

Knowledge and awareness of the Klinefelter Syndrome among the dental students

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ABSTRACT

The presence of one or more extra X chromosomes in a male causes Klinefelter Syndrome (KS). KS affects 1 in 500-1 in 1000 men, while about half remain undiagnosed. KS is characterized by huge stature, increase in arm length, the feminine distribution of adipose tissues (including gynecomastia), less or pubic hair, infertility, hypotonia, reduced size of penis and less than average verbal IQ, struggle in learning and requirements for less specified speech therapy. KS is a primary testicular insufficiency with high levels of gonadotropin caused by a lack of pituitary gland feedback. The aim of the study is to assess the knowledge and awareness of the KS among the dental students. This cross-sectional survey was conducted among dental students of a private dental hospital. To evaluate the knowledge and awareness of the participants about KS, a self-administered questionnaire consisting of 10 questions was prepared. Percentage analysis and frequency analysis and percentage analysis were performed. A Chi-square test was done to assess the correlation using the SPSS software. In our study, most of the participants were aware of the KS. They also knew that the KS is caused due to the additional X chromosome. We would like to conclude that the dental students were much aware about the Klinefelter and they also had a thorough knowledge about it.

Key words: Dental students, innovative technology, Klinefelter Syndrome, novel method

INTRODUCTION

Klinefelter Syndrome (KS) is characterized by the existence of more extra X chromosomes in a male. About 1 in 500-1 in 1000 men are affected by KS, while about half remain undiagnosed.^[1] KS was first characterized by small firm tests, azoospermia, gynecomastia, hypogonadism, and the high follicle-stimulating hormone levels as an endocrine

disorder.^[2] KS includes huge stature, increase in arm length, the feminine adipose tissue distribution (including gynecomastia), reduced facial or pubic hair, infertility, hypotonia, reduced penis size, less than average verbal IQ, learning difficulties, and requirements for less specified speech therapy requirements.^[3,4] Limited information on oral and speech deficiency in particular is available. KS children have delayed babbling and acquisition, breastfeeding difficulty, suck-swallow coordination, and organization of the muscles of oromotors.^[5,6] The persons with KS are at high risk of many diseases such as diabetes, metabolic syndrome, breast cancer, osteoporosis, mediastinal germ cell tumors, and non-Hodgkin's lymphoma.^[7]

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Patients with KS can be treated with a speech therapist (in cases of patients with delayed speech development) and with testosterone from puberty if needed (when gonadotropin levels increased). Infertility can be overcome using aided reproductive techniques in certain men with KS: Extraction of sperm and subsequent injection of intracytoplasmic sperm.^[8] Barr's discovery in the nuclei of a somatic cell of human tissue helped in the use of stained buccal mucosa to determine the genetic sex of the infant, which is decided by the absence or presence of a Barr body (presence refers to women's sex), corresponds to the phenotypical sex of women.^[9]

KS is a primary testicular insufficiency with high levels of gonadotropin caused by lack of pituitary gland feedback. In infants with XXY, the testosterone levels of the umbilical cord are less than those of controls but until puberty, the postnatal pituitary gonadal role of these patients remains normal, although the function of testicular endocrine may decrease as soon as fetal life.^[10-12] The presence of hypothalamic, pituitary, and gonadal axis has been changed by patients with KS despite low-normal testosterone levels.^[13]

Our team is enriched with research experience and knowledge which led to research publications of high quality in various fields.^[14-28] The present study is done to assess awareness and knowledge of the KS among the dental undergraduates.

MATERIALS AND METHODS

This cross-sectional survey was conducted among dental undergraduates of a private dental hospital. To evaluate the knowledge and awareness of the participants about the KS, a self-administered questionnaire consisting of 10 questions was prepared and circulated. The sample size was 107. The validated questionnaire was distributed through Google forms. The subject participation was kept voluntary. Percentage analysis and frequency analysis were performed with the obtained responses. Chi-square test was used to assess the correlation with the SPSS software version (IBM, India).

