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Reproductive health, population dynamics and contraception

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THE most widely known factors affecting human health are those associated with our feeding habits and the environment in which we live. Reproductive health, particularly those of the mother and her infant, is affected by our procreative patterns and habits. Frequent child bearing is a health hazard to both the mother as well as to the new born infant. Avert reactions to unwanted pregnancies can lead to abortions which can cause maternal death especially if they are performed clandestinely by unqualified persons as happens in countries where abortion is illegal.

Our reproductive habits can no longer be considered a matter of mere personal concern; frequent child bearing contributes adversely to population growth rates – a problem which affects all of us inhabiting this planet whose finite natural resources will not be able to meet the demands of an exponentially growing population.

This article examines some of the issues related to reproductive health, population growth and contraception.

Maternal and infant mortality rates in different parts of the world

Maternal mortality *ratios* and maternal mortality *rates* are the two indices commonly used to determine the health status of women. Maternal mortality ratios are calculated as the number of maternal deaths divided by the number of live births during a defined time span – usually a year. Maternal mortality ratios are a direct indicator of the dangers associated with pregnancy. A recent report by the World Health Organization[1] indicates that at least half a million women die each year due to causes related to pregnancy or childbirth. In developed countries this ratio is between 10 and 30 per 100,000 live births. In the USA it is as low as 14 per 100,000 live births[2]. In developing countries the ratio ranges from 100 to 1000 per 100,000 live births and the mean is about 450/100,000. The highest is in Africa where it is about 640/100,000.

Maternal mortality rate, on the other hand, is the number of deaths in a year per 100,000 women in the reproductive age group of 15–44 years. Maternal mortality rates are not only related to the hazards of pregnancy in women in this age group but also to their fertility. The number of pregnancies and deliveries determines a woman's lifetime risk of 1 in 21, 1 in 54 and 1 in 73 in Africa, Asia and Latin America, respectively, and lowest risk of 1 in 5 to 10,000 in North America and Northern Europe[3].

Contraceptive usage improves maternal health

A case study of Matlab, Bangladesh[4], a developing country, showed that in 1976, when Family Planning programme was first introduced, maternal mortality rates were about 90/100,000 women and maternal mortality ratios were about 500/100,000 live births. Ten years later, at the end of 1985, maternal mortality rates dropped to about 60/100,000 women. In contrast, maternal mortality rates increased in a comparison area. The observed reduction in maternal deaths in Matlab resulted from a 25% reduction in fertility.

Thus, there is compelling evidence from these and other studies[5] that maternal mortality ratios are influenced by family planning only when it reduces pregnancies in women at high obstetric risk and when there is a shift in pregnancies occurring in women at high obstetric risk (older women with high parity) to younger, low-risk women. Family planning reduces maternal mortality rates through the reduction of unwanted pregnancies.

Illegal abortions are hazardous to maternal health

Unwanted pregnancies lead to induced abortions. In a study of 60 developing countries Rochat *et al.*[6] showed that about 207 abortions occurred per 1000 live births and an estimated 70,000 to 100,000 maternal deaths occurred from abortion-related complications. 22% of all maternal deaths were due to illegal abortions in Benin city, Nigeria[7]. Maternal mortality ratio was estimated at 560/100,000 live births and abortions accounted for over 50% of maternal deaths in Addis Ababa[8].

Maternal deaths due to abortion-related complications are high in countries such as those in Latin America, where abortion is illegal. Studies carried out in Latin American countries indicate that between 15 and 33% of women undergoing abortion experience complications requiring hospitalization[9]. In Peru there were 660,000 births and 58,000 abortion-associated hospitalizations in 1981. In Brazil there were about 4,000,000 births in 1985 and at least 400,000 abortion-associated hospitalizations. In the same year 900,000 births and 71,000 abortion-associated hospitalizations occurred in Columbia. Contraceptive availability and use can significantly reduce these high levels of morbidity and mortality by decreasing the number of unwanted pregnancies.

Unsafe abortions result mostly from illegal abortion attempts and it is estimated that they are responsible for as many as 50% of maternal deaths in Latin America.

Legislation against abortions increases maternal mortality as indicated by the Romanian experience where abortions were restricted in 1966 and in that year alone abortions accounted for 35% of maternal mortality. In subsequent years, when illegal abortion channels opened, abortions accounted for 63% of maternal mortality in 1970 (ref. 10).

Legalizing abortions increases the absolute safety of the abortion procedure and results in a lowering of maternal mortality because legal abortions enable the performing of abortions earlier in gestation. Moreover, the availability of medical skills in a legitimate set-up ensures the safety of the procedure. A recent study by the Council on Scientific Affairs, American Medical Association[11], showed that in the USA between 1973 to 1985 there was a five-fold decrease in maternal mortality because the illegal legitimacy of abortions permitted the gradual improvement in the surgical skills required to carry out a medical termination of pregnancy.

Infant and child mortality

In spite of significant improvements in infant and child survival in the last decades, of the 50 million people who die each year, 15 million are children under five years of age. Current infant mortality rate figures in developed and developing regions are 16 and 88 per 1000 births, respectively.

Hobcroft's[12] analysis of the World Fertility Survey and Demographic Health Survey which was carried out under the aegis of the UNFPA and USAID, has shown that first births in teenaged mothers are associated with a 40% increase in child mortality as compared with first births in women aged between 20 and 35 years. Besides legislating against teenage marriage, which has proven to be ineffective in India, it may be necessary to make contraceptives freely available to teen-agers, as also to prevent such excessive child mortality especially in those societies where extra-marital intercourse is practised freely by teen-agers.

The WFS and DHS data were also analysed to determine the impact of birth interval on child mortality. Compared with births occurring at least 24 months after the preceding birth, those that occur within 17 months experience a doubling in child mortality.

