

# DETERMINANTS OF CONTRACEPTIVE USE IN MOROCCO: STOPPING BEHAVIOUR IN TRADITIONAL POPULATIONS

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**Summary.** The determinants of modern contraceptive use in traditional populations are analysed in married women aged 30–44 living in the province of Marrakech (Morocco). Women who have never used contraception have smaller family sizes than those who do: the number of live children (or live births) is the variable with maximum predictive power on contraceptive use, while child mortality is the main inhibiting factor. The probability of contraceptive use increases with female age at marriage and decreases with the woman's age, indicating a generational change in reproductive behaviour. The socioeconomic variables education, employment and residence, have no significant independent predictive character on contraceptive use, although the interaction between education and residence does. The paper evaluates the hypothesis that traditional populations in the initial phase of their demographic transition resort to modern contraception in order to stop childbearing, when they have reached a desired number of children, rather than to space births or reduce their fertility.

## Introduction

The challenge of family planning campaigns in developing countries is to provoke a behavioural change with regard to fertility control in populations that are not socioeconomically modernised. This challenge seems to be greater in Islamic societies, whose cultural foundations encourage procreation, although without any explicit doctrine on contraceptive practices (Sachedina, 1990). Within the Islamic world, fertility has dropped in the Arab countries in the last few decades (Fargues, 1988), although the reduction in fertility rates has not wholly followed the changes registered in the macro-economic indicators (Nagi, 1983). The introduction of family planning

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**Table 1.** Percentage distribution of contraceptive use of currently married women\*, by age, Marrakech, Morocco

Age group	Contraceptive use			
	Never		Yes	
	<i>n</i>	%	<i>n</i>	%
15-19	54	62.8	32	37.2
20-24	360	44.3	452	55.7
25-29	328	36.3	576	63.7
30-34	237	29.6	564	70.4
35-39	209	33.5	415	66.5
40-44	173	33.6	342	66.4
45-49	207	53.8	178	46.2
=>50	469	80.4	114	19.6
Total sample	2037	43.2	2674	56.8

\*Excluding childless.

programmes in the Arab countries, however, has been clearly related to the fertility decrease registered, even when the socioeconomic changes were only moderate (Nagi, 1984).

Morocco has an annual population growth of 2.3% (UN, 1993), a child mortality rate of 76 per thousand and a total fertility rate of 4.0 (Robey *et al.*, 1992), a low average value for the region. Family planning campaigns have been carried out in the country since 1972. In 1992, 42% of the married women of reproductive age were using some contraceptive method, either traditional (6%) or modern (36%) (Robey *et al.*, 1992).

This paper analyses the determinants of contraceptive use in the Moroccan province of Marrakech, whose Arab-Berber population maintains a rural economic structure and traditional biosocial characteristics (Crognier, 1989). The province of Marrakech was designated as a pilot area for the family planning campaigns within the national plan of 1973-77.

### Materials and methods

When the survey analysed in this paper was carried out (1984), the first family planning campaign in the study area was 5 years old, as reflected in the low percentage of women over 45 who used contraception during their fertile period (Table 1). Maximum contraceptive use occurs among women at the medium and advanced stages of their fertile lives, although more than half of the women over 20 have practised contraception; 89.5% of the contracepting women have used the pill. However, it is still an irregular practice: only 2.5% of the women who have used contraception did so in a continuous manner.

As is to be expected in an Islamic and traditional population, in which marriage and reproduction are strongly associated (mean waiting time to first birth is 20.34

months;  $SD=16.56$ ,  $n=4619$ ), only 5.4% of women under 25 use contraception before a first pregnancy. Previous local analyses have shown that there is a positive association between modern contraceptive use and high fertility in rural women, but not in those living in the city of Marrakech (Crognier & Zarouf, 1987; Crognier, 1989). A second survey in the area showed that when modern contraceptive use ceases the last interbirth interval is longer than in non-contracepting women (Baudot & Bley, 1990). As in other developing countries (Robey *et al.*, 1992), most women that stopped modern contraceptive use reported health problems associated with the pill (Naber, 1989).

