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# Chapter 1

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## Contraceptive Knowledge

### *The Role of Primary Health Care In Contraceptive Knowledge*

*Alfred A. Adewuyi (Ph.D.)*

**O**ne of the components of Primary Health Care (PHC) is Family Planning (FP). Mothers who attend clinics for health related reasons are often counseled on many aspects of PHC including the availability of FP services. Therefore, one expects that such mothers should have contraceptive knowledge and even be disposed to its use at a future date if they are not currently using it. The adoption of family planning methods helps mothers to either limit or space their children in accordance with their wishes. Mothers who limit the number or who space the births of their children reasonably well are likely to enjoy better health than their counterparts who do not limit or space their children.

In Nigeria, the primary focus of the policy in the health sector is PHC whose main objectives are to increase the awareness of the population about the health problems in their environment and to prevent or deal with such problems in their environment, to prevent or deal with such problems at the early stages in order to minimize their devastating effects on the people. Within the PHC system, emphases are placed on such health problems as malaria, measles, whooping cough, upper respiratory tract infection, diarrhea, malnutrition, skin problems, cerebro-spinal meningitis, yellow fever, complications of pregnancy and child birth, neonatal tetanus and a host

of others (FMOH, 1990). These health problems are essentially those that could be prevented or treated cheaply if prompt remedies are applied. However, in this country the prevalence of these health problems could still be described as severe. By way of illustration, the infant mortality rate in Nigeria is close to 90 per 1000 live births and indeed in some parts of the country, the rate is still above 100 (DHS, 1990). It is thus well documented that the persistence of high fertility with its attendant problems could be attributed partially to the high rate of infant mortality which is primarily caused by these preventable diseases.

The government recognized the importance of the PHC as one way to ensure that Nigerians attain a level of health that could *"lead to socially and economically productive life"* (FRN, 1990). The strategy for the implementation of the program is to fully involve the local government, as well as the local communities and individuals in collaboration with both the State and Federal Governments. These groups were to be the main implementors of health programs in the past. Even then, it was realized that not all the components of the PHC could be implemented successfully at once; primarily because of financial constraints. Resource limitations demand, that the most beneficial components of the programs be implemented first. For effective implementation, government took note of the multi-sectoral nature of the health program and intends to evolve a specific strategy *"based on intersectoral cooperation for monitoring, evaluating and coordinating health related programs in such areas as housing, environmental sanitation, drinking water as well as housing, environmental sanitation, drinking water as well as food and nutrition"* (FRN, 1990).

With these policies and strategies, the government set targets that could easily be implemented and monitored for some of the components of the PHC including Family Planning Services. For instance, the family planning target is to cover 50% of the national population by the year 1992. The intention is to educate mothers attending PHC Centers about all components including family planning particularly at Centers with service delivery points (FRN, 1990). Mothers would be informed about the availability of family planning services for those who are interested. They would be taught the concept of family planning, the advantages and side effects of methods available, where to get the services and the categories of mothers that need such services. The premise of this paper is that mothers who have bene-

fited from PHC services should equally know about contraceptives and may be favorably disposed to their future use.

### **DATA SOURCE**

The data source is from DHS. The details of data collection procedure are contained in the preliminary report of the DHS (1991). Suffice it to say that interviews were completed for 8,781 women, resulting in 95% response rate.

The indicators of PHC that are related to contraceptive knowledge are limited by the questions that were asked in the DHS. In the survey, the indicators employed include: antenatal checkup during the pregnancy; the number of antenatal care visits at the clinics; having antenatal cards; tetanus toxoid injections and the number of times given; places of delivery; assistance at delivery; immunization of children and children's vaccination cards.

Based on the earlier premise, a woman with antenatal checkups or with the antenatal card is presumed to have attended a PHC clinic where talks on Family Planning had been given among others. Similarly, women with toxoid injections with vaccination cards for their children or whose children were immunized are also expected to have attended a PHC Clinic, with the usual exposure to health care counseling including Family Planning. Women who delivered where there were health facilities or who were assisted by doctors/nurses/midwives are also likely to have benefited from the PHC program. The contraceptive knowledge of women who paid several antenatal care visits to the clinics or have obtained two toxoid injections during a pregnancy is likely to be greater than those who visited clinics only once or have had only one toxoid injection.

We also intend to compare the contraceptive knowledge through the mass media with that obtained through the PHC later in this study.

### **KNOWLEDGE OF CONTRACEPTIVES**

In the DHS, questions relating to the knowledge of specific method of contraceptives were asked with three possible answers. The first answer was spontaneous 'Yes,' followed by a 'Yes' after the woman had been probed and the third category of response was of course 'No.' In the final analyses, spontaneous and probed 'Yes' are merged as one response while the specific contraceptives are dichotomized into 'any method' and 'modern method.' Table 1 contains the sum-

**Table I - Percentage of Currently Married Women Knowing Any or At Least One Modern Method by Selected Background Characteristics**

<b>Age</b>	<b>Knows any Method</b>	<b>Knows Modern Method</b>
<b>Age Group</b>		
15-19	31.7	30.5
20-24	45.4	42.1
25-29	49.2	47.2
30-34	43.5	41.9
35-39	44.4	42.1
40-44	43.9	41.4
45-49	35.3	30.2
<b>Place of Residence</b>		
Urban	70.4	68.5
Rural	36.3	33.7
<b>Regions</b>		
Northeast	24.0	21.9
Northwest	30.3	27.7
Southeast	56.6	53.9
Southwest	73.6	71.4
<b>Level of Education</b>		
No Education	29.1	26.7
Some Primary	63.1	60.2
Comp Primary	67.2	64.5
Some Secondary	83.8	82.0
Comp Sec/Higher	90.8	81.9
Missing	24.4	24.4
<b>Total</b>	<b>43.6</b>	<b>41.2</b>

mary of findings on contraceptive knowledge by four selected characteristics -- age, place of residence, region and level of education.

Women under 20 years and those who are 45 years and above have lower knowledge of any or modern contraceptives. These are women with little exposure to contraceptive information -- the youth because they are still young and the elderly because of their low level of education. That urban women have more knowledge of contraceptive than the rural women is in consonance with the living environment of the two areas -- the urban centers are more exposed to information (including FP information) than the rural areas. The pattern of contraceptive knowledge by regions confirms that women in Northern Nigeria are not much exposed to methods of contraceptives. The low knowledge of contraceptives in the North could be due to cultural factors which in the first instance prevent the dissemination of information on topics bordering on Family Planning and which of course silence the discussion of such topics among couples in the region. The Southwest, which is most urbanized and with the earliest exposure to Western education, is more receptive of information on family life and family planning education. That this region experiences the highest knowledge of contraceptive is therefore not surprising. The expected positive relationship of contraceptive knowledge and education is clearly demonstrated in the last panel of the table.

### **ACCESS TO PRIMARY HEALTH CARE AND CONTRACEPTIVE KNOWLEDGE**

Table 2 contains information on the population of women who have live births in the last five years by source of antenatal care during pregnancy; tetanus toxoid injections; availability of antenatal card, place of delivery and attendant at the clinic. The table also contains information on the proportion of children 12-23 months who had received each vaccine by the time of survey and the proportion with a vaccination card as well as proportion of currently married women knowing at least one method of contraception. In short, the table furnishes information on access to primary health care as well as knowledge of contraceptives by regions. At this time we can not make further estimates from the data available on the number of cases involved in various percentages supplied. We can not therefore, relate the contraceptive knowledge of individual directly to this access to PHC. However, some indirect inferences are possible.

**Table II - Percent of Women with Access to Primary Health Care by Region**

	Regions			
	NE	NW	SE	SW
<b>Births in the last 5 years</b>				
<b>Antenatal care</b>				
Doctor	27	31	35	58
Nurse/Midwife	10	14	30	27
Antenatal Card	36	45	68	88
<b>TT injection</b>				
Two+	24	30	53	60
One	11	11	11	13
<b>Place of delivery</b>				
Health facility	10	10	46	64
Health worker home	0	0	11	6
Own Home	89	90	38	25
<b>Assistance at delivery</b>				
Doctor	7	5	11	22
Nurse/Midwife	4	5	37	45
Trained TBA	3	2	6	3
Untrained TBA	23	21	21	8
No One	56	64	16	16
<b>Children 12-23 months</b>				
BCG	39	48	70	77
DPT 1	40	48	66	74
DPT 3	17	17	48	47
Measles	30	36	51	59
All	15	16	41	42
None	57	50	29	20
Vaccine card	20	33	37	38
Contraceptive knowledge	22	28	54	71

KEY: NE - North East, NW - North West, SE - South East, SW - South West

To begin with, less than one third of currently married women had antenatal care with doctor during pregnancy in the last five years before the survey date in the North (Northwest and Northeast). About one third of women in the East and almost three in every five women in the Southwest did have antenatal care with doctors. When added to the population of women that have antenatal care with nurses and midwives, the total proportion of women with antenatal care rises above one third in the Northeast, almost to a half of the women in the Northwest; about 70% in the East and almost 9 women out of every ten in the Southwest. The proportion of women who had antenatal care is about the same with those who had antenatal card. The distribution exhibits the same pattern among regions. However, not all women that have antenatal care received tetanus toxoid injection. Indeed in the Southwest there is a fifteen percentage point difference between mothers that had antenatal card and those who received tetanus injection. More distressing is the evidence that a significant proportion of women that had antenatal care and received tetanus toxoid injection delivered away from the clinic and therefore were not assisted at delivery by a qualified doctor/nurse/midwife in all the regions.

The regional differential for the children aged 12-23 months that were vaccinated similarly, shows that more children in Southwest than any other region get the vaccines. There is also the evidence that more children get BCG and DPTI than any other vaccine. Indeed the proportion of women that get all the vaccines is less than half of those who are given BCG and DPTI in the North and only slightly more than a half in the South. That the vaccination for children is haphazard can also be inferred by relating the proportion of children that have vaccination card in all the regions with that of children that are given BCG or DPTI. The inference from here is that children are given vaccination without proper records.

Hence, while some women have access to primary health care, there is no evidence that such women consistently make use of the services provided. One other service provided at the PHC is FP information. The last panel on the table shows the distribution of the percentage of women with contraceptive knowledge. The regional pattern for contraceptive knowledge parallels that for use of other PHC services. The lowest contraceptive knowledge (22%) is among the women in the North East and the highest (71%) in the Southwest.

The expectation is that women with access to Primary Health Care should have contraceptive knowledge because FP information serv-

ices are always make available to women who attend clinics. This however, can not be supported from the evidence in Table 2. The proportion of women that have antenatal care in all the regions is consistently higher than that of women with contraceptive knowledge. In the Northeast, the percentage difference between women who have antenatal care and contraceptive knowledge is 15, in the Northwest 17, in the Southeast 11 and in the Southwest 14.

That women who have access to PHC do not ipso facto, have contraceptive knowledge could be because not all the PHC have family planning service delivery points (SDPs). It is known that a substantial percentage of the PHC centers are concerned primarily with other components of PHC. Even at the PHC Centers with SDPS, we do not know whether FP education is consistently given.

