

Literature Review and Annotated Bibliography: Social and Ethical Aspects of Sex Selection

**Prepared for the Human Fertilisation and Embryology Authority by
Dr. Catherine Waldby, Reader in Sociology, Brunel University**

+++++

Objective: to identify and analyse academic literature related to the ethical and social issues raised by sex selection, with a particular reference to sex selection using current medical technology.

Search Method: Searches were made on the Medline, Sociology Abstracts, Social Science Abstracts & Humanities Abstracts databases. Keywords used were ‘sex selection’ ‘sex preselection’ ‘sex determination and control’ ‘sex determination- cross cultural’ and ‘sperm sorting’. This search yielded a high degree of correlation across the different databases, suggesting that most significant material on the subject has been detected in this search. Material was restricted to English language and selected with a preference for material published between 1990 and 2002, as a method of volume control and to ensure findings as relevant to contemporary technological circumstances. Only material that directly addressed social or ethical aspects was included. Letters were excluded. Some earlier general population attitudinal material has been included as the search did not identify many such studies carried out since 1990. A total of 44 relevant articles were identified. All are listed in the bibliography.

Background – Sex Selection Techniques

The desire to exercise control over the sex of offspring is widely held, and various cultures and communities utilise a variety of folk practices to ensure the conception and birth of a child of the desired sex. Traditional societies in India, for example, have elaborate folk techniques for conceiving sons (Khanna 1997) while couples in industrialised countries may use a variety of *in vivo* periconceptual techniques to influence the sex of the conception. These include intercourse timing and position, vaginal douching and the use of ovulation induction medications or hormone measuring technologies (Savulescu 1999; Reubinoff & Schenker 1996). In addition to these domestic periconceptual techniques, a variety of preconceptual and postconceptual medical technologies facilitate sex selection. The most common preconceptual technique involves various methods for the separation of X and Y-bearing sperm, which increase the chances of conceiving a particular sex (Ethics Committee ASRM 2001). Postconceptual techniques include preimplantation genetic diagnosis (PGD), used with IVF to select embryos of a specified sex, and various forms of prenatal testing - ultrasound scanning, amniocentesis, chorionic villus sampling (CVS) – in concert with the termination of pregnancy. In the UK under current legislation it is illegal for licensed clinics to offer sex selection except for medical reasons. Some clinics in the USA and some other nations legally offer sex selection using various combinations of these techniques. This literature review will examine some of the social and ethical issues raised by the intersection of these medical technologies with broader social question of sex selection and sex preference.

Findings

Attitudinal Studies – general population. There were surprisingly few general population surveys regarding attitudes to sex selection published since 1990. It is probable that data is available embedded in more generally focused surveys of attitudes

to abortion etc. The majority of specific sex selection surveys appear to have been carried out in the US during the 1970s and 1980s. A study carried out in the USA in 1973 and 1975 (Rosenzweig & Adelman 1976; Adelman & Rosenzweig 1978) found that married couples with university education showed little desire to control the sex of the first child but a strong desire to influence the sex of their second. Here the most important consideration was a gender balance among offspring, rather than a preference for one sex over the other. Couples also in general rejected selective abortion as a method, preferring timing of intercourse or other coital method. A later study (Dixon & Levy 1985) found that one third of the US public would support a preconceptual method of sex selection if an accurate one were available. Singer (1991) found that only 5% of the US public approved of prenatal testing and abortion for sex selection, although this approval increased for more extreme cases of gender imbalance in a family. A more recent survey of 242 US graduates (Gilroy & Steinbacher 1991) found that one third supported the use of some kind of sex selection technology in conceiving children, although the study did not break down preference regarding methods.

Two more recent UK studies provide the best relevant information for this study. Statham et al. (1993) carried out a study of 2300 pregnant women in England, asking them if they preferred a boy or a girl, and if they would like to know the sex of the baby before birth. The study found no overall preference for either sex. 58% of respondents had no preference, and the remainder was almost equally split regarding preference for a girl or a boy. 62% of women also indicated that they did not want to know the baby's sex before birth, although women with one or more children were more likely to want this information. The authors conclude that the availability of a reliable method of sex selection would be unlikely to affect the sex ratio, since those who expressed a preference were as likely to want a girl as a boy.

The second study is not a general population study but rather focuses on couples attending a sex selection clinic set up in London in 1993 (Liu & Rose 1995). The study was carried out by clinic staff rather than independent researchers. The clinic provided sex selection using a sperm separation method that claimed a 75% success rate for male sex selection and 70% for female. The service was provided for family gender balancing only, and couples were informed that they must already have one child, and that any pregnancy resulting from the program must be carried to full term irrespective of the sex of the fetus. The study notes that prior to knowing these limitations, less than 5% of all inquiries were from childless couples, suggesting that families without children were unlikely to present for sex selection, even if guidelines were more permissive. In the first eighteen months of operation 809 couples were interviewed as part of the clinic screening process. Of the couples seen, 57.8% were of Indian origin, 32% were European, 3.6% were Chinese and the remaining 6.8% were primarily Middle Eastern. The majority of attendees were UK residents, drawn from all over the country. The non-European couples expressed a clear preference for a son. Indian couples requesting sons had an average of 2.75 girls in the family at point of presentation, while Chinese couples had 2.20 girls and the remainder had 3.02 girls. The reason repeatedly given for wanting a son were the need to carry on the family name for religious-social reasons, and the desire to avoid a large family in the process of trying to conceive a son. Among European couples 62.9%

wanted girls, and the main reason was the mother's desire for a special relationship with a daughter. 80.6% of the couples said that they would have another child irrespective of the availability of sex selection, a factor the authors considered important in assessing the effect of a baby not of the desired sex on the family. The authors conclude,

Our data show that it is couples with predominantly two to three children of the same sex, and nearing the end of their reproductive life, that are interested in sex selection so that they can complete their families with a child of the opposite sex. Although our data also confirm the wide belief that most cultures would prefer a boy if given a choice, this consistently is not the case in European societies such as Britain, where girls are found to be more valued by their parents, especially mothers. Given certain guidelines, these findings do not support the popular belief that sex selection will lead to the disadvantage of women in UK society and upset the established sex ration (970).