RESULTS AND DISCUSSION

Of 107 participants, 55.1% were said to be male and the remaining 44.9% were said to be female [Figure 1]. Majority of the participants taken part in this study are the undergraduates 66.36% and the rest 33.64% were the postgraduates [Figure 2]. 71.96% of the respondents were aware about the KS and the remaining 28.04% of the participants were unaware about it [Figure 3]. 57.94% of the participants told that the KS is caused due to the additional X chromosome, 18.69% of the participants told that the KS is caused due to the

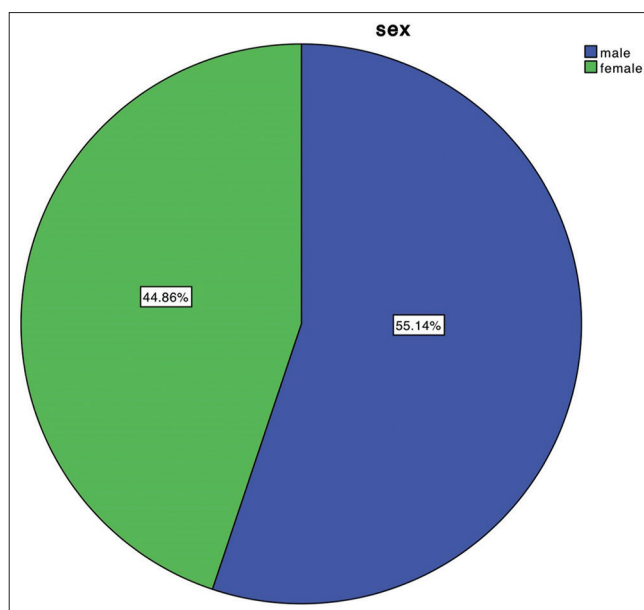


Figure 1: Represents the sex. Blue color indicates male and green color indicates female. Out of 107 participants, 55.1% were said to be male and the remaining 44.9% were said to be female

additional Y chromosome and the remaining 23.36% of the participants told that the KS is caused due to the additional X and Y chromosome [Figure 4]. 53.27% of the participants said that small tests are present in patients with the KS. 15.89% of the participants said that azoospermia is found in patients with the KS. 8.41% of the participants said that gynecomastia is found in patients with the KS. 8.41% of the participants said that speech difficulty is associated with KS. 14.02% of the participants said that all of the above features are present in patients with the KS [Figure 5]. 6.54% of the participants said that the diagnosis of KS is done by low testosterone level. 13.08% of the participants said that the diagnosis of the KS is made by infertility. 56.07% of the participants said that the diagnosis of the KS is made by the gynecomastia. 7.48% of the participants said that the diagnosis of the KS is done by the elevated plasma follicle-stimulating hormone (FSH) and luteinizing hormone (LH) level. 16.82% of the participants said that the diagnosis of KS is performed by all of the above features [Figure 6]. 67.29% of the participants told that the KS is seen only in males. 12.25% of the participants told that the KS is seen only in females. 20.56% of the participants told that the KS is seen both in males and females [Figure 7]. 71.96% of the participants said that the KS is seen only in newborns. 19.63% of the participants said that the KS is seen in boys and the teenagers. 8.41% of the participants said that the KS is seen only in men [Figure 8]. 64.49% of the participants said that anxiety and depression are the complications of KS. 16.82% of the participants said that osteoporosis is the complications of KS. 8.41% of the participants said that lung disease is the complications of KS. 10.28% of

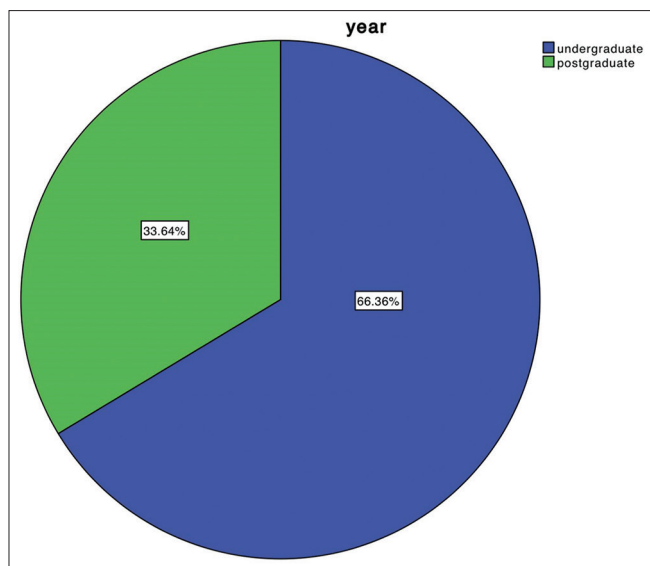


Figure 2: The year of the participants. Blue indicates undergraduate and green indicates postgraduate. Majority of the participants taken part in this study are the undergraduates 66.36% and the rest 33.64% were the postgraduates

