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INDIA'S NEEDS AND PRIORITIES IN FERTILITY REGULATION RESEARCH

India is the seventh largest country in the world and the second most populous, after China. Its vast area of over 3.29 million sq km is home to approximately 975 million people. More than 70% of the population live in rural areas and about one-third live on or below the United Nations poverty line. According to the 1991 census, 52% of the adult population was literate[1].

The people living in the 26 States and 6 Union Territories of India have distinct racial, cultural, religious and linguistic identities. The perceptions of people about fertility regulation also vary considerably. The socio-economic status, the level of education and the religious beliefs have strong bearing on their decision on the family size, spacing between children and also the sex of the children. Moreover, a large number of people are either quite ignorant of or cannot afford the available technologies and services for controlling their fertility. These factors generally perpetuate high fertility, which has a bearing on the infant and maternal mortality and eventually the quality of life both for the present and the future generations.

In view of the large diversity in the perceptions and needs of people in India, no single fertility regulation research strategy will probably be effective across the country. Why some couples in their reproductive age do not use the available technologies for birth control, or why are such technologies and services not available to some of the potential users, need to be investigated. High priority also needs to be given to develop more effective and safer fertility regulating technologies so that the couples could be provided with wider contraceptive choices, and on improving the services for ensuring their optimum utilization. Biomedical and operational research in the area of fertility regulation should be linked to users' needs and their perceptions, and the ability of the delivery system to meet those needs. It is also important to develop a comprehensive multidisciplinary approach integrating various components of reproductive health.

Reproductive Health Status

The population of India was 318 million in the 1940s[1] and has since increased to 975 million. During 1941-51, on an average 10 million people were added to the Indian population over 860 days, during the 1990s this duration has decreased to 197 days (Table), and with the present rate the population of India will double in 36 years. This visible large built-in momentum for continued growth of population is because 45% of women in India today are in the reproductive age group of 15-44 yr[2]. In 1996, the population of adolescents and youth, in the age group of 15-24 yr, was almost

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18.5% (180 million) of the total population of India[2]. Nearly 44% of women get married between the age group of 15-19 yr, and almost 17% of women aged 13-19 yr start bearing children. Less than 10% of married couples in the age group of 15-19 yr use contraception in any form. These alarming statistics stem not only from an early start of reproduction, but also from the large unmet need for contraception.

Table. Average time taken for the Indian population to grow by 10 million.

Period (Year)	Days
1941-51	860
1951-61	466
1961-71	335
1971-81	266
1981-91	226
1991-2001	197

Young people, in particular, face an excessive risk of unintended pregnancy because of their sexual behaviour and lack of information or little-or-no access to sexual and reproductive health services. Studies show, for instance, that women delay about one year on an average between starting sexual activity and using contraception. The large unmet need of contraception, in addition to the risk taking behaviour particularly among adolescents, increases the risk of unwanted pregnancy and abortion. The precise estimate of the incidence of induced abortions is not available. The official data indicate approximately 600,000 pregnancy terminations in the country during 1991-92[4]. However, the Shah Committee, an expert group constituted by the Government of India to review the situation in the late sixties, suggested that for every 73 live births there were 25 abortions including 15 induced abortions. Taking into consideration the increase in population and total fertility rate since 1960s, the Shah Committee estimated that there were 11.2 million abortions in 1991, of which 6.7 million were induced and 4.5 million spontaneous[4]. It is expected that there may be 10-11 illegal induced abortions for every legal abortion. Analysis of India's 1992-93 National Family Health Survey (NFHS) data on 301,400 pregnancies collected from ever-married women from urban and rural areas showed that 9.3% of the induced abortions were performed on females aged 15-19 yr and 31.9% on females in the age group of 15-24 yr[5]. Studies have shown that lack of information on reproductive health was one of the main reasons for unplanned pregnancies and abortions particularly among adolescents.

In India, 1 in 37 women has a chance of dying from complications of pregnancy, child birth or unsafe abortion during her life time as compared to 1 in more than 17,000 in some of the developed countries[5]. At the prevailing maternal mortality rate (MMR) of 437 deaths per 100,000 live births, more than 100,000 women in India die every year from causes related to pregnancy and child birth[5]. It is estimated that 15,000-20,000 abortion related deaths occur annually among married, multiparous women in India. In addition, a survey in India found that for each maternal death there were 16.5 illnesses related to pregnancy and child birth[6].

Similarly, the infant mortality rate (IMR) is approximately 74 per 1,000 live births, which is almost 12 times higher than that in many developed countries[7].

Sexuality and sexual behaviour may predispose women to sexually transmitted diseases (STDs) and non-sexually transmitted reproductive tract infections (RTIs), of which they may not be aware. An unpublished survey conducted by the UNICEF has shown that in India 5% of sexually active adults is infected with a STD[8]. Another survey among 2,100 urban and rural men and women found 7.3% prevalence of STDs in the general population[8]. Infection, if not treated, could lead to infertility. The whole range of adverse pregnancy outcomes *viz* miscarriage, stillbirths, prematurity, growth retardation, have all been related to various STDs.

