Knowledge and Attitudes toward Sexual Health and Common Sexual Practices among College Students – A Survey from Vellore, Tamil Nadu, India

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ABSTRACT

Background: Indian society is considered to have conservative attitudes regarding sex and is ambivalent about the concept of sex education. Previous reports suggest that a considerable proportion of Indian youth have inadequate sexual knowledge and hold a variety of sexual misconceptions. Methodological flaws limit the generalizability of some earlier studies. Aims: This study assessed knowledge and attitude toward sexual health and common sexual practices among college students in Tamil Nadu. Methodology: A total of 952 students from seven randomly selected colleges in Vellore district of Tamil Nadu participated in the survey. The survey questionnaire contained 51 questions on knowledge and attitude toward sexual health and common sexual practices and incorporated items from standardized questionnaires and additional questions suggested by a multidisciplinary group who work in the field. Results: Two hundred seventy-five students among those who completed the survey were women. Higher knowledge scores were associated with older age, male gender, being from a rural background, pursuing non-science streams, and being in postgraduate courses. Nonconservative attitudes were associated with older age, male gender, enrollment in non-science disciplines, discomfort with the family environment, and a religious family background. Conclusions: Sexual knowledge is inadequate and sexual misconceptions were widely prevalent in the population studied. School-based comprehensive sex education programs, which have been demonstrated to be effective in improving sexual health, could be used to deal with these lacunae in sexual health knowledge and attitudes.

Key words: College students, sexual attitudes, sexual knowledge, sexual misconceptions, sexual practices

Key messages: Sexual knowledge is inadequate and sexual misconceptions are widely prevalent among the youth in India. Culturally sensitive and comprehensive sex education programs could be used to deal with these lacunae.
A positive, respectful approach to sexuality and relationships, with the possibility of having pleasurable and safe sexual experiences free of coercion, discrimination and violence, is essential for good sexual health. Knowledge about sex and sexuality, and sexual attitudes and behavior are influenced by societal, cultural, environmental, and physical factors. Though the “Kamasutra” was composed in ancient India, Indian society is extremely conservative about sex and ambivalent about the concept of sex education. A considerable proportion of youth in India is reported to have inadequate knowledge, a variety of sexual misconceptions, and concerns about different aspects of sex. This can, in turn, lead to unhealthy attitudes, unsafe sexual practices, and significant health consequences.

Most data regarding sexual health from India are from nonsystematic surveys and opinion polls that look at a superficial range of issues. Methodological flaws including problems in sample selection; improper design and content of questionnaires; and participation, recall and reporting biases limit their generalizability. In this context, this study was planned to assess knowledge, attitudes, and sexual behavior among college students from Tamil Nadu.

**METHODOLOGY**

**Study design:** This was a descriptive study with a cross-sectional design.

**Selection of colleges**

A list of all arts and science colleges in Vellore district was obtained. Professional colleges were not included as the student population in these may not have been representative of the geographical region under study. Authorities of 14 randomly selected colleges of the 27 identified were approached for permission to conduct the study. The survey was carried out in all seven of the colleges that consented to participate. The colleges that did not participate in the survey did not differ from the ones that participated in location (urban/rural), the gender of the students (co-educational/men’s/women’s) or funding (public or private). As the required sample size was achieved with seven colleges that consented to participate in the study, no further colleges were recruited.

**Participants**

Details regarding the total number of classes in the college and the number of students in each class were collected. Classes were then randomly chosen using lots to obtain a total of at least 100 students from each college. Students aged 18 years and above who were able to read and write in English or Tamil were invited to participate in the survey and were provided the information sheet. The study questionnaire was given to those who provided written informed consent. The survey was conducted in the classroom, seminar hall, or auditorium of the college surveyed. Participants were seated in such a way as to ensure privacy. The questionnaire was self-administered and anonymous to encourage participants to respond as genuinely as possible. Practicing psychiatrists, fluent in the local language, were present during the administration to address any doubts and queries related to the questionnaire.

