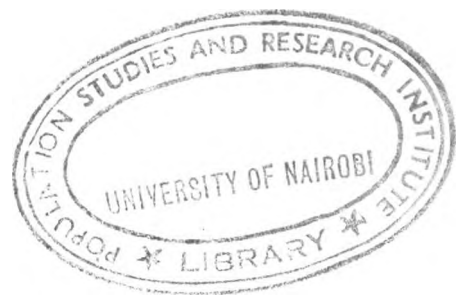


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TOPIC: THE RELATIONSHIP BETWEEN INFANT/CHILD MORTALITY
FERTILITY DESIRES AMONG KENYAN WOMEN: THE POLICY
IMPLICATION. //

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OCTOBER 1990.

DECLARATION

I declare that this project is my original work and to the best of my knowledge has not been presented for a degree at any other University, or educational institution.

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DEDICATION

I dedicate this document to my mother Joice Auma, and to my late father Erasto Oduor.

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CHAPTER ONE

1.1 INTRODUCTION.

In most developing countries, public health programmes have succeeded in producing tremendous declines in infant/child mortality but without a commensurate decline in fertility. The resulting wide gap between fertility and mortality levels has produced an unprecedented high rate of population growth. In Kenya, child mortality declined from about 106 per 1000 in 1974 to 89 per 1000 in 1984 while fertility has undergone only a modest decline from a TFR of 7.7 in 1981 (KCPS, 1981) to a TFR of 6.7 in 1989 (KDHS, 1989).

According to demographic transition theory, the process of economic development first produces a decline in mortality which is then followed by a decline in fertility. Fertility is high in traditional societies and low in modern societies. In between there is demographic transition.

Kenya as one of the developing countries has experienced a high rate of population growth and although fertility has recently started to decline, the amount of decline is still not significant. Fertility has remained at a high level while mortality has reached very low levels. Kenya has undergone a period of very rapid population growth before starting to experience a decline in fertility suggesting that it could be

1.2 STATEMENT OF THE PROBLEM.

The main problem to be investigated in this study is to determine if there is any relationship between infant, child mortality and fertility. Coale (1973) says that fertility transition occurs in three stages namely,

- i) a decline in the proportions married, followed by
- ii, a decline in marital fertility.

He outlines the three conditions necessary for fertility to decline as.

- i) acceptance of calculated choice as a valid element in marital fertility,
- ii) the perception of advantages from reduced fertility, and
- iii) knowledge and mastery of effective techniques of control

Although variables such as education, income distribution, urbanization, mass media use and infant/child mortality are thought to affect fertility transition, it is not known to what degree or in what combination these factors of modernization are required to trigger a fall in fertility. Despite extensive socioeconomic development fertility in most Sub-Saharan African countries has remained at a high level. It may be that both mortality and fertility are affected by the same forces of modernization, although mortality responds faster than fertility to modernization or it may be that mortality decline is just one of the conditions necessary for fertility decline. Recent research works as well as opinions of analysts and decision

makers contend that decline in mortality is a necessary but not a sufficient condition for decline in fertility (Hamed, 1988).

Family planning programmes in most developing countries have not been very successful. This is not because of lack of appropriate contraceptives but because most persons are still rationally motivated to have large families. This is reflected in the findings concerning desired family size. The average number of children desired by Kenyan parents is four (KDHS, 1989). It is likely that most Kenyan parents have a high number of desired children because infant/child mortality is still high.

1.3 JUSTIFICATION.

The hypothesis that infant mortality reduction could result in fertility decline has been supported by empirical evidence at many levels despite limited empirical support for the hypothesis. This is one reason why it deserves careful scientific scrutiny. Another reason is that unlike most other proposed fertility reduction policies, the failure of this one to obtain the desired fertility response would further increase population growth rates. Most developing countries of Africa have had tremendous increases in their rates of population growth as a result of massive declines in infant/child mortality which were accompanied by similar declines in fertility. Reduction of infant/child mortality may be an optimal condition for the success of family planning programmes. Acceptance of family planning may depend on levels of infant/child mortality, because

it becomes easier to convince parents to prevent pregnancies when they have some assurance that children already born will have a reasonable chance of surviving to adulthood.

