual variables to 0·106 (Table 1) when the contextual variables were included into the model. This suggests that there are other community-level predictors that might bring the variance of the random effects to a minimum and affect the current contraceptive use significantly. These could be contraception provision related or community development variables.

Determinants of method choice

Table 2 shows the effects of contraceptive goals, couples' ability to use a method effectively, contraceptive evaluation and infrastructural variables on contraceptive choice. In this model the IUD and other modern methods are compared with traditional methods amongst a sub-sample of women who are married and current users.

Overall, married women in Mongolia are more likely to use an IUD than other modern contraceptives and traditional methods. However, this finding varies across subgroups of women. The number of living children plays a significant role in choosing the IUD and other modern methods against traditional methods. It can be seen that an increase in the number of children encourages women to use an IUD compared with traditional methods or other modern methods of contraceptives compared with traditional methods. Looking at the odds ratios in Table 2, women with two or more than two children are more likely to move from traditional methods to the IUD, while women with three or more than three children are more likely to move to other modern methods as opposed to traditional methods than are women with no children or with one living child. This shows that there are substantial differences in choice of method among women by number of living children.

As women get older they are less likely to use an IUD or other modern methods as opposed to traditional methods. The age effect is strongest when other modern methods are compared with traditional methods. The odds of current use of other modern contraceptives are significantly lower in relation to traditional methods for women aged 35 and more as compared with women aged 15–24. This indicates the existence of differences in the level of use of other modern methods between older and younger women when compared with the use of traditional methods.

Table 2 reveals that increasing either the woman's or husband's level of education leads, in general, to a move from the IUD or other modern methods to use of traditional methods. For women, the strongest effects are found when comparing

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other modern methods against traditional methods, such that the odds of a woman with completed secondary education and above using other modern methods compared with traditional methods are one-third the level for an equivalent woman with only primary education. For husbands the impact of increasing education is stronger on the odds of IUD use, with increasing levels of education leading to significant reductions in the odds of a woman being a user of the IUD rather than traditional methods. The impact of knowledge about the monthly cycle on the choice of the IUD or other modern methods versus traditional methods is highly significant, but the magnitude of the effect is larger for the IUD versus traditional methods.

The existence of a problem with the current method and reason for changing the previous method belong to the contraceptive evaluation group of factors, and are important in influencing method choice. The effect of the existence of a problem with the current method is highly significant, and it is stronger for other modern methods versus traditional methods. Reasons for changing the previous method have a strong and highly significant impact on choosing the IUD and other modern methods versus traditional methods, but the magnitude of the effect is larger for other modern methods versus traditional methods.

Infrastructural or economic variables are considered to explore their effect on the choice of the IUD and other modern methods compared with traditional methods. The effect of electricity supply is significant only for other modern methods versus traditional methods, revealing that women from areas where electricity is supplied by diesel or a generator are more likely to choose other modern methods compared with traditional methods than are women who live in areas where electricity is not supplied. In contrast to the current use model, where rural woman have higher odds of use than their urban counterparts, Table 2 shows that given use, rural women are less likely to practise modern methods of contraception as opposed to traditional methods when compared with women in urban areas. This could be related to low provision of modern contraceptives and the lack of knowledge of medical professionals to provide women with advice on the use of modern contraceptives in rural areas. It has been documented that stocks of contraceptives are generally low at *som* and *bag* level, with supplies of IUDs and Depo-Provera being particularly limited. For instance, one *som* had only thirteen IUDs and five doses of Depo-Provera. There were no condoms and oral contraceptives. Moreover, *som* hospitals often lack basic medical instruments and consumable supplies, especially to insert and remove IUDs (Mongolian Ministry of Health & UNFPA, 2000).

The effects of contextual variables on the choice of the IUD and other modern methods as compared with traditional methods differ significantly. For instance, the proportion of women of reproductive age is the only contextual variable that affects the choice of contraceptives significantly for the IUD versus traditional methods. Thus, a 1% increase in the proportion of women of reproductive age in the *bag* or *horoo* reduces women's odds of using the IUD against traditional methods by 4%. Controversially, all contextual variables affect the choice of other modern methods as opposed to traditional methods significantly. Increases in any of these contextual variables in the *bag* or *horoo* are associated with decreases in a woman's odds of using other modern methods as opposed to traditional methods and the effect is highly significant for both the proportion of women and the proportion of women of

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reproductive age. Moreover, the comparison of two regressions (without and with contextual variables) shows that community employment rate is a more important factor than the individual woman's employment status in terms of the improvement in the use of other modern methods as opposed to traditional methods.

