

Marriage in Korea

III. Age at Marriage, Family Planning Practices, and Other Variables as Correlates of Fertility

**Mo-Im Kim, Dr. P.H., Rowland V. Rider, Sc.D.,
Paul A. Harper, M.D., and Jae-Mo Yang, M.D.**

The Study on which this paper is based was carried out under the direction of Dr. Mo-Im Kim as the research for her doctoral thesis. The Study was financed in part by a grant from the Population Council, New York, New York

This paper examines the relationship between age at marriage and fertility in Korea and also the relative importance of thirteen variables, including age at marriage and contraception, as determinants of fertility.

The first paper in this series showed that there have been tremendous shifts in attitudes toward marriage from the tradition of early, universal, arranged marriage toward a more contemporary and liberal view that the partners themselves should have a leading role in the decisions whether, who and when to marry (Kim, 1974a). The second paper confirms that a major postponement in age at marriage has occurred, largely since 1945. Teenage marriages have almost disappeared and the average age (singulate mean age) of marriage is 25 to 26 years for women and 29 for men. Education is the major predictor of age at marriage; several other variables each have a small but significant

contribution to change (Kim, 1974b).

SAMPLE AND METHODS

These have been described in the earlier papers mentioned above. The total study population was 1,791 Korean women, married and unmarried, aged 17 to 50 years, drawn by systematic sampling from an urban area, Seoul, and a semi-rural one, Ansong; all eligible women in a rural area, Kosam, were included. The overall response rate was 90%.

Information about the relative importance of thirteen potential predictors of fertility was based on 1,279 currently married women aged 20~49 after excluding ten who have never been pregnant after more than three years of cohabitation.

Repeatability was studied by reinterviewing a 15% sample of the original respondents with 60% of the original interview schedule. The findings indicate that respondents did not change their answers substantially and that there were no significant directional changes (Kim, M.I., 1972).

A multi-variate analysis technique known as multiple classification analysis (MCA) (Andrews, 1969) is used to study correlates of fertility.

* Dr. Mo-Im Kim is from College of Nursing and Center for Population and Family Planning, Yonsei University, Seoul, Korea; Drs. Rowland V. Rider and Paul A. Harper are from the Department of Population Dynamics, School of Hygiene and Public Health, The Johns Hopkins University, Baltimore, Maryland; Dr. Jae-Mo Yang is from the Center for Population and Family Planning of Yonsei University, Seoul, Korea.

This technique makes it possible to study the independent variables, one by one, and also to look at the relationship between each independent variable and the dependent variable while holding constant a selected group of other independent variables. The subjects were divided for this analysis into three ten-year age groups, from age 20 through 49, to allow for probable cohort effect in relationships studied. The implications of these age groupings should be kept in mind. Findings on the oldest group, 40~49, usually should be most conclusive since this group has largely completed its fertility. Contrarily, the youngest group, 20~29, is only starting its potential reproductive career and current findings may change over time; however, it is this group which has been and will be most exposed to modernizing influences such as mass media and family planning services. The 30~39 year group occupies an intermediate position.

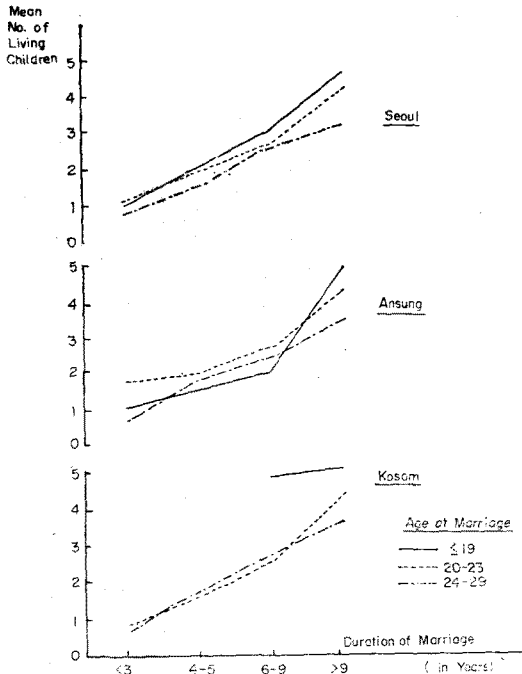


Fig. 1. Mean living children by age at marriage, duration of marriage & study area, among women 20~49 years of age, married once for both partners, currently married & fecund, 1970, Korea.

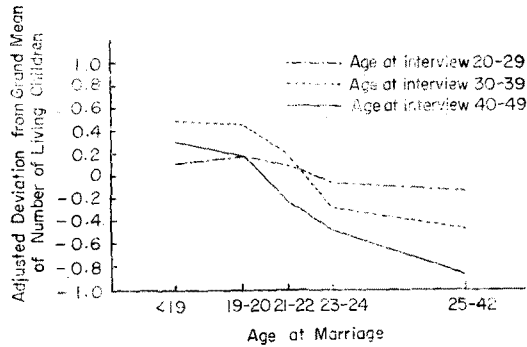


Fig. 2-A. Adjusted deviations from grand mean number of living children by age at marriage.

