Original article

Differentials of fertility in Rural Butajira

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Abstract

Background: Ethiopia is one of the populous countries in Africa. Only about 8 % of currently married women are using contraception, which is low to affect the fertility level significantly.

Objectives: To identify differentials of fertility in Rural Butajira, Meskan and Mareko District of Southern Nations', Nationalities and Peoples Regional State.

Methods: The study design is case-referent, where the Cases are women with number of children ever born alive is less than 5 and Controls are women with number of children ever born alive greater or equal to 5.

Results: A total of 219 women with number of children ever born alive less than 5 and 899 women with number of children ever born alive greater or equal to 5 were included in the study. Of all the socio-demographic and reproductive variables, later Age at first marriage and first birth showed lower number of children ever born alive with (OR= 1.82, 95 % CI: 1.24,2.83) and (OR= 3.08, 95 % CI: 2.03,4.68) respectively. Breast-feeding duration of more than 6 months showed association with less number of children ever born alive (OR= 1.92, 95 % CI: 1.30,2.80). Child mortality affected number of children ever born alive significantly (OR= 7.39, 95% CI: 4.62,9.08).

Conclusion: Based on the finding, delaying the age at first marriage and first birth, encouraging mothers to breast-feed their child and expanding interventions to reduce the high child mortality rate through curative and preventive services are recommended. [*Ethiop.J.Health Dev.* 2003;17(1):17-25]

Introduction

Ethiopia is one of the populous countries in Africa. It stands third after Nigeria and Egypt. According to the 1994 census, the projected estimate for the year 2001 is 65.3 million (1) with an annual growth rate of 2.6 % (1). The total fertility rate for the year 2000 was found to be 5.9 according to the demographic and health survey (2). The Crude Birth Rate (CBR) of 44.17 per 1000 population and Crude Death Rate (CDR) of 14.96 per 1000 population was estimated for the year 2000. If the population continues to grow at this rate, it is expected to double in less than 23 years (3). The use of contraception in Ethiopia is low, about 8% (2) for currently married women, which is too low to affect the fertility level significantly. Maternal mortality ratio (MMR) is estimated at 560-850 per 100,000 live births (4).

There are two groups of factors that affect fertility. The first consists of socio- economic variables, which are designated as indirect determinants. The direct or proximate determinants are biological and behavioral factors through which the background (indirect determinants) variables must act to affect fertility (5). Social, economic or cultural factors must operate through the direct determinants to affect fertility. The direct determinants are amenable to change and hence interventions can be considered against uncontrolled fertility.

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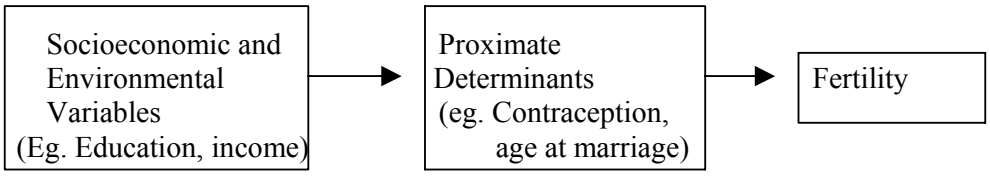

Studies in a number of countries indicate that wherever fertility is high, maternal, infant and child mortality rates are high. On average, in developing countries a pregnancy is 18 times more likely to end in the woman's death than in developed countries (6). As high fertility is associated with an increased obstetric and medical risk, understanding factors influencing fertility level would be of paramount importance in improving the health status of women through better-controlled fertility. Hence, this study was conducted to identify factors that influence fertility level in rural Butajira.

