

# Sex verification tests: ethical, legal and social aspects

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Lay people often wonder at all the fuss about identifying the biological sex of an individual. They may recall a granny or midwife, immediately after a delivery, even in the dim light, declaring with ease that it's a girl, or a boy, to the rejoicing crowd waiting eagerly outside the delivery room. When it is so simple, why are doctors, sports administrators and investigators making such a hue and cry about this? How do you identify the biological sex of an individual? What is this fuss about sex verification tests? Are they the same as gender verification tests? What are the ethical, legal and social aspects of these sex verification tests? I will try to answer some of these questions.

According to Tucker, "Sex' is the biological term denoting the genetic and anatomical characteristics of an individual, based on which we can identify ourselves as 'males' and 'females'. 'Gender', on the other hand, is a sociological construct that denotes how an individual is identified according to social norms." (1). Based on this, we could say an individual exhibits 'masculine' or 'feminine' qualities. So when we have to identify an individual as 'male' or 'female' the correct term should be 'sex verification tests' and not 'gender verification tests' as reported in the lay press as well as in some publications (2, 3, 4).

Routinely at birth, the 'external genitals' (phenotype sex), whether they are the penis and scrotum (male), or vulva and vagina (female), help in identifying the biological 'sex' of an individual. The problem arises in cases of ambiguous genitalia wherein the external genitals are a mixture of both sexes. In such cases the detection of 'internal gonads and sex chromosomes' (genotype sex), whether it is testis and XY sex chromosomes (male) or ova and XX sex chromosomes (female), solves the problem to a certain extent.

In cases of hermaphrodites (natural) or in *hijras*, *zenanas* and transsexuals (acquired) the external genitals either (i) resemble one sex while the internal gonads could be of the other sex (Klinefelter syndrome, Turner syndrome); (ii) or are not of either sex (*hijras*, *zenanas*); (iii) or are of both sexes (true hermaphrodite). There are problems in the easy identification of biological sex in certain cases: some of these are: sportspersons (like the Caster Semenya case (3)), pre-employment tests (as in the military), and in alleged crimes as in the Pinki Pramanik case (5).

Doubts are then cast on the people tested -- whether they deliberately hid their real sex identity to gain an advantage in sports, crime or in employment -- and they are forced to undergo compulsory sex verification tests. Is informed consent sought before these tests? Are the limitations of these sex verification tests explained to the individual? For instance, as in the Pinki Pramanik case, is informed consent taken, citing Section 53 of The Code of Criminal Procedure, 1973, (Cr PC) regarding the medical examination of an accused in a crime?

Section 53 Cr P C allows the use of "reasonable force" in performing a medical examination. Still, are we being ethical when performing such tests against the wish of the individual? Identification of the 'sex' of an individual is complicated by (i) 'concealed sex' (eg cross dressing); (ii) 'intersex' (having features resembling both sexes -- natural or acquired); (iii) 'transvestism' (cross dressing for sexual gratification); (iv) 'transexualism' (undergoing sex change surgeries), etc.

Official sex verification testing in sports dates back to 1960, when the 'nude parading' of female competitors before a panel of judges (female doctors) resulted in outrage and protest, and a high risk of incorrect evaluation for the reasons explained above as in cases of hermaphrodites and transsexuals (1). We cannot accept such tests which blatantly violate the dignity and privacy of an individual.

In 1967, these tests were replaced by 'nuclear sexing or microscopic tests or sex chromatin tests'. A buccal smear was done to identify the presence of a Barr body. If Barr bodies were detected, in cases of females (XX) then a certificate of 'femininity' was issued (1). Thus in males (XY), possessing only one X chromosome would produce a negative Barr body test. But this testing also had its problems in cases of androgen insensitivity syndrome, -5-reductase deficiency, and in Turner's syndrome. In all these cases though they are brought up as females, they have genetically only one X chromosome and thus would produce a negative Barr body test.

These tests were replaced by the use of polymerase chain reaction (PCR) for the detection of 'Y-linked SRY gene' (Sex-determining region of the Y chromosome) (1). The presence of this gene at five weeks of intrauterine development on the Y chromosome helps in the development of testes and production of testosterone. Although the PCR technique was supposed to identify uniquely male DNA sequences, further investigation revealed that it also yielded false positive test results (3). Later on a combination of all these tests including chromosomal studies and hormonal assays was carried out to determine the 'sex' of the individual.

