



PREIMPLANTATION GENETIC TESTING AS A MEDIUM FOR SEX RATIO BALANCING & WOMEN EMPOWERMENT

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Abstract: This paper is aims to present possibilities of PGT-Preimplantation Genetic Testing Like PGD-Preimplantation Genetic Diagnosis, PGS- Preimplantation Genetic Screening & CCS- Comprehensive Chromosomal Screening as a medium for sex ratio balancing & women empowerment. In the world where sex determination is banned, the picture shows, in low economy class, the couples are waiting for the male child and give birth to number of children. Use of Ultrasound technique for sex determination is mostly used in middle class of society. Female child aborted among them after the determination occurs. In high society, they are used the modern techniques of sex determination like PGD, PGS, CCS etc. In Indian context, the lower and middle class society covers majority of population. And the above mentioned condition is affect on the women & child health of these classes. The said condition of lower class results into the major problems like increase in population, malnutrition, anemia, crimes and status of livelihood. Rather the strategy used by the middle class results into problem creates regarding to physical & mental health of women & child. The problems create due to this situation affects not only on sex ratio balance but also on women empowerment.

Keywords: PGT, Sex ratio, Women and Child health, Sex selection, Family balancing

Introduction:

Sex selection is occurs for an inherent and sometimes culturally dominating discrimination against girls which sees males as the preferred sex. Before the Science age, male child were preferred because they provided the labour needed muscle power. After that, male child is seen as an 'asset' because he brings dowry for family, while a girl is seen as 'liability'. And finally she will depart the family to move in her husband's family. Therefore parents think traditionally that any investment in a daughter is a waste of resources. Male have higher wages than female, and the family often wants male child to run property succession and carry forward the parent's racial identity. In some cultures, the people believe in without boy they can't get 'moksha'- the salvation.

Along with China, India is one of the countries having more number of males than females. Particularly about child sex ratio of the age group 0-6 years, has been deteriorate gradually in each census, i.e. 964 in 1971, 962 in 1981, 953 in 1991, 927 in 2001, and 919 in 2011. This picture clears that the techniques for the detection of foetal abnormalities misused for sex determination. And aborted female foetuses.

The network of private medical practitioners provides sex determination and abortion services. And the ultrasound facility were widely available, even in remote rural areas bereft of basic amenities & health facilities, possibly because of the widespread use of portable ultrasound equipments and amniocentesis kits. (Menon 1996, Ganatra et al. 2001). Even after the various related laws including the Pre-Conception and Pre-Natal Diagnostic Techniques (PCPNDT) Act 1994 and even amended PCPNDT (Prohibition of Sex Selection) Act 2003 are existed, it's the reality that the child sex ratio in the country is goes continuously imbalancing.

We also observe in the society, in low economy class, the couples are waiting for the male child and give birth to number of children. Use of ultrasound technique for sex determination is mostly used in middle class of society, and female fetus aborted. The lower and middle class society covers majority of population. And the above mentioned condition is affects on the women & child health of these classes. The said condition of lower class results into the major problems like increase in population, malnutrition, anemia, crimes and poor quality of livelihood. Rather the strategy used by the middle class results into the

problem creates regarding physical & mental health of women & child. The problems create due to this situation affects not only on sex ratio balance but also on women empowerment.

In high income society, they are used the modern techniques of sex determination like PGD, PGS, CCS etc. Another existing class, higher middle class also trying to used these modern techniques. Compare with above mentioned effects of sex determination techniques, the Pre-implantation Genetic Testing techniques like PGD-Pre-implantation Genetic Diagnosis, PGS- Preimplantation Genetic Screening & CCS- Comprehensive Chromosomal Screening having less effect on women health.

We just introduced with these techniques in short. Preimplantation genetic testing is the umbrella term for genetic testing on embryos. According to the Practice Committee of the Society for Assisted Reproductive Technology (SART) and the Practice Committee of the American Society for Reproductive Medicine (ASRM), this term describes procedures involving removing one or more nuclei from eggs (polar bodies) or embryos (blastomeric or trophoectoderm cells) to test for mutations in gene sequence or aneuploidy before transfer to the uterus.