Methods

The study was conducted in Meskan and Marko District (commonly referred as Butajira) in Gurage Zone, Southern Nations, Nationalities and Peoples Regional Government (SNNPRG) which is located 130 Kms South of the Capital City of Addis Ababa (7). The study design is a case-referent, where the cases are women with number of children ever born alive (CEB) less than 5. Controls are women with number of children ever born alive (CEB) greater or equal to 5. The cutoff point of 5 is taken because the medical and obstetric risk for mothers with number of CEB greater or equal to 5 is higher compared with those less than 5. The Butajira Rural Health Program (BRHP) has selected 9 Peasant Association (PAs) out of a total of 82 PAs in the district, and one Urban Dwellers Association (UDA) out of four in the town on the ground of probability proportional to size (PPS). Out of the 9 PAs, 6 PAs were selected randomly after stratifying them into highland and lowland. By a lottery method, three PAs from each stratum were selected. The study subjects are selected from the Butajira Rural Health Project (BRHP) surveillance system with age range from 30 to 49. The age range is restricted as fertility is affected by age. All women aged 30-49 with duration of marriage 10 years and above in the selected 6 PAs are included in the study. Sample size was calculated considering education as a major determinant of fertility using STATCALC program of EPI INFO Version 6.2:

The proportion of women who are educated among the high fertile women is considered to be 15 %. Minimum detectable OR of 2.0, a 5% level of significance, a power of 80% and allocation ratio of cases to controls (n_1: n_2) 1:4. These assumptions give a sample size of a 217 for cases and 867 for the controls.

Standardized structured questionnaire that was used in the recent demographic and health survey (DHS) was used to enable comparability of study findings. A pretest was conducted in a rural village adjacent to the study area to test understandability and answerability of the questionnaire and to familiarize the interviewers with the instrument.

The number of ever born alive (CEB) children, which is categorized as low when CEB alive is less than 5 and high when CEB alive is greater or equal to 5 was the main dependent variable. Independent variables include socio-economic and demographic variables, reproductive variables, Biological variables, Sexual variables, Knowledge about contraception,

Knowledge about safe period, desire for more children and Child mortality.

The data collectors were recruited from the Butajira Rural Health Project. The data collectors who are the employees of the study base had prior training on data collection and have worked in the study base for about a decade. Training was given to the data collectors by the principal investigator on the method of data collection with respect to the study for two days. There were 16 data collectors and 2 supervisors with reliability check of 1 in 50 households. Incomplete questionnaires were filled by callbacks while on the fieldwork. The data collection was done on March/April 2001.The data were entered into EPI info version 6.2 computer program. Multiple logistic regression was used using SPSS for Windows version 10 for controlling confounding. The study got ethical clearance from the Department of Community Health and the Faculty of Medicine of AAU.

Results

A total 219 cases and 899 controls were included in the study. The majority of the study subjects are Meskans in ethnicity (49.9%), followed by the Selte (15.5%) and Sodo (12.5%). About 82.2% of the women are housewives, the remaining being traders, farmers and Tella- sellers (self employed), while most of their husbands get their means of subsistence from agriculture. Muslim is the main religion (74.1%), followed by the majority of the study subjects. Women among the low fertile group are better educated (13.7%) compared to women in the high fertile group (7.9%) (Table 1).

Table 1: **Fertility level versus Socio demographic variables of women in Butajira Adjusted for socio-demographic variables, April 2001**

	Low fertile (n=219)	High fertile (n=899)	Crude OR	95% CI	Adjusted OR	95% CI
Maternal age						
30-34	152	235	1			
35-39	27	251	0.17	(0.10,0.27)	0.20	(0.12,0.35)
40-44	23	249	0.14	(0.09,0.23)	1.14	(0.60,2.19)
45-49	17	164	0.16	(0.09,0.28)	1.17	(0.61,2.23)
Ethnicity						
Meskan	113	445	1			
Selte	38	135	1.11	(0.72,1.71)	0.69	(0.29,1.59)
Sodo	20	120	0.66	(0.38,1.13)	0.67	(0.26,1.66)
Mareko	27	112	0.95	(0.58,1.55)	0.82	(0.31,2.19)
Dobi	10	40	0.98	(0.45,2.12)	0.86	(0.35,2.12)
Others	11	47	0.92	(0.44,1.91)	0.46	(0.15,1.38)
Religion						
Muslim	173	655	1			
Orthodox	35	213	0.62	(0.41,0.94)*	1.43	(0.49,4.17)
Others	11	31	1.34	(0.62,2.5)	6.84	(0.12,41.69)
Educational Status						
Cannot read and write	189	828	1			
Read and write and above	30	71	1.85	(1.14,2.98)*	1.46	(0.77,2.78)
Occupation						
House wife	190	770	1			
Others	29	129	0.91	(0.58,1.43)	0.96	(0.61,1.52)
Income (monthly/Birr)						
≤100	192	692	1			
101-200	19	145	0.47	(0.28,0.80)*	0.02	(0.00,7.6)
>200	1	26	0.14	(0.01,0.96)*	0.04	(0.00,1.52)
Don't know	7	36				
Residence till 12 years						
Urban	5	32	1			
Rural	214	867	1.58	(0.58,4.67)	1.69	(0.56,5.14)