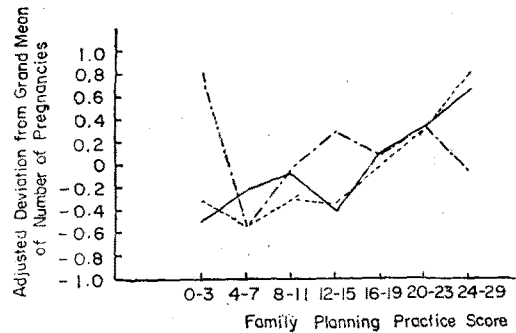


Fig. 2-B. Adjusted deviations from grand mean number of pregnancies by family planning practice score.

The relative importance of the independent variables, including age at marriage and contraception, is studied by use of Eta and Beta values. The correlation ratio Eta is based on the raw means of the MCA and gives the capacity of the independent variable (sometimes called predictor or potential predictor) to explain variation in the dependent variable; Eta^2 gives the proportion of the total sum of squares explainable by the independent variable. Beta and Beta^2 are similar to the Eta values but are based on the adjusted mean of the MCA rather than the raw means. Beta^2 measures the capacity of the potential predictor to explain variation in the dependent variable after adjusting for the effects of other independent variables. The multiple correlation coefficient squared (R^2) gives the proportion of variance in the depen-

dent variable which can be explained by all the independent variables in a specified group taken together. F values are given to show the statistical significance of each of these measures.

RESULTS

Experience and research both support the view that age at marriage is an important factor influencing the birth rate (Coale, 1961) and completed fertility (Kim, 1967; Leasure, 1965). Other workers have failed to find any consistent relationship (Das, 1967) and have suggested that the apparent changes in fertility which are sometimes associated with shifts in age of marriage may be due to other mechanisms such as premarital pregnancy and out-of-wedlock births, delays of first pregnancy after early marriage, shortened birth intervals after late marriage, and adverse affects of early marriage. The Korean data will be examined to determine the influence of each of these factors before proceeding to the main questions.

A. Alternative mechanisms for the apparent effect of late marriage on fertility

1. **Premarital pregnancy and pregnancy out-of-wedlock:** The unmarried female is at greater risk of having illegitimate children than is the married, and this risk probably increases with age for several years after puberty. Thus early marriage favors a low rate of out-of-wedlock births and a rising age of marriage has been associated with increased rates of illegitimacy in some populations.

Sexual experience for women outside marriage has been severely penalized both by law and society in Korea. Abortion is common (Hong, 1971) and reliable data on premarital pregnancy are not easily available. Illegitimate births were estimated to be from 2.8% to 3.2% of all births

in 1938 and 1939.

The study data were examined for evidence on this matter. Each respondent who had ever been married was asked for age at marriage and also for age at first conception. Then, all study women who met certain criteria were studied for evidence as to premarital conception. The criteria were (a) those who were currently married and whose marriage was the first for both partners, (b) those who know themselves to be fecund, and (c) those with less than 12th grade education. The last criterion was intended to eliminate those who might be sufficiently perceptive and clever to report age at first marriage and age at first conception in such a way that discrepancies would not be disclosed. The results in Table 1 show that only 1.2% of

Table 1. Number and percent of women who experienced premarital pregnancy by age group (among women currently married, less than 12th grade education, partner and self married once, and fecund)

Age group	Total (%)	Women who experienced premarital pregnancies	
		Number	Percent
40~49	359 (35.5)	3	0.8
30~39	462 (45.7)	4	0.9
20~29	190 (18.8)	5	2.6
Total	1,011(100.0)	12	1.2

subjects gave answers compatible with a premarital pregnancy. The greater proportion among the youngest age group is not statistically significant, nevertheless, it may indicate a trend. By comparison, the U.S.A. 1965 National Fertility Survey showed 3.7% premarital births and 9% premarital pregnancies (Ryder, 1971). Despite the limitations of our data, they support the view that marriage does represent the beginning of reproductive exposure for women in Korea.

2. **Delay of first pregnancy in early marriages:** The data in Table 2 show that first pregnancy

Table 2. Mean age at first pregnancy by age at marriage and age at interview (among women currently married, less than 12th grade education, partner and self married once, fecund, and no premarital pregnancy)

Age group at interview	Age at marriage											
	<19			19~20			21~22			23~29		
	(N)	Mean	S.D.	(N)	Mean	S.D.	(N)	Mean	S.D.	(N)	Mean	S.D.
40~49	(138)	18.7	1.7	(106)	20.9	1.3	(64)	22.7	1.5	(48)	26.1	2.1
30~39	(48)	19.8	1.8	(58)	20.6	1.7	(122)	22.6	2.1	(230)	25.4	1.9
20~29	(4)	17.7	0.1	(19)	20.5	1.0	(51)	22.4	1.2	(111)	25.2	1.4
Total	(190)	19.5	1.7	(183)	20.8	1.4	(237)	22.6	1.8	(389)	25.5	1.8

in Korea averages to occur within about a year after marriage with a small standard deviation for the distributions and negate the idea that the first pregnancy may be deliberately delayed by any substantial fraction of the population.