However, the disorders of sex development -- androgen insensitivity syndrome, -5-reductase deficiency, congenital adrenal hyperplasia, Klinefelter syndrome, Turner syndrome, mosaicism -- always pose a problem in sex verification tests because of the distinction between chromosomal sex and anatomical sex of the individual. At five weeks of intrauterine development with the presence of two X chromosomes and the absence of the Y chromosome, the gonads develop into ovaries with the resultant female development. When the Y chromosome is present, the gonads are signaled to develop into testes, which produce testosterone, and other male hormones, which ultimately result in the development of male

reproductive organs; and, at puberty, in the development of secondary sexual characteristics such as increased musculature and hair growth on the face, chest, underarms, etc.

Testosterone and dihydrotestosterone (more potent, produced by enzyme  $\alpha$ -5-reductase) help in the development of primary and secondary sexual characteristics and increased skeletal muscle mass. 'Androgen insensitivity syndrome' is caused by receptors that are insensitive to androgens, particularly testosterone. As a result, the individual, though genetically male (XY) and possessing testes would fail to develop male characteristics, appearing female with internal testes (1). These individuals would develop as female but would fail the Barr body test as they have only one X chromosome, as in the case of Maria Patino (6).

In *5-reductase deficiency syndrome* the hormone dihydrotestosterone is not produced. As a result, individuals do not develop male characteristics. For instance, the penis can resemble the clitoris. Hence such individuals are often raised as girls. At puberty, however their musculature develops, owing to normal levels of testosterone (1). These individuals fail in external examination of genitals and fail in Barr body testing.

*Congenital adrenal hyperplasia* is a condition wherein adrenal glands produce excessive amounts of testosterone in females. These individuals can develop secondary male characteristics but are genetically female (46, XX), lacking testes and male reproductive organs (1). These individuals fail in external examination of genitals but would have positive Barr body test results (as they have two X chromosomes).

*Klinefelter syndrome* (7) is male hypogonadism, with two or more X chromosomes and one or more Y chromosomes, the commonest presentation being 47XXY karyotype; the characteristic features being a eunuchoid body, long legs, gynaecomastia, small atrophic testes, small penis and absence of secondary male sexual characteristics. These individuals fail in external examination of genitals but would have false positive Barr body testing (as they have two X chromosomes).

*Turner syndrome* (7) is female hypogonadism with 45 XO karyotype. Characteristics include short stature, low posterior hairline, webbing of the neck, and a broad chest with widely spaced nipples. These individuals fail in external examination of the genitals and have false negative Barr body test results, as they have one X chromosome.

*Mosaicism* is a genetic abnormality with a mixture of cells - XX and XY, or X and XY sex chromosomes (1). Accordingly, individuals with this condition may have false positive or false negative Barr body test results, depending on number of X chromosomes.

In sports, the compulsory testing of all female competitors (in an effort to prevent male imposters) was banned in 1992. It was replaced by a policy of testing only when there is suspicion or when somebody challenges the sex of an individual. It was an absurdity to test all females when the real culprits were males posing as females. This irrational compulsory testing continued for decades in this male-dominated society. Today, sports governing bodies

have gone beyond laboratory testing and adopted more comprehensive medical evaluation by a team of experts, including gynaecologists, endocrinologists, internal medicine experts, geneticists, and experts on gender/ transgender issues (1). The aim is to eliminate unfair advantages by virtue of either increased androgen levels or increased skeletal musculature (as a result of disorders of sex); or an unfair height advantage (as a result of increased growth hormones following oestrogen hormonal supplements, after sex change surgeries). Though these are theoretical possibilities, without research evidence, it remains difficult to disqualify individuals with such sex disorders, and categorically say they cannot compete as females. The Canadian Academy of Sport Medicine also recommends that: "Individuals raised as females and are psychologically and socially females from childhood should be eligible to compete in women's competition regardless of their chromosomal, gonadal and hormonal sex" (2).

