



THE REPUBLIC OF UGANDA

Ministry of Health

Scientific Evidence on Homosexuality

23rd February 2014

SCIENTIFIC STATEMENT FROM THE MINISTRY OF HEALTH ON HOMOSEXUALITY

I. INTRODUCTION

The Minister of Health requested the Director General of Health Services to constitute a team of expert scientists to review research data, deliberate and advise him on key questions about homosexuality.

A team of scientists was appointed to respond to two questions:-

- 1) Is there a scientific /genetic basis for homosexuality?
- 2) Can homosexuality be learned and unlearned?

A series of meetings were held after the experts reviewed the existing literature and presented their views, which were discussed to reach a consensus.

Answering the above questions requires a background discussion and understanding of sex, sexuality, gender identity, and sexual orientation.

II. BACKGROUND

Sex is a natural phenomenon in all life forms and is the basis for the reproduction and the propagation of life, though some lower forms of life may have asexual reproduction. Sexuality is determined by biology (anatomy, physiology, biochemistry) and how one relates to others which is a function of psychology, sociology, and the culture in which one lives, the latter includes anthropology, religion and other environmental factors. Ultimately, these functions are determined by genes and their interactions with the environment. What, therefore, constitutes normal sexual behavior in any given society (learned sexual practices) is a function of one's biology, psychology, sociology and culture, the last three being dynamic and often changing. Sexuality depends on five interrelated factors (APA, 1974; APA, 2009):

- i) Sexual identity (XX or XY karyotype that will determine the sex phenotype),

- ii) Gender identity (the psychological feeling of being male or female and the accompanying gender roles),
- iii) Sexual orientation (ones inner sexual attraction impulses: heterosexual – to opposite sex, homosexual – to same sex and bisexual – to both sexes),
- iv) Sexual response (desire, excitement, orgasm, resolution)
- v) Environment

Historically, it is believed that, many Western-based evangelistic missionaries and Arabs penetrated Africa and influenced her people with their views on sexuality (Amory, 1997). This continues today. However, it is necessary to state that different cultures practice their sexualities differently and some of these practices have often changed with times (Amory, 1997).

Homosexuality is a form of sexual orientation in which the participants are attracted to members of the same sex (APA, 1974; APA, 2000; WHO, 1990). However, another variant of bisexuals who are attracted to both members of the same and opposite sex also exists. Homosexual behavior has existed throughout human history including in Africa (Amory, 1997). Judeo-Christian religions (Judaism, Christianity and Islam) condemn it but not all religions of the world condemn it. Homosexuality existed in Africa way before the coming of the white man. However, most African cultures controlled sexual practices, be they heterosexual or homosexual, and never allowed exhibitionistic sexual behavior. Almost universally, they contained homosexual practices to such a point that overt homosexuality was almost unheard of (Amory, 1997). Indeed there are undeclared homosexuals in Africa who may not even know it because their cultures never give room for the expression of such behavior (Amory, 1997). In addition, many asexual practicing individuals possibly exist throughout African societies, but no one has done any study to unpack their sexual orientations (Amory, 1997).

III. THE SCIENTIFIC BASIS OF HOMOSEXUALITY

Studies of human sexuality in all races throughout the world and throughout human history have documented the presence of homosexuality.

1. GENETIC STUDIES

Many genetic studies have attempted, though unsuccessfully, to pinpoint to one specific homosexual gene (Bailey & Pillard, 1991; Hamer, 1993; Hu *et al.*, 1995; McGuire, 1995; McKnight, 1997; Sanders *et al.* 1998; Bailey *et al.*, 1999; Rice *et al.* in 1999; McKnight & Malcolm, 2000; Hershberger, 2001; Bearman & Brückner, 2002; Mustanski *et al.* 2005; Långström, *et al.* 2010). As a result, a singular genetic determinant for sexual orientation has not been demonstrated.