Attitudinal Studies – medical and ancillary staff - The search identified several studies of medical and paramedical professional attitudes towards sex selection, including those of genetic counselors (Burke 1992; Wertz & Fletcher 1998), geneticists and related specialists (Evans et al. 1991; Wertz & Fletcher 1993 & 1998) and ethicists and clergy (Evens et al. 1991). Burke's (1992) study of thirty-four prenatal genetic counselors in the US found that they personally disapproved of the use of prenatal diagnosis and pregnancy termination for sex selection purposes, but at the same time continued to observe professional ethics of non-directive counseling and an observance of the woman's right to choose abortion. In many cases sex information is given to couples as part of medical screening for genetic disorders rather than in response to requests for sex identification, and many of the counselors supported the restriction of such information while legal abortion was still an option.

Wertz and Fletcher's (1993 & 1998) two multinational surveys of geneticists and genetic counselors found similar tensions in the attitudes toward sex selection. Their studies surveyed 682 geneticists in 19 nations (1993) and 2903 in 37 nations (1998) respectively, to measure differences between nations and differences over time. In the larger study they found that 47% of geneticists reported requests for sex selection, with much higher percentages in Egypt, China and India, where son preference is strong. The UK rate was considerably lower, at 32%. Using a series of five vignettes describing various sex selection cases, they asked geneticists if they would cooperate with patient requests and offer some form of prenatal diagnosis. The study found that 49% overall (up from 42% in 1985) would offer diagnosis or refer the patient elsewhere, rather than refuse. The UK rate was 39% up from 24% in 1985. However UK geneticists were much more likely to refer and less likely to perform sex selection diagnosis themselves compared to the US or other English speaking countries. Like Burke's study they found overall that geneticists would not directly deny prenatal sex diagnosis, even though they did not approve of it. The major reasons for disapproval were related to the preservation of the ethical status of the profession, to an objection to the use of medical resources for non-medical reasons and to a disinclination to abort a healthy fetus. In China, India, Japan and Turkey, concern was expressed about the effects of sex selection on the sex ratio in the

population, but in developed nations this was not considered as a likely risk. The major reason for performing sex selection was respect for patient autonomy. The study also asked 988 members of the general public in the US their opinion of sex selection using the same vignettes as those used for the geneticists. They found that the percentages supporting prenatal sex selection were very similar to that of the US geneticists, but this arm of the study was not repeated for other countries.

Cross-cultural studies – a number of studies document the utilisation of new medical technologies for sex selection in newly industrialising countries with a strong historical preference for sons. These studies will be briefly summarised as they may have some relevance to the British population and likely patterns of sex selection uptake among some ethnic groups. Studies focus particularly on rural or newly urbanising India (Everett 1998, Khanna 1997, Lingam 1991, Luthra 1994) and rural and urban China and East Asia (Coale & Banister 1994, Chu 2001, Goodkind 1996, Wong & Ho 2001). In these societies sons are historically favoured as the keys to economic prosperity and as the providers of care for parents in their old age, among other religious and social reasons. The desire for sons has historically produced high rates of female neglect and sometimes infanticide (Coale & Banister 1994, Goodkind 1996) as a way to influence sex of offspring. More recently medical prenatal sex determination and sex-selective abortion have become the favoured methods of ensuring sons. Coale and Banister (1994) found in their demographic study that the marked shortage of female infants compared to male evident in census data since the 1930s (which they explain with reference to infanticide) has been exacerbated recently by rapidly escalating sex-selective abortion. Chu (2001) in a survey of 820 married women aged 20-44 in a rural Chinese village found prenatal sex determination by ultrasound scanning and subsequent sex-selective abortion of female fetuses was common for second pregnancies. Khana (1997) observed similar dynamics in an urbanising Indian village, where loss of traditional lands and hence preference for smaller family size encouraged the use of ultrasound and abortion to reduce the number of daughters in the family. Sex selective abortion is on a scale sufficient to skew the sex ratio in both India and China. No studies were found that explicitly investigate the retention or otherwise of these traditional preferences for sons after immigration to Britain or other European country. However the data described above from the Liu & Rose (1995) study indicates that son-preference may be retained in some form among some immigrants.

Ethical Arguments against technologically assisted sex selection - It should be noted that none of the ethical literature pertaining to Europe, North America or Australia considered that sex selection in these nations would have an adverse effect on the sex ratio in the population as a whole. This is due to the improbability of large numbers of people employing the techniques, and the perceived preference for family gender balance in these societies.

The most strongly argued ethical case against the use of medically assisted sex selection related to its perceived interrelationship with sexism and discrimination against women. This argument was made by Berkowitz & Snyder (1998) Healy (1998) and Wertz & Fletcher (1998). These authors consider the use of sex selection technology to be

inherently an expression of sexism. This may take the form of son preference, which these authors argue is still evident in the preference in the US for the first-born child to be a son. They additionally argue that any practice that is not gender blind and that treats sex as having intrinsic qualities and values is sexism.