Women aged 30–44, currently married and with at least one live birth, living in the countryside and small towns of the province of Marrakech were selected ( $n=1734$ ); women living in the city of Marrakech are not included in the analysis. After a descriptive analysis, multivariate logistic regression analyses (forward stepwise selection method) were carried out in order to evaluate the independent and associated effects of socioeconomic, marital and biological variables in the determination of contraceptive use. The variables number of live births and, in a second model, number of live children have been divided into categories (low, medium and high fertility or family size) and included in the models as dummy variables.

The data analysed come from an anthropological survey (Crognier, 1989) which does not include an exhaustive follow-up of important aspects of contraception, such as are duration and efficiency. The aim of the analysis is to determine which socioeconomic and biosocial variables induce or favour initiation into modern contraception following a previous regime of natural fertility or of fertility regulated by traditional methods, and not to evaluate the efficiency of the contraceptive practice. In search of the determinants of this behavioural change, the women who reported irregular or discontinued contraceptive practice were excluded from the analysis as a group without a coherent contraceptive practice (Naber, 1989).

The small towns of the province whose homes have electric light and running water are considered as urban residence (non-metropolitan urban residence).

## Results

The female population of the province of Marrakech is characterised by a low socioeconomic development. Table 2 shows, however, that the educational level, salary-paying employment and urban residence are significantly higher in the group of women who use contraception. Polygyny and marital stability are also increased among contraceptive users (Table 2). But there are no significant differences in mean age at first marriage between the two groups of women (Table 2).

Table 3 compares the two groups by the distributions or means of the variables of fecundity, fertility and child mortality. The distributions of the number of abortions and of the number of stillbirths are not different, but there are significant differences in fertility and child mortality. The contraceptive users have a significantly higher number of live births and of live children. Child mortality is significantly greater among non-contracepting women.

Local analysis carried out by Crognier *et al.* (1993) reveals a significant positive correlation between breast-feeding duration and interbirth interval in successive

**Table 2.** Selected characteristics of currently married women aged 30–44†, by use of contraception, Marrakech, Morocco

% women	Contraceptive use		Significance	
	Never % (n=714)	Yes % (n=1020)	$\chi^2$	df
Literate	1.6	4.8	12.58273***	1
Employment	2.5	4.8	6.89138*	2
Urban residence	12.1	16.7	7.04771**	1
Polygynous marriages	7.4	11.9	8.30613**	1
Married more than once	15.3	10.0	10.82083***	1
Mean age (SD)				
Mother	36.32 (4.43)	35.91 (4.30)	t=1.82	df=1281.9
At first marriage	17.83 (2.90)	17.97 (2.81)	F=0.958‡	df=1

Significance level: \* $<0.05$ ; \*\* $<0.01$ ; \*\*\* $<0.001$ .

†Excluding childless.

‡Covariate: mean age of mother.

parities, and that there are no significant differences in mean interbirth interval between contraceptive and non-contraceptive users. In the analysed population, breast-feeding duration is not significantly different in contraceptive and non-contraceptive users (between 16 and 17 months: Table 4).

Similar fecundity and homogeneous birth-spacing lead to the hypothesis that the differences in fertility between contracepting and non-contracepting women are due to a differential prolongation of their reproductive periods—time elapsed between the first and last live births. With statistically equal ages of incorporation into reproduction, the contraceptive users have a significantly greater reproductive period than the non-contraceptive ones (12.34 years compared to 11.97), a difference due to a more delayed last live birth (Table 5).