3. Decreased birth interval after late marriage:

It has been suggested that women who marry late may speed up the rate of births in order to have their desired number of children and that this number may not differ from that of those who marry early. Figure 1 shows that in all study areas the mean number of living children increases as the age at marriage is lowered among women who have been married for more than nine years. The same tendency is noted

but is less consistent for women married nine years or less. Other data, not shown, indicate the same findings for both the contraceptors and the non-contraceptors. This suggests that the inverse relationship between age at marriage and mean number of children may be due to a decrease in fecundity among older women and that the birth interval has not been shortened among those who married late in life.

4. Adverse effects of adolescent marriage: It has been suggested that cohabitation and childbearing in the early teens may do irreparable injury to the reproductive organs and so have an adverse effect on fertility (Coale, 1961; Montagu, 1946; Wolf, 1966). Table 3 shows that this is

Table 3. Infertility rates among ever married women by age at marriage at interview

Age at marriage	Age at interview								
	20~29			30~39			40~49		
	(N)	(D)	(N/D)·1,000	(N)	(D)	(N/D)·1,000	(N)	(D)	(N/D)·1,000
≤15	(0)	(0)	—	(0)	(3)	0.0	(0)	(36)	0.0
16~19	(0)	(14)	0.0	(0)	(102)	0.0	(3)	(255)	11.8
20~23	(2)	(100)	20.0	(1)	(233)	3.5	(2)	(166)	12.0
≥24	(0)	(94)	0.0	(2)	(201)	9.9	(0)	(73)	0.0
Total	(2)	(203)	9.6	(3)	(530)	5.1	(5)	(530)	9.4

Note: (N)=Number of women who had never been pregnant and had been married for at least three years with cohabitation and no contraception and who stated themselves infertile.

(D)=Total number of women in the specific age cohort and age at marriage sub-cell.

(N/D)·1,000=Age cohort and age at marriage specific infertility rate per 1,000.

Two habitual aborters were excluded from the infertility cases. Total number of women ever married is 1390. Sixty-three cases aged more than 49 are excluded from the table.

not true of our sample of Korean women. There was no infertility among the 39 women who were married at 15 years or younger and the infertility among those married at 16~19 years was slightly less than among women married at 20~23 years. Other data, not shown, give the mean number of living children for our respondents currently aged 40~49 years who had not been pregnant for five or more years; those who married at 15 or less averaged 6.2 living children; those who married at 16~19 averaged 5.1 children, and those who wed at 20~23 years had 4.7 children. Furthermore, as shown in an earlier paper (Kim, 1974b), teenage marriage is now very rare in Korea.

The foregoing data suggest that the above alternatives are not present in Korea to an extent that would compromise a finding that age at marriage is inversely related to fertility.

B. Relative importance of thirteen potential predictors of fertility, including age at marriage and family planning practice

Thirteen variables are correlated with three indices of fertility (see list in Table 5 below) to determine their relative importance. All questions were asked of the respondents with reference to time of survey, except those about age at first marriage and residence before marriage.

The three measures of fertility merit comment. The number of living children is presumably the most reliable and includes the effect of fetal and infant mortality. The number of live births is more subject to memory lapse and so is of intermediate reliability; it includes the effect of fetal mortality. The number of pregnancies is most influenced by both lapse of memory and uncertain diagnosis in the early weeks of pregnancy and so is the least reliable, also it does not

take account of mortality; but it is a more accurate measure of fecundity than either of the other two. None of these measures take account of other factors such as abstinence and coital frequency.

Table 4 gives examples from the multiple classification analysis (MCA). The first panel relates age at first marriage to number of living children for each of three age at interview groups. The other panels relate education and indices of family planning practice and of exposure to mass media to the dependent variable number of pregnancies. This material is largely self-explanatory and will be referred to later during the discussion of individual variables.

Table 5 shows for each independent variable the instances when it is significantly associated with the three dependent variables, after adjusting for the other independent variables, i.e., when the Beta² was significant at $P < .05$ or better. It is thus a summary of significant data from the complete set of tables of the multiple classification analysis which are not shown for lack of space. The next to last column gives a crude numerical ranking to each of the thirteen variables according to the unweighted arithmetic average of all Beta². The variables ranked 1 and 2 according to Beta², viz., age at first marriage and index of family planning practice, also stand out as to their high frequency of and level of statistical significance.

Table 6 gives for each age group and fertility index the Beta² values that were significant at $P < .05$ or better in the MCA for all study areas combined. Age at marriage is the only predictor that is consistently and significantly strong for all age groups and for all fertility indices; over all it accounts for about 10% of variation in fertility.