In recognition of the importance of the subject of infant mortality in relation to the level of fertility, the Committee for International Correlation of National Research in Demography (CICRED) held a seminar between 6th and 12th May 1977 in Bangkok Thailand which was devoted exclusively for this topic. The International Union for the Scientific Study of Population (IUSSP) also devoted a session to the discussion of the effects of infant and child mortality on fertility in 1977.

According to the World Health Organisation (WHO, 1981), the contribution of child deaths to total mortality per year in many countries in Africa where mortality is recorded to be the highest among the developing regions, is close to fifty percent. The World Population Plan of Action has noted the potential relationship between infant and child mortality and fertility when it declared that "sustained reduction in fertility has generally been preceded by reductions in mortality. Although this relationship is complex, mortality reduction is a prerequisite to a decline in fertility."

Even on a regional basis, as is evident from the KDHS 1989 data, those provinces which have the highest fertility also have the highest infant and childhood mortality rates:

Table 1.

| Province | Infant/child mortality | Mean number of children ever born (CED) |
|----------|------------------------|---|
| Nyanza | 148.5 | 7.9 |
| Western | 132.8 | 8.2 |
| Coast | 156.8 | 7.8 |
| Nairobi | 88.1 | 1.8 |
| Central | 17.2 | 2.2 |

1.4 LITERATURE REVIEW

Pebley, Delgado and Brineman (1979) studied individual level behavioral effects of infant/child mortality on fertility desires in two areas of Guatemala. They assumed that either personal experience with child mortality or perception of the mortality conditions in the community would affect fertility desires. However, the validity of this assumption about accurate perception of mortality conditions has been challenged by Heer and Wu (1975). They also assumed that fertility decisions are made sequentially and may be qualitatively different at different stages in life. Hence a separate analysis is performed for each parity group women with 0-2 children, 3-4 children and 5+ children. Using logit analysis, they found that personal experience with the death of ones own children and ones siblings has an

effect on additional children desired but these influences are manifested at different life stages as represented by parity levels whereas perceived child survival chances have little influence on whether or not a woman desires any parous children.

Posselt (1975) has investigated the extent to which mortality declines influences fertility. Using a mathematical model, he concludes that the percentage change resulting from a given change in mortality is smaller than or equal to but cannot exceed 50% of the corresponding change in mortality. This means that population will continue to grow even if a reduction in mortality produces the maximum possible reduction in fertility.

A common analytical method employed in several studies has been to examine cumulative fertility of women with and without child mortality experience. The average number of ever born children according to age of the mother and the number of previous child deaths is found to be greater the greater the number of child deaths. However the positive relation observed could be due to a change in mortality causing a change in fertility as well as a change in fertility causing a change in mortality (the reverse effect). Secondly the effect could be biological rather than behavioral since the death of an infant shortens the birth intervals and makes it possible to fit in more births into a given period of time. The possible causal direction and mechanisms involved are particularly difficult to determine

at the aggregate level. Ansley Coale (1973) notes how Knodel has found instances in Germany whereby when declines in infant mortality are compared with declines in fertility, province by province, in about half of the provinces the decline in fertility preceded the decline in infant mortality. "So it is an open question which trend is the cause and which trend the effect or whether indeed it is not an instance of common causes of both trends"

John Knodel (1975) attempts to separate the four different effects of infant/child mortality on fertility. They are the

- i) "physiological effects" of shortening birth intervals from one birth to the next birth.

- ii) child replacement effects

- iii) insurance effects and

- iv) societal effects.

The first two depend on a couple's own experience with infant mortality. The last three are also termed as ~~behavioural~~ ~~social~~ effects. Replacement effects imply that couples ~~continue bearing children~~ replacing those who die young, until they reach some number of surviving progeny which they consider sufficient. Insurance effects assume that couples have an accurate perception of mortality trends in the community independent of their own experience and accordingly adjust their fertility upwards in anticipation of possible future child deaths thus insuring the survival of at least the minimum number of offspring considered sufficient. It has been found that while birth intervals are

shortened in communities which practice breastfeeding they are also shortened following the death of an infant in communities in which breastfeeding is known to be limited, suggesting that apart from the physiological effect of infant mortality other effects are also operating. The existence of "child replacement" effects is revealed in a study which examines parity progression ratios. A table is made showing the proportion of women with parity n confinements who progress to parity $n+1$ confinements according to the fate of their children. It is found that women experiencing infant deaths are more likely to continue childbearing than women who do not experience any child deaths.