A more rigorous analysis of the role of PHC in providing contraceptive knowledge can be done when we have data on indicators of PHC as contained in the DHS cross-classified by contraceptive knowledge and controlled for age, place of residence and education in each of the regions. Such classification permits identification of subgroups of women that are affected as well as social, economic or other determinants of the patterns observed. Additional analysis identifying subgroups that intend to use contraceptives in the future as a result of their exposure to PHC facilities could enrich the present study. These studies are planned for the future. Contraceptive knowledge through mass media could be another source that could be compared with knowledge gained through PHC attendance. Incidentally, that aspect of the DHS data has also not been analyzed.

### **POLICY IMPLICATIONS**

This preliminary analysis from indirect inference indicates that attendance at a PHC clinic does not guarantee that a mother will know about contraception. That this is the case is a matter of concern. One possibility is that the FP counseling that should be associated with PHC clinics is not yet firmly rooted; PHC is still mainly concerned with delivering other components. The data across regions do show however, that contraceptive knowledge increases with access to PHC. This indicates that expansion of PHC can be an important element in the FP program.

The goal of PHC is to improve maternal and child health: one of the key ways to achieve this is to encourage mothers to space their births through the use of FP methods. That this does not seem to be the case

calls for more effective integration of FP services with PHC. That is, all PHC centers should have a SDP with a well designed FP counseling as an integral part of their program.

The gap between access to PHC and contraceptive knowledge might not only be because of lack of integration or inadequate FP education, but perhaps the manpower required to perform these functions is lacking. There may therefore, be need for more short term courses in the area of FP for the PHC workers nationwide. Such training would expose the workers to the concepts of family planning, FP technology, management information systems as well as planning and evaluation principles of the program itself. Again for a sound training, Government may involve itself in the capacity building of one of the Nigerian Universities to be responsible for such training programs. The Department of Demography and Social Statistics, Obafemi Awolowo University could easily be upgraded to a center of excellence that could be charged with such training responsibility.

Apart from staff of PHC Centers, planning officers of Federal and State Ministries as well as LGAs should be encouraged to attend training in order to fully integrate FP into the planning processes at all levels of government. In addition to management training, staff should be trained in Operations Research to be able to identify and solve service delivery problems of the FP programs in the various PHC Centers in the Country.

### **References**

1. Federal Ministry of Health, 1990 Guidelines and Training Manuals for the Development of Primary Health Care System in Nigeria (Primary Health Care Development, Lagos)
2. Federal Office of Statistics, 1992, Nigeria Demographic and Health Survey, 1990 (Demographic and Health Surveys IRD/Macro International, Inc.)
3. Federal Republic of Nigeria, 1990; First National Rolling Plan, 1990-92 (Planning Office, Federal Ministry of Budget and Planning, Lagos).

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## Chapter 2

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### Unmet need in Family Planning

*Adekunbi Kehinde Omideyi (Ph.D)*

**T**he policy issue involved in the area of unmet need is that of filling gaps that exist in the demand for family planning in Nigeria. The problem that needs to be addressed is that there are groups in the population who need family planning services but who have not yet been reached. If such needs are ignored, persons involved might end up having more children than they actually want and/or can adequately cater for or they may have children at closer intervals than they planned, which might result in health consequences for the child and/or its mother.

In 1988, the Federal Government of Nigeria approved a National Policy on Population for Development, Unity Progress and Self Reliance. One of the objectives of this policy which addressed the issue of unmet need is:

*"To make family planning means and services to all couples and individuals easily accessible at affordable cost, at the earliest possible time, to enable them to regulate their fertility..."*

In line with the goal of achieving lower population growth rates through reduction of birth rates by voluntary fertility regulation methods that are compatible with the attainment of economic and social goals of the nation targets relevant to the topic in the population policy include:

- To reduce pregnancies to mothers below 18 years and above 35 years of age by 50 percent by 1995 and by 90 percent by the year 2000.
- To extend the coverage of family planning services to 50 percent of women of child bearing age by 1985 and 80 percent by year 2000.
- To direct a significant proportion of the family planning program in terms of family life education and appropriate family planning service at all adult males by the year 2000.
- To reduce the number of children a woman is likely to have during her lifetime, now over 6 to 4 per women by year 2000 and reduce the present rate of population growth from about 3.3 percent per year to 2.5 percent by 1995 and 2.0 percent by the year 2000.
- To make available suitable family life education, family planning information and services to all adolescents by year 2000 to enable them to assume responsibility parenthood:

Family planning services shall be made available to all persons voluntarily wishing to use them. Priority attention shall be given to reaching high risk clients, for example, women under 18 or over 35, those with four or more children, those with previous complicated pregnancies of childbirth, or those with chronic illness that increase the health risk of pregnancy.

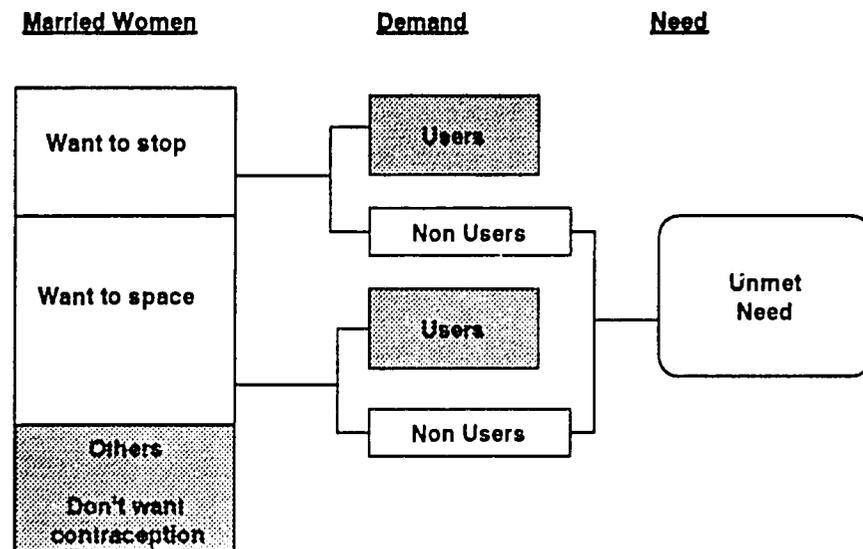
### **Information available from DHS Data**

#### **The level of unmet Need**

By definition, unmet need for spacing includes pregnant and amenorrheic women whose birth was mistimed and women who are neither pregnant nor amenorrheic and who are not using any method of family planning and say they want to wait 2 or more years for their next birth. Unmet need for limiting refers to pregnant and amenorrheic women whose last child was unwanted and women who are neither pregnant nor amenorrheic and who are not using any method of family planning and who want no more children. Excluded from the category of unmet need are pregnant and amenorrheic women who became pregnant while using a method. (These women are not in need of contraception but are in need of better contraception.) Also excluded are menopausal and infecund women.

The schema in figure 1 describes those with unmet need for family planning.

Figure 1



From Table 6.3 (NDHS data) 15.4 percent of all currently married fecund women want no more children. Hence, the overall level of demand to limit is 15.4. The highest levels of demand for contraception to limit children occur in Southwest (23.4) and Southeast (21.8) Nigeria. In these two areas, the proportions are highest for ages 40 and above. In the youngest age groups, i.e., 20-34 years, the proportions are highest in the Southeast. This might be because marriage takes place earlier in this area of the country. It might also be due to the widespread practice of Catholicism which does not encourage the use of contraception and therefore encourages high reproduction rate early in the childbearing period.

The total percentage of women who want to space, according to the DHS data, is 32.8 (DHS Table 6.2). The distribution is fairly even in all four states. Intention to space also varies between different age groups, the highest percentages occurring between ages 20 to 29 years. In Southwest Nigeria over 60 percent in the 20-24 age group

and 55.7% in the 25-29 age group expressed the desire to space their children. These represent the highest levels of desire to space. The percentages in these age groups are close to, or slightly higher than 40% in the other three states i.e. Southeast, Northwest and Northeast.

### **Unmet Need for family planning services in Nigeria**

Table 3 (i.e., 6.4 DHS) shows the percentage of currently married women with unmet need, met need, and total demand for family planning services by background characteristics. Following the definitions given above, overall unmet need to space is 11.5% while unmet need to limit is 9.3%; hence 20.8% of currently married women need family planning, but these services are not reaching them.

When the percentage of currently married women currently using contraceptive is added to the percentage of unmet need, the resulting figure gives the total demand for family planning services. From the table, the overall total demand is 26.8 for currently married, of this 14.9 represents total demand to space, while 11.9% represents total demand to limit number of children. The percent of women currently using contraception to space is therefore 3.4% while current use to limit is 2.7%. The total percentages of need satisfied (i.e., Current use divided by total demand) is 22.6%. A high level of need therefore remains unsatisfied, i.e., 77.4%

Broken down by age, the level of unmet need to space is higher among the younger women while unmet need to limit is higher among older women. Young women also use family planning to space while the older ones use it to limit. Not much difference exists in unmet needs to space and to limit between urban and rural areas, while the use of contraception both to space and to limit are remarkably higher in urban than rural areas as expected.

There are also clear differences in unmet need to space and to limit between the southern and the northern regions although, unmet need to space is highest in the Northeast (14.4%) while it is lowest in the Northwest (8.0%). Current use to space and to limit are very low in the northern regions compared to the southern regions.

Differences also exist in unmet need between educational categories. Higher proportions of women who have less than a secondary level of education have unmet needs to limit compared to women with education above the secondary level (i.e., higher education). The reverse is the case for current use of contraception.

### **Implications of current trends continue**

The implications of continued trends in the level of unmet needs to space and to limit the numbers of children among Nigerian women are obvious:

a) A sizable proportion of younger women will keep reproducing at shorter birth intervals while a higher proportioning older women are likely to continue having unwanted pregnancies at a great cost to their health.

b) Education may encourage women to accept family planning, but this is only at the post secondary level. Hence, there is the need to encourage women to aim for higher than primary level education.

### **Policy Recommendation and Program Strategies**

Following from the above discussion, suggestions for policy makers include expanding family planning services to those women who need them, either to space or to limit the number of children they wish to have. Family Planning Programs may include the improvement of health facilities in rural areas where fertility is high and where the need to space is high enough to warrant some action. The Government needs to be involved at all levels -- Federal, State and Local -- to give financial support to the widespread use of effective means of contraception. Special attention needs to be given to youth of today since they are the potential parents of tomorrow. Finally, there is need to conduct research to find out those obstacles that stand in the way of the popular use of effective contraception. Attention should be given to the role of cultural and social factors as well as other disincentives that have to do with the health of mothers.

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# Chapter 3

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## Infant and Child Mortality

### *Trends in Infant and Child Mortality and Primary Health Care*

**A. O. Grange (F.M.C. Paed)**

**T**he health status of a community is measured by the pattern of vital statistics obtained for that community. In Nigeria national data which show trends are rather scarce. Thus, the effort made to depict mortality rates for five year periods over a total period of twenty-five years preceding the Demographic Health Survey is of considerable benefit (See DHS Table 7.1). It can be seen that while neonatal, postneonatal, and infant mortality showed a modest decline over the past 15 years, that child mortality has actually increased in the recent period. Overall, five mortality rates thus show a decline in the earlier period then in the five-year period immediately preceding the survey.