**Survey questionnaire**

A total of 105 questions were initially proposed for possible inclusion in the questionnaire. These were sourced from the Illustrative Questionnaire for Interview-Surveys with Young People and a questionnaire devised by Martin S. Weinberg at the Kinsey Institute. In addition, questions based on discussions with mental health professionals who routinely deal with sexual issues among the target age group were also included. These were evaluated by a panel of five experts (three men and two women) comprising of three psychiatrists, a psychologist, and a psychiatric nurse for suitability, relevance, and language. 51 questions that were selected were piloted among a group of 37 professionals, including psychiatrists, psychologists, psychiatric nurses, and general physicians who work in this field; further revisions were made based on their feedback. The finalized questionnaire was translated into Tamil independently by two people, back-translated into English by two persons, and the final consensus version was arrived at by all translators together. For those words which did not have precise or commonly used Tamil translations, the English equivalents were provided in brackets. Face and content validity of the questionnaire was established by the expert group as well as during the pilot study. Cronbach’s alpha value calculated for the questions (knowledge and attitudes), which could be scored using the study sample, was 0.6. The alpha value is lower than what is acceptable, as only 22 items of the 51-item questionnaire were used in the calculation, and the questions used a dichotomous (yes/no) response format. A proforma was used to collect selected sociodemographic details. A score was calculated by giving a point for a correct response to each of the 13 questions that assessed knowledge. Higher scores reflect better knowledge. Similarly, a point was given for nonconservative responses (accepting of premarital romantic or sexual relations, not endorsing the concept of virginity till marriage, agreeing with medical termination when pregnancy is unplanned, not feeling that homosexuality is wrong, etc.) to the nine questions...
which assessed attitude. Higher scores reflect less conservative attitudes.

**Ethical considerations**
Informed consent was obtained from all participants. The survey was anonymous and participants were asked not to identify themselves by name. The information collected was available only to the research team. The research protocol was approved by the Institutional Review Board and Ethics Committee.

**Determination of sample size**
The sample size was determined based on the findings from a previous study which reported prevalence rates for sexual knowledge, attitude, and practices. The sample size for each of these was calculated and the largest sample size obtained was 941, assuming the prevalence as 2.7% for a forced sexual encounter, with 95% confidence limits and adjusting for 20% students whom we anticipated might withdraw consent or leave the questionnaire incomplete.

**Data analysis**
SPSS for Windows (version 16.0. SPSS Inc., Chicago, IL, USA) was employed for the analysis of data. Mean and standard deviation were calculated to describe continuous variables, while frequency distributions were used for categorical data. The Chi-square test, Pearson’s correlation coefficient, and the Student’s t-test were used to assess the significance of associations for categorical and continuous variables, respectively. A P value of less than 0.01 was considered as statistically significant. Linear and logistic regression was employed as multivariate statistics to adjust for common confounders. All variables with $P < 0.05$ in bivariate analyses were entered into the regression model.

**RESULTS**

**Sociodemographic details**
A total of 952 students completed the survey. The mean age of the participants was 19.39 years (SD = 1.34). The majority were male, single, and pursuing an undergraduate course in a science discipline [Table 1].

**Sources of information**
Participants reported that they acquired information regarding puberty, sex, and reproduction mostly from books, magazines, or videos (40.2% for males and 30.5% for females), friends (32% for males), and parents (23% for females).

**Sexual knowledge**
Half of the respondents were aware that a woman could become pregnant after puberty (51.7%) and about the legal ages for marriage and consent for sexual intercourse (50.1%). A total of 20% of males and 12% of females believed that a woman could get pregnant if sexual intercourse occurred during menstruation. The contraceptive measure that respondents were most aware of was the condom (46.6%), while knowledge about the other methods was less.

The use of condoms (46.6%) and avoiding unprotected sexual intercourse (16.6%) were reported as the most effective ways of preventing HIV infection, with men considering the former to be more effective, while women considered the latter to be more useful. 22% of males and 9.4% of females stated that they would approach a traditional healer or local pharmacy rather than a medical practitioner for treatment of sexually transmitted diseases (STDs).

Awareness regarding the legal age of consent for sexual intercourse for males ($\chi^2 = 24.58, P < 0.001$) and females ($\chi^2 = 36.22, P < 0.001$) was better in men, while awareness regarding the `safe period’ was better in women ($\chi^2 = 8.79, P < 0.001$). Higher knowledge scores were significantly associated with male gender, postgraduate education, and married status [Table 2].