According to Retherford (1975), the decline in infant/child mortality increases parents demanded number of surviving children aged x . This is because reduction of child mortality reduces the cost for the average family for producing an additional surviving child, say to age fifteen. The change in family fertility due to the increase in the demanded number of surviving children may be termed the "demand effect" of child mortality reduction on fertility. But when the mortality declines, fewer births are needed to achieve the new demanded number of surviving children. This offsetting effect is termed the "replacement effect" of child mortality on fertility. The inconsistency of earlier studies on the influence of child mortality on fertility at the individual level has been due to their failing to take into account these offsetting "demand effects".

Empirical studies of aggregate data have proved rather

inconsistent, revealing positive relationships between infant/child mortality and fertility in some cases and in others. In studying replacement effects (the behavioral response resulting in additional births to make up for actual child loss) it is assumed that some deliberate fertility control is practiced causing couples to cease childbearing after attaining the number of surviving children they want. In studying biological effects it is also assumed that no contraception is used. The problems encountered in some micro-level studies is possibly due to researchers trying to measure replacement effects in the natural fertility setting or biological effects in contraceptive societies (Hamed, 1978)

Rutstein and Medica (1975) found no relationship between crude birth rates and crude death rates in a study of the effect of infant/child mortality on fertility using data from 11 Latin American countries. They found a small positive relationship for some countries but failed to establish a relationship for others when using aggregate data. Results show that in only two of the four rural-semi-urban areas studied does there exist an increase in the probability of having an additional birth (parity progression ratio, PRR) with increasing experience of child mortality. The increase in PRR is however small and does not occur at all parity levels. They conclude that any additional fertility is much less than what is necessary for the replacement of children who have died. However, although aggregate data are notoriously unreliable, even micro-level data are not all

consistent. Schultz and Davanzo (1979) demonstrated a biological effect while Chowdhury, Khan and Chen (1978) found no significant behavioral effect. Heer and Wu (1978) provide support for the operation of community effects but find little evidence for fertility behavior being influenced by perceptions of child survival. They attribute this to the lack of a good measure of perceived child survival.

Chowdhury, Khan and Chen (1975) in a study on the average time required between successive live births following an infant death according to parity and previous child death experience found that the magnitude of the behavioral effects due to child mortality is negligible compared to biological effects. Women at the same parity level but with fewer living children obviously have experienced higher child mortality than their counterparts with more living children. When intervals with infant deaths (biological effects) are excluded, no difference was observed in mean birth intervals between women with varying numbers of living children implying that there are no behavioral effects due to child deaths.

Mohy Edden Hamed (1988) using micro-level data for Egypt and multiple classification analysis established the existence of both replacement and insurance effects of infant and child mortality on fertility. In the literature by Knodel, Retherford, Rutstein and Medica, Chowdhury, Khan and Chen, Schultz and Davanzo as well as Heer and Wu, the dependent variable was fertility as measured by various indicators such as children ever

born, birth intervals, subsequent fertility following child deaths, and so on. The choice of the dependent variable seems to affect the results of the study. In later studies such as those of Febley, Delgado and Brineman and Mohy Edden named, the dependent variable was the desire for more children or simply desired family size. The choice of fertility desires as the dependent variable effectively controls for the physiological effect of breastfeeding (Febley, 1979). Most empirical evidence suggest that fertility reduction will be smaller in magnitude than the corresponding decline in mortality (Preston, 1977). The reason is that most women are unable or unmotivated to act upon their desires to replace a deceased child by another live birth because of sub-fecundity, loss of a husband or other intervening reproductive obstacles. Hence additional number of children desired is found to be more responsive to variations in child mortality than is actual fertility. When studying the effects of infant/child mortality on fertility using the average number of ever born children versus number of previous child deaths, we know that infant/child deaths will shorten birth intervals and result in higher fertility but the higher fertility will also cause more children to die. We control for this reverse effect of fertility on mortality by studying individual level data instead of aggregate data (Chowdhury, Khan and Chen 1975, page 153).

As already noted, biological effects of shortening birth intervals, are best observed in natural fertility settings, that is, where no birth control is practiced. On the other hand

behavioral effects of replacement and insurance are best observed in contracepting societies.

de Guzman (1986) has found support for the replacement hypothesis in his study of the effect of infant/child mortality on fertility using parity progression ratios.

