

Associations of Son Preference and Socio-demographic Factors with Sex Selection of Children: Results from the Taiwan Women Health and Fertility Survey

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ABSTRACT

This study aimed to examine the associations of son preference and socio-demographic factors with sex selection of children among married women in Taiwan. We used data from the 2008 Women Health and Fertility Survey. A total of 1,634 women who had experience of planned pregnancies were analyzed. Contingency table and Chi square test were used to compare differences across categories. Generalized estimating equations (GEE) models were applied for multivariate analysis. 8.9% of the respondents ever used sex selection. Older at the time of pregnancy, higher education, later parity, husband was the only son of the family, or not reaching desired number of son were significantly associated with sex selection. The most frequently applied method for sex selection was traditional method. It is crucial to call public attention on gender balance and advocate on avoidance of using sex selection without medical reasons.

INTRODUCTION

Son preference in many countries of Asia, North Africa, Western Europe and North America has been reported and broadly described. {{ 1 Mutharayappa, R., Choe, M. K., Arnold, F. and Roy, T. K. 1997; 2 Van Balen, F. 2006;}}. Having preference for a child of a particular sex does not necessarily correlated with utilization of sex selection methods; however, higher sex ratios at birth were observed in societies with strong son preference and raised great social-demographic concerns. Taiwan is one among the East Asia countries that has strong son preference deep rooted in culture and historical background. As the increasing availability of sex selection technologies and decreasing in desired number of children of the child-bearing age couples, sex ratios at birth in Taiwan was fluctuating around 107 to 110 males per 100 females in the past three decades, which were higher than the range of normal expectation (105 to 107). In 2009, the sex ratio at birth (SRB) in Taiwan was 108.5. The imbalanced sex ratios were even much remarkable for higher birth order. {{ 3 BHP, 2009;}}

Whether women had preference for children of a particular sex did result in utilization of sex selection method and how it interacts with socio-demographic factors were seldom investigated. The aim of this paper was to examine the associations of son preference and socio-demographic factors with sex selection of children among married women in Taiwan. Sex selection here refers to the practice of using medical techniques or traditional methods to choose the sex of offspring. The medical techniques were designated to be performed for medical reasons such as avoidance of sex-linked disease like hemophilia. Sex selection for non-medical reasons include family balancing and gender preference and could result in distortion of the natural gender balance, reinforce discriminatory and sexist stereotypes towards women or devaluing. {{ 4 Dahl, E. 2007;}}. Debate remains on moral, legal, and social issues. {{ 5 Dickens, B. M. 2002; 6 McCarthy, D. 2001;}}.

METHOD

Study population

We used data of the 2008 Women Health and Fertility Survey, which was designed to collect policy-relevant information of women's health and their knowledge, attitude and practice on fertility related issues. A multi-stage, equal probability sampling was applied to obtain a national representative sample of women aged 20-49. In the first stage, 74 townships were selected from 359 administrative units. Secondly, blocks (lins) were sampled within each selected townships. In the final stage women aged 20-49 were selected from the sampled blocks. The survey protocols consisted of in-home face to face questionnaire interview administered by interviewer and a self-administered questionnaire. All information used for this analysis came from face to face interview questionnaire. A total of 4,301 sampled individuals responded. The response rate was 72.8%. 2,860 of the respondents were married at the time of interview. A total of 2,808 events of pregnancy from 1,634 women who ever had experience of planned pregnancies were identified for

subsequent analysis. All protocols were approved by human subjects committees at the Bureau of Health Promotion. (Taichung, Taiwan)

Variables

Sex selection was defined as making any attempt on sex selection of children before each of planned pregnancy. Socio-demographic characteristic and self-rating importance levels of having a son to continue family line were treated as categorical variables. Calendar year of each pregnancy was obtained directly from the structured questionnaires. Age at each pregnancy was computed from respondent's year of birth and year of pregnancy. We constructed variables of reaching desired number of son or daughter by comparing live birth of the respondent with her desired number of children of a particular sex. Pressure to have a son to continue family line was measured according to whether the respondent's husband was the only son of his family.

Statistical Analysis

The proportions of using sex selection method among subgroups, characterized by their socio-demographic factors, reaching desired number of daughter or son, importance and pressure to have a son to continue family line, were presented in contingency table, with Chi square test for differences among categories. Generalized estimating equations (GEE) models were applied for multivariate analysis of planned pregnancies and adjusted for within-subject correlations, using first-order autoregressive to assume working covariance. All statistic tests were two-tailed and $p < 0.05$ was considered statistical significant. Analyzes were performed with SAS version 9.1.3 (SAS Institute, Cary, NC).