**Attitudes regarding sexual behavior**
While the majority of the participants disapproved of premarital romantic and sexual relationships even if monogamous, more of those who were in favor were men. Many considered virginity till marriage important. Several participants believed that having sexual urges before the age of 18 was harmful, that a frequency of sexual intercourse more than three times a week was harmful, and that semen loss could harm the body or result in sexual dysfunction [Table 3]. Higher nonconservative attitude scores were significantly associated with gender, the stream of study, and family environment [Table 2].

**Sexual practices**
Details of sexual behavior or practices are found in Table 4.

**Masturbation**
About a third of the respondents, men more than women, reported that they had masturbated at some time in their life, with a mean age of onset of 17.21 years (SD = 2.65). Factors significantly associated with masturbatory practice were greater age ($t = 5.13, df = 739, P < 0.001$), male gender ($\chi^2 = 56.64, P < 0.001$), nonscience stream of study ($\chi^2 = 31.32, P < 0.001$), and endorsement of the concept of ‘virginity till marriage’ ($\chi^2 = 18.03, P < 0.001$). Those who believed that loss of semen damages health reported less masturbatory behavior ($\chi^2 = 6.60, P = 0.01$). Higher scores on knowledge ($t = -3.86, df = 776, P < 0.001$)
and nonconservative attitudes ($t = -6.35$, $df = 776$, $P < 0.001$) were present in respondents who practiced masturbation.

Multivariate logistic regression revealed that masturbatory practice (age, gender, discipline of study, and attitude and knowledge scores were entered into the model) was associated with increasing age (adjusted OR = 1.17, CI = 1.05-1.3, $P = 0.006$), male gender (adjusted OR = 3.09, CI = 1.86-5.14, $P < 0.001$), and higher score on non-conservative attitude (adjusted OR = 1.27, CI = 1.13-1.42, $P < 0.001$). Students in the science stream appeared to have lower masturbatory practice (adjusted OR = 0.69, CI = 0.49-0.99, $P = 0.044$).

### Sexual intercourse

Thirty-five percent of the sample reported ever having had sexual intercourse. The average age of first sexual intercourse was 21 (SD = 2.68) years for females and 19.11 (SD = 3.41) years for males. Less than one-tenth of the respondents reported an oral or anal sexual experience. More men than women had a sexual experience through relationships developed on social networking sites.

Male respondents ($\chi^2 = 16.97$, $P < 0.001$), older people ($t = 2.15$, $df = 806$, $P = 0.032$), those who perceived their family environment as uncomfortable ($\chi^2 = 6.49$, $P = 0.011$) and those who

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**Table 1: Sociodemographic variables**