1.5 OBJECTIVES

The ultimate objective of this study is to provide policy makers and programme administrators with useful information on the significance of infant/child mortality reduction as a fertility reduction policy.

The family size preference is on average comparatively high and contraceptive prevalence low because parents are rationally motivated to have many children. The mean ideal family size for all women is about four according to the Kenya Demographic and Health Survey, KDHS 1989. The percentage of currently married women who use any contraceptive method is 26.9. The reason is perhaps because of child loss experience among the families concerned which give rise to insurance (hoarding) effects as well as replacement effects of infant/child mortality. If this is true then reduction of infant/child mortality is likely to reduce the average number of children desired and increase motivation for acceptance of family planning services.

The immediate objectives are to conduct a study based on the KDHS 1989 data to determine:

i) the relationship between additional children desired and child loss experience.

ii) the role of socio-economic variables such as education and rural-urban residence in shaping fertility preference among Kenyan families.

1.6 THEORETICAL FRAMEWORK

Demographic, environmental, cultural and socio-economic factors are likely to affect the fertility desires of any given society.

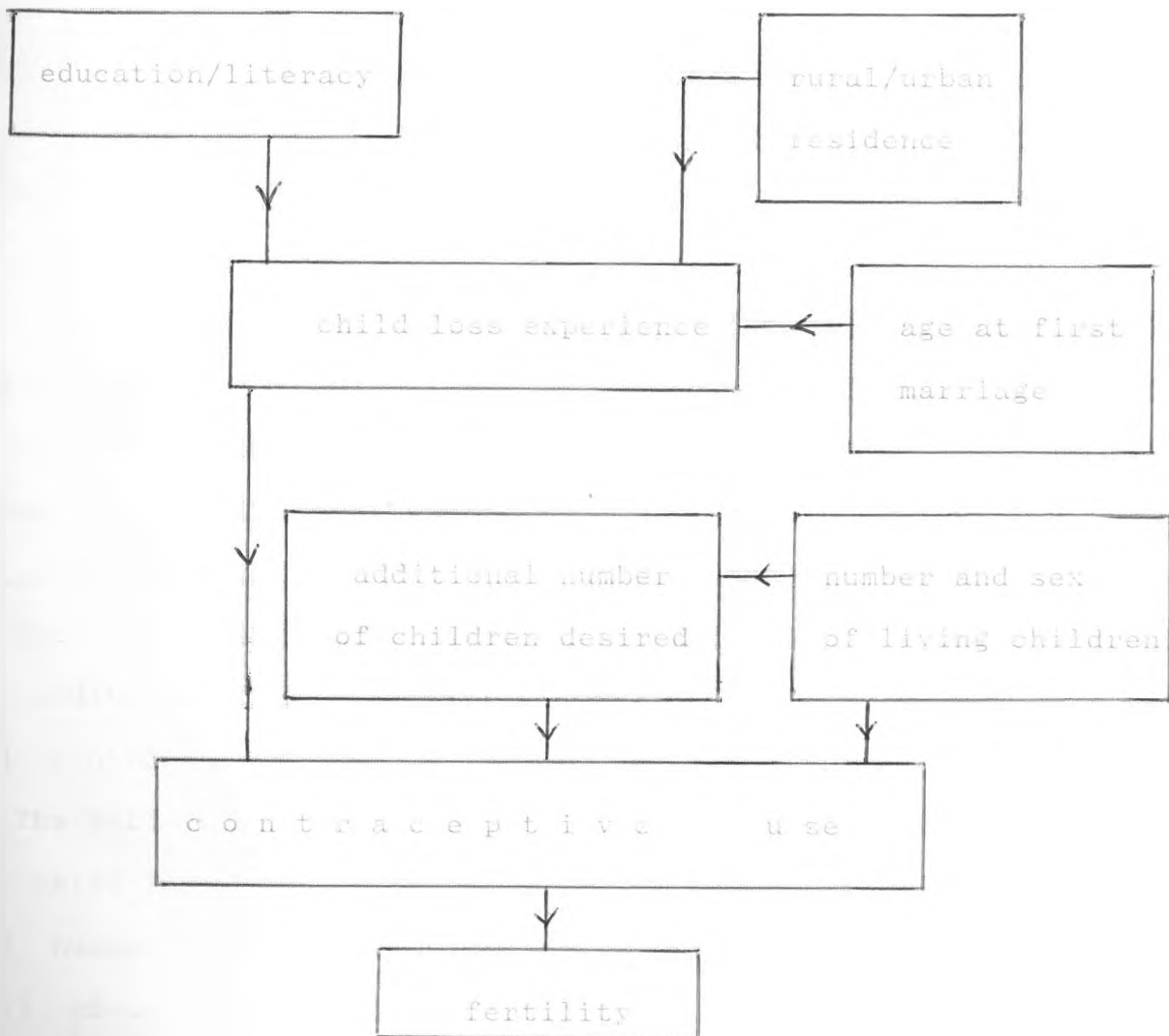
1.6.1 CONCEPTUAL HYPOTHESIS.