Intra-*bag* (in rural area) or intra-*horoo* (in urban area) correlations suggest that 3·3% of the total unexplained variations in using the IUD as opposed to traditional methods is attributable to unobserved *bag* or *horoo* factors, while it is 0·1% for other modern methods versus traditional methods (and not significant). The inclusion of contextual variables in the model has affected the random effects of the regression differently for the choice of the IUD or other modern methods as compared with traditional methods. Comparison of the random effects of two regressions (without and with contextual variables) shows that there has not been a change in the variance for IUD versus traditional methods. It indicates that variables other than these contextual variables are important community-level predictors for IUD versus traditional methods. In contrast, when other modern methods are compared with traditional methods the variance of the random effect dropped from 0·008 to 0·002. Thus, it can be concluded that there are significant variations between *bags* or *horoos* in the odds of using the IUD or other modern methods compared with traditional methods. The inclusion of the community-level contextual variables in the model reduces these variations to a minimum for other modern methods versus traditional methods, while variations between *bags* or *horoos* remained the same for the IUD compared with traditional methods.

Conclusion

Mongolia implemented a strong pronatalist population policy in the 1960s and 1970s, which was reflected in lower modern contraceptive use among married women. Since 1976, access to modern contraceptives has been liberalized. The IUD became legal in 1976 in certain circumstances, the abortion law was modified in the 1980s, and all restrictions on the use, distribution and import of contraceptives were removed in 1989. These policy changes have resulted in the increasing use of contraceptives, in particular modern contraceptives, among Mongolian women.

Between 1990 and 1998, there were increases in the use of modern contraceptives among Mongolian married women, especially in the use of the pill, injection and female sterilization. However, their share of total contraceptive use remains low. The IUD and periodic abstinence continue to be the most widely used methods, despite a decrease in their share of the total contraceptive prevalence.

Findings show that older married women are less likely to practise any form of contraception currently than their younger counterparts, and their preferred methods are traditional methods, in particular periodic abstinence. The number of living children is a significant factor affecting the current use of contraception when combined with duration of marriage, with increasing duration and low numbers of children leading to lower odds of use. The number of living children is also an important factor in women choosing modern contraceptives, particularly in the choice of IUD verses traditional methods, with a 50% increase in the odds for two children compared with zero or one child. Women with higher levels of education are more

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likely to be current users of contraception, and if they do use, their odds of using other modern methods compared with traditional methods drop by nearly two-thirds. This finding suggests that while women with higher levels of education are more likely to want to control their fertility, they are also more likely to feel that they can achieve their fertility goals by using traditional methods. This study also demonstrates the importance of husband's educational attainment in method choice, with husband's level of education being a stronger predictor in the choice between IUD and traditional methods. Employed women are more likely to practise contraception; however, women's employment status does not have a significant effect on method choice.

Women living in rural areas have higher odds of using contraception, but are then more likely to choose traditional methods. The use of traditional methods may well be linked to a high failure rate of contraception, and hence the high fertility observed in rural areas. The choice of traditional methods by rural women could be a consequence of low provision of modern contraceptives and necessary medical instruments in rural areas combined with a lack of sufficient knowledge of medical professionals to provide women with advice on the use of modern contraceptives.

Electricity supply is included in the analysis as a proxy for infrastructural development of the country. Women who live in areas where electricity is supplied through diesel or a generator are more likely to use contraception than are women living in other areas where electricity is not supplied, and if they do use, they have higher odds of using other modern methods.

In addition to the individual characteristics, contextual variables are considered in the analysis of contraceptive use and method choice while controlling for individual factors. The rise in the proportion of women of reproductive age within the community increases the odds of using any type of contraception. However, the increase in the proportion of women of reproductive age lessens the use of modern methods as opposed to traditional methods. The majority of contextual variables were significant factors in choosing other modern methods as compared with traditional methods, highlighting the importance of spatial factors. Improvement in the community-level unemployment rate is more important than the individual woman's employment status in influencing the choice of other modern methods compared with traditional methods.

This study demonstrates that patterns of contraceptive use and method choice differ considerably by individual characteristics as well as by geographic areas. The results of the analysis indicate that significant variation exists between *bags* or *horoos* in current contraceptive use and in the choice of modern methods against traditional methods. These variations are reduced significantly in the comparison of other modern methods with traditional methods when community-level predictors or contextual variables are included in the analysis. Variation between *bags* or *horoos* essentially remained unchanged when contextual variables were included in the analysis of current contraceptive use and in the choice of the IUD as opposed to traditional methods. This suggests that variables other than these contextual variables are important community-level predictors for current contraceptive use and the choice IUD against traditional methods.

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