RESULTS

Figure 1 shows the schematic diagram of the sample. Among a total of 1,634 women who had experience of planned pregnancy, 8.9% of them ever used sex selection method.

The proportions of using sex selection according to socio-demographic characteristics of the sample are presented in Table1. Higher proportions of sex selection were observed among those who had higher education or whose husband was the only son of the family. The proportion was 4.99% among those who had junior high school or lower education, 10.36% among senior high school education, and 9.69% among college or higher. For those whose husband was the only son in his family, the proportion was 12.35%.

If we used planned pregnancies of all respondents for analysis, older at age of pregnancy, later at year of pregnancy, higher education, or later parity were found to be associated with higher proportion of sex selection. There were significant differences between proportions of sex selection with whether husband was the only son in his family, but no significant difference were observed across levels of self-rating importance of having a son to continue family line. (Table2)

Table 3 describes the multiple adjusted odds ratio of using sex selection according to socio-demographic characteristics, reaching desired number of son or daughter, attitude toward and pressure to have a son to continue family line. Three GEE models were specified. In model

one, we included whether the respondent reached her desired number of son and daughter in the multiple adjusted model. Compared with those who had a baby before the age of 24, married women aged 35 and above were more likely to use sex selection (OR=2.88, 95%CI: 1.33-6.22). In comparison with junior high school or lower education, women of senior high school education and college or above were more likely to use sex selection (OR=2.31, 95%CI: 1.27-4.20 and OR=2.14, 95%CI: 1.08-4.24, respectively). After controlling for socio-demographic variables, later parity had higher risk of using sex selection (OR=3.16, 95%CI: 2.05-4.89 for second parity and OR=3.87, 95%CI: 2.28-6.56 for third parity or above). For those who did not reach their desired number of son and daughter were more likely to use sex selection (OR=1.55, 95%CI: 1.04-2.31). (Table 3)

In model two, we replaced the variable of whether the respondent reached her desired number of son and daughter with the variable of whether respondent reaching her desired number of son. There was not much change on odds ratios of the independent variables. Those who did not reach their desired number of son were more likely to use sex selection (OR=2.40, 95%CI: 1.67-3.44). In model three, we further replaced the variable of whether the respondent reached her desired number of son with the variable of whether the respondent reached her desired number of daughter. Those who did not reach their desired number of daughter were less likely to use sex selection (OR=0.41, 95%CI: 0.27-0.61). Positive association was observed between sex selection and self-rating importance of having a son to continue family line. Compared with those who thought having a son to continue family line was unimportant, those who thought that was very important had a significant higher risk of using sex selection (OR=1.66, 95%CI: 1.03-2.68). (Table 3)

Table 4 shows the distribution of multiple-response of sex selection methods. Among a total of 171 planned pregnancies that ever used sex selection, 72.51% used traditional methods, 8.19% used the method of sperm separation, and 4.68% used the vaginal douche. The percentage of using sperm separation increased with age at pregnancy and calendar year of the pregnancy. An inverse trend was observed on traditional methods. (Table4)

DISCUSSTION

In this paper, we used data from the most recent Women Health and Fertility Survey in Taiwan to examine the associations of son preference and socio-demographic factors with sex selection of children among married women. Whether the women reached her desired number of son and daughter was a significant predictor of using sex selection. The statistical significance remained when the variable was replaced by whether respondent reaching her desired number of son. However, an inverse association was found between not reaching desired number of daughter and sex selection.

After adjusted for reaching desired number of children of a particular sex, older at the time of pregnancy and later parity were significantly associated with sex selection. This implies women might have higher intention to select a child of a particular sex when letting chance decide is not likely to meet their expectation on sex composition of children, especially when they are reaching

their desired number of children or are less likely to plan for more children in the future due to biological age constrain of child-bearing.

We used whether husband was the only son of the family as indicator for pressure to have a son to continue family line. It appeared to be a significant predictor of sex selection. However, the predictive value of self-rating importance of having a son to continue family line was controversial. Significant but inverse association was found only in the multivariate model adjusted for whether the respondent reached her desired number of daughter. This indicates son preference would play more important role than daughter preference on sex selection.

There were two limitations of this analysis. Firstly, the survey data did not collect information about the particular sex of child that the women intended to select for. We tried to differentiate this by specifying 3 multivariate models and include the variables of reaching desired number of son or daughter in 3 different ways. Secondly, we did not have sufficient information to examine the possible social expectation bias on measurement of self-rating importance of having a son to continue family line.