Family planning practice is the second strongest predictor but varies both by age group and

Table 4. Multiple classification analysis of two indices of fertility using selected predictors for women of three age groups currently married in all three study areas combined

Predictors and category	Number of cases	%	Category mean	Deviation from grand mean	Adjusted deviation from grand mean	Eta ²	Beta ²
Age at first marriage		Number of Living Children-Females Aged 40~49					
1. Less than 19	197	39.1	4.02	0.401	0.317	.150**	.100**
2. 19~20	125	24.8	3.80	0.188	0.194		
3. 21~22	77	15.3	3.41	-0.203	-0.206		
4. 23~24	51	10.1	3.09	-0.521	-0.471		
5. 25~42	54	10.7	2.50	-1.110	-0.870		
Grand mean=3.61	S.D.=1.26		Total number of females=504				
		Number of Living Children-Females Aged 30~39					
1. Less than 19	50	8.8	3.28	0.805	0.493	.240**	.107**
2. 19~20	105	18.4	3.07	0.601	0.453		
3. 21~22	138	24.2	2.79	0.322	0.200		
4. 23~24	154	27.0	2.12	-0.351	-0.275		
5. 25~42	124	21.7	1.71	-0.756	-0.463		
Grand mean=2.47	S.D.=1.12		Total number of females=571				
		Number of Living Children-Females Aged 20~29					
1. Less than 19	5	2.5	1.60	0.403	0.120	.100**	.061*
2. 19~20	20	9.8	1.40	0.203	0.194		
3. 21~22	55	27.0	1.32	0.131	0.117		
4. 23~24	75	36.8	1.14	-0.049	-0.050		
5. 25~42	49	24.0	1.00	-0.196	-0.145		
Grand mean=1.19	S.D.=0.47		Total number of females=204				
Wife's educational level		Number of Pregnancies-Females Aged 40~49					
1. Less than 6th grade	240	47.6	4.46	0.135	0.170	.017	.024**
2. Less than 9th grade	143	28.4	4.27	-0.058	-0.075		
3. Less than 12th grade	40	7.9	4.30	-0.031	-0.073		
4. 12th grade	59	11.7	4.11	-0.212	-0.342		
5. More than 12th grade	22	4.4	3.86	-0.467	-0.312		
Grand mean=4.33	S.D.=1.19		Total number of females=504				
		Number of Pregnancies-Females Aged 30~39					
1. Less than 6th grade	158	27.7	3.39	0.184	0.206	.023**	.035**
2. Less than 9th grade	229	40.1	3.21	0.005	0.042		
3. Less than 12th grade	56	9.8	2.96	-0.244	-0.201		
4. 12th grade	74	13.0	3.24	0.034	-0.051		
5. More than 12th grade	54	9.5	2.85	-0.356	-0.503		
Grand mean=3.20	S.D.=1.08		Total number of females=571				
		Number of Pregnancies-Females Aged 20~29					
1. Less than 6th grade	18	8.8	2.33	0.539	0.330	.060*	.026
2. Less than 9th grade	97	47.5	1.79	-0.0003	0.012		
3. Less than 12th grade	38	18.6	1.57	-0.215	-0.096		

Table 4. (continued)

Predictors and category	Number of cases	%	Category mean	Deviation from grand mean	Adjusted deviation from grand mean	Eta ²	Beta ²
4. 12th grade	27	13.2	1.81	0.020	0.023		
5. More than 12th grade	24	11.8	1.70	-0.085	-0.171		
Grand mean=1.79	S.D.=0.76					Total number of females=204	
Index of family planning practice			Number of Pregnancies-Females Aged 40~49				
1. 0~ 3 points	35	6.9	3.94	-0.388	-0.497	.030*	.057**
2. 4~ 7 points	111	22.0	4.26	-0.070	-0.216		
3. 8~11 points	121	24.0	4.25	-0.075	-0.073		
4. 12~15 points	22	4.4	3.81	-0.513	-0.399		
5. 16~19 points	105	20.8	4.45	0.125	0.128		
6. 20~23 points	89	17.7	4.56	0.230	0.351		
7. 24~29 points	21	4.2	4.71	0.382	0.679		
Grand mean=4.33	S.D.=1.19					Total number of females=504	
			Number of Pregnancies-Females Aged 30~39				
1. 0~ 3 points	9	1.6	3.00	-0.208	-0.313	.132**	.112**
2. 4~ 7 points	47	8.2	2.59	-0.612	-0.548		
3. 8~11 points	164	28.7	2.82	-0.379	-0.295		
4. 12~15 points	27	4.7	2.85	-0.356	-0.322		
5. 16~19 points	123	21.5	3.30	0.100	0.010		
6. 20~23 points	164	28.7	3.60	0.395	0.326		
7. 24~29 points	37	6.5	3.89	0.683	0.836		
Grand mean=3.20	S.D.=1.08					Total number of females=571	
			Number of Pregnancies-Females Aged 20~29				
1. 0~ 3 points	3	1.5	2.66	0.872	0.818	.084**	.126**
2. 4~ 7 points	29	14.2	1.44	-0.345	-0.539		
3. 8~11 points	110	53.9	1.76	-0.304	-0.019		
4. 12~15 points	20	9.8	1.80	0.005	0.294		
5. 16~19 points	20	9.8	1.85	0.055	0.105		
6. 20~23 points	21	10.3	2.23	0.443	0.354		
7. 24~29 points	1	0.5	2.00	0.205	-0.047		
Grand mean=1.79	S.D.=0.76					Total number of females=204	
Index of mass media exposure			Number of Pregnancies-Females Aged 40~49				
1. 0 points	76	15.1	4.42	0.089	-0.118	.003	.016*
2. 1~ 5 points	215	42.7	4.37	0.045	-0.112		
3. 6~10 points	163	32.3	4.23	-0.092	0.092		
4. 11~14 points	50	9.9	4.30	-0.031	0.354		
Grand mean=4.33	S.D.=1.19					Total number of females=504	
			Number of Pregnancies-Females Aged 30~39				
1. 0 points	44	7.7	3.15	-0.049	0.021	.006	.012*