PGD- Preimplantation Genetic Diagnosis: Preimplantation genetic diagnosis (PGD) enables the identification of genetic diseases in the embryo before pregnancy is established, and eliminates the need for possible pregnancy termination after prenatal diagnosis of a genetically affected fetus. Determining the sex of the embryo to avoid X-linked disorders remains a common indication for PGD, and the vast majority of such cases are carried out using fluorescence in-situ hybridization (FISH) with DNA probes derived from the X and Y chromosomes (Griffin et al., 1994; Munné et al., 1994; Stassen et al., 1999; ESHRE Preimplantation Genetic Diagnosis Consortium, 1999).

PGS- Preimplantation Genetic Screening: Preimplantation Genetic Screening (PGS) is a newer term used to describe the process of screening embryos to make surety about all

23 pairs of chromosomes and find any structural abnormalities in chromosomes. PGS is proving its effectiveness by increasing success rate of IVF in women over 35 years age. It also proves its usefulness in decreasing repeatedly miscarriage rates. (Fertility authority)

CCS-Comprehensive Chromosomal Screening:

Comprehensive Chromosomal Screening (CCS) is a term used to refer a type of aneuploidy screening. The method is useful for the analysis of all 23 pairs of human chromosomes on a single cell. (Fertility authority)

In this method, there are 5 to 10 cells retrieve from a Day 5 to 6 embryo. The embryo has to be frozen while waiting for the result, and then in a separate cycle, the normal embryo is defrost and transferred in uterus. Biopsying a Day 5 embryo increases the accuracy of this testing and minimizes the potential damage that a biopsy can cause on an embryo. Because Day 5 embryo has no limitations use a single cell as do on Day 3 embryo, but now there are few new little cells, so you have a little more material to test.(Dunn Randall)

PGT-Preimplantation Genetic Testing is a reproductive technology used with an IVF cycle. In this process the healthy sperm & ovum fertilization happened outside the uterus. After 3 to 5 days, embryo implants in uterus. Hence it is possible to do all tests out of uterus. Sex determination is also possible.

On this background, we must lookout the situation of poor and middle class women suffering by recurring pregnancies & repeatedly abortions and its side effects on her overall development. On other hand families from high society used PGT for family balancing to avoiding recurring pregnancies & repeatedly abortions. The paper discussed on, if PGT allowed legally, the number of benefits gets for the women empowerment including sex ratio balancing.

Research questions:

Above discussion clears that the legal ban on the sex selection is not an answer for sex ratio imbalance. Then questions arise,

1. Does open access of sex selection methods like Preimplantation Genetic Testing useful to sex ratio balancing?
2. Does its open access useful to women empowerment?

Objectives:

To study the possibilities of Preimplantation Genetic Testing as a medium of sex ratio balancing & women empowerment.

Hypothesis:

1. Open access of sex selection methods like Preimplantation Genetic Testing should be useful to sex ratio balancing.
2. Open access of sex selection methods like Preimplantation Genetic Testing should be useful to women empowerment.

Research method:

Library method. Secondary data used for analysis i.e. books, journals, newspaper cuttings, websites.

Research Design:

This research has exploratory & diagnostic research design having an argumentative nature.

Discussion:

The opponents of sex selection argue that the sex determination test for male fetus is a indication of omnipresent all kind of injustice against women and is such a clear-cut violation of women's human rights. It is also severe form of brutality against women.

This opinion is obliterate by this one that if it happens for the family balancing it should be prevent the culturally, socially violation & mental torture of women in family for male child. And it is more realistic than the opponents' argument. Here, we must take in notice that the family balancing meansboth sexes are present in the family.