[Sex selection] forces parents to figure sex into the calculus of a child's worth, to place a value on sex. Furthermore, by making a choice, parents must essentially prefer one sex over another. ... Pre-conceptive [sic] sex selection represents sexism in its purest ... form as prior to conception ... before parents can possibly know anything about their child, a child's worth is based in large part upon their sex (Berkowitz & Snyder 1998: 33).

Sex selection may heighten an expectation that children so conceived will act in sex stereotyped ways, and possibly threaten the welfare of children who do not, they argued. However Ten (1998) points out that this position fails to take the desire for family balancing into account as a (potentially) non-sexist use of sex selection.

Another widely canvassed argument against sex selection is the 'slippery slope' argument; that it will pave the way for other kinds of non-medical trait selection if the technology becomes available (Healy 1998). It is feared that sex selection may be merely the first in an array of genetic technologies that would allow for selection of hair colour, height, intelligence, sexual preference etc. However the majority of articles that raised this argument also considered it rhetorical, given that social interest in sex selection has a long history, while other kinds of trait selection are not well established as cultural preferences (Ethics Committee of ASRM 2001; Savulescu 1999).

A further objection was that medically assisted sex selection diverted medical resources for non-medical purposes. This argument was strongly held among the geneticists interviewed by Wertz & Fletcher (1998), many of whom considered that sex selection should be on a strictly user-pays basis.

Ethical arguments in favour of sex selection - The majority of the ethical literature argued for the availability of some forms of sex selection, under certain specified conditions and restrictions. A recurrent argument was in favour of maximum procreative autonomy, a position strongly put by Rhodes (2001) and Savulescu (1999) in particular. Rhodes argues that there is at present no empirical evidence that sex selection leads to discrimination against women or imbalance in the sex ratio. She dismisses arguments that sex selection may involve parents having children for unethical reasons (as means rather than ends) on the grounds that parenting frequently has selfish components but that this does not justify prohibition of sex selection. She argues that sex selection may have the benefits of stopping 'try-again' methods of family balancing and lead to more satisfactory family size. Overall her argument is primarily a libertarian one, concluding that reasons for restricting the use of the technology are not sufficient to restrict personal liberty. Savulescu (1999) lists the possible harms of sex selection as i. psychological harm if the child is not the desired sex ii. that it treats the child as a means not an end and iii. that it devalues girls. However she regards these harms as generally remote, and furthermore

argues that procreative autonomy - ‘the liberty to decide when and how to have children according to what parents judge is best’(375) – should not be sacrificed to correct social inequality.

The remaining ethical literature examined (Pennings 1996; Ethics Committee of ASRM 1999 & 2001; Schulman 1993; Esposito 1999) made a limited case for the use of sex selection for family balancing. Pennings makes this case most clearly and in greatest detail. He notes that sex selection for family balancing has been shown to be acceptable to the majority of geneticists in Wertz and Fletcher’s study (1993) and to the US general population in the few attitudinal surveys that have been undertaken. It is not associated with sexism because the sex desired is conditioned by the sex of the child already born, rather than by an abstract regard for one gender over the other. Moreover it has the potential to contribute to the satisfaction of the parents and the interactions of siblings, he argues. He outlines three restrictions that should be placed on sex selection in accordance with the aim of family balancing. These are i. sex selection cannot proceed where the family is already balanced ii. the sex selected must be for the outnumbered sex iii. sex selection should not be permitted for the first child. After the birth of the first child, sex selection may be permitted, or it may be prohibited until the birth of a second child of the same sex. That is it might be used to pre-empt an imbalance or to correct an imbalance. He also argues that, in cases where couples have children by previous marriages, the relevant reference unit is the composition of the household at time of presentation.

Technology-Specific Issues

Prenatal techniques – ultrasound scanning, amniocentesis, chorionic villus sampling (CVS) have the major drawback that they can only detect sex well after conception. Hence the only means of exercising sex selection is via termination of the pregnancy. In general the attitudinal and ethical literature regards this as a last resort, and to be avoided for sex selection in all but the most extreme cases (Evans et al 1991).

Preimplantation Genetic Diagnosis – the issues specific to sex selection and PGD were discussed in Ethics Committee of ASRM (1999); Savulescu & Dahl (2000) and Sills et al (1999). PGD is currently used primarily to select embryos that are free from genetic disorders, and sex selection can be part of a procedure to screen for sex-linked disorders. In the US patients may also request PGD for non-medical sex selection purposes. The Ethics Committee report argues that while sex information as part of a medical PGD procedure is unlikely to lead to harm, the social harms associated with use of an expensive and highly invasive technology like PGD for sex selection purposes only are not well characterised. Furthermore PGD involves the production and discarding of healthy embryos. Hence they argue that IVF/PGD for sex selection should be discouraged and that a study of the social consequences of PGD for sex selection should be undertaken. Savulescu & Dahl (2000) argue that, on the contrary PGD should be made available for sex selection, as a privately funded option, on grounds of reproductive autonomy.

Sperm sorting - Sperm sorting techniques are examined in Pennings 1996; Ethics Committee of ASRM 2001; Schulman 1993; and Healy 1998. While Healy (1998) equates sperm sorting with eugenics and other kinds of trait selection, the remaining articles give it qualified support as a family balancing technique. The Ethics committee compares it favourably to other available methods of sex selection.