| Characteristics                        | Overall (%) (n=952)* | Men (%) (n=662) | Women (%) (n=275) |
|----------------------------------------|----------------------|-----------------|-------------------|
| Mean age in years (SD)                 | 19.39 (1.54)         | 19.62 (1.63)    | 18.89 (1.16)      |
| Religion                               |                      |                 |                   |
| Hindu                                  | 683 (71.7)           | 468 (70.7)      | 211 (76.7)        |
| Muslim                                 | 171 (18)             | 153 (23.1)      | 15 (5.5)          |
| Christian                              | 64 (6.7)             | 19 (2.9)        | 45 (16.4)         |
| Others                                 | 1 (0.1)              | 1 (0.2)         | -                 |
| Place of residence                     |                      |                 |                   |
| Rural                                  | 509 (53.5)           | 377 (56.9)      | 130 (40.3)        |
| Urban                                  | 412 (43.3)           | 267 (40.4)      | 140 (40.9)        |
| Education                              |                      |                 |                   |
| Degree student                         | 773 (81.2)           | 541 (81.7)      | 225 (81.8)        |
| Postgraduate student                   | 123 (12.9)           | 88 (13.3)       | 35 (12.7)         |
| M Phil/PhD student                     | 11.9 (1.1)           | 6 (1)           | 5 (1.8)           |
| Discipline                             |                      |                 |                   |
| Arts stream                            | 254 (26.7)           | 235 (35.5)      | 16 (5.8)          |
| Science stream                         | 546 (57.4)           | 301 (45.5)      | 242 (86.8)        |
| Commerce stream                        | 48 (5)               | 48 (7.3)        | -                 |
| Marital status                         |                      |                 |                   |
| Single                                 | 886 (93.1)           | 626 (94.6)      | 254 (92.4)        |
| Married                                | 24 (2.5)             | 7 (1.1)         | 15 (5.5)          |
| Divorced/separated/widowed             | 5 (0.5)              | 3 (0.5)         | 2 (0.7)           |
| Fathers’ education                     |                      |                 |                   |
| Educated up to higher secondary        | 630 (66.2)           | 438 (66.2)      | 186 (67.6)        |
| Graduate                               | 50 (5.3)             | 25 (3.8)        | 24 (8.7)          |
| Postgraduate                           | 14 (1.6)             | 9 (1.4)         | 6 (2.2)           |
| Mothers’ education                     |                      |                 |                   |
| Educated up to higher secondary        | 603 (63.3)           | 410 (61.9)      | 188 (68.4)        |
| Graduate                               | 23 (2.4)             | 11 (1.7)        | 11 (4)            |
| Postgraduate                           | 7 (0.7)              | 3 (0.5)         | 4 (1.5)           |
| Importance of religion to the person   |                      |                 |                   |
| Very important                         | 423 (44.4)           | 291 (44)        | 129 (46.9)        |
| Important                              | 267 (28)             | 179 (27)        | 85 (30.9)         |
| Not important                          | 75 (7.9)             | 144 (21.8)      | 49 (17.8)         |
| Importance of religion to the family   |                      |                 |                   |
| Very important                         | 499 (52.4)           | 328 (49.5)      | 167 (60.7)        |
| Important                              | 287 (30.1)           | 195 (29.5)      | 88 (32)           |
| Not important                          | 75 (7.9)             | 71 (10.7)       | 4 (1.5)           |
| Comfortable in the family environment  |                      |                 |                   |
| Comfortable                            | 655 (68.8)           | 426 (64.4)      | 225 (81.8)        |
| Not comfortable                        | 115 (12.1)           | 90 (13.6)       | 21 (7.6)          |
| Neither                                | 83 (8.7)             | 65 (9.8)        | 18 (6.5)          |
| Restriction in the family environment  |                      |                 |                   |
| Very strict                            | 225 (23.6)           | 170 (25.7)      | 53 (19.3)         |
| Strict                                 | 501 (52.6)           | 323 (48.8)      | 174 (63.3)        |
| Not strict                             | 95 (10)              | 57 (8.6)        | 36 (13.1)         |

*15 respondents did not mention their gender
Table 3: Sexual attitudes and misconceptions

| Sexual attitudes                                      | Overall (%) | Men (%) | Women (%) |
|-------------------------------------------------------|-------------|---------|-----------|
| Approves premarital romantic relations               | 428 (45%)   | 353 (53.3) | 68 (24.7) |
| Approves premarital sexual relations when in love    | 193 (20.3)  | 171 (25.8) | 19 (6.9)  |
| Approves premarital monogamous sexual relations      | 325 (34.1)  | 270 (40.8) | 55 (18.2) |
| Women should be virgins till marriage - Agree        | 779 (81.8)  | 549 (82.9) | 221 (80.4) |
| Men should be virgins till marriage - Agree          | 698 (73.3)  | 494 (74.6) | 197 (71.6) |
| Approves medical termination when pregnancy is unplanned | 327 (34.3)  | 259 (39.1) | 62 (22.5) |
| Homosexuality is wrong - Agree                       | 555 (58.3)  | 407 (61.5) | 142 (51.6) |
| Social networking causes promiscuity - Agree         | 693 (72.8)  | 499 (75.4) | 187 (68)  |
| Sex education should be mandatory - Agree            | 574 (60.3)  | 384 (58)   | 181 (65.8) |
| Sex is important in life - Agree                     | 818 (85.9)  | 598 (90.3) | 208 (75.6) |
| Using condoms reduces pleasure - Agree               | 413 (43.4)  | 312 (47.1) | 95 (34.5)  |