Though data not show in the tables, sex ratio of the babies gave birth by those who used sex selection method was as high as 231 males per 100 females. The most frequently applied sex selection method was traditional method (72.5%), followed by sperm separation (8.2%) and vaginal douche (4.7%) selection method. Higher educated women tend to have more control over selecting children of a particular sex. Sex selection for non-medical purposes are not allowed in Taiwan. The increasing trend of using medical techniques, namely sperm separation, implies regulations on medical intervention of sex selection should be reinforced. Couples of child-bearing age shall be aware of the serious social-demographic problems, which may result from sex selection.

In conclusion of this paper, child-bearing age women who have not reach desired number of son or under pressure of having a son to continue family line are more likely to use sex selection. It is crucial to call public attention on the socio-demographic problems of imbalance sex ratio at birth. Advocate on avoidance of sex selection for non-medical purposes are essential, especial for high education couples.

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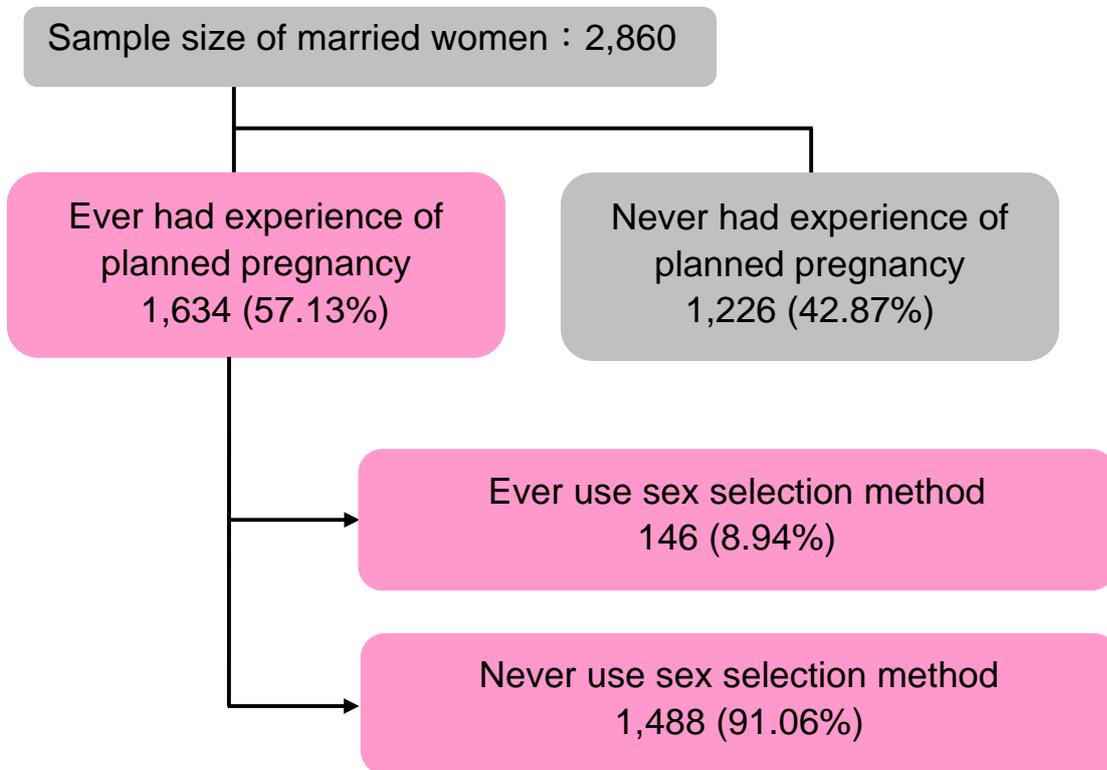


Figure 1 The schematic diagram of sample

Table 1 The percentage of using sex selection method among those who had experience of planned pregnancy

	Use of Sex Selection Method				p-value#
	Ever		Never		
	n	%	n	%	
Total	146	8.94	1488	91.06	
Age					
20-29	8	5.13	148	94.87	0.1752
30-39	67	9.85	613	90.15	
40-49	71	8.90	727	91.10	
Education					
Junior high or lower	18	4.99	343	95.01	0.0108
Senior high	72	10.36	623	89.64	
College or above	56	9.69	522	90.31	
Husband was the only son in his family					
Yes	30	12.35	213	87.65	0.0490
No	116	8.42	1261	91.58	
Attitude toward the importance of having a son to continue family line					
Very important	57	10.42	490	89.58	0.3273
Somewhat important	51	8.31	563	91.69	
Unimportant	38	8.05	434	91.95	

#: Chi-square test

Table 2 The percentage of using sex selection method among those who had experience of planned pregnancy, analysis on planned pregnancies of the respondents