In order to evaluate the independent effect of the socioeconomic, marital and biological variables in the determination of contraception, a multivariate logistic regression analysis was carried out. Table 6 shows statistics for variables selected for entry into the equation as predictors of the dependent variable, as well as goodness-of-fit model tests. Depending on the order of incorporation into the equation, the variables with independent predictive power on contraceptive use are: the number of live births, the number of children who died before 5 years of age, the age of mother, the type of marriage (monogamous or polygynous) and the age at first marriage. So compared with women of low fertility (reference category), the probability of using modern contraception increases among those with medium and high levels of fertility (odds ratio, 2.4722 and 4.6606, respectively). Probability of access to contraception decreases with under-5 child mortality (OR, 0.8514) and with female age (OR, 0.9459), and increases in polygynous marriages (OR, 1.7083) and with age at marriage (OR, 1.0496). The remaining variables—number of marriages,

**Table 3.** Fecundity, fertility and child mortality by contraceptive use of currently married women, aged 30–44, Marrakech, Morocco

	Contraceptive use					<i>p</i>
	Never		Yes			
	<i>n</i>	%	<i>n</i>	%		
Abortions						
0	534	80.3	1068	80.5		
1	82	12.3	168	12.7		
=>2	49	7.4	90	6.8	$z = -0.6268$	0.849†
Stillbirths						
0	558	83.9	1126	84.9		
1	62	9.3	139	10.5		
=>2	47	6.8	61	4.6	$z = -1.0296$	0.303‡
Deaths under 5 years						
0	233	37.6	402	40.5		
1	118	19.1	236	23.8		
2	105	17.0	158	15.6		
3	73	11.8	98	9.9		
4	41	6.6	50	5.0		
=>5	49	7.9	48	4.8	$z = -2.6731$	0.007‡
Mean no. (SD)						
Live births	5.91 (2.61)		6.52 (2.46)		$F = 51.970$	0.000*
Live children	4.35 (2.12)		5.15 (2.06)		$F = 97.033$	0.000*

†Mann–Whitney test, childless included.

‡Mann–Whitney test, childless excluded.

\*Univariate F test, childless excluded; covariates: mean age of mother, mean age at first marriage and mean number of marriages.

place of residence, and female employment and level of education—do not significantly increase the fit of the model. The percentage of correctly predicted cases by the model is 63.9%.

The predictive effect of the interactions between the dichotomous independent variables (residence, education and type of marriage) on contraception was also evaluated. Only the association between residence and education has a significant character: urban residence and a basic educational level increase—in an odds ratio of 8.8127—the probability of contraceptive use. None of the interaction terms of both sociocultural variables with type of marriage has an effect improving the explanatory power of the model.

With an opposite effect, the number of live births and the number of dead children under 5 are the variables which have the strongest predictive power on contraceptive use. Both variables determine the family size of the couple (over-5 mortality represents a minimum percentage of the general mortality rate in the area: Varea, 1990a). The variable number of live children thus allows evaluation of the joint effect

**Table 4.** Breast-feeding duration (months) for each parity by contraceptive use of currently married women aged 30–44\*, Marrakech, Morocco

Parity	Contraceptive use						t
	Never			Yes			
	n	Mean	SD	n	Mean	SD	
1	510	16.60	7.13	817	16.50	6.67	0.27
2	494	16.88	7.03	827	16.40	6.49	1.25
3	468	16.86	6.87	808	17.00	6.12	-0.35
4	440	16.82	6.81	772	16.89	6.41	-0.16
5	381	16.79	6.99	692	17.00	6.83	-0.47
6	310	17.21	6.55	589	16.78	6.19	0.95
7	243	16.58	6.71	443	16.92	6.08	-0.66
8	181	16.68	6.55	302	16.73	6.22	-0.09
9	114	15.90	7.04	206	17.04	6.04	-1.46
10	62	15.59	7.15	136	16.30	6.71	-0.68
11	27	15.07	7.98	75	16.69	6.30	-1.06
12	11	20.18	6.72	39	15.84	7.20	1.79

\*Excluding childless.

**Table 5.** Mean reproductive span and age at last live birth by contraceptive use of currently married women aged 30–44‡, Marrakech, Morocco

	Contraceptive use				F	df	p
	Never		Yes				
	Mean	SD	Mean	SD			
<b>Main effects</b>							
Age at last live birth	32.00	4.73	32.34	4.48	7.35740	1	0.000
Reproductive span	11.97	5.17	12.34	4.90	9.32897	1	0.002*
					1.99978	1	0.158†
<b>Interaction effects</b>							
					4.68265	2	0.009

Main effects: \*Univariate F test; †Roy-Bargann Stepdown F test, adjusted for mean age at last live birth.