The paths through which child mortality may influence fertility originate with three sources of experience: direct personal experience, indirect personal experience and societal experience. Direct personal experience involves the death of one's own children or one's siblings. Indirect personal experience involves knowledge of child deaths or perception of infant/child mortality level in the community, that is, among other family members, friends, neighbors and the public. Societal experience refers to the experience of child mortality in the past which has now been incorporated into the socio-cultural structure. It influences norms on specific aspects of fertility such as age at marriage, behavior on social relations within marriage, use of fertility control and family size goals. There is a long time lag between changes in community levels of infant/child mortality and changes in these norms.

As we have seen, direct personal experience is the one with the greatest impact on fertility. It influences fertility through biological effects and through fertility preferences.

In this study we shall examine the effects of direct personal experience as well as indirect personal experience of infant/child mortality on fertility desires. Biological effects only affect fertility and not fertility desires. Hence they are effectively controlled for when studying fertility desires. Additional number of children desired will act as an indicator for the operation of both replacement and insurance effects.

A modified conceptual hypothesis for this study would therefore look like this:



1.8 OPERATIONAL HYPOTHESES.

1. Child loss experience increases the additional number of children desired.
2. Number of living children is negatively associated with the additional number of children desired.
3. Number of living children is negatively associated with the level of contraceptive use.
4. Contraceptive use should diminish with child experience.
5. The higher the level of women's education/literacy, the lower the level of infant/child mortality.
6. The higher the level of urbanization, the lower the desired number of additional children.
7. The place of residence (that is rural/urban) is associated with infant/child mortality. Those who live in urban centres should have a lower level of infant/child mortality than those who live in rural areas.

1.9 VARIABLES.

The following are the dependent variables

- i) additional number of children desired
- ii) contraceptive use

The following are the independent variables

- i) child loss experience
- ii) number of living children
- iii) education/literacy

iv) rural/urban residence

v) age at first marriage.

1.10 OPERATIONAL DEFINITION OF TERMS.

Child loss experience.

This refers to the number of ones who have died.

Additional number of children desired.

This is the response obtained from the question "How many more children other than those ones you already have would you like to have?"

Fertility desires.

This refers either to the additional number of children desired or simply the answer (yes/no) to the question "would you like to have any more children?"

Level of contraceptive use.

This refers to the percentage number of respondents who were found to have ever used any contraceptive method

The level of women's education

This is dichotomised in the KDHS data into primary incomplete; primary complete; secondary and higher.

The level of urbanization.

This is the percentage of the respondents living in urban centres. The variable takes only two values namely rural or urban residence

Age at first marriage.

This is the age in completed years of the respondent at the time of first entry into marital union.

2.1 DATA SOURCES AND QUALITY.

The data used in this study were taken from The Kenya Demographic and Health Survey (KDHS) (1989). The KDHS was a nationally representative survey as it covered 97% of the population. The KDHS covered a sample of 8171 ever married women aged 15-49 years from 31 of the 41 districts. The survey had three questionnaires: a household schedule, a woman questionnaire; and a husbands questionnaire. So in addition to the women, 1116 husbands were also interviewed.

Possible sources of error in this study are in the reporting of child deaths where some may be omitted completely due to either non-recall or cultural beliefs that children who die before they attain any social importance need not be mentioned.

2.2 SCOPE AND LIMITATIONS.

This study is aimed at using the national sample to study the relationship between infant/child mortality and fertility desires at the individual(or family) level.

The most serious limiting factor in this study is time. To do a thorough study of this very interesting topic would require some primary data at least to supplement the secondary data. Variables such as fertility desires were not available in the KDHS data in terms of the additional number of children desired but rather in terms of whether a woman desires additional children or not.