	Use of Sex selection Method				p-value#
	Yes		No		
	n	%	n	%	
Total	171	6.09	2637	93.91	
Age at pregnancy					
15-19	0	0.00	53	100.00	<0.0001
20-24	25	3.61	667	96.39	
25-29	61	5.46	1056	94.54	
30-34	50	9.88	456	90.12	
35+	16	15.09	90	84.91	
Year of pregnancy					
~1989	18	3.05	572	96.95	<0.0001
1990~1999	67	5.96	1058	94.04	
2000~	67	8.83	692	91.17	
Education					
Junior high or lower	20	2.89	672	97.11	0.0002
Senior high	83	6.87	1126	93.13	
College or above	68	7.50	839	92.50	
Parity					
First	27	2.59	1017	97.41	<0.0001
Second	75	7.52	922	92.48	
Third or more	69	9.00	698	91.00	
Reach desired number of son and daughter					
Yes	56	4.84	1101	95.16	0.0204
No	115	6.97	1536	93.03	
Husband was the only son in his family					
Yes	34	8.48	367	91.52	0.0336
No	137	5.73	2254	94.27	
Attitude toward the importance of having a son to continue family line					
Very important	64	6.63	902	93.37	0.5687
Somewhat important	60	5.52	1027	94.48	
Unimportant	47	6.23	707	93.77	

#: Chi-square test

Table 3 Odds Ratio of sex selection among those who had experience of planned pregnancy, analysis on planned pregnancies of the respondents

	Model 1		Model 2		Model 3	
	OR	95% Confidence Interval	OR	95% Confidence Interval	OR	95% Confidence Interval
Age at pregnancy						
≤24	1.00	—	1.00	—	1.00	—
25-29	1.21	(0.74, 1.97)	1.24	(0.76, 2.02)	1.19	(0.72, 1.95)
30-34	1.78	(1.00, 3.18)	1.76	(0.99, 3.14)	1.71	(0.96, 3.05)
≥35	2.88	(1.33, 6.22)*	2.80	(1.28, 6.13)*	2.65	(1.22, 5.74)*
Year of pregnancy						
~1989	1.00	—	1.00	—	1.00	—
1990~1999	1.39	(0.76, 2.56)	1.46	(0.80, 2.66)	1.44	(0.79, 2.63)
2000~	1.58	(0.81, 3.07)	1.66	(0.86, 3.21)	1.71	(0.88, 3.30)
Education						
Junior high or lower	1.00	—	1.00	—	1.00	—
Senior high	2.31	(1.27, 4.20)*	2.12	(1.16, 3.87)*	2.53	(1.39, 4.61)*
College or above	2.14	(1.08, 4.24)*	2.00	(1.01, 3.98)*	2.58	(1.31, 5.11)*
Parity						
First	1.00	—	1.00	—	1.00	—
Second	3.16	(2.05, 4.89)**	3.71	(2.37, 5.82)**	2.60	(1.72, 3.94)**
Third or more	3.87	(2.28, 6.56)**	4.59	(2.66, 7.89)**	2.89	(1.73, 4.81)**
Reach desired number of son and daughter						
Yes	1.00	—	—	—	—	—
No	1.55	(1.04, 2.31)*	—	—	—	—
Reach desired number of son						
Yes	—	—	1.00	—	—	—
No	—	—	2.40	(1.67, 3.44)**	—	—
Reach desired number of daughter						
Yes	—	—	—	—	1.00	—
No	—	—	—	—	0.41	(0.27, 0.61)**
Attitude toward the importance of having a son to continue family line						
Unimportant	1.00	—	1.00	—	1.00	—
Somewhat important	0.90	(0.56, 1.45)	0.88	(0.55, 1.41)	1.06	(0.65, 1.72)
Very important	1.35	(0.84, 2.15)	1.24	(0.78, 1.97)	1.66	(1.03, 2.68)*

*p<0.05 **p<0.001

Table 4 The percentage of methods for sex selection, results of multiple-response

	n	Traditional Methods		Sperm Separation		Vaginal Douche		Others	
		n	%	n	%	n	%	n	%
Total	171	124	72.51	14	8.19	8	4.68	42	24.56
Age at pregnancy									
15-19	0	0	0.00	0	0.00	0	0.00	0	0.00
20-24	25	22	88.00	0	0.00	0	0.00	4	16.00
25-29	61	44	72.13	4	6.56	2	3.28	16	26.23
30-34	50	37	74.00	4	8.00	4	8.00	10	20.00
≥35	16	11	68.75	3	18.75	0	0.00	4	25.00
Year of pregnancy									
~1989	18	15	83.33	0	0.00	0	0.00	4	22.22
1990~1999	67	48	71.64	3	4.48	3	4.48	18	26.87
2000~	67	51	76.12	8	11.94	3	4.48	12	17.91