Table 4. (continued)

Predictors and category	Number of cases	%	Category mean	Deviation from grand mean	Adjusted deviation from grand mean	Eta ²	Beta ²
2. 1~5 points	268	46.9	3.28	0.078	0.102		
3. 6~10 points	204	35.7	3.16	-0.046	-0.058		
4. 11~14 points	55	9.6	3.03	-0.172	-0.238		
Grand mean=3.20			S.D.=1.08				Total number of females=571
Number of Pregnancies-Females Aged 20~29							
1. 0 points	7	3.4	2.28	0.491	0.668	.020	.050**
2. 1~5 points	93	45.6	1.82	0.033	0.068		
3. 6~10 points	82	40.2	1.75	-0.038	-0.048		
4. 11~14 points	22	11.8	1.63	-0.157	-0.321		
Grand mean=1.79			S.D.=0.76				Total number of females=204

- Note: 1. Deviation from Grand Mean=The gross or unadjusted effect of the predictor.
 2. Adjusted Deviation from Grand Mean=Deviation of category mean after adjusting for effects of other predictors (i.e., after all other predictors have been "held constant").
 3. Eta² estimates the proportion of total variance explained by the particular "independent" variable. Its significance is judged by an F-test which tests the differences among the unadjusted means in a classical one-way analysis of variance, testing here, "Does this predictor all by itself explain a significant portion of the variance of the dependent variable?"
 4. Beta² is like Eta² but pertains to the adjusted means. The corresponding significance that aims at answering the question, "Would this predictor explain a significant portion of the variance of the dependent variable if we could hold constant the other predictors?"
 5. **=Statistically significant at the 1 percent level.
 *=Statistically significant at the 5 percent level.

by index of fertility. It is a weak second place variable in the 40~49 age group; it becomes a strong second place variable in the 30~39 age group and is the leading independent variable in the group under 30 where it accounts for about 10% of the variation.

A group of seven other independent variables occupy an intermediate position, but they show great variation by age group and fertility index.

In approximate order of overall importance, as ranked in Table 5, they are ideal number of children, living in urban versus rural study area, education of wife, wife's aspiration for daughter, index of economic level of respondent's home at time of survey, index of exposure to mass media, and residence before marriage.

There is no clear cut-off point between those variables which may be said to have predictive

value and those which do not. However, it does appear that the remaining variables are of very limited overall predictive value. These are family type, number of siblings, religion, and wife's occupational status at time of survey.

Separate examination of the Beta² values for each age group discloses an important finding: In the 40~49 age group, age at first marriage is the strongest predictor with no close competitors, but in the 20~29 year group family planning practice is the strongest predictor. Also in this younger group aspiration for daughter begins to show substantial predictive strength.

C. Combined effects of the correlates

The multiple correlation coefficients, R², given in Table 6 estimate the combined effect of all thirteen variables listed in Table 5. The double

asterisks indicate that the F values for the R²s all attained statistical significance at P < .01. The thirteen variables can account for a maximum of about 40% of the variance in number of live births in the age group 30~39.

D. Description of selected independent variables

Age at First Marriage: Age at marriage has long been known to be one of the strongest determinants of fertility, but many of the relevant studies have not controlled for other influential variables (Bumpass, 1969; Talwar, 1967). The extraordinarily rapid increase in age at marriage in Korea since 1945 which has been documented in earlier papers is again emphasized by the changing distribution among the three age at interview groups, Table 4. The inverse

The following data are summarized from Table 4.

	40~49	30~39	20~29
Percent of respondents scoring in upper half of family planning index	43	57	21
Relationship between score on family planning index and three indices of fertility	Direct**	Direct**	Not Clear**

** Findings significant at P < .01 after adjustment.

⊕ Direct for number of pregnancies; not clear for numbers of living children and of live births.

relationship between age at first marriage and fertility is significant for the three indices of fertility and for all age groups; it is most marked for the 40~49 age group and least so for the 20~29 year group, Figure 2A. This relationship is found both before and after adjusting for the effect of other variables.

Index of Family Planning Practice: This is a modernity variable. The national family planning program started in 1962 and made gradual but steady progress so that by 1970 about one-quarter of Korean women of reproductive age

were currently utilizing government contraceptive services (Nortman in Hong, 1971). There have been the usual age, parity, and socioeconomic differentials in adoption of contraception. One would, therefore, expect a mixture of transition patterns.