Table 2.
The percentage distribution of women by number of sons who have died and desire for more children and other socio-economic variables.

| Desire/socio-economic variables | Sons who have died | | | TOTAL |
|---------------------------------|--------------------|--------------|--------------|-------|
| | 0 | 1 | 2+ | |
| wants no more | 37.2 (1696) | 7.9 (361) | 2.8 (123) | |
| wants more | 41.2 (3569) | 6.5 (293) | 1.7 (86) | 6850 |
| Ideal no. | | | | |
| <3 | 23.5 (798) | 1.1 (58) | 0.1 (10) | |
| 3 | 11.8 (1809) | 0.8 (56) | 0.1 (10) | |
| 4 | 34.4 (2357) | 4.5 (306) | 1.2 (98) | 6850 |
| 5+ | 23.8 (1633) | 1.3 (86) | 1.7 (133) | |
| Ever used contraceptives | 32.7 (2241) | 1.7 (126) | 1.2 (81) | |
| Never used | 52.0 (3567) | 6.7 (157) | 2.3 (186) | 6850 |
| No education | 17.0 (1164) | 4.7 (323) | 2.1 (153) | |
| Primary incompl. | 21.8 (1494) | 3.5 (239) | 1.2 (82) | |
| Primary complete | 24.6 (1689) | 2.6 (138) | 0.2 (15) | |
| Secondary plus | 21.2 (1455) | 1.1 (76) | 0.1 (8) | 6850 |
| Rural residence | 60.6 (4157) | 9.2 (631) | 3.4 (237) | |
| Urban residence | 24.1 (1654) | 2.1 (113) | 0.5 (30) | 6850 |

Note: The results for the desire for more children excludes those who were undecided and those declared infertile. For ideal number of children those who gave non-numeric answers were excluded. For education, those who did not state their level of education are excluded.

Table 3

The percentage distribution of women by number of daughters who have died and desire for children and other socio-economic variables.

| Desire/socio-economic variables | Daughters who have died | | | TOTAL |
|---------------------------------|-------------------------|--------------|--------------|-------|
| | 0 | 1 | 2+ | |
| wants no more | 38.3 (1744) | 7.6 (326) | 2.7 (121) | |
| wants more | 37.1 (1686) | 5.2 (236) | 1.1 (50) | |
| Ideal no. | | | | |
| <3 | 11.6 (795) | 0.6 (43) | 0.1 (11) | |
| 3 | 11.8 (812) | 0.8 (52) | 0.1 (10) | |
| 4 | 35.5 (2431) | 3.8 (202) | 0.9 (61) | |
| 5+ | 24.3 (1671) | 1.1 (81) | 1.6 (121) | |
| Ever used contraceptives | 33.3 (2285) | 1.1 (85) | 1.9 (79) | |
| Never used | 52.9 (3628) | 6.2 (426) | 2.2 (156) | |
| No Education | 17.4 (1191) | 1.5 (111) | 2.1 (148) | |
| Primary incompl. | 22.2 (1523) | 3.3 (227) | .9 (65) | |
| Primary compl. | 25.1 (1719) | 1.5 (105) | .2 (18) | |
| Secondary + | 21.5 (1473) | .9 (67) | .0 (3) | 6856 |
| Rural residence | 24.4 (1676) | 1.3 (127) | 0.1 (25) | |
| Urban residence | 61.8 (4237) | 6.5 (382) | 2.6 (209) | 6856 |

Note: The results for desire for more children excludes those who were undecided and those declared infertile. For ideal number of children those who gave non-numeric answers were excluded. For education those who did not state their level of education are excluded.

2.4 DATA ANALYSIS AND FINDINGS.

The results of table 2 and 3 for the desire for more children by child loss experience are contrary to what is expected. According to our hypothesis, additional number of children desired should increase with child loss experience. But the results show that more women with one child loss experience do not want any more children and similarly more women with two or more child loss experience do not want any additional children. A possible explanation is that those women with child loss experience also have a large number of living children and so they do not desire more children.

For women who have had no child loss experience, the median of the ideal number of children desired is four. The median remains at four for women who have had one child loss experience. But the median number of children desired by women with two or more child loss experience is in the 5+ group. This means that the average number of children desired increases with child loss experience.