Proponents of social sex selection, on the other hand, view it as an expression of parental reproductive freedom (autonomy) and argue that PGD is too expensive to be so widely used as to contribute to sex ratio disparities (McCarthy D 2001),(Dahl

E 2003). Furthermore, it can also be argued that parents who seek family balancing are not sexist and are unlikely to devalue one or the other sex but simply wish to enjoy the different experiences that come with rearing children of opposite sexes(Robertson 2001). It is also feared that if Preimplantation Genetic Testing is not permitted, pregnancy and abortion may be practiced instead.(Malpani A et.al.2002) Indeed, the Ethics Committee of the American Society of Reproductive Medicine concluded in 2001 that sex selection for the purposes of sex variety, but not for the first child, was acceptable, thereby legitimizing the desire to raise children of both sexes. (Tarek El-Toukhy Clare Williams, Peter Braude 2008)

The right to reproductive choice exists in International Human Rights Law (IHRL) through a set of inter-related rights including the right to life; the right to health; and the right to be free from torture or degrading treatment, which are outlined in treaties such as the Convention to Elimination all forms of Discrimination against Women (CEDAW), the Convention on the Rights of the Child (CRC) and the International Covenant on Civil and Political Rights (ICCPR). Countries have an obligation to ensure that women are not denied access to safe abortion services. Multiple international organisations such as the CEDAW Committee and the Human Rights Committee (HRC) have called upon states to ensure the eradication of gender selective abortions, although there is no international piece of legislation which explicitly calls for a ban on gender-specific abortions. All current international treaties also call upon state parties to eradicate discrimination based upon gender that underlie sex-selective abortions.

CEDAW is the predominant international treaty dealing with outlawing discrimination against women adopted in 1979 by the United Nations General Assembly UNGA. It is often described as the international bill of rights for women. Article 16 of the Convention grants women the right to be able to choose the number and spacing of her children. There has been controversy over this provision in relation to sex selection as some argue that this means she

has the right to choose the gender of her offspring, however the CEDAW Committee has explicitly called upon State Parties to eradicate the practice of sex selection. The Committee recognises the importance of women's right to health during pregnancy and childbirth as it is closely linked to their right to life.

Public attitude is more liberal towards PGT than government policy. At present, The couples from the countries where sex selection is banned, they travel to another country to get the treatment for desired baby. Due local restrictions concerning oocyte donation and compensation for donors have invited patients to Spain, where in 2004, almost one-third of ART couples were foreigners from Germany, Italy, Briton and Ireland, Switzerland, Portugal and some from South America and Asia (El Pais, January 2005).

Dr. Hsien Hsien Lei wrote about the medical tourism for PGD, a study on PGD patient traveling abroad for treatment. In nations where gender selection is banned, people often travel to the United States, Mexico, Italy, Thailand and other nations where it's legal to undergo PGD/PGS. This new phenomenon is called 'reproductive tourism' where people travel for gender selection and general infertility treatments such as IVF. For instance, in Australia, the Sydney IVF clinic discontinued its PGD sex selection program in 2005 after the Australian Health Ethics Committee banned its use for non-medical reasons. Many Australians now travel to Bangkok for sex selection procedures. Ironically, Superior ART(Assisted Reproductive Technologies) in Bangkok operates in conjunction with Sydney IVF, its parent laboratory.

Risk of Abortions:

Increasing awareness about small family norms is another influencing factor of female baby abortions. Rather than couples continuously bearing a pregnancy until they have male child.

According to the World Health Organization (WHO), in 2008, an estimated 43.8 million induced abortions occurred in the world, a slight decline from 45.6 million on 1995. Induced abortion rates have declined in all major regions of the world

since 1995. In 2008, developing countries accounted for a large majority (86 %) of all induced abortions worldwide. About half of all induced abortions (21.6 million) were carried out using unsafe procedures, up from 19.7 million in 2003. According to WHO estimates, in 2008, almost all unsafe abortions occurred in developing countries. Globally, an estimated 47,000 women die each year from complications associated with unsafe abortion. Most of these deaths could be prevented through better access to sexuality education, contraceptive information and supplies, and safe abortion services and post abortion care, where allowed by law. (World Health Organization 2012, Shah et.al. 2010)

A large 2009 study published in Obstetrics & Gynecology determined that drug-induced abortions led to significant adverse events in 20 percent of cases—almost four times the rate of immediate complications as surgical abortions.

Physical risks of abortion :

Surgical abortions documented complications include hemorrhage, infection, cervical damage, uterine perforation, pelvic inflammatory disease and retained fetal or placental tissue. These complications can affect future fertility. Abortions can also result in death. Non-surgical or drug-induced abortions documented complications include hemorrhage, infection, rupture of undiagnosed ectopic pregnancy and incomplete abortion (resulting in a surgical abortion) and have sometimes led to death.