This unexpected rise in mortality can be attributed to the adverse trend of the national economy coupled with a rising population. For example, Nigerian's population grew steadily from 55.7 million in mid-1985 to 88.5 million in 1990 giving an average rate over this entire time period at 1.79 per year. No doubt the actual annual rate of population growth in recent years is much higher, as death rates have declined substantially in the past 27 years, while birth rates have remained high. On the other hand, agricultural growth has been marginal at 1.4% in 1986, 0.6% in 1987, 1.0% in 1988 and 1.3% in 1989! Industrial growth actually declined from 5.8% in 1985 to

-5.1%, -4.4% and -2.1% respectively in 1986, 1987 and 1989. This is in contrast to what occurred between 1965 and 1980 when the country, according to the World Bank, achieved agricultural and industrial growth of 1.7% and 13.4% respectively. Furthermore, the depreciation of the naira and inflation have drastically reduced the purchasing power of the people to the extent that families are spending up to 80% of their income on food. (See DHS Table 7.2) shows neonatal, infant, childhood and 5 mortality rates by zonal distribution and rural/urban location. All mortality rates are highest for the northern zones where development and urbanization have been most retarded. The lowest levels are seen in the southern zones. This interregional disparity cannot be explained in demographic and/or economic terms alone, rather it generally parallels the pattern of female literacy encountered in the various zones. (See DHS Table 2.4) Access and utilization of effective health care services will also influence the pattern positively.

Education of mothers is an important factor that affects infant and child mortality rates. (See DHS Table 7.2) shows that the children of mothers who have had higher education have the lowest mortality while those without any formal education have the highest rates.

Curiously, there are highly significant differences in values among those mothers who completed their secondary school and those who did not. Infant and child mortality rates are also highest among those babies whose size was described as very small, babies with birth intervals less than 2 years, first births and those whose birth order is higher than 7. Women who are younger than twenty years and those who are older than 40 years have the highest risk of losing their children in infancy and early childhood. (See DHS Table 7.3)

Factors that contribute to adverse trends in infant mortality include inadequate national policy formulation, poor planning and uncoordinated management of health and health related programs. Although practically all developmental programs are health-related, those that are of direct influence are those that increase the access of the community to accurate health information as well as to effective health care delivery. Primary Health Care which is relatively affordable and equitably-distributed curative, preventive, promotive and rehabilitative care help to reduce the need for secondary and tertiary care services. The Nigerian Health Policy appropriately provides the much needed focus on primary health care which has as its components eight elements as shown below.

### **Components of Primary Health Care**

- Maternal & Child Care
- Immunization
- Treatment of common ailments
- Control of Local Endemic Diseases
- Health Education
- Supply of Portable Water
- Environmental Sanitation
- Nutrition

The total implementation of these strategies should offer optimal protection particularly for the health of mothers and children. Through the implementation of PHC at the local government level, mothers and children are guaranteed access to basic health services including immunization at a cost that is affordable by the community. Sustainability of such services is ensured as a result of the full participation of the communities themselves.

Although, the NDHS data give us valid information on natural trends in infant mortality over the past twenty five years, data on the regional distribution of the problem are only available for recent times, i.e., 1990. There are no data on morbidity and mortality rates of such special groups as low-birth weight babies, handicapped children and children in especially difficult circumstances. General social and economic determinants of infant mortality are also not addressed to any appreciable extent. However, the data on procreative choices of women which is a major determinant of maternal and infant mortality are quite extensive. These data relate particularly to access and utilization of contraceptive methods by women.

### **Nutrition**

Under nutrition increases the susceptibility of infants to infections while debilitating infections such as measles and diarrhea almost invariably precipitate malnutrition. Children under fifteen years of age constitute 47% of Nigeria's teeming population enumerated in 1990 at 88.5 million. The proportion of children who show evidence of under-nutrition as reflected by their anthropometric measurements appears to be increasing *pari passu* with the deteriorating status of our national economy.

Information relevant to nutrition and primary health care services include the feeding pattern of babies in the first year of life, nutritional status of children under five years of age, prevalence of diarrheal disease, utilization of immunization and oral rehydration services. A variety of parameters of growth is used to assess the nutritional status of the childhood population. The most commonly used are weight for age, height for age, weight for height and mid-arm circumference. The weight-for-height is the most suitable indicator of acute nutrition (wasting) while the height-for-age is an indicator of chronic malnutrition or stunting. Findings are usually compared with international anthropometric standards such as those of Harvard or NCHC/CDC/WHO. According to the latter reference standards, between -1 and -1.99 Standard Deviation (SD) from the mean indicates moderate undernutrition while below -2 indicates severe undernutrition.

In the NDHS three different indices of anthropometric status were utilized to highlight the prevalence of undernutrition. (See DHS Table 9.5) The percentage of children who are moderately and severely stunted using height for age are 43.1% and 22.2% respectively while those whose weight for age are below two and three standard deviation are 35.7% and 12.0% respectively. The results also show that moderate and severe wasting as reflected by weight-for-height of 9.1% and 1.8% respectively cannot be considered on its own to give the true magnitude of undernutrition. There is a consistent increase in proportion of stunted children with increasing age while other indices do not entirely conform to this pattern. There is no significant sex difference. However, children born with a birth interval less than two years appear to have a significantly higher prevalence of moderate and severe stunting. (See DHS Table 9.6) also shows significant differences in percentages of children with low anthropometric indices between rural and urban areas, between the four geographical zones and between educated and none educated mothers. These differences are least obvious with the weight-for-height index.

## **CHILD FEEDING PRACTICES**

### **BREASTFEEDING**

Most studies in Nigeria have revealed that there is almost universal commencement of breastfeeding within 48 hours of delivery of babies and weaning usually commences after the first year of life.

However, more in-depth surveys have shown that optimal breastfeeding is quite rare. Optimal breastfeeding is defined as exclusive breastfeeding in the first 4 to 6 months of life after which supplement may be introduced while breastfeeding continues at an optimal level well into the second year of life.

The Ondo Demographic and Health Survey (1986-9) shows that less than 1% of babies were exclusively breastfed while most babies received water, herbal concoctions formula or other liquids in addition to breastfeeding from the first day of birth. Similar results were obtained from NDHS (1990) which was countrywide. Only 2.1% of babies under two months of age were exclusively breastfed. It is worthy to note that the median duration of breastfeeding decreased with increasing level of literacy among the mothers (See DHS Table 9.4) The duration of breastfeeding appears to vary with location of mothers and with their educational status. It seems also that those who were delivered by medically trained personnel had the shortest mean duration of breastfeeding of 16.1 months. This could be a reflection of the influence of the negative attitude on breastfeeding transferred by health workers to mothers. Literate mothers tend to introduce milk formula much earlier than uneducated mothers. This could also be related to the occupational characteristics; more literate mothers may be in formal employment in urban areas where they would be away from home for several hours during the day.

## **SUMMARY AND CONCLUSIONS**

Data on sources of health information and communication are rather scanty. There are also no data on the availability of trained health personnel or the level of their performance in any area. The administrative and program data required to complement the available data include data on girls and women in their reproductive age. Such data include age at marriage, age at delivery of first and last babies, income-generating capacities of women, pattern of family expenditure, time available for child care and data on maternal mortality. All these data should be cross-tabulated with level of education and by zonal location. The pattern of administrative and social organizations, level of funding by government and non-governmental organizations of health care programs will also serve as indicators of the capacity of the nation to prioritize and make appropriate commitments in a way that will lead to sustainability of effective health care programs. An example of a community funding system is the "Bamako initiative" which is being implemented on a model basis in

some local government areas. The Federal Government of Nigeria has also set up community (people's) banks in both rural and urban areas.

The current trend by and large suggests that under-5 mortality rates are increasing while fertility rates are maintained at a high figure of 6.0 per woman. This is in spite of the tremendous resources invested into the Child Survival Strategies such as the EPI and ORT. With poor economic growth, the services offered to this large dependent group will become increasingly inadequate and less effective leading to the persistence of the currently unfavorable trend in infant mortality and a loss of potential manpower resource.

From the available data it is recommended that all development-related policies be reexamined with a view to articulating more clearly the social and health related components. For example, education policy should stipulate a period of uniform exposure of both boys and girls to a standardized curriculum on Family Health and responsible parenthood. It should also aim at providing functional literacy for adults who have had no formal education and functional and remedial education for young people who drop out of school. Every effort should be made to achieve universal primary and secondary school education by the year 2000. Agricultural policy should address the important issue of household food security which is dependent not only on food production but also on availability of transport, storage and food preservation facilities. A national policy on information should include a substantial package on health, nutrition, family planning and other relevant programs.

National programs that involve mobilization of communities for participatory health-oriented activities include Primary Health Care (PHC) and Better Life for Rural Dwellers. Similar local model-building initiatives include institutional community linkage projects e.g. University - Community, UNICEF's National Capacity Building Program. All these programs require strengthening and systematic integration into the overall national health care delivery system. Even well articulated policies can not be translated into implementable strategies without the full commitment and adequate financial administrative, technical and moral support of government and non-governmental organizations.

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# Chapter 4

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## Women at Risk

*Paulina Makinwa-Adebusoye (D.Sc.)*

Every year thousands of Nigerian women die from causes related to pregnancy and over one million infants and children die before the age of five. These are personal tragedies for the families concerned, for their communities and for the social development of the country. Evidence from around the world shows that the highest infant and maternal mortality rates are found in four types of pregnancy:

- 1) pregnancies before age 18,
- 2) pregnancies after age 35,
- 3) pregnancies after four births,
- 4) pregnancies less than two years apart.

Therefore, "*to improve the quality of life of the people of this nation; to promote their health and welfare, especially through preventing premature deaths and illnesses among high risk mothers and children...*", the government, in 1988, adopted the National Policy on Population for Development, Unity, Progress and Self-Reliance. Policy objectives which are to be realised through a nation-wide voluntary family planning programme include the following:

- to reduce the proportion of women who get married before the age of 18 years by 50 per cent by 1995 and by 80 per cent by the year 2000;
- to reduce pregnancy to mothers below 18 years and above 35 years of age by 50 per cent by 1995 and by 90 per cent by the year 2000;
- to reduce the proportion of women bearing more than four children by 50 per cent by 1995 and by 80 per cent by the year 2000;
- to extend the coverage of family planning service to 50 per cent of women of child-bearing age by 1995 and 80 per cent by the year 2000;
- to reduce the infant mortality rate to 50 per 1000 live births by the year 1990 and 30 per 1000 live births by the year 2000 and the crude death rate to 10 per 1000 by the year 2000.

In this chapter, data from the Nigeria Demographic Health Survey (NDHS), 1990 are used to highlight i) the magnitude of high risk births, and ii) the risks of infant and maternal morbidity and mortality in pregnancies in women under age 18, in older women after age 35, in women with 4 or more children, or within two years of another pregnancy.