* significant at 5% ** Adjusted for socio-demographic variables

Ethnicity, Religion and education of the mother didn't show statistically significant difference among the low and high fertility group when adjusted for socio-demographic variables (Table 1). Women with Age at first marriage at or greater than 20 have lower number of CEB alive with OR of 1.82 and 95 % CI lies between 1.24 and 2.83 when compared with women age at first marriage below 15 years. Age at menarche is not related with number of children ever born alive (Table 2).

Table 2: **Fertility level versus sexual behavior of women in Butajira Adjusted for socio-demographic and reproductive variables, April 2001**

Risk factors	Low fertile (n=219)	High fertile (n=899)	Crude OR	95 % CI	Adjusted OR	
Age at first marriage						
<15	10	87	1			
15-19	175	764	1.99	(0.98, 4.17)	1.68	(1.18, 2.56)*
20+	34	48	6.16	(2.64, 14.68)*	1.82	(1.24, 2.83)*
Duration of marriage						
10-14 years	84	62	1			
15 +years	135	838	0.12	(0.08, 0.17)*	0.15	(0.12, 0.32)*
Being in polygamous Marriage						
No	147	583	1			
Yes	72	361	0.90	(0.65, 1.25)	1.11	(0.70, 1.74)
Frequency of sex in Days/month						
0-4	24	84	1			
5-10	51	234	0.76	(0.43, 1.37)	2.64	(0.19, 34.90)
11-20	39	162	0.84	(0.46, 1.55)	3.36	(0.27, 41.53)
21-30	2	8	1.22	(0.24, 5.60)	4.46	(0.34, 58.91)
not willing to tell	103	411				
Age at menarche						
<15	42	197	1			
15-19	174	682	1.15	(0.78, 1.70)	0.72	(0.17, 3.02)
20+	33	19	2.47	(0.99, 6.10)	0.41	(0.27, 3.87)
Don't know	0	1				
Age at first intercourse						
<15	12	85	1			
15-19	174	767	1.61	(0.83, 3.17)	0.12	(0.03, 4.56)
20+	33	46	5.08	(2.26, 11.58)	0.41	(0.04, 3.87)
Don't know	0	1				
Age at first birth						
≤19	108	682	1			
20+	98	214	2.89	(2.09, 4.01)	3.08	(2.03, 4.68)*
Infertile	13	0				
Don't know	0	3				
Age at last birth						
≤24	27	9	1			
25-29	84	87	0.30	(0.12, 0.71)	0.03	(0.01, 0.07)
30+	94	802	0.04	(0.02, 0.08)	0.11	(0.07, 0.17)
Infertile	13	0				
Don't know	0	1				