Thus the ethical issues are:

Sex testing is compulsory rather than voluntary. This is discriminatory as only females are tested. And as athletes they are unfairly disqualified for genetic abnormalities which in fact do not give them an unfair advantage. Third, it is regarded as invasive and abusive of female athletes. The testing is performed once the athlete has arrived at an international competition site, away from home and without her personal support group. The opinions of athletes are not considered in the debate on sex testing (8). Sex verification testing of athletes should be considered as a human rights violation and eliminated from all levels of sport (9). These tests are unfair, unscientific and possibly discriminatory against women who may not meet the traditional notions of femininity (10).

Sex verification in employment (the military), and in professional beauty contests depends on contractual policies. However, sex verification tests must not be unscientific, inhuman, unethical or irrational or forced on an individual against her informed consent.

Sex verification in cases like that of Pinki Pramanik depends on the charges leveled against the accused. Rape is defined under Section 375 of the Indian Penal Code, 1860, as a man having sexual intercourse with a woman against her will; or without her consent; or with her consent obtained under fear of death or hurt, etc. Given this, the charge of rape against her had to be decided by confirming whether Pinki Pramanik was indeed a male. Under the Indian legal system the investigating officers are empowered to do everything possible to investigate a case (including sex verification tests in this case!). In such sex-specific offences, often they claim that there is no alternative. But who will judge whether these sex verification tests are being conducted ethically and in a scientifically approved manner? In this era of trial by media (3) and with unethical practices, the accused is judged guilty even before being heard in the courts (as was the case with Pinki Pramanik).

When even today's scientific community does not have a single decisive test for all cases of sex verification, can we blame our grannies for giving the wrong verdicts on such sex verification? With such ignorance, if some innocent individual

is raised till puberty with the wrong sexual identity, is our social environment conducive to fulfilling their needs? Are we not violating the rights of those individuals who recognise themselves with 'a' particular sexual identity? Unless we identify the third sex legally and socially, most of these problems will continue. The issues related to individuals who undergo sex change surgeries in order to identify themselves with the sexual identity of their choice are little understood (4). Thus, when our society is still too backward to address the issues of the third sex, only time can provide answers to the ethical, legal and social issues related to deliberate sex change surgeries.

Sex verification tests, though accepted by society should not be forced on any individual against their consent. Nor should they be performed in violation of the privacy or dignity of the individual. With the inherent limitations of the accuracy of the results, utmost confidentiality has to be maintained in disclosing them. With a number of intricacies involved in a clear understanding of the conditions causing ambiguity in sexual identity, the authorities, society, and the media should refrain from making judgments before understanding the facts of a situation.

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## Developing and sustaining a medical humanities program at KIST Medical College, Nepal

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#### Abstract

The author conducted a voluntary Medical Humanities (MH) module at Pokhara, Nepal, in 2007 as a curriculum innovation project for a fellowship in health sciences education. He conducted a module for faculty members at KIST Medical College (KISTMC), Lalitpur, Nepal, in 2008. The modules used literature excerpts, case scenarios, role-plays, paintings and group activities to explore different aspects of MH. The module for faculty members had the objectives of introducing faculty to MH and also creating facilitators for the student modules. For the last four years the author has been facilitating an MH module for first-year medical students at KISTMC.

The activity-based modules were conducted in small groups. Participant views about the modules were positive. MH has a number of benefits in medical education and should be strongly considered for inclusion by medical schools in developing countries. MH modules should be creative, fun and taken forward by interested faculty members.

#### What are the medical humanities?

The medical humanities (MH) have been defined as 'an interdisciplinary, and increasingly international endeavor that draws on the creative and intellectual strengths of diverse disciplines, including literature, art, creative writing, drama, film, music, philosophy, ethical decision making, anthropology and history in pursuit of medical educational goals' (1). In MH, subjects traditionally known as the humanities are used for medical educational purposes. Many reviews have highlighted the importance and usefulness of MH in medical education (2,3).

#### A voluntary MH module at Pokhara

In early January 2007, I was selected for a two-year, part-time fellowship in health professions education and educational leadership at the PSG-FAIMER (PSG Foundation for Advancement of International Medical Education and Research) Regional Institute in Coimbatore, India, while working as a faculty member at Manipal College of Medical Sciences (MCOMS), Pokhara, Nepal. As part of the application