### **MAGNITUDE OF HIGH RISK BIRTHS**

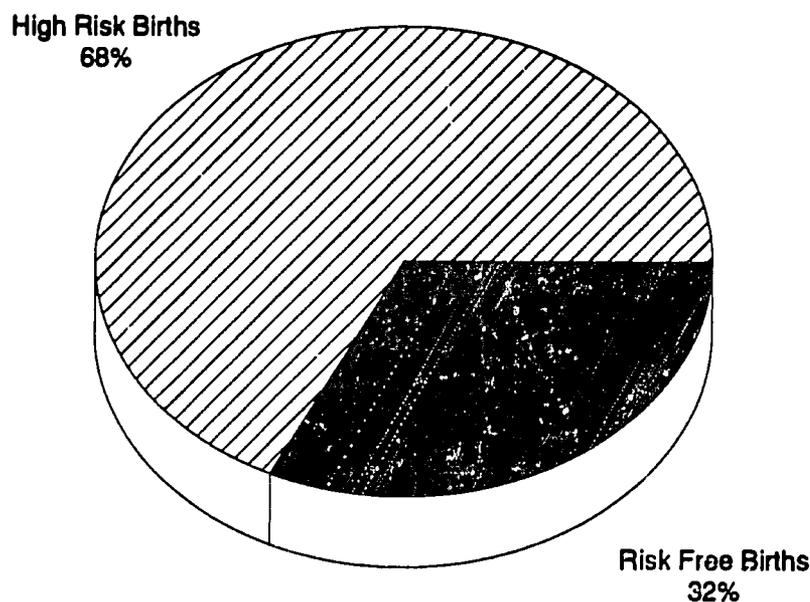
As depicted in Figure 1, more than two thirds, 67.68 per cent of all births in Nigeria (in the five-year period, 1985 to 1990) were high risk births. Only 32.32 per cent of births during the same period were risk free.

Given that a risk-free birth is measured by a relative risk ratio (of infant mortality) of 1.00, an alarming proportion, 41.54% of Nigerian babies (born 1985-1990) risked illness and death before their first birthday. As shown in the first panel of Table 1, such deaths result from any of these four maternal risk factors; maternal ages below 18 or above 34, high parity and short birth intervals.

The single most important maternal risk factor which exposes babies to the risk of premature death is mother's young age.

Babies born to teen-age mothers are at greatest risk of infant mortality; their risk of dying is 44 per cent higher than normal. Mothers who frequently give birth, at intervals less than twenty four months, expose their babies to very high risks; 40 per cent higher

## Figure 1: Percent High Risk Births Nigeria 1990



Source: NDHS 1990, Table 7.01

than normal. The risk of infant mortality among births to mothers who have had more than three children is 10 per cent higher than normal.

Although it is not immediately apparent, babies born to older mothers (more than 35 years old) are also at elevated risk of premature death because, in Nigeria, most older mothers would have had many children. In other words, children of older mothers are usually high parity births.

Nigerian women bear an average of over 6 children during their reproductive life span with the result that, at any one birth, most mothers may combine two or more risk factors. It is important to note the dramatic rise in the risk of morbidity or death to babies whose mothers combine two or more maternal risk factors. For example, the

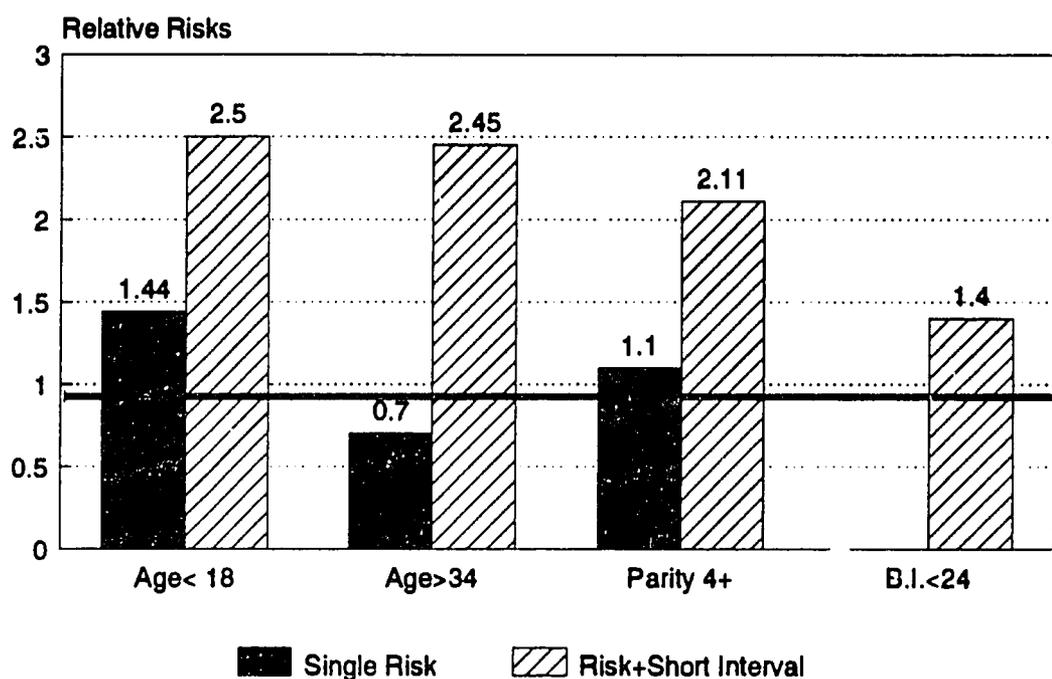
second panel of Table 1 shows that a short birth interval by itself increases the risk of infant morbidity and mortality by about 40 per cent. However, **short birth interval in combination** with any of the other three maternal risk factors more than doubles the risk of infant morbidity and mortality. Figure 2 depicts elevated risks of infant mortality when short birth interval is combined with each of the other three maternal risk factors.

**Table 1: Percent of children born in the last five years at elevated risk of mortality and percent of currently married women at risk of conceiving a child with an elevated risk of mortality, according to category of increased risk.**

Category of Risk	% of births	% married women	Risk Ratio
<b>Total Not At Risk</b>	<b>32.32</b>	<b>20.83</b>	<b>1.00</b>
<b>AT RISK</b>			
<b>The 4 Risk Factors</b>			
Mother's age less than 18 years	6.68	2.49	1.44
Birth Interval less than 24 months	7.76	9.33	1.40
Birth Order greater than 3	26.03	18.74	1.10
Mother's age greater than 34 years	0.90	4.05	0.70
<b>Subtotal</b>	<b>41.54</b>	<b>34.59</b>	<b>1.20</b>
<b>Short Interval + Other Risk Factors</b>			
Birth interval less than 24 months and age less than 12	1.15	0.87	2.50
Birth interval less than 24 months and age greater than 34	0.05	0.12	2.45
Birth interval less than 24 months and birth order greater than 3	11.96	14.64	2.11
Birth interval less than 24 months, age greater than 34 and birth order greater than 3	2.88	5.66	1.83
Age greater than 34 and birth order greater than 3	10.10	23.30	1.38
<b>Subtotal</b>	<b>26.14</b>	<b>44.58</b>	<b>1.81</b>
<b>Total in all categories of risk</b>	<b>67.68</b>	<b>79.17</b>	<b>1.44</b>
<b>TOTAL (ALL BIRTHS)</b>	<b>100.00</b>	<b>100.00</b>	

Source: NDHS, 1990.

**Fig.2: Risk Factors-Short Birth Interval Under 18, Over 34, & Four or More Births**



Source: NDHS 1990, Table 7.04.

Unless necessary precautions are taken, many Nigerian mothers and babies will continue to die as a result of either one or various combinations of the four maternal risk factors.

**Infant Mortality**

As shown in Table 2, neonatal, postneonatal, infant and childhood mortality rates substantiate the fact that, in Nigeria, the highest death rates are found among high risk births. Irrespective of the index of mortality, death rates are significantly higher than average among babies who are (i) born to mothers who are too young (less than 20), (ii) born at intervals of less than 24 months, (iii) born to mothers that are too old (over 40), and (iv) born after three or more previous births.

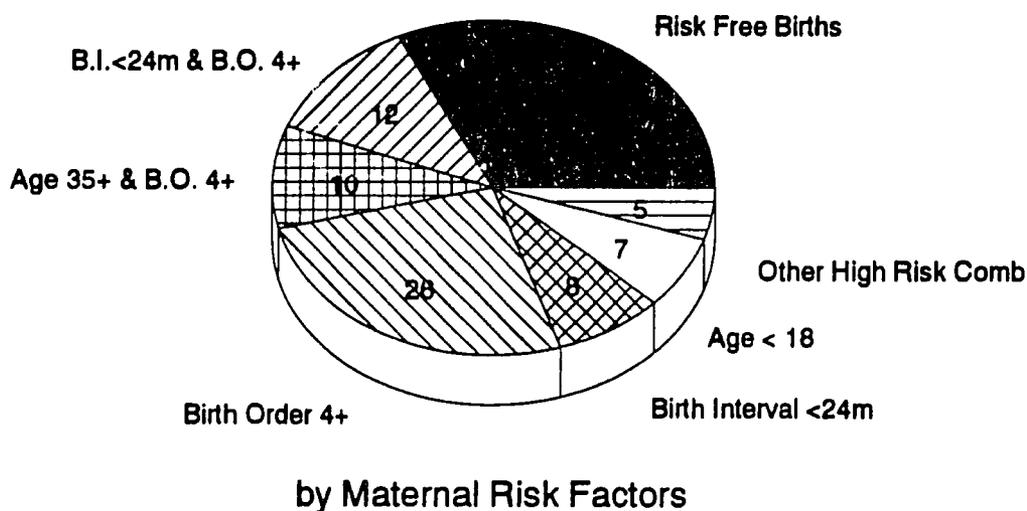
**Table 2 - Neonatal, Postneonatal, Infant, and Childhood Mortality by selected Bio-Demographic Background Characteristics for the Ten-year Period Preceding the Survey\***

Types of Mortality	TOO YOUNG Mother <20	TOO OLD Mother 40-49	AFTER4 Birth Order 4-6	BIRTHS Birth Order 7+	SHORT INTERVAL Previous Birth Interval <2yrs	All Births
Neonatal mortality	61.63	68.49	39.56	57.92	57.48	45.34
Post-neonatal mortality	58.93	57.52	49.46	47.62	60.90	46.09
Infant mortality	120.55	126.02	89.02	105.54	118.83	91.43
Child mortality	122.78	138.60	111.83	126.47	123.24	109.60
Under five mortality	228.53	247.15	190.89	218.66	227.01	191.01

\*Excludes month of interview from analysis

Source: compiled from tables 7.2 and 7.3, NDHS, 1990.

**Fig. 3: Mortality in High Risk Groups  
Nigeria, 1990**



Source: NDHS 1990, Table 7.04

Figure 3 which shows mortality rates for children under 5 vividly illustrates the fact that the single most important factor in child survival is the age of mother. When mother's age is less than 20 years, under 5 mortality rate is 228.53 deaths; a much higher rate than the national average rate of 191.01 deaths per 1000 live births. The marked zonal differences in infant mortality is not unconnected with the higher prevalence of teenage mothers in the northeastern and northwestern zones. (See Figure 4: under five mortality by each of the four zones).

The next important single factor for child survival is the interval between births. As shown in Figure 3, 227.01 out of every 1,000 babies born in quick succession (at intervals of less than 24 months) die before their fifth birthday.

Figure 3 also illustrates the dramatic increase in infant deaths when a mother combines several risk factors. The highest mortality rate of 247.15 per 1,000 live births are among children born to older women (aged 40 to 49) who can be presumed to have had many and, perhaps, frequent births.