(a) Evolutionary arguments

Homosexuality represents one of the “sexual orientation” variants possible in the same species. As is the case for many human behavioral variants, the evolution and emergence of one’s self identity as a “homosexual—be it gay or lesbian” is governed by nature and nurture. Ironically, an argument for a purely structural-genetic basis for the origins of homosexuality contravenes the essence of sex, which is that of procreation (Camperio, *et al.* 2008; Dorner, *et al.* 1991). Specifically, the essence of homosexuality would be an antithesis for the Darwinian evolution of sex in species largely because homosexuality does not offer an opportunity for self-propagation of the species. This has been a critical and fundamental argument by some scholars against the non-genetic basis of homosexuality. However, the counterargument has been for group survival, that some individuals in a group not overburdened by reproduction responsibilities

would be available to give a hand to weak members of the group (e.g. the elderly and children) as happens in social animals (Camperio, *et al*, 2008).

(b) Chromosomal studies

Chromosome linkage studies, which attempt to link a single gene loci to a physical trait, represent another approach that has been used to unveil the genetics about homosexuality. The first such study identified a position on the female chromosome X (denoted Xq28, and famously labeled the “gay” gene) as a possible influence (Hamer, 1993). A preponderance of gay relatives on the maternal side, was also stated (Hamer, 1993; Sanders *et al*. 1998; Hu *et al*.1995). Subsequent studies however, failed to replicate these findings and some even unveil new markers : 7q36, 8p12 and 10q26 (Bailey *et al.*, 1999; McKnight & Malcolm, 2000; Rice *et al.* in 1999; Mustanski *et al.* 2005).

(c) Genomics Studies

More recently, an independent group—during the proceedings of the American Societies of Human Genetics (ASHG), have used a genome-wide study to replicate Hamer’s Xq28. However, this study also reveals other markers other than Xq28. The authors of the latter work conclude: “our findings, taken in context with previous work, suggest that genetic variation in each of these regions contributes to development of the important psychological trait of male sexual orientation“(Sanders, *et al* 2012). These studies are, however, far from conclusion.

(d) Epigenetic studies

The influence of epigenetics—which involves non-structural modifications of the genetic code, and represents one of the ways by which we learn many of our acquired traits that we can even pass on to our off-springs, cannot be ruled out (Jannine, 2010; Dorner,

et al 1991; Dorner, et al 2001). Gavrilets S, et al (2012), reported a model for epigenetic regulation of genes for sexual development *in-utero*, that accommodates the view that a genetic basis for homosexuality may lie, not in the structural genome, but rather, epigenetic markers. See also Dorner, et al (2001).

(e) Twin studies

Twin studies, which looked at “monozygotic, MZ and dizygotic, DZ, or simply stated “identical and non-identical twins” in reference to study-trait(s) with the reasoning that traits that are genetically inherited should be most concordant among the MZ or identical twins, represent another unique piece of evidence around homosexuality. Most twin studies aimed at exposing the genetic heritability of homosexuality have shown variable concordance rates of homosexuality and genetics, with the majority, though reporting presence of minimal and variable genetic basis, clearly agreeing that the individual-specific environment plays the biggest role. In one of the most recent and biggest twin study so far done, Långström, et al. (2010) biometric modeling revealed that, in men, genetic effects explained .34–.39 of the variance [of sexual orientation], the shared environment .00, and the individual-specific environment .61–.66 of the variance. Twin studies, however, have their shortcomings including “selection bias” and the fact that not even MZ-twins are genetically identical (Bailey & Pillard, 1991; Buhrich et al 1991; Hershberger, 2001; Bearman & Brückner, 2002; Långström, et al 2010). These findings underline the intertwined role of nature (genes) and nurture in the emergence and or evolution of homosexual behaviour.

2. NEURO-ANATOMICAL STUDIES

Many scientists thus hypothesize that a combination of genetic, hormonal, psychological, environmental and social factors determines sexual orientation (Dorner, et al 1991; Sander, et al 1999; Camperio, et al 2008; Sander, et al 2012; Zhang, et al.

2013). Studies of human brain structure and function between homosexual and heterosexual brains shows variations in the suprachiasmatic area, the anterior commissure and more recently odor processing in the hypothalamus (Swaab & Hofman, 1990; LeVay, 1991; Allen & Gorski, 1992; Savic, et al 2005; Purves, et al 2008). However these studies do not provide any conclusive evidence on whether these differences exist at birth or appear later in life.