The age distribution of family planning practice seems reasonable in that one would expect it to be highest in the 30~39 year group and lowest in that 20~29 year group, especially in view of the late age of first marriage of the latter group. The finding of a direct relationship between the level of family planning practice and number of pregnancies is not surprising in the oldest age group but is mildly so in the 30~39 year group, Figure 2B. The probable explanation is that family planning services for both groups became available and popular only after the individuals in both groups had had several children and that the more fecund were the ones most likely to adopt the new practice. In this situation, the supposed dependent variable changes its role and acts as an independent variable. The "not clear" direction of the relationship for the 20~29 year group is due in part to the fact that their reproductive pattern is not yet clear but it also is probable that this is the group which will demonstrate the success of contraception in lowering fertility.

Ideal Number of Children: Several authors support the view that the reproductive goal expressed as the ideal number of children is positively related to actual fertility (Blake, 1968). This study provides additional support, greater in the unadjusted data, but still impressive after adjustment, Tables 5 and 6.

Study Area: Couples living in a rural area have higher fertility than those from a city. The correlate, residence of wife before marriage, shows a similar association between rurality and fertility but the relationship is weaker than that for current residence.

Table 5. Summary of significant associations between three indices of fertility and each of thirteen independent variables after adjusting for other variables, currently married women in all study areas combined, by age at interview

Predictors pertaining to wife	Number of living children			Number of live births			Number of pregnancies			Rank according to contribution to variance†	Of Association between variable and fertility
	40~49		20~29	40~49		20~29	40~49		20~29		
	30~39	20~29	40~49	30~39	20~29	40~49	30~39	20~29			
A. Demographic Variables											
1. Age at first marriage	**	**	*	**	**	**	**	**	**	1	Inverse
2. Number of siblings	NS	NS	NS	NS	NS	NS	NS	NS	NS	11	
B. Modernity Variables											
1. Family planning practice	NS	**	**	NS	**	**	**	**	**	2	#
2. Mass media exposure	**	*	NS	NS	*	NS	*	*	**	8	#
3. Aspiration for daughter	*	NS	**	NS	NS	*	NS	NS	NS	6	Not clear
C. Reproductive Goal											
Ideal number of children	*	**	NS	*	**	NS	**	NS	*	3	Direct
D. Socio-Economic Variables											
1. Educational level	NS	NS	**	NS	**	**	**	**	NS	5	Inverse
2. Religion	NS	NS	NS	NS	*	NS	NS	*	NS	12	
3. Economic index at survey	NS	NS	NS	NS	NS	NS	NS	**	NS	7	
4. Residence before marriage	*	**	NS	**	*	NS	NS	NS	NS	9	Rural>Urban
5. Occupational status at survey	NS	NS	NS	NS	NS	NS	NS	NS	NS	13	
6. Family type	NS	NS	NS	NS	NS	NS	NS	NS	*	10	
7. Study area	**	NS	NS	**	NS	NS	**	**	*	4	Rural>Urban

**=Statistically significant at the 1 percent level.

*=Statistically significant at the 5 percent level.

†=For each predictor the unweighted arithmetic average of all Beta's was calculated. Rank 1 means largest average, rank 2 means second largest, etc.

#=Direct for oldest age group, inverse or not clear for youngest age group; see text.

Table 6. Ability (Beta²) of leading predictors to explain variations in fertility after adjusting for other variables, currently married women in all study areas combined, by age at interview.

Predictors pertaining to wife	Average for all three fertility indices ⁺		Living children		Live births		Pregnancy	
	Rank	Beta ²	Rank	Beta ²	Rank	Beta ²	Rank	Beta ²
A. Women Aged 40~49(504)								
Age at first marriage	1	.096	1	.100**	1	.104**	1	.084**
Family planning practice	2	.024		NS		NS	2	.057**
Study area	3	.021	3	.022**	2	.034**		NS
Ideal number of children	4	.018	4	.020*	4	.018*		NS
Residence before marriage	5	.017	6	.017*	3	.027**		NS
Mass media exposure	6	.015	2	.023**		NS	4	.016*
Aspiration for daughter	7	.012	5	.018*		NS		NS
Education level	8	.009		NS		NS	3	.024**
				R ² =0.184**		R ² =0.255**		R ² =0.099**
B. Women Aged 30~39(571)								
Age at first marriage	1	.115	1	.107**	1	.127**	1a	.112**
Family Planning practice	2	.066	3	.051**	3	.036**	1b	.112**
Ideal number of children	3	.042	2	.057**	2	.043**	6	.025**
Study area	4	.024		NS		NS	3	.064**
Education level	5	.021		NS	4	.024**	4	.035**
Economic index (at survey)	6	.015		NS		NS	5	.027**
Mass media exposure	7	.011	5	.012*	7	.009*	7	.012*
Residence before marriage	8	.010	4	.016**	5	.011*		NS
Religion	9	.008		NS	6	.010*	8	.010*
				R ² =0.335**		R ² =0.392**		R ² =0.312**
C. Women Aged 20~29(204)								
Family planning practice	1	.100	1	.088**	2	.086**	1	.126**
Age at first marriage	2	.085	3	.061*	1	.092**	2	.103**
Aspiration for daughter	3	.043	2	.068**	4	.049*		NS
Education level	4	.041	4	.042**	3	.055**		NS
Ideal number of children	5	.039		NS		NS	4	.044**
Study area	6	.031		NS		NS	6	.036*
Mass media exposure	7	.027		NS		NS	3	.050**
Family type	8	.022		NS		NS	5	.038*
				R ² =0.178**		R ² =0.217**		R ² =0.213**

⁺Average for all three fertility indices is sum of Beta²'s for the three indices including those labelled NS, divided by 3.