### **MAGNITUDE OF CURRENTLY MARRIED WOMEN AT RISK**

As depicted in table 3, nearly 80 per cent (79.17%) of currently married women were at risk of conceiving a child with an elevated risk of mortality in the five-year period between 1985 and 1990. In other words, 4 of every 5 married women or about 19 million women had pregnancies that had almost certainly resulted in illness and/or death to the mother, the child or both.

High parity, having too many children and having children too frequently are the two most important single causes of maternal morbidity and mortality. As shown in table 3, mothers who have four or more children represent 18.71 per cent, and those with short birth intervals represent 9.33 per cent of currently married women at risk.

A combination of risk factors, such as high parity with short birth intervals and/or other risk factors, result in still greater number of maternal deaths. Nearly a quarter (23.30%) of the women at risk are high parity women who persist in having additional children in old age. Another group of mothers at an elevated risk are high parity women who give birth frequently at short intervals; less than 24 months. These represent 14.64 of women at risk.

Overall, high parity and frequent births alone or in combination with other maternal risk factors pose the greatest threats to mothers' lives.

### **CAUSES OF MATERNAL AND INFANT MORBIDITY AND MORTALITY**

#### **Young Mothers**

- These mothers usually have less financial and other resources.
- The young mothers tend to be inexperienced in child care.
- Increased risks of premature and underweight babies weighing under 2.5 kg.
- The young mothers are physiologically immature and suffer from a range of disorders (such as pre-eclampsia) associated with pregnancy and delivery.

**Table 3 - Percentage distribution of currently married women at risk of conceiving a child with an elevated risk of mortality according to category of increased risk.**

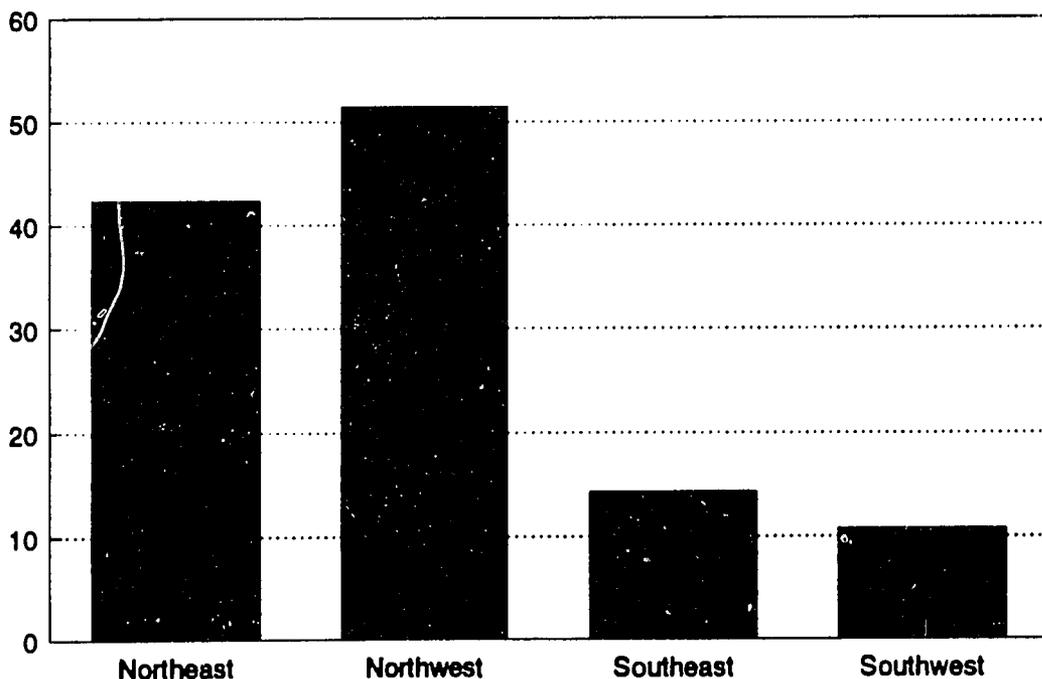
Category of Risk	% of Married Women	Risk Ratio
Not in any risk	20.83	1.00
<b>At Risk</b>		
<b><u>WOMEN WITH HIGH PARITY BIRTHS</u></b>		
High Parity (Birth Order >3)	18.71	1.10
Combination: High parity and short birth interval	14.64	2.96
Combination: Mother too old and high parity	23.30	1.38
Combination: Mother too old, short birth interval and high parity	5.66	1.83
<b><u>WOMEN WITH FREQUENT BIRTHS</u></b>		
Short birth interval	9.33	1.40
(Combination: Mother too old, short birth interval and high parity)	(5.66)	(1.83)
Combination: Mother too young and short birth interval	0.87	2.50
Combination: Mother too old and short birth interval	0.12	2.45
(Combination: High parity and short birth interval)	(14.64)	(2.11)
<b><u>WOMEN THAT ARE TOO OLD</u></b>		
Mother's age >34	4.05	0.70
(Combination: Mother too old and short birth interval)	(0.12)	(2.45)
(Combination: Mother too old and High parity)	(23.30)	(1.38)
(Combination: Mother too old, short birth interval and High parity)	(5.66)	(1.83)
<b><u>WOMEN THAT ARE TOO YOUNG</u></b>		
Mother's age <18	2.49	1.44
(Combination: Mother too young and short birth interval)	(0.87)	(2.50)
<b>% currently married women at risk</b>	<b>79.17</b>	<b>1.44</b>
<b>TOTAL</b>	<b>100.00</b>	

### High Parity and Old Mothers usually with Short Birth Intervals

- These mothers run a higher risk of giving birth to premature children with heightened chances of death.
- Mothers are not given sufficient time to recover their health especially in conditions of anemia and under nutrition.
- The responsibility of simultaneously nursing two young children leads to child neglect.
- Breastfeeding may be shortened if pregnancy occurs early.
- Too many pregnancies result in premature babies.

In conclusion, if child-bearing can be restricted to the most favourable period of women's reproductive lives so that mothers are neither too young nor too old, if children are well spaced and if higher-order births (high parity) are avoided, the rate of infant and maternal deaths can be substantially reduced. Greater spread and vigorous pursuit of existing family planning programmes and the other provisions of the national population policy will contribute significantly to the reduction of maternal and infant deaths.

**Fig4: % teenagers begun childbearing  
Regions NE, NW, SE, SW**



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# Chapter 5

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## Target Setting Models

*Estimating the Number of Contraceptive Users Required to Attain a Target Level of Fertility: The Use of Target-Setting Models*

*Bamikale Feyisetan (Ph.D.)*

**L**ike many other developing countries of the world, Nigeria has, for some time, been experiencing rapid population growth that results primarily from stable high birth rates and declining death rates<sup>1</sup>. All available evidence indicates that fertility has remained high for some time. Estimates by the United Nations put the Total Fertility Rate at close to 7 and Crude Birth Rates at around 50 for the past three decades (see for instance United Nations, 1985)<sup>2</sup>. Estimates from the 1981/82 Nigeria Fertility survey showed a TFR of 6.34 with little variations among the regions of the country. The stability in fertility is further demonstrated by findings from the 1990 Nigerian Demographic and Health Surveys that indicate that the Total Fertility Rate for the entire country is 6.06.

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<sup>(1)</sup>International migration was of little significance to the demographic situation in Nigeria, except during the mid-seventies.

<sup>(2)</sup>These are estimates from the medium variant projection which has been accepted as the closest to the Nigerian situation

While birth rates have remained high in Nigeria, death rates, especially infant mortality rates have been declining over time<sup>1</sup>. The Crude Death Rate (CDR) declined from 25 in 1960 to 17 in 1983. During the same period, Infant Mortality Rate declined from 195 to 115 (UNICEF, 1985). Under 5 mortality was also found to decline from about 325 to 190 during the same period.

The balance between Nigeria's stable high fertility rates and steadily declining death rates has led to a situation in which annual population growth rate is in excess of 3 percent. From a figure of 55.7 million in 1963, it has grown to 88.5 million in 1990. Although, it has been recognized for a long time that Nigeria's population was growing at a rapid rate, and in spite of the fact that many studies have suggested a negative correlation between rapid population growth and economic development, it was not until the late 1980's that Nigeria's policy planners saw the need for a population control through deliberate control of family size.

Prior to 1980, the official thinking about Nigeria's population situation was amply reflected by the following excerpt from the Third National Development Plan:

*"Although Nigeria has (by world standard) a large and rapidly growing population, these demographic factors do not appear as yet to constitute a significant or serious obstacle to domestic economic progress. The country is fortunate in possessing a large land area well endowed with natural resources, which if carefully exploited should provide a basis for building a viable economy which would ensure a steadily rising standard of living for the population within the foreseeable future especially during the current phase of the country's demographic transition which is characterized by rapid growth. Emphasis of policy is, therefore, being deliberately placed on accelerating the rate of growth of the economy rather than on direct action to achieve a drastic or immediate reduction in the overall birth rate. It is believed that the high tempo of social and economic development itself will help to accentuate the forces already at work, which will tend to bring down the birth rate in the long run.*

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<sup>(1)</sup> There is no doubt that death rates are still high when compared with the situation in developed and some developing countries

*The Government is not, however, leaving the problem of reducing the overall fertility rate solely to the normal process of social change. During the plan period, the task of integrating the various voluntary family planning schemes into an overall health and Social Welfare for the country will be continued. The newly established National Population Council will be strengthened so that it can, in association with the Family Planning Council of Nigeria and other non-government agencies in the field, accelerate the provision of family planning information and services on a voluntary basis to people in all parts of the country (Third National Plan: 293-294).*

Events in the past decade have convinced everybody that the invisible hands of economic growth have failed to shape the course of procreation and that there is a need for a new approach to arrest the imminent population crisis. The events have also made it increasingly obvious that Nigeria's population growth, which like those of many other less developed countries is unmatched by a corresponding increase in the production of goods and services, constitutes an obstacle not only to domestic economic growth but also to the provision of adequate social amenities to the population.

With respect to health, frequent confinements (characteristic of high fertility societies) have been attributed to high rates of sickness and death among mothers and young children. Frequent confinements, it is claimed, tend to result in short intervals between pregnancies and positive correlation has usually been found between short birth intervals and fetal loss, still birth, prematurely and early child loss. Also, the level of fertility determines not only the number (and hence the proportion) of women in reproductive years but also the size of the pediatric population, the segment of the population that is usually at greatest risk of disease and death and consequently the most likely to require health services. Rapid population growth also makes it increasingly costly to develop the health infrastructure-to build enough facilities, train enough personnel and provide enough funds to meet health needs of the country.

### **The Population Policy Today:**

Acknowledging the inadequacies of past policies in shaping the course of procreation, the 1988 National Policy for Development, Unity, Progress and Self-Reliance noted that:

*"while all development plans up to date have articulated a series of programs for the enhancement of the nation's standard of living*

*and welfare, a laissez-faire approach to population issues has always been adopted. This approach has indirectly favored rapid population growth with adverse consequences on the welfare of the citizens and on the socioeconomic development of the country..."*

In relation to the objective of slowing down the rate of growth of Nigeria's population, the 1988 National Policy attempts to attain the following demographic goals, among others:

(i) For the protection of the health of the mother and the child, to reduce the proportion of women who get married before the age of 18 years by 50 percent by 1995 and by 80 percent by the year 2000;

(ii) to reduce pregnancy to mothers below 18 years and above 35 years of age by 50 percent by 1995 and by 80 percent by the year 2000;

(iii) to reduce the number of children a woman is likely to have during her lifetime, now over 6 to 4 per women by year 2000 and reduce the present rate of population growth from about 3.3 percent per year to 2.5 percent by 1995 and 2.0 percent by the year 2000.