Interaction effects: Pillais Multivariate F test.

Covariates: mean age of mother, mean age of first marriage, and mean number of marriages.

‡Excluding childless.

of fertility and child mortality on reproductive behaviour and contraceptive practice. In a second logistic regression analysis, the number of live children replaces both the number of live births and the number of dead children under 5. Live children is also

**Table 6.** Results of stepwise multiple logistic regression analysis of selected variables (live births as categorical variable) on contraceptive use in currently married women\*, aged 30–44, Marrakech, Morocco

Variables included (in order of entry)	Improvement		Odds ratio	R	p
	$\chi^2$	p			
Constant					0.100
Fertility	24.776	0.000		0.1660	0.000
(1)			2.4722	0.1403	0.000
(2)			4.6606	0.1594	0.000
Under-5 child mortality	23.808	0.000	0.8514	-0.0979	0.000
Residence and education	17.582	0.000	8.8127	0.0588	0.002
Age of mother	13.399	0.000	0.9459	-0.0842	0.000
Type of marriage	9.248	0.002	1.7083	0.0532	0.005
Age at marriage	5.502	0.019	1.0496	0.0416	0.019

Model:  $\chi^2=94.315$ ,  $df=7$ ,  $p=0.000$   
 Goodness of fit:  $\chi^2=1495.893$ ,  $df=1481$ ,  $p=0.3878$

\*Excluding childless.

Residence, 0: rural, 1: urban. Education, 0: illiterate, 1: literate. Type of marriage, 0: monogamous, 1: polygynous. Fertility categories: low (reference category) 1–4 live births; medium (1) 5–8; high (2) >8.

included as categorical variable with small family size (0 to 3 living children) as reference category. Model 2 (Table 7) conserves the variables of the first model giving family size the strongest predictive power on contraception and improving the fit of the model (chi-square improvement=49.543,  $p=0.000$ ; percentage of correctly predicted cases, 65.8%). The probability of use of contraception increases remarkably among women with medium and large family size (OR, 2.4338 and 5.0463, respectively) compared with women with no more than three live children.

## Discussion

### *Contraception and fertility and child mortality*

The association between contraceptive use and high fertility or large family size has been described in traditional populations (Agyei & Mbamanya, 1989). The data from the WFS show that two-thirds of the women who use contraception in developing countries do so in order to stop childbearing, when family size is considered complete, rather than to space births and reduce their fertility (Lightbourne, Singh & Green, 1982). The results of this analysis coincide.

In the analysed population of Marrakech, family size is the variable with the strongest predictive effect on contraceptive practice: the women who use contraceptive methods have more live children (i.e. more live births and fewer deaths of children under 5 years) than non-contraceptive users. The low percentages of childless women

**Table 7.** Results of stepwise multiple logistic regression analysis of selected variables (family size as categorical variable, Model 2) on contraceptive use in currently married women\*, aged 30–44, Marrakech, Morocco

Variables included (in order of entry)	Improvement		Odds ratio	R	p
	$\chi^2$	p			
Constant					0.081
Family size	49.543	0.000		0.1951	0.000
(1)			2.4338	0.1459	0.000
(2)			5.0463	0.1912	0.000
Age of mother	22.080	0.000	0.9315	-0.1086	0.000
Residence and education	19.816	0.000	10.0282	0.0632	0.001
Age at marriage	11.189	0.000	1.0647	0.0602	0.002
Type of marriage	9.742	0.001	1.8019	0.0602	0.002

Model:  $\chi^2=112.370$ ,  $df=6$ ,  $p=0.000$

Goodness of fit:  $\chi^2=1493.767$ ,  $df=1482$ ,  $p=0.4099$

\*Excluding childless.