Long-term risks:

Abortion can hinder future reproductive success. It substantially increases the risk of subsequent preterm birth, which seriously threatens the lives and health of newborn children. The risk of premature delivery increases with each additional abortion. Abortion is also associated with an increased risk of infertility, miscarriage, ectopic pregnancy and placenta prevail. Other long-term risks of abortion include breast, cervical and ovarian cancers. Physiological and epidemiological evidence indicate that abortion leaves a woman with more cancer-vulnerable breast tissue than if

she had not become pregnant in the first place.

Psychological risks of abortion:

A 2011 meta-analysis published in the British Journal of Psychiatry found an 81% increased risk of mental health problems among women who had undergone abortions; nearly 10 % of the incidence of psychological problems was directly attributable to abortion. These problems included anxiety, depression, alcohol use, drug use and suicidal behavior. Not all women suffer as a result of induced abortion, but many do. The risks to physical and psychological well-being should not be ignored. (Paul Stark 2013). PGT could be useful to prevent the risk of abortions.

Birth Defects:

In the MARCH OF DIMES- Global Report on Birth Defects that every year an estimated 7.9 million children, 6 % of total births worldwide, are born with a serious birth defect of genetic or partially genetic origin. Additional hundreds of thousands more are born with serious birth defects of post-conception origin, including maternal exposure to environmental agents (teratogens) such as alcohol, rubella, syphilis and iodine deficiency that can harm a developing foetus.

Serious birth defects can be lethal for those who survive; these disorders can cause lifelong mental, physical, auditory or visual disability. Data presented in this report show that at least 3.3 million children under five years of age die from birth defects each year and an estimated 3.2 million of those who survive may be disabled for life. (Christianson Arnold & others 2006)

"The number of infants with genetic disorders and birth defects in India is the highest in the world," said Sir Ganga Ram Hospital Center for Genetic Medicine Director and Society of Fetal Medicines President I C Verma. "This huge burden and mortality rates can be reduced by providing pre-conception counseling, screening of the mother, pre-natal diagnosis and adequate care of the new-born." Verma, who was recently in Chandigarh to attend a conference on pre-natal diagnosis and therapy, said that no one wants an

abnormal child. So everyone should take the benefits of advanced technical diagnosis. (Majid Janhangir Indian expresses 2010)

Ms. Dey estimates the live birth prevalence of Down syndrome in India, a nation of more than a billion. Currently, the incidence of Down syndrome is 1:800, which means approximately 32,000 babies with Down syndrome are born every year. (Mark Leach January, 2015)

Monogenic diseases result from modifications in a single gene occurring in all cells of the body. Scientists currently estimate that over 10,000 of human diseases are known to be monogenic. (who.int)

PGT is useful to avoid termination of pregnancy for couples with a high risk of their offspring being affected by a sex-linked genetic disease.

Benefits/Results: Use of PGT as a medium for sex ratio balancing & women empowerment results in useful to-

- Develop healthy fetus, avoid diseases & deformities.
- Population control among low income group results into improves their quality life.
- Avoid number of abortions & Anemia among women.
- Decrease infant mortality rate.
- Decrease the women's death rate during abortions.
- Save or minimize government funds utilized for malnutrition, anemia, child illness, physically & mentally disabled, infant mortality rate & Maternal & child health program.
- Protect women from mental torture about demands of male child, repeatedly abortion or recurring pregnancies.
- Sex ratio balancing
- Restrict malpractices in reproductive health field.
- Achieve the ultimate goal of women empowerment.

Conclusion:

In the light of points discussed above it is proving that Preimplantation Genital Testing is effective medium of sex ratio balancing & women empowerment. Hence Governments

of the countries where it is banned, take initiative to open it for their citizens in favor of healthy & balanced family. And they should achieve the target of sex ratio balancing & women empowerment.

Recommendations:

- For the every willing couple, make availability of PGT from government hospitals. It should be allowed only for family balancing. It means for equal numbers of both sex children in family.
- -It should be restricted for every couple that they must stop on 2 births.
- -Access of PGT for sex selection is only for second pregnancy,
- -Those who want to wishing single baby make access of PGT for them.

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