(iv) to reduce the infant mortality rate to 50 per 1000 live births by the year 1990 and 30 per 1000 live births by the year 2000 and the crude death rate to 10 per 1000 by 1990 and 8 per 1000 by the year 2000 (Federal Republic of Nigeria, 1988: 13-14).

The present paper is mostly concerned with the feasibility of attaining a Total Fertility Rate of 4 by the year 2000. Since we are operating under a Family Planning Policy, the questions remain: (i) how many contraceptive users are needed to attain that goal by the year 2000; (ii) how many people should be using each contraceptive method if the present method mix is allowed to prevail; (iii) how many people should be using each method if there is a slight shift towards more effective contraceptive methods. The target-setting model is used to answer these questions.

The rest of this paper is devoted to a discussion of the target-setting model and the results obtained under different assumptions.

### **The Target-Setting Model:**

The RAPID version of the target-setting model, adopted to obtain our estimates is like the Population Council Version, usually used to estimate the number of contraceptive users required to achieve a given target level of fertility in the future. In addition to the current

and target levels of Total Fertility Rates, the model requires adequate data on contraceptive prevalence at the beginning of the projection period and on the proximate determinants of fertility. Like other projection procedures, estimates from the target-setting model are based on assumptions about the behavior of social and demographic parameters during the projection period.

### **Inputs for the Estimated Models:**

Table 1 gives a summary of data used for the two models whose estimates are reported in this paper. The sources of the various data are indicated at the bottom of the Table. In addition to data shown in Table 1, the 1990 Nigeria Demographic and Health Survey also indicates that:

(i) Total Fertility Rate varies among the regions: 5.53 in the South-West; 5.64 in the South-East; 6.56 in the North-East; and 6.65 in the North-West.

(ii) The proportion of currently married women using contraceptive methods varies among the regions: 0.012 in the North-West; 0.02 in the North-East; 0.088 in the South-East and 0.15 in the South-West. Thus, contraceptive use is much lower in regions with higher TFR.

### **Obtaining a TFR of 4 by the year 2000: What Policy Options**

In order to move from the present TFR of about 6 to 4 within a decade, greater proportions of women of reproductive ages must adopt contraception. There appears to be no alternative to high contraceptive adoption since the invisible hands of economic growth have failed to influence procreation propensities, at least remarkably. It is necessary, therefore, based on the projected populations of Nigeria to estimate the number of contraceptive users needed to attain the target level.

Two models were estimated using data in Table 1. Model 1 assumes that the 1990 method mix prevails throughout the decade. Estimates of model 1 are presented in Tables 2 and 3. Model 2 assumes that there will be a substitution of more effective methods for the less effective ones during the decade. On the basis of the present economic situation in Nigeria, which makes childbearing extremely expensive, it is reasonable to assume that more women, especially the more educated and those in the urban areas will adopt the more effective modern methods. We have therefore, assumed that the use

of the pill, IUD, female sterilization and the condom will increase by about 33%, 50%, 20% and 40% respectively by the year 2000. Estimates of model 2 are presented in Tables 4 and 5.

There are two variants of each model. The first variant (presented in Tables 2 and 4) uses the mean duration of postpartum amenorrhea obtained from the 1990 NDHS as the duration of postpartum infecundability. The second variant (presented in Tables 3 and 5) estimates postpartum infecundability from the mean duration of breastfeeding. Reasons for doing that are indicated at the bottom of Table 3.

The first panel of Table 2 shows the number of contraceptive users required to attain a TFR of 4 by the year 2000. The Table shows that 46.2 per cent of married women of reproductive ages must be using contraceptives by the year 2000. This represents a tremendous rise from the 1990 level of 6.0 percent. Numerically, the number of currently married women using contraceptives must rise from 1.15 million in 1990 to about 12.5 million by the year 2000.

The remaining panels of the Table show the number of women that should use each method, the annual number of acceptors and the annual number of units of each method required to attain the fertility goal. For example, 2.495 million currently married women (representing 9.2 percent of currently married women) are expected to use the pill by the year 2000. This is much higher than the 231,000 (1.2 percent) estimated to be using the pill in 1990. In addition, 28.724 million cycles of the pill would be needed in 1999. This is also much higher than the estimate for 1990 which is 5.273 million.

Table 3 shows the required number of contraceptive users when postpartum infecundability was recalculated from the mean duration of breastfeeding<sup>1</sup>. As could be seen from the Table, the percentage and number of women required to adopt contraception were not much different from what we presented in Table 2. It must be noted, however, that by holding other parameters constant (as is the case here) shorter duration of postpartum infecundability leads to some decline in the percentage (and number) of women required to use contraception. The opposite is the case with longer duration of postpartum infecundability. When we combined these factors with

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<sup>(1)</sup> See bottom of table for explanation

a duration of postpartum insusceptibility of 19.4 months (obtained also from NDHS), the percentage of married women required to be using contraceptives by the year 2000 is 46.6 which is also not very different from the figure of 46.2 presented in Table 2.

The first panel of Table 4 shows the required number of contraceptive users under the assumption that greater proportions of women who use contraceptive will use modern methods during the projection period. The Table shows that 43.8 per cent of married women of reproductive ages must be using contraceptives by the year 2000. Although this represents a tremendous rise from the 1990 level of 6.0 percent, the figure shows that overall lower percentage of women will be required to adopt contraception when greater proportions of acceptors use the more effective modern methods. However, as would be observed under each method, higher proportions of women are required to adopt the modern methods. The remaining panels of the Table show the number of women that would be required to use each method, the annual number of acceptors and annual number of units of each method required to attain the fertility goal. For example, 710,000 (representing 2.6 percent of currently married women) would be required to adopt female sterilization by the year 2000. This is much higher than the 57,700 (or 0.2 percent) estimated for 1990.

Table 5 also shows that the percentage and number of women required to adopt contraception do not differ significantly when lower duration of postpartum infecundability was used.

### **Discussions:**

The preceding analysis has demonstrated that much has to be done to facilitate greater adoption of contraception by currently married women in Nigeria in order to be close to the target level of TFR by the year 2000. As shown in Tables 2 and 4, the proportion of currently married women using one form of contraception or the other will have to increase by about 670 percent if the 1990 method mix prevails throughout the decade and by about 630 percent if there is a substitution of more effective modern methods for the less effective methods during the decade. Expected increases in the proportion using each method are also high. Several alternatives were examined but we have presented the results of the two that seem most reasonable and significantly different from each other.

Several questions emanate from our analysis:

First, is it possible to raise contraceptive prevalence to the desired levels during the next 9 years considering the sociocultural barriers to the adoption of contraception among the various groups in Nigeria? The level of contraceptive prevalence required to meet the target level of TFR appears to far away from the present level. This fact becomes more important when it is realized that we have not taken into consideration use. For instance, the North-West with a TFR of 6.65 and the North-East with a TFR of 6.56 have contraceptive prevalence of 1.2 percent and 2.0 percent respectively. For this part of Nigeria to achieve a TFR of 4 by the year 2000, contraceptive prevalence will have to increase more than 1000 percent. This amount of increase may not be feasible.

Secondly, which of the two alternatives presented in this paper is more desirable? The constant method mix approach requires, at the aggregate level, higher number of acceptors but lower numbers of acceptors of modern methods. The reverse is the case with the variable method mix approach. The variable method mix approach (as is being suggested here) will definitely be more expensive to operate as more money will be required for the materials and personnel to administer the methods. At our current level of contraceptive use, however, the two alternatives will be expensive to operate if we are to attain the desired levels in this decade. This is besides the feasibility of acquiring the amount of materials needed to attain that level within a short period of time.

Thirdly, our estimates are based on the assumption that the use effectiveness of the methods are as specified among the various segments of the population. If, for any reason the use effectiveness of the methods is lower than the specified values, then the amount of acceptors needed to attain the target TFR will be higher than our estimates.

### References

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3. National Population Bureau, 1984 The Nigeria Fertility Survey 1981/1982: Principal Report, Vol 1.

4. United Nations, 1985. World Population Prospects: Estimates as Assessed in 1982. New York, 274-275

Table 1. Inputs for Models 1 and 2

TOTAL FERTILITY RATES:			
	1990	6.06 <sup>1</sup>	
	2000	4.00 <sup>2</sup>	
WOMEN AGED 15-49 YEARS (IN THOUSAND) <sup>3</sup>	1990		2000
	24581	29243	35023
CONTRACEPTIVE METHODS:			
Method:	Effectiveness <sup>4</sup>	Discontinuation <sup>5</sup>	Consumption
Pill	0.90	0.30	13.0
IUD	0.95	0.15	
Female Sterilization	1.00	0.01	
Male Sterilization	1.00	0.01	
Injectables	0.98	0.25	
Condom	0.70	0.40	4.0
Other (Norplant)	0.70	0.15	100
METHOD MIX <sup>6</sup>			

TOTAL FERTILITY RATES:		
	1990	6.06 <sup>1</sup>
	2000	4.00 <sup>2</sup>
Method	1990	2000 (for model 2 only)
Pill	20.00	27.00
IUD	13.30	20.00
Female Sterilization	5.00	6.00
Male Sterilization	0.00	0.50
Injectables	11.70	15.00
Condom	6.70	10.00
Other	43.30	21.50

PROXIMATE DETERMINANTS:			
	1990	1995	2000
Contraceptive prevalence among CM Women (%)	6.0		
Percent WRA married <sup>7</sup>	78.3	77.7	77.1
Duration of postpartum infecundability (months) <sup>8</sup>	15.9	14.7	13.5
Induced abortion rates per 1000 women <sup>9</sup>	0.00	0.00	0.00
Pathological sterility rates	0.00	0.00	0.00

Table I. Inputs for Models 1 and 2 (Continued)

<b>DISTRIBUTION BY SOURCE IN 1990<sup>10</sup>:</b>				
<b>Method:</b>	<b>Public/Govt</b>	<b>PPFN</b>	<b>Private</b>	<b>Other/Unknown</b>
<b>Pill</b>	29.0	2.3	62.1	6.6
<b>IUD</b>	61.1	7.8	20.0	11.1
<b>Fem Sterilization</b>	43.8	4.4	11.6	40.2
<b>Male Sterilization</b>	0.0	0.0	0.0	100.0
<b>Injectables</b>	44.9	3.6	48.5	3.0
<b>Condom</b>	13.4	3.6	54.9	28.1

## Notes:

1. 1990 TFR obtained from 1990 NDHS
2. 2000 TFR corresponds to the 1988 Policy target
3. Estimates obtained from the World Population Prospects: Estimates and Projections as Assessed in 1982 (UN, 1985)
4. Standard effectiveness levels
5. For condom and injection, calculation of discontinuation rates is based on pattern of differentials in use according to number of living children. While over two thirds of women who use condom are women who have 2 or fewer children (those who have high propensity to discontinue contraceptive use in order to have more children) approximately 80 percent of those who use injectables are women with 3 or more children (those who are less likely to have more children and thus discontinue contraceptive use).
6. Obtained from 1990 NDHS. For model 1, method mix was assumed to be constant throughout the projection period. Contraceptive prevalence among Currently Married Women was also obtained from 1990 NDHS.
7. 1990 estimate was obtained from NDHS. The 1981/82 Fertility Survey gave the proportion as 0.795. Using the 1981/82 NFS as base, an estimate of annual growth rate in proportion married was obtained as -0.002. The annual growth rate was then used to predict the proportion that would be married in years 1995 and 2000.
8. Obtained from 1990 NDHS (mean duration of post-partum amenorrhoea).
9. No estimates
10. No estimates
11. Obtained from 1990 NDHS.