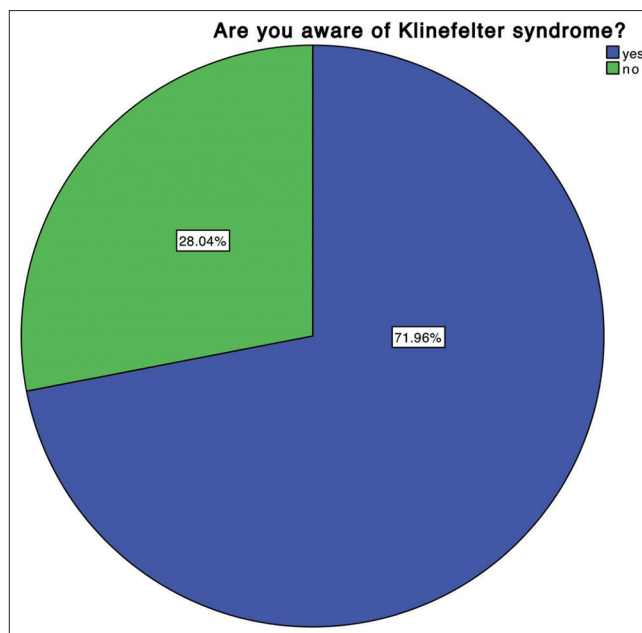


Figure 3: The awareness of KS. Blue represents yes and green represents No. 71.96% of the students were aware about the KS and the remaining 28.04% of the participants were unaware about it. KS: Klinefelter Syndrome

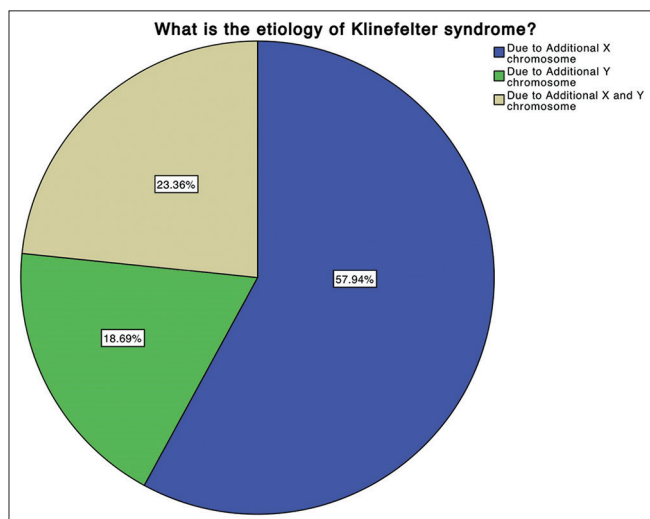


Figure 4: The etiology of KS. Blue represents an additional X chromosome, green represents an additional Y chromosome, and gray represents an additional X and Y chromosome. 57.94% of the participants told that the KS is caused due to the additional X chromosome, 18.69% of the participants told that the KS is caused due to the additional Y chromosome and the remaining 23.36% of the participants told that the KS is caused due to the additional X and Y chromosome. KS: Klinefelter Syndrome

the participants said that autism is the complications of KS [Figure 9].

In our study, most of the participants were aware of the KS. They also knew that the KS is caused due to the additional X chromosome. Participants were also aware about the various clinical manifestations, diagnosis, and the complications of the KS. In an Australian study, the prevalence of KS in