Beta²=See text.

*=Statistically significant at the 5 percent level.

**=Statistically significant at the 1 percent level.

All variables where F₂ value attained statistical significance at P≤.05 in MCA analysis are included² except economic level and religion which attained significance in only one and two indices, respectively, in 30~39 age group and family type which was significant in only one index in 20~29 age group.

Education of Wife: Many studies have shown an inverse relationship between education of women and their fertility (Freedman, 1959; Koh, 1970; Ryder, 1971). Table 4 shows that substantial progress is being made in increasing the education of women in Korea; nevertheless, over half of the 20~29 year cohort have less than nine years of schooling. Despite this, the data here and in Tables 5 and 6 confirm that education has been a moderately potent determinant of fertility in Korean women and that the relationship is generally inverse. This supports the view that the trend to more education for females is likely to be an effective means of promoting fertility control.

Index of Wife's Aspiration for Daughter: This variable attains significance for only one fertility index among women above 30 years of age. However, it is the second and fourth ranking correlate of number of living children and number of live births, respectively, for the youngest group of mothers. A priori, one would expect an inverse relationship between this variable and fertility, but when the data are plotted, there is only a faint suggestion of such a relationship and the verdict is not clear.

Index of Economic Level of Respondent's Home at Time of Survey: This is based on three items, the wife's estimate of her economic level in the community, a similar estimate by the interviewer, and the number of modern objects possessed. After adjustment, the only significant finding is a direct relationship between economic status and number of pregnancies for the age group 30~39. The same direct relationship is shown for the other indices of fertility for this age group but it does not attain statistical significance. For the older and younger age groups the adjusted relationship between economic level is generally an inverted U with the lowest and highest economic groups having the lowest

fertility, but these findings do not attain statistical significance. The effect of economic level on fertility, after adjustment, is not clear.

Index of Mass Media Exposure: This is another modernity variable, the youngest age group obtain only slightly higher scores than does the oldest group. It is pertinent that Korea has put considerable emphasis on mass media to promote its family planning program. The adjusted relationship between the score in this index and fertility is a direct one for the 40~49 year group and inverse for the two younger age groups. This suggests that the use of mass media to promote contraception came too late to affect fertility in the oldest group. The inverse relationship in the two younger age groups is consistent with the view that mass media in Korea has been an effective means of promoting family planning.

DISCUSSION

This paper examines relationships of age at marriage and other selected factors with fertility. Although it does not directly deal with the time trends in fertility, some background information on these trends in Korea is pertinent. Estimates indicate that fertility was falling rapidly during the late 1950's and early 1960's (Cho, 1971a and 1971b; Chang, 1973; Kim, Y., 1967). The national family planning program was initiated in 1962. In the 1961~1971 decade, the number of children per family was estimated to have dropped 23% from 5.8 to 4.5, most of this fall occurring before 1966. In the same decade the average number of life-time abortions per woman rose from 0.7 to 1.6.

The current study found an unadjusted total of 3.7 living children from all study areas combined, ranging from 4.1 in Kosam to 3.3 in Seoul. The number of life-time abortions repo-

rted by our sample ranged from 0.3 in Kosam to 1.6 in Seoul as of 1970.

The data in this study support the view that a rise in age of marriage in Korea has been a major factor in the decrease in fertility in the last two decades. The influence of family planning is more difficult to assess despite its ranking second to age of marriage as a contributor to observed variation. The direct relationship between family planning and fertility in the two oldest age groups and the asyet uncertain direction of relationship for the youngest age group emphasize this difficulty.

We have suggested that the older age groups already had large families when family planning services became more available and were the first to adopt such services. This study does not attempt direct assessment of the relative importance of such factors as contraception and abortion on current fertility, dealing instead with the respondents' cumulative reproductive behavior. It does suggest that rise in age of marriage seems to be levelling off and that any further fall in fertility will be more clearly related to the success of family planning programs.

SUMMARY

Data from this study support the view that the following factors are not sufficiently important in Korea to invalidate the relationships observed between age of marriage and fertility: (1) Premarital pregnancy and common law marriage, (2) shortening of birth intervals in late marriages, (3) adverse effects of very early marriage in reproductive capacity, and (4) postponement of first pregnancy among early marriages.