Table 2: Estimates of Contraceptive Users: Model 1

ALL METHODS:		
Year	Percent of MWRA Using	Number Using (Thousands)
1990	6.0	1154.8
1991	10.2	2027.9
1992	14.3	2950.8
1993	18.5	3925.6
1994	22.5	4954.4
1995	26.6	6039.5
1996	30.6	7192.7
1997	34.5	8409.9
1998	38.5	9694.0
1999	42.4	11047.7
2000	46.2	12473.8

PILL:				
Year	Percent MWRA Using	Number using (Thousands)	Annual No of Acceptors (Thousands)	Annual No of Cycles (Thousands)
1990	1.2	231.0		
1991	2.0	405.6	308.5	5272.6
1992	2.9	590.2	373.8	7672.1
1993	3.7	785.1	443.9	10206.6
1994	4.5	990.9	518.2	12881.5
1995	5.3	1207.9	597.4	15702.7
1996	6.1	1438.5	681.8	18700.9
1997	6.9	1682.0	770.1	21865.8
1998	7.7	1938.8	863.0	25204.4
1999	8.5	2209.5	960.8	28723.9
2000	9.2	2494.8		

IUD:				
Year	Percent MWRA Using	Number using (Thousands)	Annual No of Acceptors (Thousands)	Annual No of insertions (Thousand)
1990	0.8	153.6		
1991	1.4	269.7	166.9	166.9
1992	1.9	392.5	192.9	192.9
1993	2.5	522.1	221.1	221.1
1994	3.0	658.9	251.0	251.0
1995	3.5	803.3	283.2	283.2
1996	4.1	956.6	317.6	317.6
1997	4.6	1118.5	353.3	353.3
1998	5.1	1289.3	390.8	390.8
1999	5.6	1469.3	460.3	430.3
2000	6.1	1659.0		

**Table 2: Estimates of Contraceptive Users: Model 1 (Continued)**

<b>FEMALE STERILIZATION</b>				
<b>Year</b>	<b>Percent MWRA Using</b>	<b>Number using (Thousands)</b>	<b>Annual No of Acceptors (Thousands)</b>	<b>Annual No of Procedures (Thousands)</b>
1990	0.3	57.7		
1991	0.5	101.4	49.0	49.0
1992	0.7	147.5	52.6	52.6
1993	0.9	196.3	56.6	56.6
1994	1.1	247.7	60.9	60.9
1995	1.3	302.0	65.7	65.7
1996	1.5	359.6	70.8	70.8
1997	1.7	420.5	76.0	76.0
1998	1.9	484.7	81.5	81.5
1999	2.1	552.4	87.2	87.2
2000	2.3	623.7		

<b>INJECTABLES:</b>				
<b>Year</b>	<b>Percent MWRA Using</b>	<b>Number using (Thousands)</b>	<b>Annual No of Acceptors (Thousands)</b>	<b>Annual No of Injections (Thousands)</b>
1990	0.7	135.1		
1991	1.2	237.3	168.1	949.1
1992	1.7	345.2	200.7	1381.0
1993	2.2	459.3	235.8	1837.2
1994	2.6	579.7	273.0	2318.7
1995	3.1	706.6	312.7	2826.5
1996	3.6	841.5	355.1	3366.2
1997	4.0	984.0	399.3	3935.8
1998	4.5	1134.2	445.9	4536.8
1999	5.0	1292.6	494.9	5170.3
2000	5.4	1459.4		

<b>CONDOM:</b>				
<b>Year</b>	<b>Percent MWRA Using</b>	<b>Number using (Thousands)</b>	<b>Annual No of Acceptors (Thousands)</b>	<b>Annual No of Units (Thousands)</b>
1990	0.4	77.4		
1991	0.7	135.9	117.2	13587.0
1992	1.0	197.7	145.4	19770.5
1993	1.2	263.0	175.5	26301.7
1994	1.5	331.9	207.4	33194.7
1995	1.8	404.6	241.4	40464.5
1996	2.0	481.9	277.6	48190.8
1997	2.3	563.5	315.4	56346.5
1998	2.6	649.5	355.4	64949.8
1999	2.8	740.2	397.4	74019.4
2000	3.1	835.7		

**Table 2: Estimates of Contraceptive Users: Model 1 (Continued)**

<b>OTHER:</b>				
<b>Year</b>	<b>Percent MWRA Using</b>	<b>Number using (Thousands)</b>	<b>Annual No of Acceptors (Thousands)</b>	<b>Annual No of Units (Thousands)</b>
1990	2.6	500.0		
1991	4.4	878.1	406.2	
1992	6.2	1277.7	428.6	
1993	8.0	1699.8	454.6	
1994	9.8	2145.	482.6	
1995	11.5	2615.1	514.1	
1996	13.2	3114.4	548.1	
1997	15.0	3641.5	582.0	
1998	16.7	4197.5	617.5	
1999	18.3	4783.6	654.7	
2000	20.0	5401.2		

**Table 3: Estimates of Contraceptive Users: Model 1b**

<b>ALL METHODS:</b>		
<b>Year</b>	<b>Percent of MWRA Using</b>	<b>Number Using (Thousands)</b>
1990	6.0	1154.8
1991	10.2	2020.5
1992	14.3	2936.0
1993	18.4	3903.5
1994	22.4	4925.0
1995	26.4	6002.9
1996	30.4	7149.0
1997	34.3	8359.4
1998	38.2	9636.8
1999	42.1	10984.0
2000	45.9	12404.1

<b>PILL:</b>				
<b>Year</b>	<b>Percent MWRA Using</b>	<b>Number using (Thousands)</b>	<b>Annual No of Acceptors (Thousands)</b>	<b>Annual No of Cycles (Thousands)</b>
1990	1.2	231.0		
1991	2.0	404.1	306.5	5253.6
1992	2.9	587.2	371.4	7633.6
1993	3.7	780.7	441.1	10149.0
1994	4.5	985.0	514.9	12805.0
1995	5.3	1200.6	593.7	15607.5
1996	6.1	1429.8	677.7	18587.4
1997	6.9	1671.0	765.6	21734.4
1998	7.6	1927.4	858.2	25055.6
1999	8.4	2196.8	955.6	28558.5
2000	9.2	2480.8		

<b>IUD:</b>				
<b>Year</b>	<b>Percent MWRA Using</b>	<b>Number using (Thousands)</b>	<b>Annual No of Acceptors (Thousands)</b>	<b>Annual No of insertions (Thousands)</b>
1990	0.8	153.6		
1991	1.4	268.7	165.7	165.7
1992	1.9	390.5	191.5	191.5
1993	2.4	519.2	219.6	219.6
1994	3.0	655.0	249.4	249.4
1995	3.5	798.4	281.4	281.4
1996	4.1	950.8	315.7	315.7
1997	4.6	1111.8	351.2	351.2
1998	5.1	1281.7	388.7	388.7
1999	5.6	1460.9	428.1	428.1
2000	6.1	1649.7		

Table 3: Estimates of Contraceptive Users: Model 1b (Continued)

<b>FEMALE STERILIZATION</b>				
<b>Year</b>	<b>Percent MWRA Using</b>	<b>Number using (Thousands)</b>	<b>Annual No of Acceptors (Thousands)</b>	<b>Annual No of Units (Thousands)</b>
1990	0.3	57.7		
1991	0.5	101.0	48.6	48.6
1992	0.7	146.8	52.2	52.2
1993	0.9	195.2	56.2	56.2
1994	1.1	246.2	60.5	60.5
1995	1.3	300.1	65.3	65.3
1996	1.5	357.4	70.4	70.4
1997	1.7	418.0	75.6	75.6
1998	1.9	481.0	81.1	81.1
1999	2.1	549.2	86.8	86.8
2000	2.3	620.2		

<b>INJECTABLES:</b>				
<b>Year</b>	<b>Percent MWRA Using</b>	<b>Number using (Thousands)</b>	<b>Annual No of Acceptors (Thousands)</b>	<b>Annual No of Units (Thousands)</b>
1990	0.7	135.1		
1991	1.2	236.4	167.0	945.6
1992	1.7	343.5	199.4	1374.1
1993	2.1	456.7	234.3	1826.8
1994	2.6	576.2	271.3	2304.9
1995	3.1	702.3	310.8	2809.3
1996	3.6	836.4	353.0	3345.7
1997	4.0	978.0	397.0	3912.2
4.5	1127.5	443.4	4510.0	64566.3
1999	4.9	1285.1	492.2	5140.5
2000	5.4	1451.3		

<b>CONDOM:</b>				
<b>Year</b>	<b>Percent MWRA Using</b>	<b>Number using (Thousands)</b>	<b>Annual No of Acceptors (Thousands)</b>	<b>Annual No of Units (Thousands)</b>
1990	0.4	77.4		
1991	0.7	135.4	116.5	13537.3
1992	1.0	196.7	144.5	19671.2
1993	1.2	261.5	174.4	26153.1
1994	1.5	330.0	206.2	32997.5
1995	1.8	402.2	239.9	40219.3
1996	2.0	479.0	275.9	47898.2
1997	2.3	560.1	313.6	56007.8
1998	2.6	645.7	353.3	64566.3
1999	2.8	735.9	395.2	73593.0
2000	3.1	831.1		

**Table 3: Estimates of Contraceptive Users: Model 1b (Continued)**

<b>OTHER:</b>				
<b>Year</b>	<b>Percent MWRA Using</b>	<b>Number using (Thousands)</b>	<b>Annual No of Acceptors (Thousands)</b>	<b>Annual No of Units (Thousands)</b>
1990	2.6	500.0		
1991	4.4	874.9	402.8	
1992	6.2	1271.3	425.2	
1993	7.9	1690.2	451.3	
1994	9.7	2132.5	479.3	
1995	11.4	2599.2	510.8	
1996	13.2	3095.5	544.8	
1997	14.9	3619.6	578.8	
1998	16.6	4172.7	614.4	
1999	18.2	4756.1	651.6	
2000	19.9	5371.0		

**Note:**

For model 1b, Table 3:

Postpartum infecundability was calculated from the duration of breastfeeding using Bongaart's formula:

$$DPPF=1.753 \exp (0.1396* B-0.001872*B)$$

where B=19.5 (from NDHS). This exercise yielded a mean duration of postpartum infecundability of 13.1 months in 1990. This exercise was carried out because the estimate of postpartum amenorrhoea from the 1990 NDHS is much higher not only than any estimate from earlier surveys, but also than the regression estimate from the Target-setting model. It was assumed that mean duration of postpartum infecundability will decline to 11.0 months in 2000.