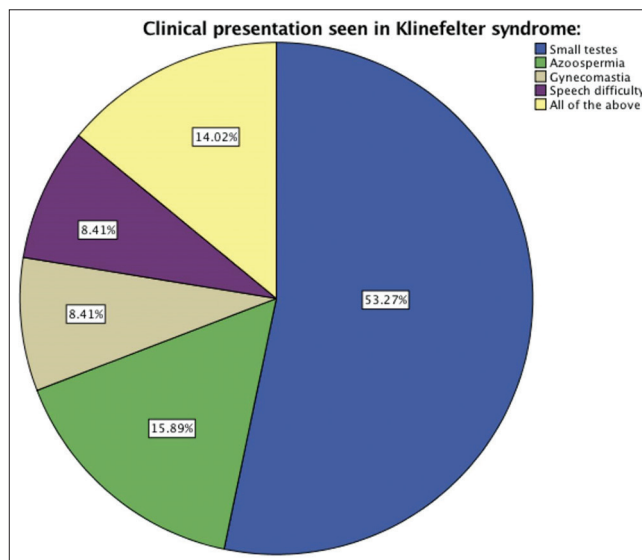


Figure 5: The clinical presentation of KS. Blue represents small testes, green represents azoospermia, gray represents gynecomastia, purple represents speech difficulty and yellow represents all of the above. 53.27% of the participants said that small testes are found in patients with the KS. 15.89% of the participants said that azoospermia is found in patients with the KS. 8.41% of the participants said that gynecomastia is found in patients with the KS. 8.41% of the participants said that speech difficulty is found in patients with the KS. 14.02% of the participants said that all of the above features are found in patients with the KS. KS: Klinefelter Syndrome

Australia was reported, with a total of 25,000 cases, with almost 13,000 still undiagnosed.

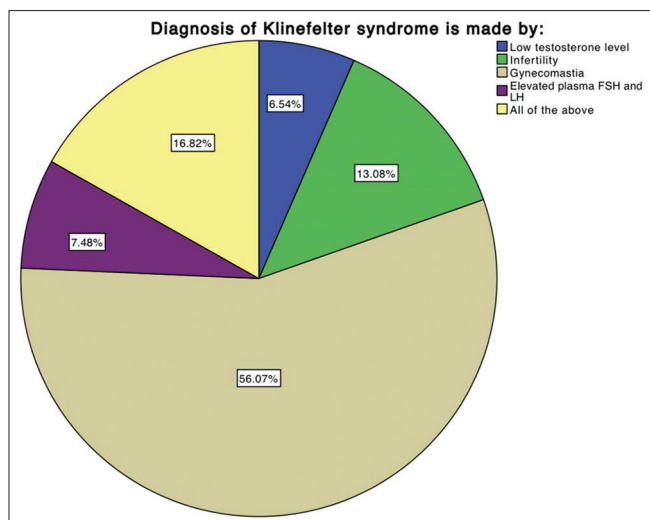


Figure 6: The diagnosis of KS. Blue represents low testosterone level, green represents infertility, gray represents gynecomastia, purple represents elevated plasma FSH and LH, yellow represents all of the above. 6.54% of the participants said that the diagnosis of KS is made by the low testosterone level. 13.08% of the participants said that the diagnosis of KS is made by infertility. 56.07% of the participants said that the diagnosis of KS is made by the gynecomastia. 7.48% of the participants said that the diagnosis of KS is made by the elevated plasma FSH and LH levels. 16.82% of the participants said that the diagnosis of KS is made by all of the above features. KS: Klinefelter Syndrome, FSH: Follicle-stimulating hormone, LH: Luteinizing hormone

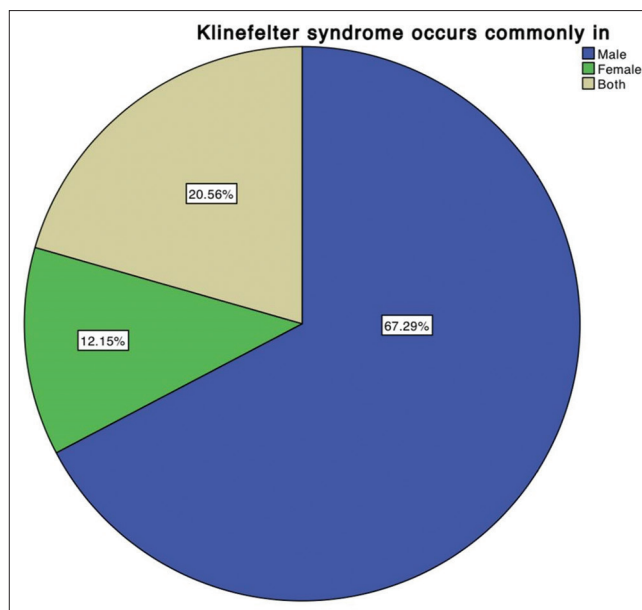


Figure 7: The occurrence of the KS. Blue represents male, green represents female and gray represents both. 67.29% of the participants told that the KS is seen only in males. 12.25% of the participants told that the KS is seen only in females. 20.56% of the participants told that the KS is seen both in males and females. KS: Klinefelter Syndrome