Residence, 0: rural, 1: urban. Education, 0: illiterate, 1: literate. Type of marriage, 0: monogamous, 1: polygynous. Family size categories: low (reference category) 0–3 live children; medium (1) 4–6; high (2) >6.

and of women in the first years of their marital life who practised contraception confirm this close association between nuptiality and childbearing. This association is characteristic of Islamic populations and has been maintained even in Tunisia (Witwer, 1990), the Arab country that has experienced the most sustained fertility decline due to governmental family planning campaigns.

As a main determinant of family size, child mortality is an outstanding inhibiting factor on the use of contraception. Baudot & Hilali (1987) describe a geographical gradient of child mortality in the province of Marrakech with the highest rates in the mountain villages of the Atlas range, isolated and far from the health centres. It therefore can be assumed that the negative association between contraception and child mortality could be explained by a common factor to both variables: the territorial disparities in sanitary infrastructure. Certainly, the highland women must necessarily have more difficult access to modern health care and family planning services than those living on the plains or in the small towns. The results show, however, that the place of residence has no independent predictive effect on contraception. There could be two explanations for this. First, in the province of Marrakech, aside from the capital, the level of urbanisation is basic, and therefore the sociocultural differences between the little towns and the countryside, between the urban and rural environments, are not excessive, even with regard to sanitary conditions (Crognier *et al.*, 1992). Secondly, in order to develop the family planning programme in the province, the Moroccan authorities have tried to lessen the local differences in sanitary infrastructure by means of intensive and free distribution of the



pill, as the main contraceptive method, in the areas furthest away from the health centres.

There must, therefore, be another explanation for the negative association between child mortality and contraception. High fertility increases the risk of mortality of live births as a consequence of the reduction in birth-spacing (National Research Council, 1989); but the causality is also inverse due to physiological and behavioural mechanisms. The European demographic transition shows that the decline in fertility was clearly associated with the fall in infant and child mortality (Coale, 1986). Death of the child before the age of weaning determines suppression of breast-feeding, resumption of ovulation and, therefore, reduction in the interbirth interval (Chandran, 1989). But high infant and child mortality can also induce high fertility due to the determination of the parents to guarantee their offspring as a consequence of the value of the children as labour force or economic security in their old age, or just for pronatalist cultural pressures. The intentional replacement of dead children ('child survival strategy') is a well established fact in some Asian and Arab populations (Cain, 1983; Suchindran & Adlakha, 1984), although some authors (Sufian & Johnson, 1989) consider this more probable in societies which already consciously control their fertility and have access to efficient contraceptive methods. Analysis of World Fertility Survey data (Lightbourne & MacDonald, 1982) confirms that the number of surviving children is the most powerful determinant of whether a woman wants an additional child. In any case, in the analysed population the strong negative association between child mortality and use of contraception confirms that, when survival of children is still uncertain, couples are not inclined to control their fertility, a conclusion which coincides with that of Ahmad (1985) in Islamic populations.

#### *Contraception and socioeconomic variables*

The place of residence does not have an independent predictive effect on contraception. Cleland (1990) reports that the only socioeconomic variable that establishes an unmistakable association with contraception is the level of education of the couple. Both in developing and developed countries, use of modern contraceptive methods increases with the number of years of female education (Lightbourne *et al.*, 1982). On the other hand, fertility differences between rural and urban women are due more to changes in their marital pattern (increase in age at marriage) than to differences in contraceptive practices (Singh, Casterline & Cleland, 1985). At least a secondary education level is, however, necessary for contraception to counteract fertility increases provoked by behavioural changes in the traditional birth-spacing mechanisms (Millman, 1985), as has occurred in many Third World populations during their economic modernisation and urbanisation process (Bongaarts, Frank & Lesthaege, 1984; Dyson & Murphy, 1985; Gadalla, McCarthy & Kak, 1987; Cleland & Rodriguez, 1988; Page & Lesthaege, 1988; Sathar, 1988; Chimere-Dan, 1990; Hill, 1990). Prolonged education of the woman delays her incorporation into marriage and favours a behavioural change with regard to childbearing which is fundamental for the success of any governmental initiative in favour of containing population growth (Chang, Warren & Pendleton, 1979).