Another major issue of great health concern is the growing evidence that STDs act as risk factors or facilitators of HIV transmission. Within 8 years of the detection of the first HIV positive case in 1986 in India, the official figures as of mid-1994 stood at 15,000 HIV positive and 559 AIDS cases[9]. This is most certainly an underestimate because of under reporting. It is estimated that by the year 2000, 5-7 million people in India will be infected with HIV and 1 million persons will have AIDS, and the country will contain one-sixth of the world's HIV infected population[10,11]. The WHO estimates that India may have more HIV infected individuals than any other country in the world by the year 2000[12]. The chance of HIV transmission during a single act of intercourse may be increased 50 times[13]. Young people once again face an excessive risk of

STDs both because of their sexual behaviour and because they lack information or have little or no access to sexual and reproductive health services[14]. Prevention and treatment of STDs is a major challenge and there is an urgent need to integrate STD care with family planning programmes.

Regional Variations in Reproductive Health

The burden of reproductive ill-health is not uniformly distributed all over the country. The five states, Uttar Pradesh, Bihar, Rajasthan, Madhya Pradesh and Orissa which constitute almost 44% of the country's population contribute maximum to the burden of reproductive ill-health[3]. Fertility and mortality rates are lower in most of the western and southern states. Kerala has the least crude birth rate, IMR, and the highest life expectancy at birth.

According to the 1992 NFHS data, in Kerala 19.3% of women aged 20-24 yr had married before the age of 18 as compared to 73.3 and 69.1% in Uttar Pradesh and Bihar, respectively[3]. Similarly, in Kerala only 5.9% of women aged 13-19 yr had begun child-bearing which was much less compared to Uttar Pradesh (14.1%), Bihar (18.6%) and Madhya Pradesh (26.5%). Kerala with the highest contraceptive prevalence rate of 63.3% among married women, has 94.7% of boys and girls attending schools between the age group of 6-14 yr, 54.4% of children fully immunized and IMR of 23.8 per 1000 live births. Whereas, Uttar Pradesh and Bihar with contraceptive use of 19.8 and 23.1%, respectively have the least number of children attending school between 6-14 yr, and total fertility rate and IMR above the national averages. Moreover, relative risk of female to male mortality in the age group of 5-9 yr is almost double in Uttar Pradesh and Bihar as compared to Kerala. The female to male ratio in Kerala is 1.04 and in Uttar Pradesh it is 0.88[1]. These statistics are suggestive of wide variations in the reproductive health status of people in various parts of the country.

Kerala spends Rs 78.37 (< 2 US $) annually per eligible couple on family welfare programmes and this expenditure is quite comparable to that spent by Gujarat (Rs 78.80), Rajasthan (Rs 72.30) and Orissa (Rs 72.07), and far less than that spent by Haryana (Rs 97.28) and Punjab (Rs 119.81)[15]. In spite of this, the burden of reproductive ill health is much less in Kerala as compared to other states.

Analysis of the NFHS data is suggestive of a positive correlation between contraceptive use, literacy rate particularly that of the female child, children attending school, children fully immunized and even the socioeconomic status in terms of availability of essential items like water and sanitation. Statistics also suggest that the success of the family planning programme cannot be related only to the investments in Family Welfare Programmes but is closely linked to the health and social needs of the population. The Programme of Action of the International Conference on Population and Development (ICPD) has rightly emphasized the need for shifting the focus from population control by just increasing the contraceptive prevalence rates to programmes that promote overall sexual and reproductive health and rights[16]. Programmes with emphasis on the need of improving the quality of services; empowering women and improving their social and economic status; and enhancing the involvement of men in sharing the responsibilities in parenthood will help achieve the ICPD goals.

Unmet Need for Contraception

The contraceptive prevalence rate due to all methods in India was 46.5% in 1996[1] *ie* approximately 70 million eligible couples practice contraception either because they do not want any more children or want to space children[17]. On the other hand, there are at least 35 million people who are not using any method of contraception in spite of the fact that they would either like to stop or space child-bearing. The average unmet need for contraception is 19.5%, of which 11% is for spacing births and 8.5% for those who have reached their desired family size and need no more children[2]. Within the country, the unmet need for contraception ranges from 10.4% in Andhra Pradesh to 30.1% in Uttar Pradesh[3].

The reported unmet need of 19.5% in India may be an underestimate as NFHS had covered primarily the sexually active married women living in union, and not the large proportion of unmarried adolescents and youth. Unlike the developed countries, in India only a minority of young adults engage in sexual activities before marriage. However, there is a gradual increase in premarital sexuality reflecting a clear need for contraception. An Indian family planning survey found that 13% of girls and 25% of boys approved of premarital sexual relations[18]. The high incidence of

abortion in the country is also suggestive of the fact that a large proportion of women want to limit their family size or space the children but are not using any effective contraceptive. The projected unmet need for contraception also does not consider the needs of men. In addition, there may be some couples who practise contraception but are not satisfied with their method of choice. This implies that the actual unmet need for contraception might be much higher than that officially projected. It also suggests that increasing the contraceptive choices may help increase contraceptive prevalence and eventually reduce fertility.