The data from these sources clearly substantiate the view that the incidence of teen-age pregnancy related child deaths as well as those due to poor spacing dropped markedly in 25 countries over a ten-year period when family planning methods were increasingly used.

Population growth rates in different parts of the world

The human population grew at an extremely low rate throughout the first two billion years but, suddenly since the beginning of the nineteenth century, it reached one billion people.

As shown in Figure 1, it took 127 years to add the second billion but only 10 years to add the sixth at the close of the twentieth century. At the current rate of population growth more than a billion people will be added between now and the year 2010. The rate of population growth will be highest in Sub-Saharan Africa (91%), followed by North Africa and West Asia (60%) and Latin America (40%). Developed countries will grow

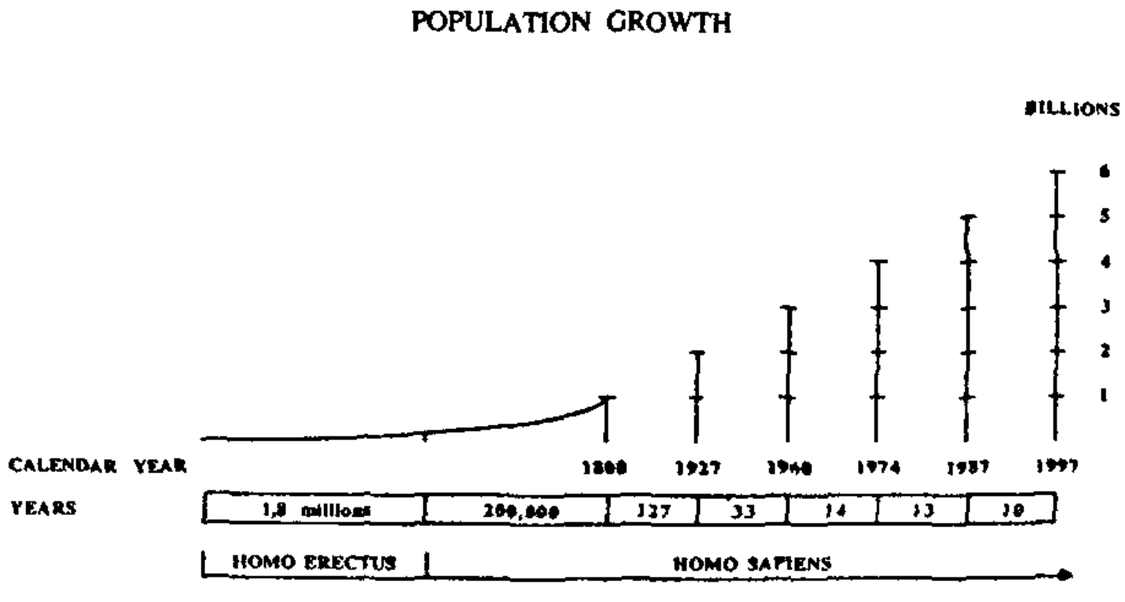

Figure 1.

much slowly with Europe increasing less than 5%. The largest increase in absolute numbers will occur in India, China and Nigeria totalling nearly 500 million people.

Contraceptive usage

The use of certain types of contraceptives is not suited to some categories of women. For example, women above 35 years of age and who are habitual smokers are at a greater risk to cardiovascular disorders, stroke, thrombosis and embolism if they use some of the older generation of high-dose, steroidal oral contraceptives; such women should use an alternate method of contraception. Nevertheless, the use of oral contraceptives can also confer reproductive-health benefits such as lowering the risks of reproductive cancer (i.e., those of the cervix, endometrium, ovary and breast)[13].

The availability of a wide range of contraceptives to suit individual needs, a widening in the number of contraceptive users, concern and appropriate legislative steps by governments to reduce risk-factors affecting reproductive health are the most obvious steps that need to be taken urgently to stem the threats to personal reproductive health and to our planet by unbridled growth rates of our population.

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Antiprogestins: Useful investigative tools and novel contraceptives

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The development of antiprogestational drugs such as, RU 486, ZK 98.299, ZK 98.734 and HRP 2000, is one of the most significant contributions to science in recent years. These drugs were originally synthesized to intercept progesterone action at the molecular level of receptor binding. They have found use as a tool to understand mechanisms regulating progesterone action. Antiprogestins also have direct effect on the endometrium as well as on the hypothalamo-hypophyseal axis and therefore have a potential use for intercepting a wide range of progesterone-dependent reproductive processes. This potential is being explored to develop new methods of birth control. Treatment with antiprogestins during the follicular phase of the menstrual cycle impairs gonadotropin release in primates, as a consequence of which folliculogenesis is either retarded or arrested and ovulation is blocked. When administered in the luteal phase, the secretory activity of the endometrium is inhibited and the corpus luteum regresses. Interestingly, the effects of antiprogestins on the gonadotrophs and the endometrium are dose-related, the endometrium being more sensitive than the gonadotrophs. The doses at which ovulation is blocked also retard endometrial development. However, at lower doses endometrial development is impaired but ovulation is not blocked. Treatment of bonnet monkeys with 2.5 mg or 5 mg ZK 98.299 administered every third day for four to six consecutive cycles does not block ovulation but the endometrial glands were regressed, atrophied and rendered non-secretory. Since conception did not occur in 39 out of the treated and mated cycles it would appear that the desynchronization of the endometrium by antiprogestins treatment is incompatible with the establishment of pregnancy. These results clearly suggest that the antiprogestins can be developed as contraceptives by inhibition of ovulation or by rendering the endometrium out of phase with respect to embryonic implantation.