A safe and effective means of separating X and Y-bearing sperm before in vivo artificial insemination or IVF is more likely to be sought by persons contemplating reproduction, for it causes no destruction of prenatal life and is less intrusive and costly than other methods (861)

This summarises the primary arguments for sperm sorting. Compared to other methods it does not involve the destruction of embryos or fetuses, nor does it involve highly intrusive procedures for the woman. The primary concern, apart from general issues related to sex selection per se, is the margin of error involved in the technique. The above literature expresses concern regarding the welfare of a child conceived using sperm sorting who is nevertheless the 'wrong sex'. The conclusion, with the exception of Healy, is that sperm sorting should be offered in concert with careful screening and counseling procedures. The Ethics Committee of ASRM recommends that such procedures should include i. thorough screening of the couple, who must be made fully aware of the risks of failure ii. the couple must accept children of the opposite sex to that selected iii. they are counseled about having unrealistic expectations of gender behaviour in the selected child and iv. are offered the opportunity to participate in research to assess the effects of preconception selection. The committee concludes "If the social, psychological, and demographic effects of those uses of preconception gender selection have been found acceptable, then other non-medical uses of preconception selection might be considered." (Ethics Committee of ASRM 200: 863).

Annotated Bibliography and Website Selection

Author(s): Adelman, Stuart ; Rosenzweig, Saul

Title: Parental Predetermination of the Sex of Offspring: II. The Attitudes of Young Married Couples with High School and with College Education

Source: Journal of Biosocial Science 1978, 10, 3, July, 235-247.

Abstract: In an extension of a previous pilot project (see SA 25:4/18376), the sex choice attitudes of high school & partially college-educated subjects were tested, using data from a sample of 96 white married couples from the St. Louis, mother area. Results indicate that the exercise of sex choice is favored by the majority of subjects. Most individuals would employ sex control to ensure a balance of the sexes in a limited two-child family. Little desire was shown to choose first-child sex, but active choice of a second child of opposite sex from the first appears a strong probability. Male preference, while pronounced, had a much weaker influence on the desire to make choices than the balance principle. Selective intercourse & a sex-choice pill were acceptable methods of sex control, but both artificial insemination & fetal sex determination, combined with selective early abortion, were rejected. Once put into practice, sex choice will create new marital problems that may require professional counseling.

Author(s): Benagiano G ; Bianchi P

Title: Sex preselection: an aid to couples or a threat to humanity?

Source: Hum Reprod (Human reproduction (Oxford, England)) 1999 Apr; 14(4): 868-70
ISSN: 0268-1161;

Author(s): Berkowitz JM ; Snyder JW

Title: Racism and sexism in medically assisted conception.

Source: Bioethics 1998 Jan; 12(1): 25-44 ISSN: 0269-9702;

Author(s): Berkowitz JM

Title: Two boys and a girl please and hold the mustard.

Source: Public Health (Public health.) 2000 Jan; 114(1): 5-7 ISSN: 0033-3506;

Author(s): Boss, Judith A.

Title: First trimester prenatal diagnosis: earlier is not necessarily better.

Source: Journal of Medical Ethics v. 20 (Sept. '94) p.146-51 ISSN: 0306-6800

Abstract: In the past few years, considerable attention has been devoted to chorionic villus sampling (CVS), which is a relatively new means of prenatal diagnosis. CVS can be carried out in the first trimester and has therefore been applauded by many as an important advance over amniocentesis. However, the drawbacks of CVS and earlier prenatal diagnosis have not been given so much publicity. Emotional costs that need to be weighed against the advantages of early prenatal diagnosis include the emotional costs of CVS with regard to the greater number of spontaneous and selective abortions after CVS, the use of CVS for sex selection, and--due to the greater social acceptability of first trimester abortion--the possibility of increased pressure on women to undergo prenatal diagnosis by health insurance companies, medical professionals, and government agencies.

Author(s): Burke BM

Title: Genetic counselor attitudes towards fetal sex identification and selective abortion.

Source: Soc Sci Med (Social science & medicine.) 1992 Jun; 34(11): 1263-9 ISSN: 0277-9536;

Abstract: Thirty-four prenatal genetic counselors (all but one non-M.D.s) in seven American cities were interviewed on attitudes which might plausibly affect counselor-client interchanges. They overwhelmingly endorse both non-directive counseling and the pro-choice ethos which supports a woman's absolute right to abortion in the early stages of pregnancy. However, they also overwhelmingly condemn using prenatal diagnosis for sex selection purposes. Therefore, counselors experience continual stress from clients who evoke the conflict inherent between these two stances. Counselors use a variety of coping mechanisms to minimize this cognitive dissonance. Avoidance through out-referral or invoking institutional policies forbidding prenatal diagnosis for sex selection purposes is a diminishing option and not possible with clients who have or offer a medical indication. More common is the use of psychological coping mechanisms. By elevating the ideals of non-directiveness and female autonomy counselors better tolerate client values in conflict with their own. Some redefine the category of 'unwanted pregnancy' to include fetuses of the 'wrong sex'; others redefine the problem as their own ethnocentrism. Empowering counselors to set the protocols they use to screen applicants for prenatal diagnosis would not remove these conflicts. Many counselors believe a ban on releasing fetal sex information while abortion is still a legal option would be organizationally or legally unacceptable, or a violation of patient autonomy. A complicating factor is that 60% of the counselors interviewed would prefer to know fetal sex in their own pregnancies. Counselors reflect the ambivalence of American society in balancing conflicting social goals

Chappell T

Title: Sex selection for non-medical reasons: Advisory Report of the Standing Committee on Medical Ethics and Health Law of the Health Council of the Netherlands.

Source: J Med Ethics (Journal of medical ethics.) 1997 Apr; 23(2): 120-1 ISSN: 0306-6800;

Author(s): Coale AJ ; Banister J

Title: Five decades of missing females in China.