Results from surveys in India show that the knowledge about available contraceptives and the desire to use contraception varied not only among different states but also among different religions. For example, in a survey carried out in three districts of Madhya Pradesh, in spite of the fact that the mean age of marriage was 15 yr, 92% of the adolescents knew at least one modern contraceptive and 83% were aware of at least one modern method of birth spacing[19]. They were more familiar with female sterilization, oral contraceptives, male sterilization, condom and the IUD. However, only 19% of the married teenagers had ever used a contraceptive method and their unmet need was 43%. About 25% of the adolescents did not approve of using family planning methods[19]. Similar surveys from other areas also suggest that a substantial percentage of women know about at least one contraceptive and wanted to stop child-bearing but were not practising contraception. In general, knowledge about contraceptive methods and contraceptive prevalence rate was higher among Hindus as compared to the Muslims[20]. The most common reasons cited as to why some apparently motivated couples were not practising contraception are: (i) lack of sufficient knowledge about the methods and apprehensions that the available methods are not safe; (ii) lack of easy access to contraceptive supplies and services; and (iii) social and family disapproval including religious beliefs.

In addition, there are couples with very low socioeconomic status living in slums or remote areas who are not aware of existing technologies which can help them control fertility. In a survey 88% of girls seeking abortion did not know that sexual intercourse could lead to pregnancy or STDs and 90% did not know about contraception[21]. In general, studies have shown that the unmet need was highest among women who lived in rural areas, were illiterate or whose husbands were illiterate, were Muslims and were not exposed to media messages.

Priorities in Fertility Regulation Research

The Programme of Action of the ICPD has emphasized that all countries should ensure the provision of family planning products and services including counselling, information and education to all individuals no later than the year 2015[16]. The ICPD has also emphasized the need to develop newer methods of fertility regulation so as to widen the contraceptive choices. The objective of research in fertility regulation should be to ensure that couples have control over their fertility and are able to plan the number and spacing of their children. Moreover, their attitude towards sexuality and sexual behaviour should not increase the risk for unwanted pregnancies and STDs. Fertility regulation research should accord high priority to the reproductive health needs of adolescents and youth who are most vulnerable and in greater need for information, counselling and services for fertility regulation. It necessitates integration of technology development with provision of services.

Research in fertility regulation should thus aim at expanding contraceptive choices by improving the accessibility and acceptability of good quality contraceptive products and services which have already been developed. In addition, high priority needs to be given to develop newer methods which are more effective and safer. It would necessitate improving the quality of care, increasing awareness about sexuality and fertility regulation, empowering women, and even increasing male-female partnership in sharing responsibilities for family planning and parenthood.

Expanding Contraceptive Options

Studies have shown that the unmet need for contraception is related to the number of contraceptive methods and services accessible to the potential user. The greatest unmet need is among those who have the least access to family planning programmes[22]. An analysis of the demographic health survey data from 44 countries showed that for each additional method of family planning which is made widely available in

the country, the contraceptive prevalence rate increases by 3.3% and the unmet need is met by 1.7%[23]. These figures clearly speak for expanding contraceptive choices if the couples are to be empowerd to control their fertility.

In India only five contraceptive choices are offered through the National Family Welfare Programme, namely vasectomy and condoms for men, and IUDs, oral pills and tubectomy for women. Long-acting injectables, or implantable devices which are quite effective and safe for preventing pregnancy and available in many countries are still not offered through the Family Welfare Programme in India[24]. Since some of the modern contraceptives have not been extensively evaluated in India, the immediate challenge is to assess their efficacy, safety and acceptability and if found acceptable introduce those methods in the national programme. In addition, realising that none of the available methods is 100% effective, completely free of side effects and fully reversible, research should continue looking for better methods of fertility regulation. High priority should be given to develop methods which men can use, those which can prevent pregnancy when used even after unprotected sex and which have the potential to prevent both pregnancy and transmission of STDs including HIV.

Male methods

Condom and vasectomy, in addition to the withdrawal method, are the only options available to the Indian male to control fertility. In a study, over 90% of the men surveyed had heard of these two methods[25]. However, less than 3% use condoms and less than 2% use vasectomy[2]. Condoms have been promoted as an easy to use, comfortable and safe method of birth control. However, studies show that a large number of men, at least in stable marriages do not prefer condoms for the following reasons (i) embarrassment of buying and disposing off the condom; (ii) the need for planning before having sex; (iii) its use reduces the sensitivity of the penis including sometimes loss of erection; and (iv) female partner feels less exciting to touch the penis with condom on. In stable marriages condom may not be the best choice when more acceptable female control options are available. However, realising that the use of condom can also help reduce the chances for transmitting STDs including HIV, it is essential to undertake research to identify the means to improve the acceptance of condom as a male contraceptive.

Similarly, vasectomy, a simple procedure, is not preferred by men. Firstly, because it is not reversible in all men and secondly, because of the apprehension that vasectomy reduces male potency. The first concern is justifiable. The IMR in India is very high and couples would prefer to use a method which is totally reversible. Research efforts to make vasectomy a reversible procedure must be pursued more vigorously. Secondly, the conventional vasectomy procedure requiring incision should be replaced with the 'no scalpel' procedure. This would further motivate men to accept vasectomy. Finally vasectomy should be performed under most hygienic conditions to prevent any sepsis, otherwise interpersonal communication will discourage many more men to opt for this procedure. The quality of information, better privacy and dispelling myths about the harmful effects of vasectomy should be addressed.

In addition, efforts to develop newer male contraceptives should be given preference. The weekly injection of testosterone enanthate has been shown in multi-country clinical trials to render men infertile and the method has been found to be safe and reversible. A longer acting androgen which would either make men azoospermic or severely oligospermic would be preferred. Research efforts to further pursue work on the antifertility vaccines directed against follicle stimulating hormone (FSH) and specific molecules on the spermatozoa or the epididymal secretions need to be geared up. Approaches targeting maturation of spermatozoa in the epididymis or sperm egg interaction without interfering with sperm production or secretion of testosterone, may find more acceptance by men.