Table 2: Continued

Risk factors	Low fertile (n=219)	High fertile (n=899)	Crude OR	95 % CI	Adjusted OR	95 % CI
Postpartum abstinence (last birth)						
0-2	140	637	1			
3.5	46	139	0.23	(0.23,0.47)*	0.97	(0.31,3.11)
6+	19	56	1.56	(0.86,2.76)	1.27	(0.48,3.39)
Infertile	13	0				
Don't know	1	67				
Postpartum Abstinence (Last but one birth)						
0-2	140	637	1			
3-5	48	202	1.08	(0.74,1.58)	2.10	(0.00,4.45E+52)
6+	11	46	1.09	(0.52,2.24)	1.56	(0.00,3.19E+52)
Infertile	13	0				
Don't know						
Postpartum ammenorrhea (last birth)						
0-6	32	148	1			
7-12	45	178	1.17	(0.69,1.99)	0.69	(0.26,1.92)
13-18	26	112	1.07	(0.58,1.98)	0.34	(0.13,1.89)
19-24	71	312	1.05	(0.65,1.71)	0.68	(0.25,1.87)
24+	31	148	0.97	(0.54,1.73)	0.93	(0.41,2.10)
Infertile	13	0				
Don't know	1	1				
Postpartum ammenorrhea (last but one birth)						
0-6	16	86	1			
7-12	22	116	1.02	(0.48,2.18)	1.98	(0.69,5.73)
13-18	36	123	1.57	(0.79,3.18)	2.63	(0.98,7.09)
19-24	91	418	1.17	(0.63,2.18)	1.04	(0.42,2.60)
24+	31	147	1.13	(0.56,2.31)	1.33	(0.63,2.81)
Infertile	13	0				
Don't know	10	9				
Breast feeding duration (last birth)						
0-6	28	141	1			
7-12	33	162	1.03	(0.57,1.85)	1.67	(0.72.3.84)
13-18	14	52	1.36	(0.62,2.93)	1.97	(0.88,4.39)
19-24	74	297	1.25	(0.76,2.08)	0.77	(0.27,2.21)
24+	55	245	1.13	(0.67,1.92)	1.04	(0.59,1.86)
Infertile	13	0				
Don't know	2	2				
Breast feeding duration (last but one birth)						
0-6	9	69	1			
7-12	16	41	2.99	(1.12,8.15)*	1.92	(1.30,2.80)*
13-18	14	36	2.98	(1.08,8.36)	1.38	(1.16,1.88)*
>18	166	748	1.74	(0.81,3.86)	1.05	(0.59,1.88)
Infertile	13	0				
Don't know	1	5				

* Significant at 5%

** Adjusted for socio-demographic and reproductive variables

Those mothers who breast fed their child in the last but one child for more than 6 months have a significantly lower number of children ever born alive than mothers who breast fed below 6 months. Breast feeding duration of 7-12 months and 13-18 months showed significantly lower fertility with OR of 1.92 and 95% CI (1.12,8.15) and OR of 1.38 with 95 % CI of (1.16,1.88) respectively (Table 2). Use of contraception was not statistically different between the low and high fertility groups; OR= 1.51 (95% CI: 0.19,1.38).

Knowledge about contraception assessed by asking whether the woman knows the existence of family planning and Knowledge about the fertile period between the menstrual cycles also didn't show significant difference between the low and high fertility group with OR of 1.07 and 95% CI (0.65,1.76). Number of desired children didn't show significant difference between the two fertility groups (Table 3).

Table 3: **Fertility level versus contraceptive use of women in Butajira adjusted fro socio-demographic, reproductive and delivery outcome variables, April 2001.**

	Low fertile (n=219)	High fertile (n=899)	Crude OR	95% CI	Adjusted OR	95% CI
Contraceptive use						
No	206	859	1			
Yes	13	40	1.36	(0.68,2.68)	1.51	(0.19,1.38)
Have you ever heard of Contraception						
No	130	523	1			
Yes	89	376	0.95	(0.70,1.30)	1.07	(0.65,1.76)
No of desired Children						
<5	10	35	1			
≥5	157	661	0.83	(0.39,1.83)	0.99	(0.00,5.40)
As God Gives	52	203	0.92	(0.41,2.12)	0.99	(0.00,5.21)

** Adjusted for socio-demographic and reproductive, and delivery outcome variables

History of child death is associated with higher number of children ever born alive with OR of 6.47 and 95 % CI: (4.62, 9.08). The difference persisted even after controlling for socio-demographic, reproductive and birth outcome variables, with OR of 7.39 and 95 %CI of (4.62, 9.08). Those mothers with history of child death are likely to end up in having many children. The occurrence of abortion (wanted or unwanted) and stillbirth didn't contribute for significant difference between the low and high fertility profile group (Table 4).

Discussion

This study has attempted to look into differentials of fertility in a rural context encompassing as many risk factors as possible. Ethnicity and religion made no significant difference on number of children ever born alive. This could be due to the fact that almost all of them are Gurages who have common traditional values and aspirations. The Muslim is the dominant religion in the study area and it is very difficult to observe significant difference among the various religious groups, as the others are not adequately represented in the study area. Studies have shown that the effect of religion on fertility is mediated through education, contraception utilization pattern and early marriage patterns (8).