Source: Demography (Demography.) 1994 Aug; 31(3): 459-79 ISSN: 0070-3370;

Abstract: This paper seeks to explain the dearth of females in the population of China in cohorts born from the late 1930s to the present. We demonstrate that in virtually all cohorts, the shortage of females in comparison with males is revealed when the cohort is first enumerated in a census. Subsequently it barely changes, an indication that female losses occur very early in life. Using the high-quality data from the censuses and fertility surveys in China, we show that many of the births of the girls missing in the censuses were not reported in the surveys because they died very young. The incidence of excess early female mortality (probably infanticide) declined precipitously in the Communist period, but not to zero. The recent escalation in the proportion of young females missing in China has been caused largely by rapidly escalating sex-selective abortion.

Author(s): Chu Junhong.

Title: Prenatal sex determination and sex-selective abortion in rural central China.

Source: Population and Development Review v. 27 no2 (June 2001) p. 259-81 ISSN: 0098-7921

Abstract: This study examines the practice of prenatal sex selection in rural central China. It examines the prevalence and determinants of prenatal sex determination by ultrasound scanning and subsequent sex-selective abortion. The data were derived from a survey of 820 married women aged 20-44 and from in-depth interviews with rural women and men, village leaders, family planning managers, and health providers, conducted by the author in one county in central China in 2000. Prenatal sex determination was a widespread practice, especially for second and higher-order pregnancies.

Sex-selective abortion was prevalent and order of pregnancy, sex of fetus, and sex of previous children were major determinants of the practice. A female fetus representing a high-order pregnancy in a family with one or more daughters was the most likely to be aborted. Awareness among rural families that in the population at large a future marriage squeeze was likely did not diminish the demand for sex-selective abortion.

Author(s): Dixon, R & Levy, D. (1985)

Title: Sex of children: a community analysis of preferences and pre-determination attitudes

Source: Sociological Quarterly 26: 251-71

Author(s): Esposito L

Title: Gender selection--helping families break even.

Source: Nurs Spectr (Wash D C) (Nursing spectrum (D.C./Baltimore metro ed.)) 1999 Apr 5; 9(7): 4-7 ISSN: 1098-9153;

Author(s): Ethics Committee of the American Society for Reproductive Medicine.

Title: Preconception gender selection for nonmedical reasons.

Source: Fertil Steril (Fertility and sterility.) 2001 May; 75(5): 861-4 ISSN: 0015-0282;

Authors: The Ethics Committee of the American Society of Reproductive Medicine.

Title: Sex selection and preimplantation genetic diagnosis.

Source: Fertil Steril (Fertility and sterility.) 1999 Oct; 72(4): 595-8 ISSN: 0015-0282;

Author(s): Evans MI ; Drugan A ; Bottoms SF ; Platt LD ; Rodeck CA ; Hansmann M ; Fletcher JC

Title: Attitudes on the ethics of abortion, sex selection, and selective pregnancy termination among health care professionals, ethicists, and clergy likely to encounter such situations.

Source: Am J Obstet Gynecol (American journal of obstetrics and gynecology.) 1991 Apr; 164(4): 1092-9 ISSN: 0002-9378;

Abstract: The ethical attitudes of health care providers toward abortion, sex selection, and selective termination of normal and anomalous fetuses in singleton or multiple pregnancies were evaluated by questionnaires distributed to members of the American Society of Human Genetics, the International Fetal Medicine and Surgery Society, the Society of Perinatal Obstetricians, ethicists, and clergy. Demographic characteristics of respondents exhibited a preponderance of men (76%), age greater than 40 (68%), and of United States residents (82%). Seventy-nine percent of respondents were in the medical profession. Approximately half of the respondents were Protestant, the rest being evenly distributed among Catholic, Jewish, and other religions. Acceptance of abortion for social indication varied by religion and gestational age but not by religious conviction, age, country, or gender of respondent. First-trimester abortion of a normal singleton pregnancy was considered more acceptable than selective termination of normal fetuses in multifetal gestations. Sex selection was considered unethical by most respondents. Selective termination was deemed ethically appropriate in quadruplets or multifetal gestations of more than five fetuses and in multiple pregnancies bearing one anomalous fetus. In the latter situation, acceptance increased with the severity of fetal anomalies and decreased from the first to the third trimester. The medical specialty of respondents was the only independent factor strongly associated with acceptance of selective termination by trimester, indication, and number of fetuses. Acceptance of selective termination among health care professionals appears to reflect

not only perceptions of procedure-related risks and benefits in the index pregnancy but also individual training and religious beliefs.

Author(s): Everett, Jana

Title: Indian Feminists Debate the Efficacy of Policy Reform: The Maharashtra Ban on Sex-Determination Tests

Source: Social Politics 1998, 5, 3, fall, 314-337. ISSN: 1072-4745

Abstract: Examines the Indian feminist debate over the efficacy of Maharashtra State legislation to end the practice of female feticide via the use of genetic sex-determination tests (SDTs) to make possible the selective abortion of female fetuses. Discussed are two interpretive feminist stances to assess the campaign against SDTs, which moved underground: policy advocacy & statist skepticism. This case study provides a useful vehicle for exploring questions regarding the consequences of women's movement efforts at state policy reform.

Author(s): Gilroy FD ; Steinbacher R

Title: Sex selection technology utilization: further implications for sex ratio imbalance.