Post-coital contraception

The available emergency contraceptive methods if used within 72 hours of unprotected sexual intercourse can prevent approximately 80% of unintended pregnancies[26,27]. If the providers and potential users are made aware of these methods, and services could be provided within 72 hours, a substantial number of the 11 million induced abortions occurring annually in India can be prevented. This will also help save some women from the agony and embarrassment of undergoing abortion, and many more from the post

abortion complications which generally occur in the hands of unskilled providers operating under unhygienic conditions.

Research needs to be directed to assess the reasons why these methods are not readily available to or used by the potential users. This also necessitates research on the risk taking behaviour of people, determinants and consequences of induced abortion including its effects on subsequent fertility, reproductive and mental health and contraceptive practices.

More biomedical research is needed to understand the 'window' of endometrial receptivity. Research should also be aimed to increase the window of effectiveness of the available methods of emergency contraception, and to increase their contraceptive efficacy to almost 100%. The development of better methods of emergency contraception is a challenging task requiring high priority.

STDs and contraception

It is estimated that more than 300 million people get infected with curable STDs each year, most of them in developing countries[28]. In more than 90% of the cases the transmission of HIV is due to heterosexual partners. About half of the HIV infections world-wide occur among people younger than 25 yr of age and rates of STDs and HIV are higher among adolescents than for any other age group. Girls are the worst affected. The focus of research for the prevention of STDs must be directed to both men and women.

In this regard, it may be appropriate to focus on the development of methods which would prevent pregnancy and simultaneously transmission of STDs. Research on the development of male and female condoms, spermicides or diaphragm with or without spermicide and cervical cap should be pursued. At present only 12% of the contraceptive users in India use condoms. Due to the weak socio-economic status of women, the professional sex workers, in particular, are not in a position to impress upon the male partner to use a condom.

Quality of Care

Quality of care refers to the way clients are treated by the system, or the actual process of care giving, with a focus on the users' perspectives of services[29]. A number of safe fertility regulating methods are available which can help couples prevent unintended pregnancies. It is for the health care providers to ensure that such methods are provided with appropriate quality of care to the potential users who differ greatly in their needs and perceptions. A survey covering 2,500 ever married women from each of the 15 districts of Uttar Pradesh showed that in spite of the fact that some of the contraceptives were readily available the contraceptive prevalence rate in some districts was as low as 12% and the unmet need ranged between 19 to 59%[30]. Less than 15% of women had recently been contacted by community health workers[30].The quality of care in these districts was poor. These observations suggest that merely making the contraceptives available at the chemists' shops or through a social marketing system is not sufficient in our society. Continuous motivation and follow up are essential for better compliance.

Improving the quality of care in the family planning services would require: (i) broadening the potential user's knowledge about family planning choices; (ii) motivating the potential user to weigh the beneficial effects of using fertility regulating technologies with perceived or real side-effects, religious beliefs and other societal inhibitions of using such technologies; (iii) increased realization by men of their role in family planning and responsible sexual behaviour; (iv) accessibility of a variety of good quality affordable methods and services for fertility regulation; (v) management of unwanted pregnancies; and (vi) prevention and treatment of reproductive tract infections and STDs, and other reproductive health issues[31]. Implementation of these may require a multipronged strategy focusing on improving reproductive health care facilities rather than a narrow focus on meeting contraceptive targets. It may necessitate improving infrastructure support for women's health, mobilizing community involvement and providing training to health care personnel. There is a greater need to involve non-governmental organizations in improving the quality of care with better coordination among different national and international agencies.

Awareness about Sexuality and Fertility Regulation

In India more than 45% of the population is illiterate and over 70% reside in rural areas, and their knowledge about sexuality and awareness about

fertility regulation is very poor. A prospective study of school girls about their knowledge of menstruation, reproductive physiology and birth control methods showed that 87.6% of the girls in rural areas and 75.1% in urban areas lacked this knowledge[21]. The NFHS data showed that only 29 to 73% of the couples in various states knew about the four official methods of family planning *ie* vasectomy, tubal ligation, condom and oral pill. Moreover, most of the couples did not know from where to obtain these contraceptive services. For example, in Madhya Pradesh only 34-39% of women knew from where to obtain pills, condoms, and IUDs[32]. In Gujarat, only 33% of persons reporting knowledge of AIDS had correct information and 19% believed that AIDS was curable[33].

Sex education, even in the urban areas, is a sensitive subject and talking about this is taboo. There are cultural and ethical constraints to providing contraceptives to unmarried adolescents. With an increase in the gap between menarche and marriage there is a gradual increase in sexual intimacy among unmarried adolescents and youth. Many of them do not know about the fertility regulating methods and some do not use them reliably or properly.

A survey conducted by the Family Planning Association in 1992 among school children revealed that the primary source of information on sex and related matters was television, magazines and not the family, friends or the school[34]. However, surveys have revealed that in most parts of the country only about a quarter of the ever married women was exposed to the mass media family planning messages[3]. Illiterate, rural and scheduled tribes women were the least likely to be exposed.