In the population of Marrakech, however, female education has no independent predictive character on contraceptive practice. This is not surprising: the percentage of women who have studied increases among contraceptive users, but it does not reach 5% of the group, and their level of education is minimal, with very few years of schooling. On the other hand, the association between urban residence and education significantly increases the probability of contraceptive use: this result confirms that the combination of individual motivation and easy access to contraception can be decisive in the success of family planning programmes, and that the efforts of the authorities must be channelled in both directions.

### *Contraception, marital pattern and polygyny*

Probability of contraceptive use decreases with female age and increases with age at marriage. Both results show the convergence of two trends which, by reinforcing each other, must be fundamental in order to decrease fertility in developing countries: First, a generational change, the increase of contraceptive use among the younger women; secondly, a behavioural change, which associates delayed incorporation into marriage and use of modern contraceptive methods. Apart from reducing the potential period of exposure to pregnancy and increasing the time between successive generations (Liskin *et al.*, 1985), the increase in age at marriage is associated with a global change in the marital pattern which includes a decrease in the age difference between the spouses and, as a consequence, the reduction of marital instability. The greater female maturity and a more equal relationship between the wife and her husband are factors which must necessarily favour the use of birth control by the couple, even when a greater marital stability provisionally provokes a fertility increase, as has occurred—among other countries—in Morocco (Nagi, 1984; Housni, 1990).

With this last consideration in mind, the greater use of contraception among polygynously married women is surprising, given that this type of union is characterised by a great age difference between the spouses (Varea, 1990b). Other arguments that would, at least theoretically, reinforce the negative relationship between polygyny and contraceptive use are the reproductive competition between co-wives (White, 1982) and the decision of the husband to increase his own fertility by means of an additional wife, as Chamie (1986) describes in Egypt and Jordan.

In the province of Marrakech, polygyny significantly increases among urban and literate women (Crogner, 1989). Contraceptive use increases, however, among women in polygynous marriages, regardless of their place of residence or schooling, as is shown by the fact that interactions between these two sociocultural variables and the variable type of marriage do not have a predictive power on contraception in the logistic regression model. Controlling the remaining independent variables (including the number of live births and the number of previous marriages), the greater use of contraception among polygynously married women appears as a genuine characteristic of this type of union (Adewuyi, 1988) which must be explained by other socioeconomic (perhaps the employment of the husband) or behavioural determinants not included in this analysis.

### Conclusion

The results of this paper confirm that the determinants of modern contraception are multiple and of complex interaction, basically because birth control is the consequence of changes both at the individual and social levels.

In Third World populations, the success of family planning programmes depends on whether they are capable of strengthening and expanding the tendencies towards birth control already existing in the society (Retherford, 1985), initially acting as a mechanism to stop childbearing, as seems to occur in Marrakech, during a transitional period of limited efficiency, and without necessarily determining a sudden or intense fertility decline.

The Western experience shows that an initial phase of the demographic transition process can be carried out through traditional contraceptive methods (Coale & Watkins, 1986). An association between age at marriage—or at first live birth—and age at last live birth has been described in populations living in developing countries (Gajanayake, 1987; Horne & Suchindran, 1988; Varea, 1993), suggesting the existence of a deliberate parity-dependent birth control even in traditional societies without access to modern contraception and weak socioeconomic modernisation. In these populations, the diffusion of modern contraception could thus allow for the substitution of traditional methods of birth control in a first phase of change of reproductive behaviour. As McDonald (1984) points out: 'Within marriage, population programmes should be concentrated on stopping rather spacing behaviour. . . . Initially at least, couples may welcome the replacement of currently less comfortable approaches to the stopping of childbearing by modern methods of family limitation'. A successful experience with modern contraception thus may determine new attitudes towards effective birth control and fertility decline (Cleland & Wilson, 1987).

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