Source: Soc Biol (Social biology.) 1991 Fall-Winter; 38(3-4): 285-8 ISSN: 0037-766X;

Abstract: A survey of 242 undergraduates assessed attitudes toward use of sex selection technology and the choice of sex of first- and second-born offspring among potential users. Of our sample, 31 per cent endorsed use of sex selection technology, with the small subsample of nonwhites more accepting of utilization than were whites. There was a significant preference for first-born sons among all potential users, but nonwhites indicated a stronger preference than did whites. Students from rural areas were more desirous of boys than were urban residents. The desire for gender balance within the family documented in earlier studies did not manifest itself. Choice of gender of second child was independent of preference for first-born, with 54 per cent of the potential users desiring sons as both first and second children.

Author(s): Goodkind, Daniel.

Title: On substituting sex preference strategies in East Asia: does prenatal sex selection reduce postnatal discrimination?

Source: Population and Development Review v. 22 (Mar. '96) p. 111-25 ISSN: 0098-7921

Abstract: Recent evidence from East Asia suggests that parents use prenatal sex testing to selectively abort female fetuses, a practice manifested in rising sex ratios (males per females) at birth. Many observers have condemned prenatal sex testing, arguing that it results in discriminatory abortion against females. However, observers have neglected the dynamics between this new prenatal discrimination and traditional postnatal discrimination against young daughters. If the option of sex-selective abortion implies that daughters carried to term are more likely to be wanted, postnatal discrimination might decline. Evidence from East Asia is used to investigate this "substitution" hypothesis. In societies where excess daughter mortality existed in the 1970s, rises in the sex ratio at birth in the 1980s tended to be associated with declines in excess daughter mortality. This preliminary support for the substitution hypothesis suggests that judging the morality of sex-selective abortion requires prior consideration of the prevalence and relative evils of both prenatal and postnatal discrimination.

Author(s): Healy BP

Title: GATTACA rising: sorting sperm by favored traits.
Source: J Womens Health (Journal of women's health / : the official publication of the Society for the Advancement of Women's Health Research.) 1998 Oct; 7(8): 933-4

Author(s): Kalaça C ; Akin A
Title: The issue of sex selection in Turkey.
Source: Hum Reprod (Human reproduction (Oxford, England)) 1995 Jul; 10(7): 1631-2 ISSN: 0268-1161;

Abstract: In accordance with a recent decision of the High Health Council, which is the highest advisory Council of the Ministry of Health, and following 6 months of debate, the clinical application of sex selection methods when there are no medical indications has been restricted in Turkey. The participants of the debate were the Turkish counterparts of Dr R.J. Ericsson, who is the owner of the patent of the sperm separation method, the General Directorate of Mother and Child Health and Family Planning, the Ethical Committee of the Turkish Medical Association, the Legal Consultancy of the Ministry of Health and the whole community through the press and television programmes. Many reports concerning sex selection were prepared that were opposed to the application of the Ericsson method when there were no medical indications, depending on ethical and technical considerations. The debate also induced ethical discussions about other related subjects, such as recent improvements in reproductive technologies, prenatal diagnosis and the Human Genome Project.

Author(s): Khanna, Sunil K.
Title: Traditions and Reproductive Technology in an Urbanizing North Indian Village
Source: Social Science and Medicine 1997, 44, 2, Jan, 171-180. ISSN: 0277-9536

Abstract: Ethnographic data collected via participant observation & interviews with 160 ever-married women & 8 doctors are drawn on to examine the practices of prenatal sex determination & sex-selective abortion in Shahargaon, a Jat village undergoing rapid urbanization & cultural change in north India. Sociodemographic outcomes of sex-selective abortion practiced in a system of patriarchy, manifested in terms of son preference & daughter disfavor, are discussed. It is argued that changes from an agricultural to an urban society have led to a decrease in family size among Shahargaon Jats. In spite of improvements in educational & economic status, son preference & daughter disfavor are reinforced, with couples using prenatal sex determination & sex-selective abortion to achieve smaller family size & reduce the number of daughters.

Author(s): Kuhse H ; Singer P
Title: Choosing the sex, race and sexual orientation of our children.
Source: Bioethics 1998 Jan; 12(1): iii- ISSN: 0269-9702;

Author(s): Kumar TC
Title: Gender pre-selection. Prevention or perpetuation of female deaths.
Source: Hum Reprod (Human reproduction (Oxford, England)) 1995 May; 10(5): 1319 ISSN: 0268-1161;

Author(s): Lilford RJ
Title: Sex selection--ethical issues.

Source: Hum Reprod (Human reproduction (Oxford, England)) 1995 Apr; 10(4): 762-4
ISSN: 0268-1161;

Author(s): Lingam, Lakshmi

Title: Sex-Detection Tests and Female Foeticide: Discrimination before Birth

Source: The Indian Journal of Social Work 1991, 52, 1, Jan, 13-19.

Abstract: It is contended that sex-determination testing (amniocentesis) in India often leads to abortion of female fetuses (feticide). Societal & government interventions against the practice are examined, & the inadequacy of accurate statistical data is lamented. Maharashtra state legislation's regulation of the use of prenatal diagnostic techniques since 1988 is discussed. It is concluded that the selective abortion of female fetuses perpetuates the negative social worth of women.

Author(s): Liu P ; Rose GA

Title: Sex selection: the right way forward.

Source: Hum Reprod (Human reproduction (Oxford, England)) 1996 Nov; 11(11): 2343-5

ISSN: 0268-1161;

Author(s): Liu P ; Rose GA

Title: Social aspects of > 800 couples coming forward for gender selection of their children.