Studies have found that the mass media messages about family planning have a positive correlation with contraceptive use. For example, in Kerala 56% of ever married women were exposed to the mass media family planning messages and had a contraceptive prevalence rate of 63%[35]. On the other hand, in Rajasthan 33% of ever married women were exposed to the mass media family planning messages and had a contraceptive prevalence rate of 33%[36]. The NFHS has shown that in Uttar Pradesh among women who were not using contraception, those exposed to the mass media messages about family planning were considerably more likely to say that they intended to use contraception than women with no exposure[37].

It is essential to undertake research to assess the knowledge, attitude, needs and perceptions of people about sexuality and contraception and develop programmes to increase their awareness about sexuality and fertility regulation. Sex education, in the form of creating awareness about one's own body, should be introduced in schools and expanded to the mass media for spreading awareness of the available technologies for fertility regulation, and inculcating favourable attitudes towards contraceptive use. The mass media should also help dispel apprehensions, of the users about the efficacy, safety and mode of action of the fertility regulating methods and also create awareness of the places from where these services can be sought.

Women's Empowerment

The Constitution of India assures equality of status and of opportunity for all citizens. It specifically prohibits discrimination against women. However, a gender gap still exists in most parts of the country. Women are biologically the stronger sex with a life expectancy at birth greater than that of men. In spite of this biological advantage, however, there are approximately 100 women for every 107 men, creating an unaccountable deficiency of almost 33 million women. A recent report estimating that 17% of female mortality in India is due to gender discrimination and gross neglect is a reflection of the weak socioeconomic status of women[38]. Almost 30% of HIV infection occurs in those women who have sexual intercourse with a single male partner[28]. World-wide studies also show that from 20 to over 50% of women have been beaten by a male partner[28]. Female discrimination is also reflected in primary educational opportunities, nutritional status, and income. On the other hand, the burden of contraceptive usage, consequences of unintended pregnancies and induced abortions, responsibilities of child bearing and rearing, and STDs are borne more by women than by men.

Gender discrimination is primarily due to the economic dependence of the female on the male. Consequently, females often cannot act effectively to realize their reproductive intentions in the face of real or perceived objections from their husbands or others. Studies have shown that woman's status, education and economic independence are positively linked not

only to her reproductive health but also to better health of the entire family. Woman's control over fertility empowers her to complete her education, seek job opportunities and plan the family size[39]. The preventable mortality and morbidity of the infants and mothers are less in families with more educational and financial resources. In Kerala 23% of women work at places other than their own farms as compared to 5-7% in states like Uttar Pradesh and Rajasthan which have high fertility rates and IMR[3].

ICPD, the Fourth World Conference on Women and the World Conference on Human Rights have emphasized[40], in addition to other women-related issues, (i) the need to enforce woman's right to health, reproductive health and family planning; (ii) the right to decide on the number of and spacing of children; and (iii) the right to be free from sexual assault and exploitation.

These goals can be achieved by increasing access to education, job opportunities outside the house, and access to methods and services for fertility regulation. This demands for an increase in investment in women-related programmes including reproductive health, quality family planning services and combating STDs.

Increasing Male-female Partnership

In most families in India, and probably in many other countries too, man is the dominant factor in decision making in almost all spheres of life including family planning and family size. The illiteracy and low economic independence of woman works against her being an equal partner with her husband in decision making. It does not imply that most men are not responsible in accepting their responsibilities in family planning, sexual behaviour and parenthood. It may be ignorance, illiteracy and poverty which inadvertently prevent most men from sharing responsibilities in several matters related to reproductive health.

Studies show that a vast majority of men in urban areas who are educated and aware of the available technologies for fertility regulation control their fertility by choice in spite of the fact that the quality of care in general is poor in urban areas. Even less educated men with low economic status working in the industrial sector in urban areas have started to realize the advantages of a small family size. In many such societies small family size has become a status symbol. A study on 77 male and 101 female family members from the five generations of a south Indian family showed a gradual decline in fertility levels with practically no female involvement in reproductive decision making[41]. It was primarily the men who decided to limit the family size. Media motivation was the major factor which had influenced men to control their fertility rather than the choice of methods. These observations suggest that interpersonal and mass media communication are central to motivating men to control their family size.

The nonavailability of a choice of a variety of contraceptive methods which men can use is another major reason depriving them from sharing responsibility for contraceptive use. Vasectomy is still considered to be a terminal method and condom use is not a preferred method. No 'mini pill' or long-acting hormonal method is yet available for men. Many men also have apprehensions about vasectomy, its relationship to prostate cancer and its effect on sexual potency. Men believe that in comparison to vasectomy, tubectomy is easier to perform, associated with fewer complications and has no effect on libido or potency.

Fertility regulation programmes for males need to be developed with the objectives of (i) increasing awareness among men about the available contraceptive services; (ii) helping build a positive attitude to accept available family planning methods and to support his partner's decision to use a contraceptive; (iii) encouraging their cooperation with methods which are under their control; (iv) disseminating information about safer sex practices to reduce the incidence of STDs; and (v) dispelling myths or strong beliefs not only about the technologies but also for holding the partner responsible for the birth of a female child and for infertility.

To formulate these programmes would require extensive research to understand the perceptions and needs of men about fertility regulation and sex behaviour and to develop appropriate quality of care for providing reproductive health services for men. Moreover, it is important that the programme should start addressing the needs of men early in their teens. The new programme to increase involvement of men in reproductive health and in making service delivery more male friendly should in no way be at the cost of

the ongoing or proposed programme for women. Moreover, women should not feel offended that their rights and privileges were being challenged. The research effort should be directed to develop and promote communication, understanding and feeling for sharing responsibilities between partners.