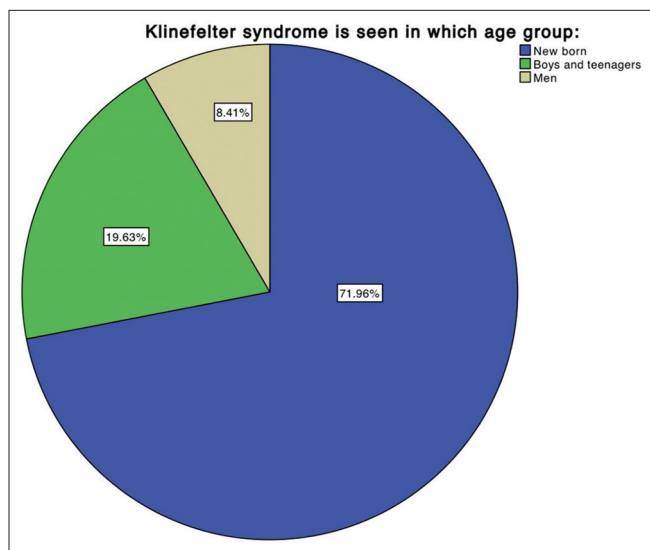


Figure 8: The age group. Blue represents newborn, green represents boys and teenagers, gray represents men. 71.96% of the participants said that the KS is seen only in newborns. 19.63% of the participants said that the KS is seen in boys and the teenagers. 8.41% of the participants said that the KS is seen only in men. KS: Klinefelter Syndrome

In a study done in Australia, the prevalence rate of Victorian birth has been greater than in Denmark, however, the combined newborn screening tests in several countries range between 85 and 223/100,000 males.^[29] The difference

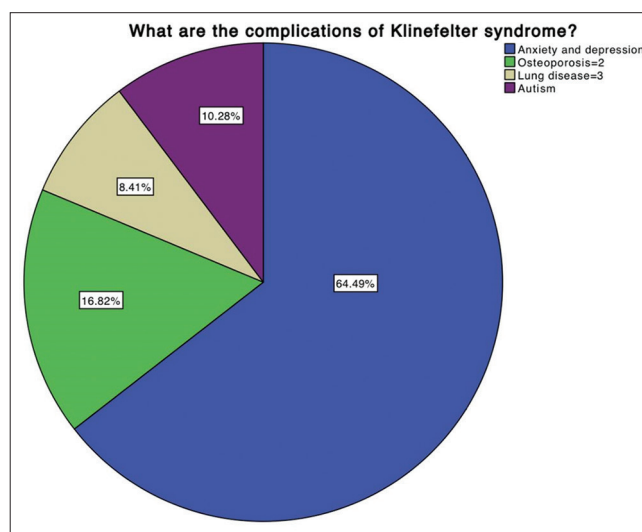


Figure 9: The complications of KS. Blue represents anxiety and depression green represents osteoporosis, gray represents lung disease, and purple represents autism. 64.49% of the participants said that anxiety and depression are the complications of KS. 16.82% of the participants said that osteoporosis is the complications of KS. 8.41% of the participants said that lung disease is the complications of KS. 10.28% of the participants said that autism is the complications of KS. KS: Klinefelter syndrome

in karyotype proportions other than 47,XXY could be one factor which contributes to this higher rate: 14.2% compared to the Danish.^[1,3,30,31] Maternal ages, not merely at the time of prenatal diagnosis, but as well at the time of the birth may also play an important role in the increased prevalence of KS in Victoria.^[32,33] The average age of Victorian women

with prenatal tests for Denmark is 36 years, compared with 34 years and these differences have been modified by standardization.^[34] There are uncertain health outcomes to diagnose KS, but there is a wide range of psychosocial and biomedical endpoints for which evidence-based and empirical data are available in the support of interventions. Most men with KS remain undiagnosed by the health-care professionals which leads to several complications and it is later diagnosed them.^[3,31,32]

CONCLUSION

From the analysis done, we would like to conclude that the dental practitioners were much aware about the KS and its complications. The dental students also had a thorough knowledge of the etiology of the disease, its pathogenesis, and the treatment methods. Medical education camps on KS may be conducted to create awareness on the pathogenesis, diagnosis, and treatment among the community.

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Conflicts of interest

There are no conflicts of interest.

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