Those who ever used any contraceptive method should diminish with child loss experience per our hypothesis. This is exactly what is shown by the results of table 2 and 3. The number of women who never used any contraceptive method is greater than those who used any contraceptive method and this is the case at all levels of child loss experience. The percentage of those who never used any contraceptive method drops sharply from slightly over 30% for women with no child loss experience to about 1% for women with one child loss experience.

Table 4 : The percentage distribution of women by number of living children and desire for more children and other socio-economic variables.

| Desire/socio-economic variables. | Number of living children | | | | | |
|----------------------------------|---------------------------|---------------|---------------|---------------|---------------|-------------|
| | 0-1 | 2-3 | 4-5 | 6-7 | 8-11 | 12+ |
| wants more | 15.3 (702) | 17.3 (791) | 7.3 (337) | 2.2 (102) | 0.5 (20) | 0.0 (1) |
| wants no more | 0.8 (39) | 8.5 (386) | 13.9 (630) | 13.7 (622) | 10.7 (485) | 0.1 (23) |
| ideal no. | | | | | | |
| <3 | 7.3 (498) | 2.7 (123) | 1.5 (103) | 0.5 (35) | 0.1 (28) | -- |
| 3 | 6.8 (465) | 3.1 (236) | 1.2 (82) | 1.0 (69) | 0.2 (22) | -- |
| 4 | 15.4 (1055) | 10 (684) | 7.0 (477) | 4.9 (334) | 2.9 (197) | 0.1 (7) |
| 5+ | 6.1 (433) | 1.6 (361) | 7.6 (510) | 5.8 (405) | 3.0 (223) | 0.1 (16) |
| ever used a contraceptive | 8.3 (564) | 10.3 (719) | 5.2 (632) | 0.4 (119) | 1.4 (299) | 0.1 (13) |
| never used a contraceptive | 28.8 (1978) | 12.1 (829) | 5.1 (624) | 0.9 (173) | 1.3 (287) | 0.1 (14) |

Note: The results for the desire for more children excludes those who were unsure and those who were declared infertile. For ideal number of children those who gave non-numeric responses are included.

CHAPTER THREE.

3.1 SUMMARY AND CONCLUSIONS.

We have seen that parity appears to have no significant effect on contraceptive use. We have also seen that the fact that women with a larger family size tend to use a lower level of contraceptive use can be explained in one of two ways. Either they were rational in choosing the number of children or they were forced by conditions outside their control but later justified that situation by not stating smaller desires than what they already had. If the latter was true then at least they would be expected to have a higher level of contraceptive use. But since parity also appears to have little effect on contraceptive use, we conclude that parents were rational in choosing a large number of children. The only basis for this behavior is likely to be the operation of replacement and "insurance" effects of high infant/child mortality among certain parents.

According to Preston (1975), the involuntary biological effect whereby birth intervals are shortened following a child death is the principal contributing factor in increasing fertility. However, it is clearly impossible for fertility to make a fully-compensating response to variations in mortality. The reason is that even if they die, children cannot be replaced instantaneously. Hence a reduction in mortality can only produce a maximum of 50% of the corresponding reduction in fertility. Other factors also operate to make the reduction in fertility

less than it would otherwise be. The choice of fertility desires rather than fertility itself as the dependent variable eliminates these confounding influences.

This study has established that there is a positive correlation between infant/child mortality and fertility desires. Infant/child mortality is also found to be positively correlated with contraceptive use. The level of education as well as urban residence are negatively correlated with infant mortality. Therefore, the level of education as well as urban residence should be negatively correlated with fertility desires.

However, there is need to be cautious in making conclusions because of the occasional inconsistencies in findings. In the case where additional number of children desired was found to decrease instead of increasing with child loss experience, it is necessary to perform a more rigorous mathematical analysis in order to discover the direction of the relationship.

3.2 RECOMMENDATIONS.

Although further research is needed in this area of study, it is already evident that there is a positive correlation between infant/child mortality and fertility hence reducing infant/child mortality is likely to reduce fertility desires which in turn will reduce fertility and increase level of contraceptive use. The elimination of involuntary biological effects of infant/child mortality and the replacement and insurance effects will definitely reduce a significant effect of reducing fertility. As a fertility reduction policy reduction of

infant/child mortality must be pursued in combination with other general socio-economic development strategies such as furthering women's education, raising income levels and income distribution and so on. Women's education will first affect the proportions married by raising the age at first marriage and then higher standards of living will reduce marital fertility given that low infant/child mortality and other conditions are satisfied.

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