Non-surgical Methods of Pregnancy Termination

Pregnancy termination is not a method to regulate fertility. However, the 11 million abortions induced annually in India suggest that induced abortion is the primary means of fertility regulation. Providing abortion services is also a necessity as no contraceptive is perfect. A survey of women seeking abortions in the United States found that half were using some form of contraception during the month that they conceived. In addition, in India, the incidence of abortion related deaths, 14% of all maternal deaths, or development of other complications such as chronic infection, endometritis or infertility is very high. It suggests that a large number of induced abortions are performed by unqualified persons under septic conditions. These observations suggest that mere legalization of the abortion procedure is not sufficient. The need is to make abortions safe, readily accessible and affordable.

Vacuum aspiration is an acceptable safe method to terminate pregnancy[42]. However, in resource poor settings where millions of pregnancies are to be terminated annually, it is probably difficult to provide matching facilities and qualified providers. Providing a safe, non-invasive medical method should be a feasible and affordable alternative. The advent of prostaglandins (PGs) during the early 1970s and more recently of an antiprogestin mifepristone (RU 486) has completely changed the scenario of induced abortions[43]. Treatment with a single oral dose of mifepristone followed 48 hours later with a small dose of a PG analogue, administered either vaginally or intramuscularly, has been shown to terminate pregnancy in almost 95% of the women with an amenorrhoea of up to 63 days[42-44]. More recently, an orally active prostaglandin misoprostole, when used in combination regimen with mifepristone, has also been shown to be effective in terminating up to 56 day pregnancy[42,45,46]. Mifepristone and misoprostole both are orally active and stable at room temperature and can be easily made available. Similarly, the use of PG alone or in combination with mifepristone has made abortion safer in the second trimester[42]. However, further research is required to develop newer more potent antiprogestins which can terminate early pregnancy without the need for supplementation with PGs.

The major thrust of the family welfare programme should be to prevent unintended pregnancies and induced abortions, which can be achieved by providing high quality contraceptive services. In addition, it should make abortion safe. Due to social inhibitions and lack of easy access to good pregnancy termination services many couples are compelled to subject themselves to high risks by going to unqualified persons.

CONCLUSIONS

The fertility regulation research programmes should be linked to the potential user's perceptions and needs. Increase in contraceptive options by introducing existing methods and developing newer more effective and safer methods backed by service delivery system with appropriate quality of care is essential to curtail the burden of reproductive ill health. Tailored information, education and communication programmes promoted through interpersonal and mass media communication can help dispel the myths and disbeliefs about the available fertility regulating technologies and help increase awareness and eventually the acceptance of the available methods and services. A multidisciplinary comprehensive approach integrating various components of reproductive health might be a better option rather than an isolated focus on fertility regulation with an intention of improving the contraceptive prevalence rate. Various initiatives have been taken by the Government as well as non-governmental agencies to confront the alarming rise in population growth. However, there is no time for complacency. Modern fertility regulating methods still remain unavailable to more than 35 million couples in India. Any further delay in controlling the high fertility rate and meeting the large unmet need for contraception may be too late to ensure better quality of life for the coming generations.

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This write-up has been contributed by Dr Chander P. Puri, Deputy Director (Sr. Grade), Institute for Research in Reproduction, Mumbai-400012. The views expressed by the author do not necessarily represent those of the Indian Council of Medical Research.

ABSTRACTS

Some Research Projects Completed Recently

Fragile sites and mutagen sensitivity in colon cancer families.

The study was carried out to determine the presence if any, of constitutional chromosomal markers and chromosomal fragile sites in familial and non familial colon cancer patients and their close relatives; and to see whether any family member showed mutagen sensitivity or resistance with regard to chromosomal breakage. The subjects studied comprised 44 familial colon cancer patients from 34 families (23 males and 21 females), their first/second degree relatives (189) and 44 sporadic colon cancer patients (no family history of colon cancer).

Cytogenetic analysis of peripheral blood lymphocytes of colon cancer patients and their relatives showed a normal chromosomal pattern without any constitutional or structural anomalies. No consistent fragile sites were detected in colon cancer patients or their relatives. All familial colon cancer patients showed bleomycin induced chromosome hypersensitivity. Of the 189 relatives of familial colon cancer patients, 13(6.9%) showed hypersensitivity, 33(17.4%) normal sensitivity and 143(75.7%) hyposensitivity. Among the 44 sporadic patients, 7(15.9%) were hypersensitive, 31(70.5%) sensitive and 6(13.6%) hyposensitive. Of the 13 hypersensitive relatives 2(15.3%) developed colon cancer. Subsequently Pedigree analysis showed that familial colon cancer was inherited in an autosomal dominant pattern.

The observations indicate that the genetic susceptibility risk in familial colon cancer is transmitted from generation to generation. There was a good correlation between bleomycin induced chromosome hypersensitivity and cancer susceptibility. Results of this study indicate that the bleomycin induced chromosome sensitivity analysis can be utilized as a biomarker for identification of high risk members in cancer families.

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Publication:

Jyothis, B., Ankathil, R., Chandini, R., Vinod Kumar, B., Roy, D.D., Nayar, S.G., Madhavan, J. and Nair, M.K. The cytogenetic identification of high risk members in colorectal cancer families. *Neoplasma 44*: 258. 1997.