Thirteen variables which were considered to be potential predictors of fertility were studied to determine their influence on three indices of

fertility. Age of marriage and family planning practice are the strongest predictors and account for about 10% and 7% of the total variance, respectively. Seven other factors each account for an intermediate amount of variability; these are ideal number of children, rural versus urban study area, education, aspiration for daughter, index of exposure to mass media, economic index of respondent's home at survey, and residence before marriage. The remaining variables have no consistently significant relationship to fertility.

Most of the relationships appear to be stable and consistent over time; others appear to be changing. The latter group include those variables which are associated with modernization indices of family planning practice, mass media exposure, and aspiration for daughters. Thus, the index of family planning practice is of limited significance for the 40~49 age group but is the most important variable for the 20~29 year women. The relationship is a direct one for the two age groups between 30 and 49 years which suggests that these groups already had high fertility when family planning services became available and that this high fertility then became an inducement to accept contraception. The pattern of relationship is not yet clear for the 20~29 year group. Similar interactions are observed for the other indices of modernity and are discussed.

The thirteen variables together can account for a maximum of about 40% of the variance in the number of live births in the age group 30~39, and for lesser amounts of variance in other age and fertility groupings.

REFERENCES

- 1) Andrews, F., et al.: *Multiple Classification Analysis: A Report on a Computer Program for Multiple Regression Using Categorical Predictors*, Survey Research Center, ISR, The Univ-

- ersity of Michigan, Ann Arbor, Michigan, November 1969.
- 2) Blake, J.: "Are Babies Consumer Durables? A Critique of the Economic Theory of Reproductive Motivation," *Population Studies*, 22, 1968, pp. 15-25.
 - 3) Bumpass, L.: "Age at Marriage and Socio-Economic Fertility Differentials," *Demography*, Volume 6, Number 1, February 1969, pp. 45-54.
 - 4) Chang, K.S.: "East Asia Review 1972," *Korea (South), Studies in Family Planning*, Number 3, May 1973, pp. 107-111, Population Council, New York.
 - 5) Cho, L.J. (1971a): "Korea: Estimating Current Fertility from the 1966 Census," *Studies in Family Planning*, Number 3, March 1971, pp. 74-78, Population Council, New York, New York.
 - 6) _____. (1971b): "Preliminary Estimates of Fertility for Korea," *Population Index*, 37, Number 1, January-March 1971, pp. 3-8.
 - 7) Cho, L.S. and Hahm, M.J.: "Recent Changes in Fertility Rates of the Korean Population" *Demography*, Volume 5, Number 2, 1968.
 - 8) Coale, A.J., et al.: "The Significance of Age Pattern of Fertility in High Fertility Population," *Milbank Memorial Fund Quarterly*, Volume XXXIX, Number 4, October 1961, pp. 621-646.
 - 9) Das, N.C.: "A Note on the Effect of Postponement of Marriage on Total Fertility and Female Birth Rate," *United Nations World Population Conference 1965, II*, New York, United Nations, 1967, pp. 128-131.
 - 10) Freedman, R., et al.: *Family Planning, Sterility, and Population Growth*, McGraw-Hill Book Company, Inc., 1959, pp. 273-288.
 - 11) Hong, S.: "Changing Patterns of Induced Abortion in Seoul, Korea," 1971.
 - 12) Kim, M.I.: "Age at Marriage and Fertility of Women in Three Selected Areas in Korea," Dr. P.H. thesis, The Johns Hopkins University, December 1972.
 - 13) Kim, M.I., et al.: "Marriage in Korea: I. Evidence of Changing Attitudes and Practice," submitted for publication, 1974a.
 - 14) _____, et al.: "Marriage in Korea: II. Changing Age at Marriage and the Influence of Social, Demographic, and Attitudinal Variables," submitted for publication, 1974b.
 - 15) Kim, T.L., et al.: *The Korean National Family Planning Program*, The Population Council, New York, 1972, pp. 166-169.
 - 16) Kim, Y.: "Age at Marriage and the Trend in Fertility in Korea," *United Nations World Population Conference 1965, II*, New York, United Nations, 1967, pp. 145-149.
 - 17) Koh, K.S., et al.: *The Korean 1968 Fertility and Family Planning Survey*, The National Family Planning Center, December 1970, Table 59, p. 83.
 - 18) Leasure, J.W.: "Malthus, Marriage, and Multiplication," *Milbank Memorial Fund Quarterly*, Volume XLI, Number 4, October 1965, pp. 419-435.
 - 19) Montagu, M.F. Ashley: "Adolescent Sterility in the Human Female," *Human Fertility*, Volume II, Number 2, 1946.
 - 20) Ryder, N.B., et al.: *Reproduction in the United States 1965*, Princeton University Press, Princeton, New Jersey, 1971, pp. 298-300.
 - 21) Talwar, P.P.: "A Note on Changes in Age at Marriage of Females and Their Effects on the Birth Rate in India," *Eugenics Quarterly*, Volume 14, Number 4, December 1967, pp. 291-295.
 - 22) Wolf, A.P.: "Childhood Association, Sexual Attraction, and the Incest Taboo: A Chinese Case," *American Anthropologist*, Volume 68, Number 4, August 1966, pp. 883-898.