Source: Hum Reprod (Human reproduction (Oxford, England)) 1995 Apr; 10(4): 968-71

ISSN: 0268-1161;

Abstract: The social characteristics of 809 couples attending a sex preselection clinic have been studied. Their ethnic origins were: Indian 57.8%, European 32.0%, Chinese 3.6% and others 6.8%. The average number of boys and girls per family was 0.09 and 2.70 respectively for couples wanting a boy, and 2.46 and 0.14 for those wanting a girl. The average age of the wives was 34.0 years. These figures were not significantly different in any ethnic subgroup. Out of all the couples, 80.6% stated that they would have had another baby even had sex preselection not been on offer; 37.5% of the couples interviewed have been treated so far. The figures among those treated are substantially the same as those for the whole group. Asian and Middle Eastern couples overwhelmingly wanted boys, whereas European couples showed a slight preference for girls. These results suggest that, given certain guidelines, sex selection is unlikely to lead to a serious distortion of the sex ratio in Britain and other Western societies, but may need careful monitoring in other parts of the world.

Author(s): Luthra, Rashmi

Title: A Case of Problematic Diffusion: The Use of Sex Determination Techniques in India

Source: Knowledge 1994, 15, 3, Mar, 259-272. ISSN: 0164-0259

Abstract: Examines the technological diffusion of sex determination techniques in India, used to detect & subsequently abort female fetuses. This technology has spread rapidly because it imparts valuable knowledge within the Indian context, & because it fits in neatly with the modernization dynamic within India, which itself has enmeshed with traditional patriarchal institutions to oppress women. More research needs to be done on ways to stem the adoption of problematic innovations.

Author(s): Mastroianni L Jr

Title: Swimming upstream: views on the ethics of preconception gender selection.

Source: J Androl (Journal of andrology.) 1999 May-Jun; 20(3): 332-5 ISSN: 0196-3635;

Author(s): Pennings G

Title: Family balancing as a morally acceptable application of sex selection.

Source: Hum Reprod (Human reproduction (Oxford, England)) 1996 Nov; 11(11): 2339-43

ISSN: 0268-1161;

Author(s): Reubinoff BE ; Schenker JG

Title: New advances in sex preselection.

Source: Fertil Steril (Fertility and sterility.) 1996 Sep; 66(3): 343-50 ISSN: 0015-0282;

Abstract: OBJECTIVE: To review the current developments in the field of preconceptual sex selection and to discuss the moral dilemmas that accompany the scientific progress. DESIGN: A survey of the major publications on sex preselection. RESULTS: Examination of current methods of preconceptual gender selection revealed that in vivo methods such as timing of intercourse, the use of ovulation induction medications, and artificial insemination do not appear to affect the sex ratio to a clinically significant degree. In vitro separation of X- and Y-bearing spermatozoa by gradient techniques have been reported to alter significantly the sex ratio at birth. However, these trials were noncontrolled, and molecular biological techniques could not validate that these methods indeed change the Y- to X-bearing spermatozoa ratio sufficiently for clinical use. Nevertheless recent scientific advances have made highly reliable preconceptual sex selection possible by using preimplantation diagnosis or sperm separation by flow cytometry combined with IVF. At present, these methods have been used to avoid sex-linked disorders. Both involve the invasive procedure of IVF and thus are held by most as inappropriate for nonmedical indications. However, improvement in flow cytometry output of sexed spermatozoa might provide in the near future sufficient sorted gametes for artificial insemination. This technique then will provide an available noninvasive method of sexing for social purposes. CONCLUSIONS: Reliable preconceptual sex selection is currently possible only by preimplantation diagnosis, or sperm separation by flow cytometry combined with IVF. Both methods involve invasive procedures and are at present exclusively used for medical indications. It may be that in the near future, an improvement in flow cytometry output of sexed spermatozoa will provide sufficient sorted gametes for artificial insemination. In such a case, the medical community will be forced to take a stand, whether this reliable noninvasive method of sexing will be allowed for social purposes.

Author(s): Rhodes R

Title: Ethical issues in selecting embryos.

Source: Ann N Y Acad Sci (Annals of the New York Academy of Sciences.) 2001 Sep; 943: 360-7 ISSN: 0077-8923;

Abstract: People involved in assisted reproduction frequently make decisions about which of several embryos to implant or which of several embryos to reduce from a multiple pregnancy. Yet, others have raised questions about the ethical acceptability of using sex or genetic characteristics as selection criteria. This paper reviews arguments for rejecting embryo selection and discusses the subject of choosing offspring in terms of the centrality of liberty and autonomous choice in ethics. It also presents a position on the acceptable scope of embryo selection and the professional responsibilities of those who practice reproductive medicine.

Author(s): Rosenzweig, Saul ; Adelman, Stuart

Title: Parental Predetermination of the Sex of Offspring: The Attitudes of Young Married Couples with University Education Journal of Biosocial Science 1976, 8, 4, Oct, 335-346.

Abstract: An intensive pilot survey involving direct contact with 47 married couples between the ages of 20-30 enrolled as graduate students at Washington U, St Louis (all with few or no children) was conducted during Mar & Apr, 1973, to determine their attitudes toward general (public) & personal choice & control by parents, of the sex of offspring. Questionnaires were completed before & after information had been provided regarding new methods of fetal sex determination, abortion, & related topics. Results indicate that sex choice will be accepted & employed by the majority of highly educated, Mc individuals, most couples preferring a 2-child family with one child of each sex. Prospective methods (precoital, sex-selection pill) were much preferred to retrospective methods (abortion) in the sex determination. Fetal sex determination in the 1st trimester of pregnancy with selective abortion may soon be widely practiced. New problems in marital & family adjustment, family planning, & social organization may arise with the advent of this new step in human sexual autonomy; these contingencies need further investigation at various SE & educational levels & in different cultural milieus.