3. ANIMAL STUDIES

Studies in the animal world have also shown homosexual practices do exist in animal and insect species. The practice of homosexuality in animals is, however, uncommon as are many physical deviants (Bell, 1981, Begamihl, 1999). A model for brain development and sexual orientation has previously been described in animal model studies, specifically *Drosophila* (Pavlou, et al. 2013). Dorner, et al. 1991 have proposed a gene and environmental brain development model driven neuro-endocrinology. In Korea a scientific team induced attraction to urine of the same sex mice by deleting a single gene, *FucM* (Park, 2010). At this point in time, however, there is no single comprehensive animal model for homosexuality.

4. SOCIAL STUDIES

Sexual phenomena exist on a normal distribution continuum like most human attributes e.g. height – most people are in the middle but others may be taller or shorter. Thus also in sexuality, there is spectrum of sexual behaviors. Some people are less fixed in one form of sexuality than others. Thus sexuality is a far more flexible human quality than used to be assumed in the past, demonstrating the biological variability within the human race (Rubio-Aurioles & Wylie, 2008; Rice, et al., 2012). Therefore homosexuality is not, and should not be labeled, a social abnormality.

IV. CAN HOMOSEXUALITY BE LEARNED OR UNLEARNED?

Homosexuality is a sexual behaviour involving sexual attraction to people of the same sex. It is not clear whether this differing physiological response exists at birth or developed after homosexual experience later in life. The conclusion from the current body of scientific evidence is that there is no single gene responsible for homosexuality and there is no anatomical or physiological data that can fully explain its occurrence. Psychosocial causes of homosexuality imply that it may be learned through experiences in life (Dorner, et al 1991; Dorner, et al 2001; Xue & Tai, 2007; Jannine, 2010). Previous disastrous heterosexual encounters (e.g. erectile dysfunction, premature ejaculation) and child-abuse may lead to aversion towards heterosexual intercourse (Katz-Wise, et al, 2013; Zhang, et al. 2013). A chance homosexual encounter in early life may be associated with sexual pleasure leading to homosexual relationships being associated with pleasure. The increasing influence of Western culture provides homosexuality as a choice one can make, it's therefore seen as a socially acceptable option for a few. Homosexuality is therefore not a disease. Indeed, the WHO removed homosexuality from its group of sexual perversions (WHO 1990). The American Psychiatric Association also does not regard homosexuality to be a disorder (APA 1974). Homosexual tendencies can be taken up based on the person's judgement on what is pleasurable for them. Why this happens to some people and not others is not clear. Whereas some homosexuals may take up the behaviour as an open choice, for others it may be due to early sexual experiences (Xue & Tai, 2007).

In summary, homosexuality has no clear cut cause, several factors are involved which differ from individual to individual (denoted, individual specific environment). Reparative therapies to change people's sexual practices have not proven successful and their scientific validity has remained questionable (Spitzer, 2012).

V. ON THE “NATURE OR NURTURE” DEBATE

Nature is dictated by genetic make-up, and is therefore innately present at birth; inherited ("nature" in the sense of nativism or innatism) . Nurture, *on the other hand*, although literally refers to the care given to children by the parents, is expanded to include influences on development arising from prenatal, parental, extended -family, culture, peer experiences, extending to physical environment and influences such as media, marketing, exhibitions, promotions, religion, and society as a whole("nurture" in the sense of empiricism). The debate of “nature or nurture” relates to “what may be the relative importance of an individual’s nature (innate qualities) as compared to his or her nurture (personal experiences) in causing individual differences in physical and behavioral traits or characteristics (Ridley M, 2003)”

a. Is there scientific evidence that nature is the determinant of homosexuality?

Scientists have attempted to answer this question. Current evidence suggests that there is contribution from nature towards sexual orientation, *however*, on its own, nature is not the cause of homosexuality. To disentangle the effects of nature (genes) and nurture (environment), behavioral geneticists perform adoption and twin studies. In one of the largest and most recent twin studies, **Långström, et al (2010)** biometric modeling revealed that, in men, genetic effects explained .34–.39 of the variance [of sexual orientation], the shared environment .00, and the individual-specific environment .61–.66 of the variance.

b. Can nature alone without the influence of nurture, cause homosexuality?

According to the above study Långström, et al (2010), nature (gene) interacts with external factors (nurture) to give rise to human behavior. It is clear from the above data, that the individual-specific environment exerts a bigger role (61–66%) than genetic-make-up (34–39%). **Donald Hebb** is said to have once answered a journalist's question of "which,

nature or nurture, contributes more to personality?" by asking in response, "Which contributes more to the area of a rectangle, its width or its length?" (Meaney M, 2004)

c. Does nurture alone cause homosexuality?