Table 4: Estimates of Contraceptive Users: Model 2

ALL METHODS:		
Year	Percent of MWRA Using	Number Using (Thousands)
1990	6.0	1154.8
1991	10.1	2017.0
1992	14.2	2919.2
1993	18.2	3862.8
1994	22.1	4849.3
1995	25.9	5880.2
1996	29.6	6966.2
1997	33.3	8102.6
1998	36.9	9291.2
1999	40.4	10533.9
2000	43.8	11832.6

PILL:				
Year	Percent MWRA Using	Number using (Thousands)	Annual No of Acceptors (Thousands)	Annual No of Cycles (Thousands)
1990	1.2	231.0		
1991	2.1	417.5	329.2	5427.7
1992	3.0	624.7	412.6	8121.2
1993	4.0	853.7	505.0	11097.9
1994	5.0	1105.6	606.2	14373.4
1995	6.1	1381.8	717.2	17963.9
1996	7.2	1685.8	838.9	21915.5
1997	8.3	2017.5	969.8	26228.1
1998	9.4	2378.6	1111.4	30921.2
1999	10.6	2770.4	1264.1	36015.5
2000	11.8	3194.8		

IUD:				
Year	Percent MWRA Using	Number using (Thousands)	Annual No of Acceptors (Thousands)	Annual No of Insertions (Thousands)
1990	0.8	153.6		
1991	1.4	281.8	186.0	186.0
1992	2.1	427.4	227.1	227.1
1993	2.8	591.4	273.0	273.0
1994	3.5	774.9	323.5	323.5
1995	4.3	979.0	379.3	379.3
1996	5.1	1206.5	440.8	440.8
1997	6.0	1457.7	507.0	507.0
1998	6.9	1733.7	578.7	578.7
1999	7.8	2036.2	656.3	656.3
2000	8.8	2366.5		

Table 4: Estimates of Contraceptive Users: Model 2 (Continued)

<b>FEMALE STERILIZATION</b>				
<b>Year</b>	<b>Percent MWRA Using</b>	<b>Number using (Thousands)</b>	<b>Annual No of Acceptors (Thousands)</b>	<b>Annual No of Procedures (Thousands)</b>
1990	0.3	57.7		
1991	0.5	102.9	51.2	51.2
1992	0.7	151.8	56.2	56.2
1993	1.0	204.7	61.8	61.8
1994	1.2	261.9	67.9	67.9
1995	1.4	323.4	74.5	74.5
1996	1.7	390.1	81.8	81.8
1997	1.9	461.8	89.2	89.2
1998	2.1	538.9	97.1	97.1
1999	2.4	621.5	105.4	105.4
2000	2.6	710.0		

<b>MALE STERILIZATION</b>				
<b>Year</b>	<b>Percent MWRA Using</b>	<b>Number using (Thousands)</b>	<b>Annual No of Acceptors (Thousands)</b>	<b>Annual No of Cycles (Thousands)</b>
1990	0.0	0.0		
1991	0.0	1.0	1.2	1.2
1992	0.0	2.0	2.5	2.5
1993	0.0	5.8	3.5	3.5
1994	0.0	9.7	4.7	4.7
1995	0.1	14.7	5.9	5.9
1996	0.1	20.9	7.3	7.3
1997	0.1	28.4	8.8	8.8
1998	0.1	37.2	10.4	10.4
1999	0.2	47.4	12.1	12.1
2000	0.2	59.2		

Table 4: Estimates of Contraceptive Users: Model 2 (Continued)

INJECTABLES:				
Year	Percent MWRA Using	Number using (Thousands)	Annual No of Acceptors (Thousands)	Annual No of Injections (Thousands)
1990	0.7	135.1		
1991	1.2	242.6	177.2	970.6
1992	1.8	360.8	217.4	1443.2
1993	2.3	490.2	261.8	1960.8
1994	2.9	631.4	310.0	2525.5
1995	3.5	785.0	362.6	3140.0
1996	4.1	953.0	420.1	3811.9
1997	4.7	1135.2	481.5	4540.7
1998	5.3	1332.4	547.5	5329.4
1999	5.9	1545.3	618.4	6181.3
2000	6.6	1774.9		

CONDOM:				
Year	Percent MWRA Using	Number using (Thousands)	Annual No of Acceptors (Thousands)	Annual No of Units (Thousands)
1990	0.4	77.4		
1991	0.7	141.8	128.1	14179.3
1992	1.0	214.9	166.4	21485.2
1993	1.4	297.1	209.4	29705.1
1994	1.8	388.9	256.9	38891.6
1995	2.2	491.0	309.7	49099.3
1996	2.6	604.7	368.0	60466.3
1997	3.0	730.0	431.6	73004.2
1998	3.4	867.8	500.9	86780.0
1999	3.9	1018.6	576.3	101863.1
2000	4.4	1183.3		

OTHER:				
Year	Percent MWRA Using	Number using (Thousands)	Annual No of Acceptors (Thousands)	Annual No of Units (Thousands)
1990	2.6	500.0		
1991	4.2	829.4	336.1	
1992	5.5	1136.7	312.0	
1993	6.7	1420.0	288.2	
1994	7.6	1676.9	262.7	
1995	8.4	1905.2	236.2	
1996	9.0	2105.2	207.5	
1997	9.3	2272.0	174.4	
1998	9.5	2402.7	138.1	
1999	9.6	2494.4	98.4	
2000	9.4	2544.0		

**Table 5: Estimates of Contraceptive Users: Model 2a**

<b>ALL METHODS:</b>		
<b>Year</b>	<b>Percent of MWRA Using</b>	<b>Number Using (Thousands)</b>
1990	6.0	1154.8
1991	10.1	2009.6
1992	14.1	2904.5
1993	18.1	3841.0
1994	21.9	4820.5
1995	25.7	5844.5
1996	29.4	6923.9
1997	33.1	8053.9
1998	36.7	9236.4
1999	40.1	10473.2
2000	43.6	11766.5

<b>PILL:</b>				
<b>Year</b>	<b>Percent MWRA Using</b>	<b>Number using (Thousands)</b>	<b>Annual No of Acceptors (Thousands)</b>	<b>Annual No of Cycles (Thousands)</b>
1990	1.2	231.0		
1991	2.1	416.0	327.1	5407.8
1992	3.0	621.6	501.8	11035.2
1993	4.0	848.9	501.8	11035.2
1994	5.0	1099.1	602.3	14288.0
1995	6.0	1373.5	712.8	17855.0
1996	7.1	1675.6	833.8	21782.5
1997	8.2	2005.4	964.2	26070.4
1998	9.4	2364.5	1105.1	30738.6
1999	10.6	2754.5	1257.3	35808.0
2000	11.8	3176.9		

<b>IUD:</b>				
<b>Year</b>	<b>Percent MWRA Using</b>	<b>Number using (Thousands)</b>	<b>Annual No of Acceptors (Thousands)</b>	<b>Annual No of Insertions (Thousands)</b>
1990	0.8	153.6		
1991	1.4	280.7	184.7	184.7
1992	2.1	425.2	225.6	225.6
1993	2.8	588.1	271.2	271.2
1994	3.5	770.3	321.4	321.4
1995	4.3	973.1	377.0	377.0
1996	5.1	1199.2	438.2	438.2
1997	6.0	1448.9	504.1	504.1
1998	6.8	1723.5	575.5	575.5
1999	7.8	2024.5	652.9	652.9
2000	8.7	2353.3		

Table 5: Estimates of Contraceptive Users: Model 2a (Continued)

<b>FEMALE STERILIZATION</b>				
<b>Year</b>	<b>Percent MWRA Using</b>	<b>Number using (Thousands)</b>	<b>Annual No of Acceptors (Thousands)</b>	<b>Annual No of Procedures (Thousands)</b>
1990	0.3	57.7		
1991	0.5	102.5	50.8	50.8
1992	0.7	151.0	55.8	55.8
1993	1.0	203.6	61.4	61.4
1994	1.2	260.3	67.4	67.4
1995	1.4	321.4	74.1	74.1
1996	1.6	387.7	81.3	81.3
1997	1.9	459.1	88.7	88.7
1998	2.1	535.7	96.6	96.6
1999	2.4	617.9	104.9	104.9
2000	2.6	706.0		

<b>MALE STERILIZATION</b>				
<b>Year</b>	<b>Percent MWRA Using</b>	<b>Number using (Thousands)</b>	<b>Annual No of Acceptors (Thousands)</b>	<b>Annual No of Procedures (Thousands)</b>
1990	0.0	0.0		
1991	0.0	1.0	1.2	1.2
1992	0.0	2.9	2.5	2.5
1993	0.0	5.8	3.5	3.5
1994	0.0	9.6	4.6	4.6
1995	0.1	14.6	5.9	5.9
1996	0.1	20.8	7.3	7.3
1997	0.1	28.2	8.8	8.8
1998	0.1	36.9	10.3	10.3
1999	0.2	47.1	12.1	12.1
2000	0.2	58.8		

**Table 5: Estimates of Contraceptive Users: Model 2a (Continued)**

<b>INJECTABLES</b>				
<b>Year</b>	<b>Percent MWRA Using</b>	<b>Number using (Thousands)</b>	<b>Annual No of Acceptors (Thousands)</b>	<b>Annual No of Injections (Thousands)</b>
1990	0.7	135.1		
1991	1.2	241.8	176.0	967.0
1992	1.7	359.0	216.0	1436.0
1993	2.3	487.4	260.1	1949.7
1994	2.9	627.6	308.0	2510.5
1995	3.4	780.2	360.4	3121.0
1996	4.0	947.2	417.6	3788.7
1997	4.6	1128.3	478.7	4513.4
1998	5.3	1324.5	544.4	5298.0
1999	5.9	1536.4	615.1	6145.7
2000	6.5	1765.0		

<b>CONDOM</b>				
<b>Year</b>	<b>Percent MWRA Using</b>	<b>Number using (Thousands)</b>	<b>Annual No of Acceptors (Thousands)</b>	<b>Annual No of Units (Thousands)</b>
1990	0.4	77.4		
1991	0.7	141.3	127.3	14127.5
1992	1.0	213.8	165.4	23177.3
1993	1.4	295.4	208.0	29537.4
1994	1.8	386.6	255.3	38660.5
1995	2.1	488.0	307.8	48801.8
1996	2.6	601.0	365.8	60099.1
1997	3.0	725.7	429.1	72565.3
1998	3.4	862.7	498.1	86267.6
1999	3.9	1012.8	573.2	101276.2
2000	4.4	1176.6		

<b>OTHER</b>				
<b>Year</b>	<b>Percent MWRA Using</b>	<b>Number using (Thousands)</b>	<b>Annual No of Acceptors (Thousands)</b>	<b>Annual No of Units (Thousands)</b>
1990	2.6	500.0		
1991	4.2	826.3	333.0	
1992	5.5	1131.0	309.4	
1993	6.6	1412.0	286.0	
1994	7.6	1666.9	260.8	
1995	8.3	1893.6	234.7	
1996	8.9	2092.4	206.3	
1997	9.3	2258.3	173.6	
1998	9.5	2388.5	137.6	
1999	9.5	2480.1	98.2	
2000	9.4	2529.8		