Author(s): Savulescu J ; Dahl E

Title: Sex selection and preimplantation diagnosis: a response to the Ethics Committee of the American Society of Reproductive Medicine.

Source: Hum Reprod (Human reproduction (Oxford, England)) 2000 Sep; 15(9): 1879-80 ISSN: 0268-1161;

Abstract: In its recent statement 'Sex Selection and Preimplantation Genetic Diagnosis', the Ethics Committee of the American Society of Reproductive Medicine concluded that preimplantation genetic diagnosis for sex selection for non-medical reasons should be discouraged because it poses a risk of unwarranted gender bias, social harm, and results in the diversion of medical resources from genuine medical need. We critically examine the arguments presented against sex selection using preimplantation genetic diagnosis. We argue that sex selection should be available, at least within privately funded health care.

Author(s): Savulescu J

Title: Sex selection: the case for.

Source: Med J Aust (The Medical journal of Australia.) 1999 Oct 4; 171(7): 373-5 ISSN: 0025-729X;

Abstract: There is a strong argument in favour of sex selection, based on respect for procreative autonomy--the autonomy of couples to decide for themselves how to procreate, and what children to have. Objections based on possible harm to the child, the parents, or society, are not compelling, particularly in Australia.

Author(s): Schulman JD

Title: Ethical issues in gender selection by X/Y sperm separation.

Source: Hum Reprod (Human reproduction (Oxford, England)) 1993 Oct; 8(10): 1541 ISSN: 0268-1161;

Author(s): Sheldon T

Title: Dutch sex selection clinic faces opposition.

Source: BMJ (BMJ (Clinical research ed.)) 1995 Jul 1; 311(6996): 10-1 ISSN: 0959-8138;

Author(s): Sills ES ; Goldschlag D ; Levy DP ; Davis OK ; Rosenwaks Z

Title: Preimplantation genetic diagnosis: considerations for use in elective human embryo sex selection.

Source: J Assist Reprod Genet (Journal of assisted reproduction and genetics.) 1999 Nov; 16(10): 509-11 ISSN: 1058-0468;

Author: Singer, E

Title: Public attitudes toward genetic testing

Source: Population Research and Policy Review 1991 (10): 235 – 255

Author(s): Statham, H., Green, J. Snowdon, C. & France-Dawson, M.

Title: Choice of baby's sex

Source: Lancet, 1993, 341: 564-5

Author(s): Sureau C

Title: Gender selection: a crime against humanity or the exercise of a fundamental right?

Source: Hum Reprod (Human reproduction (Oxford, England)) 1999 Apr; 14(4): 867-6
ISSN: 0268-1161;

Author(s): Ten CL

Title: The use of reproductive technologies in selecting the sexual orientation, the race, and the sex of children.

Source: Bioethics 1998 Jan; 12(1): 45-8

Author(s): Wertz, Dorothy C. ; Fletcher, John C

Title: Prenatal diagnosis and sex selection in 19 nations. part of a symposium on: Women, development and health

Source: Social Science & Medicine v. 37 no11 (Dec. '93) p. 1359-66 ISSN: 0277-9536

Author(s): Wertz, Dorothy C. ; Fletcher, John C.

Title: Ethical and social issues in prenatal sex selection: a survey of geneticists in 37 nations.

Source: Social Science & Medicine v. 46 no2 (Jan. '98) p. 255-73 ISSN: 0277-9536

Abstract: In a recent 37-nation survey of 2903 geneticists and genetic counselors, 29% would perform prenatal diagnosis (PND) for a couple with four girls who want a boy and would abort a female fetus. An additional 20% would offer a referral. The percentage who would perform PND in the United States (34%) was exceeded only by Israel (68%), Cuba (62%), Peru (39%), and Mexico (38%). In all, 47% had had requests for sex selection. There appears to be a trend toward honoring such requests since a similar survey in 1985. This paper discusses reasons for this trend and the ethical dilemmas of refusing patient requests in societies where individual autonomy is stressed.

Author(s): Wong, S. F. ; Ho, L. C.

Title: Sex selection in practice among Hong Kong Chinese.

Source: Social Science & Medicine v. 53 no3 (Aug. 2001) p. 393-7 ISSN: 0277-9536

Abstract: The aim of this study is to identify factor(s) influencing imbalance in the sex distribution of children (more children of the same sex) of the multiparous women attending an antenatal clinic in Hong Kong. A retrospective study was carried out to compare the expected and observed sex ratios of babies born to women with one previous live birth and women with two. All singleton pregnant women of parities 1 and 2 delivering after 22 weeks of gestation, between 1 July 1996 and 30 June 1998, were included. A total of 2604 women of parity 1 and 752 women of parity 2 were included. The sexes of the children of parity 1 women and the sex distribution of their newborns were consistent with the predicted value. The parity 2 women were more likely to have third children if their previous children were of the same sex (p-value <0.001). This implies that the parity 2 women attending our antenatal clinic had third pregnancies because of social, economical or environmental reasons. Our parity 2 women with two daughters were more likely to have sons (p<0.05). Thus, biological or parental factors were unlikely to be important in influencing the sex of the newborn. This suggested that sex selection or sex-selective abortion might be practiced among Hong Kong Chinese women.

Social Aspects of Sex Selection websites

IVF.net <http://www.ivf.net/>

An excellent site that links into global media sites, numerous links to IVF related sites and educational material regarding reproductive health issues, including extensive material on sex selection

Microsort <http://www.microsort.net/>

Website of the company holding the patent for the microsort sperm sorting technique

Additional bibliography

Shenfield and Sereau...

Reproductive Biomedicine Online (Vol.4 No.1) January/February 2002.