YES, in the event that there is a viable nature, nurture has the potential to model it into a diversity of behaviors.

- Philosopher John Locke posted the tabula rasa (blank-page) concept –that humans are born ‘blank’ and acquire all traits
- In line with this; John. B Watson once said, “give me a dozen healthy infants; I'll guarantee to take and train anyone of them to become any type of specialist I might select.”

(d) Can a combination of genes, without nurture, cause any body to be a homosexual?

An advanced view of the role of genetics in influencing the phenotype, acknowledges the place of gene-interaction. Gene-interactions are known to occur in the body and these give rise to synthetic effects that cannot be accounted for by each of these working in isolation. It is not clear how these arise within anyone, but it may be because of the complex-network of molecular activities in the cell, that could even further be disturbed by the external factors. As noted above in section III, “Scientific basis for homosexuality”, sub-section (1) “Genetics studies”, regarding genomic studies, these are the latest methods available to us to expose the influence of gene interactions. The recent genome-wide study by Sanders, et *al* (2012) in addition to replicating Hamer’s Xq28; also reveals other markers. The authors of the former study conclude: “our findings, taken in context with previous

work, suggest that genetic variation in each of these regions contributes to development of the important psychological trait of male sexual orientation“(Sanders, et al 2012). This, *however*, is the first such study, and more studies are required to replicate this evidence. Further still, the population studied were Western, in a Western Environment. Specific studies among Africans are lacking. The heterogeneity of the African genome, may offer relevant scientific information.

(e) Can someone be born a homosexual?

To date there is no scientific evidence to this effect. Studies in this direction are limited by the fact that, the awareness of one’s sexual orientation is a thing that emerges later in life. Imposing a quantitative measure of penetrance as the measure of the extent to which a trait may be inherited, has recently been used to portray the levels of heritability of human physical traits. These studies for instance, list specific language as being of low heritability, body weight as medium heritability, and eye color and blood group as high heritability.

VI. CONCLUSION

On the basis of the current available evidence, we conclude that;

- a) Nature (genes) and nurture (environment) interact to yield homosexuality. However nurture appears to play a greater role, as the heritability coefficient of homosexuality is evidently low.
- b) No single gene for homosexuality is known to date
- c) It remains unclear whether or not several genes may interact to yield a composite genotype that drives homosexuality
- d) Homosexuality is not a disease
- e) Homosexuality is not an anomaly or abnormality

- f) In all human societies, there are a small number of people with homosexual tendencies
- g) There is need for more studies to address sexualities in the African context, particularly in-light of the diverse heterogeneity present here.

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Members of the Ministerial Scientific Committee on Homosexuality in the Ministry of Health

Name	Title	Institution	Signature
Dr. Jane Ruth Aceng	Director General of Health Services/Senior Consultant Paediatrician/Public Health Specialist	Ministry of Health	
Dr. Isaac Ezati	Director of Planning and Development/Senior Consultant Surgeon	Ministry of Health	
Dr Jacinto Amandua	Commissioner Clinical Services/ Consultant Physician	Ministry of Health	
Assoc. Prof Charles Ibingira	Dean/Surgeon/Anatomist	School of Biomedical Sciences, Makerere University College of Health Sciences	
Dr. Sheila Ndyabangi	Principal Medical Officer, Head Mental Health Section	Ministry of Health	

Dr David Basangwa	Director/Senior Consultant Psychiatrist	Butabika Hospital	
Dr. Sylvester Onzivua	Senior Consultant Pathologist	Mulago Hospital	
Dr. Misaki Wayengera (MD, MSc)	Lecturer/Head of Genetics and Genomics, Department of Pathology	School of Biomedical Sciences, Makerere University College of Health Sciences	
Dr. Paul Bangirana (PhD)	Lecturer/Clinical Psychologist	Department of Psychiatry, Makerere University College of Health Sciences	
Dr. Hannington Kasozi	Lecturer Neurophysiology	Department of Medical Physiology, School of Biomedical Sciences, Makerere University College of Health Sciences	
Prof. Wilson Byarugaba	Professor of Biomedical Sciences, Kabale University Professor and former Head of Human and Molecular Genetics, Dept of Pathology, Makerere University	Kabale University	