Prevalence of *Mycoplasma pneumoniae* in acute lower respiratory tract infections.

The study was carried out in 249 patients (192 children <10 yr of age, 43 adults between 18-30 yr, and 14 elderly >60 yr) with acute lower respiratory tract infections and 55 normal healthy individuals (matched for age) to find out the age related prevalence of *Mycoplasma*

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The study was carried out in 249 patients (192 children <10 yr of age, 43 adults between 18-30 yr, and 14 elderly >60 yr) with acute lower respiratory tract infections and 55 normal healthy individuals (matched for age) to find out the age related prevalence of *Mycoplasma*

pneumoniae and correlate the clinical findings with *M.pneumoniae* to identify the risk factors.

M.pneumoniae was found to be an important respiratory pathogen in patients of all ages; the prevalence being 34.89% (67/192) in children, 46.5% (20/43) in adults and 14.28% (2/14) in the elderly. Coexistence of *M.pneumoniae* with other bacterial pathogens (both Gram positive and negative) was frequently seen in all age groups; 17.07, 48.9 and 14.28% in children, adults and the elderly, respectively.

A past history of parents having had upper and lower respiratory tract infections was identified as a risk factor in the children. *M.pneumoniae* infection was more prevalent in children whose parents had had at least 1-3 episodes of upper and lower respiratory tract infections per year.

The high incidence of *M.pneumoniae* in patients of all age groups thus emphasizes the need for examination of specimens for this pathogen in all patients with acute lower respiratory tract infections. For the complete diagnosis of *M.pneumoniae* infection culture/antigen detection must be supplemented with serological examination so as to plan appropriate treatment strategies for the management of acute lower respiratory tract infections in these patients. Since Mycoplasma infection was seen along with other bacterial pathogens, it is suggested that the therapy should be directed towards both pyogenic and atypical pathogens for a good clinical and therapeutic response.

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Publication:

Day, A.B., Chaudhry, R., Nisar, N., Goel, P., Nagarkar, K. and Kumar, V.P. Community acquired pneumonia due to *M.pneumoniae*. A preliminary report. *J Assoc Phys India 12*: 880. 1996.

ICMR NEWS

The following meetings of various technical groups/ committees of the Council were held:

Meetings of the Scientific Advisory Committee (SAC)/ Project Review Committee (PRC)/Task Force (TF) and other meetings held:

PRC for Proposals in Epidemiology and Communicable Diseases	February 12, 1999 (at New Delhi)
Meeting of the Steering Committee and Principal Investigators of the National Cancer Registry Programme	February 15, 1999 (at New Delhi)
SAC of the Centre for Advanced Research on Standardization and Quality Control and Formulation of Selected Traditional Remedies/ Natural Products, Jammu	February 15, 1999 (at Jammu)
TF on Filariasis	February 16, 1999 (at New Delhi)

Participation of ICMR Scientists in Scientific Events:

Dr. S.C. Gupte, Dy.Director, Institute of Immunohaematology, Mumbai, participated in the II General Assembly and International Conference of the Third World Organization for Women in Science at Cape Town (February 8-11, 1999).

Dr. M.A. Ansari, Dy.Director (Sr.Grade), Malaria Research Centre, Delhi, undertook a short-term WHO Consultancy on Integrated Vector Control in Muscat and Oman (February 12-26, 1999).

Honours/Awards:

Dr. H.V. Bhat, Dy. Director, National Institute of Occupational Health, Ahmedabad, has been awarded the Academy of Environmental Biology Archana Medal for 1997 in recognition of his outstanding contribution and research in the field of neurobehavioural toxicology.

Workshop/Symposium/Conference:

An Indo-German Symposium-cum-Workshop on inflammatory Heart Diseases was organised at New Delhi (January 28-30. 1999).

The ICMR Consensus Conference on Interferon Therapy in Chronic Liver Disease due to HBV and HCV Infections was organised at New Delhi (February 11. 1999).