Age at first marriage has significant bearing on the number of children ever born alive. Age at marriage is an important factor influencing fertility in countries like ours where level of contraception is very low. Similar results are

Table 4: **Fertility level versus child/infant mortality and pregnancy outcome of women in Butajira adjusted for socio-demographic, reproductive and delivery outcome variables, April 2001.**

	Low fertile (n=219)	High fertile (n=899)	Crude OR	95% CI	Adjusted OR	95% CI
History of Child/infant Mortality						
No	154	241	6.47	(4.62,9.08)	7.39	(4.62,9.08)*
Yes	65	658	1			
Abortion (Wanted)						
No	217	888	1.35	(0.28,8.84)	0.03	(0.00,8.3E+30)
Yes	2	11	1			
Abortion (Unwanted)						
No	184	754	1.01	(0.66,1.54)	1.88	(0.19,17.83)
Yes	35	145	1			
Still birth						
No	214	850	2.47	(0.93,7.12)	0.01	(0.00,3,1E+24)
Yes	5	49	1			

* Significant at 5%
** Adjusted for socio-demographic and reproductive variables

documented in Nepal (9), Egypt (10) and Morocco (11). The earlier age at marriage exposes to an early first intercourse, with a consequence to earlier age at first birth. Mothers with an earlier age at first birth are likely to end up in having many children (12).

The duration of breast-feeding showed significant difference between the two fertility profiles in the last but one child. Those mothers with a prolonged breast-feeding showed a lower fertility status. A comparative study assessing differentials of fertility in two rural areas of Bangladesh, Matlab and Teknaf showed a variation in the natural fertility of the two populations. The differences in number of children ever born alive were explained by the difference in breast-feeding practice of the two populations with median duration of 30 months for Matlab and 22 months for Teknaf (13). The Demographic and Health Survey data of Kenya showed that the fertility declining effect of postpartum infecunadabilty stood dominant over the other determinants (14).

The overall contraceptive use among the study subjects is low (1.9%) compared with the national average 8% and also lower than the CPR for rural Ethiopia, which is 4.3% (4). Therefore, the use of contraception did not appear to have a significant effect on fertility level. In areas where the use of contraception is significantly higher like in Senegal (15,5), Bangladesh (16,13), Egypt (10) and Zimbabwe(14), the fertility declining effect of contraception is significant.

The role of induced and spontaneous abortion in explaining fertility differentials is insignificant. Getting information on abortion is quite difficult hence the fertility declining effect of abortion has been very difficult to quantify (17). An attempt was made in Kenya and Zimbabwe to see the impact of abortion on fertility, but because of rare and unreliable statistic on induced abortion, it was not possible to see its effect (6).

In those mothers who experienced child death, the risk of having higher fertility increases proportionally. Similar results have been documented in Korea (18), Ethiopia (19) and India (20). In a study done in urban India, the fear of child mortality and their own experience of the child death tended to increase the size of family even beyond what the mother

considered to be ideal (20). The Korean data collected for National Fertility Survey indicated conclusively that infant death increases the sequential risk of child bearing across the birth order and irrespective of time, whether family planning services were available or not (18). A study conducted in urban Addis Ababa has also showed the fertility enhancing effect of child death after controlling for variables like age at marriage, desired number of children, educational level of woman and husband and working status of women (19). There is an argument though the association between child death and number of children ever born alive works in both directions. Child death could result in high number of CEB alive or high number of CEB alive could result in child death. As this data was collected cross-sectionally, the chicken –egg dilemma in the association could not be resolved.

Number of children desired before marriage is not significantly different between the two fertile groups. This is contrary to other studies where the desire to have lower children usually precedes the actual decline in fertility (21).

Some of the events may be difficult to remember and hence the effect of recall bias and chicken-egg dilemma in some associations must be treated carefully. The effect of age at first marriage and birth and the duration of breast-feeding as fertility differentials are significant factors. Childhood mortality by far stands as a powerful predictor of fertility. Based on the findings of the study, delaying the age at first marriage and first birth through an organized women activity for women empowerment, encouraging mothers to breast-feed their child for a longer duration are recommended. Curbing the high child mortality through measures like better vaccination access, strengthened Oral Rehydration therapy and better hygiene through safe water supply is recommended.

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