ICMR AIDED SYMPOSIA/SEMINARS/WORKSHOPS/COURSES/CONFERENCES

Symposium/Seminar/Workshop/ Course/Conference	Date & Place	Contact Address
I Conference of South Asian Pacific Society of Human Genetics and XXIV Annual Conference of Indian Society of Human Genetics	February 1-3. 1999: (at Mumbai)	Dr. Dipika Mohanty. Chairperson of the Conference. Institute of Immunohaematology. Mumbai-400012.
Seminar on Low Level Electromagnetic Field Phenomena in Biological System	February 3-4. 1999. (at New Delhi)	Dr. J. Behari. Professor of Environmental Physics. School of Environmental Sciences. Jawaharlal Nehru University. New Delhi-110067.
I National Conference on Hepatitis and Renal Medicine	February 13. 1999: (at New Delhi)	Dr. Sanjay K. Agarwal. Organising Secretary of the Conference. Department of Nephrology. All India Institute of Medical Sciences. New Delhi-110029.
VII Annual Meeting of Molecular Immunology Forum - 1999	February 13-15. 1999: (at Hyderabad)	Dr. Ashok Khar. Convener of the Meeting. Centre for Cellular and Molecular Biology. Hyderabad-500007.
IV International Symposium on Vectors and Vector-borne Diseases	February 18-20. 1999: (at Gwalior)	Dr. P.R. Malhotra. Convener of the Symposium. Defence Research and Development Establishment. Gwalior-474002.
XVIII Annual Convention of Indian Association for Cancer Research and National Symposium on Molecular Biology of Cancer	February 19-21. 1999: (at New Delhi)	Dr. Neeta Singh. Addl. Professor. Department of Biochemistry. All India Institute of Medical Sciences. New Delhi-110029.
AOCS-OTAI International Conference and Exhibition on Oil Seeds and Vegetable Oil Processing	February 19-21. 1999: (at New Delhi)	Sh. K.P. Sharma. Organising Secretary of the Conference. Oil Technologists Association of India. 1205. Nirmal Tower. Barakhambha Road. New Delhi-110001.
Technical Training Workshop on Industrial Hygiene Measurements and National Seminar on Occupational Safety and Health	March 1-6. 1999: (at Chennai)	Dr. Kalpana Balakrishnan. Organising Secretary of the Workshop. Sri Ramachandra Medical College and Research Institute. Chennai-600016.
Workshop on HIV/AIDS/STDs and Healthy Life Style	April 10-11. 1999: (at Berhampur)	Dr. R.M. Tripathy. Organising Secretary of the Workshop. Department of Social and Preventive Medicine. MKCG Medical College. Berhampur-760004.

COUNCIL'S TRAINING PROGRAMMES FOR 1999-2000

Reproductive Biology

At the Institute for Research in Reproduction, Mumbai:

- Training Course in Molecular Techniques in Ovarian Function (September 27-October 2, 1999).
- Training Course on Cytological Detection of Reproductive Tract Infections (December 13-17, 1999).

Endocrinology

At the National Institute of Nutrition., Hyderabad:

- Annual Certificate Course on Endocrinological Techniques and their Application (August 1 - September 15, 1999).

Nutrition

At the National Institute of Nutrition, Hyderabad:

- M.Sc. in Applied Nutrition (June 1, 1999-February 28, 2000).
- Postgraduate Certificate Course in Nutrition (December 1, 1999-February 28, 2000).

Laboratory Animal Technology

At the National Centre for Laboratory Animal Science, National Institute of Nutrition, Hyderabad:

- Training Course for Laboratory Animal Technicians (June 14-July 30, 1999).
- Training Course for Laboratory Animal Supervisors (September 1-November 30, 1999).

Medical Entomology:

At the Vector Control Research Centre, Pondicherry:

- Postgraduate Diploma Course in Medical Entomology (from July 1999).

Biomedical Statistics

At the Institute for Research in Medical Statistics, Chennai:

- Basic Course in Statistics for Medical Officers (July 1999).
- Training Course in Field Epidemiology (November, 1999).

ICMR PUBLICATIONS

	Price(Rs.)
Nutritive Value of Indian Foods (1985) by C. Gopalan, B.V. Rama Sastri and S.C. Balasubramanian, Revised and Updated (1989) by B.S. Narasinga Rao, Y.G. Deosthale and K.C. Pant (Reprinted 1996)	23.00
Growth and Physical Development of Indian Infants and Children (1972, Reprinted 1989)	10.00
Studies on Weaning and Supplementary Foods (1974, Reprinted 1996)	15.00
A Manual of Nutrition (Second Edition 1974, Reprinted 1995)	6.00
Low Cost Nutritious Supplements (Second Edition 1975, Reprinted 1996)	5.00
Menus for Low-Cost Balanced Diets and School-Lunch Programmes Suitable for North India (Second Edition 1977, Reprinted 1994)	4.50

Menus for Low-Cost Balanced Diets and School-Lunch Programmes Suitable for South India (Fourth Edition 1996)	6.00
Some Common Indian Recipes and their Nutritive Value (Fourth Edition 1977. Reprinted 1995) by Swaran Pasricha and L.M. Rebello	10.00
Nutrition for Mother and Child (Fourth Edition 1994. Reprinted 1996) by P.S. Venkatachalam and L.M. Rebello	11.00
Japanese Encephalitis in India (Revised Edition 1980)	5.00
Some Therapeutic Diets (Fifth Edition 1996) by Swaran Pasricha	7.00
Nutrient Requirements and Recommended Dietary Allowances for Indians (1990.Reprinted 1995)	16.00
Fruits (Second Edition 1996) by Indira Gopalan and M. Mohan Ram	20.00
Count What You Eat (1989. Reprinted 1997) by Swaran Pasricha	15.00
*The Anophelines of India (Revised Edition 1984) by T.Ramachandra Rao	150.00
Depressive Disease (1986) by A. Venkoba Rao	58.00
*Medicinal Plants of India Vol.2 (1987)	136.00
Diet and Diabetes (Second Edition 1993. Reprinted 1997) by T.C. Raghuram.Swaran Pasricha and R.D. Sharma	18.00
Dietary Tips for the Elderly (1992. Reprinted 1997) by Swaran Pasricha and B.V.S. Thimmayamma	5.00
Diet and Heart Disease(1994.Reprinted 1995) by Ghafoorunissa and Kamala Krishnaswamy	26.00
Dietary Guidelines for Indians – A Manual (1998)	23.00
Dietary Guidelines for Indians (1998)	10.00
पोषण नियमावली (द्वितीय संस्करण 1974, पुनर्मुद्रण 1990)	6.00
अपने आहार को जानें (1997)	9.00

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