| Sexual misconceptions                                 | Overall (%) | Men (%) | Women (%) |
|-------------------------------------------------------|-------------|---------|-----------|
| Nightfall is a normal phenomenon - Agree              | 486 (51.1)  | 442 (66.8) | 35 (12.7) |
| Semen loss can cause serious damage to the body - Agree | 435 (45.7)  | 371 (56)  | 57 (20.7) |
| Semen loss can cause sexual dysfunction - Agree       | 445 (46.7)  | 366 (55.3) | 72 (26.2) |
| Retention of semen improves stamina or physical health - Agree | 425 (44.6)  | 354 (53.5) | 63 (22.9) |
| Sexual urge before 18 years of age is harmful - Agree  | 657 (69)    | 462 (69.8) | 184 (66.9) |
| The size of the penis should be at least six inches for satisfactory sexual intercourse - Agree | 274 (28.8)  | 236 (35.6) | 32 (11.6) |
| Sexual intercourse more than three times a week is harmful - Agree | 539 (56.6)  | 402 (60.7) | 131 (47.6) |
| Sexual intercourse during menstruation is harmful to the man - Agree | 613 (64.4)  | 444 (67.1) | 162 (58.9) |

*15 respondents did not mention their gender

Table 2: Association of knowledge and attitude scores with selected sociodemographic details

| Characteristics | Attitude score Mean (SD) | Knowledge score Mean (SD) |
|-----------------|--------------------------|---------------------------|
| Age             | 0.109 (0.001*)           | 0.240 (<0.001**)          |
| Gender          |                          |                           |
| Males           | 4.5 (1.62)               | 4.94 (2.22)               |
| Females         | 3.41 (1.54)              | 3.73 (1.92)               |
| Place of residence |                      |                           |
| Rural           | 4.17 (1.69)              | 4.73 (2.23)               |
| Urban           | 4.22 (1.64)              | 4.42 (2.14)               |
| Education       |                          |                           |
| Undergraduate student |               | 4.19 (1.6)               |
| Postgraduate student |                    | 5.28 (2.34)               |
| Discipline      |                          |                           |
| Science stream  | 4.01 (1.64)              | 4.41 (2.12)               |
| Non-science stream |                     | 4.94 (2.24)               |
| Marital status  |                          |                           |
| Single          | 4.2 (1.66)               | 4.58 (2.19)               |
| Ever married    | 4.07 (1.65)              | 5.45 (2.38)               |
| Fathers education |                       |                           |
| School educated | 4.28 (1.66)              | 4.65 (2.15)               |
| College educated |                     | 3.98 (1.84)               |
| Mothers education |                        |                           |
| School educated | 4.22 (1.64)              | 4.38 (2.11)               |
| College educated |                      | 4.4 (2.25)                |
| Importance of religion to the person                  | 4.14 (1.63)               | 4.56 (2.19)               |
| Important      | 4.4 (1.72)               | 4.7 (2.16)                |
| Not important  |                          |                            |
| Importance of religion to the family                  |                          |                            |
| Important      | 4.16 (1.65)              | 4.57 (2.17)               |
| Not important  | 4.85 (1.65)              | 4.84 (2.45)               |
| Comfortable in the family environment                  |                           |                            |
| Comfortable    | 4.15 (1.63)              | 4.56 (2.22)               |
| Others         | 4.46 (1.7)               | 4.77 (2.05)               |
| Restriction in the family environment                  |                           |                            |
| Not strict     | 4.18 (1.55)              | 4.69 (2.26)               |
| Others         | 4.21 (1.66)              | 4.58 (2.18)               |

r = t value on Independent t-test; r = Pearson’s correlation coefficient. *P<0.01 **P<0.001
did not feel the need to preserve virginity till marriage in men ($\chi^2 = 26.48, P < 0.001$) or women ($\chi^2 = 13.23, P < 0.001$) were more likely to have had a sexual experience. Other significantly associated factors were a favorable attitude toward premarital romantic relations ($\chi^2 = 20.67, P < 0.001$), premarital sexual relationship when in love ($\chi^2 = 31.92, P < 0.001$), premarital monogamous relationship ($\chi^2 = 20.76, P < 0.001$), and absence of worries about the harmful effects of semen loss ($\chi^2 = 9.24, P = 0.002$). Higher knowledge ($t = -2.63, df = 847, P = 0.009$) and nonconservative attitude scores ($t = -6.47, df = 847, P < 0.001$) were present in respondents who reported having had sexual relations.

On logistic regression analysis, the likelihood of having had sexual intercourse (age, gender, attitude, and knowledge score were entered into the model) was associated with male gender (adjusted OR = 1.46, CI = 1.02–2.08, $P = 0.040$) and higher nonconservative attitude scores (adjusted OR = 1.28, CI = 1.15–1.41, $P < 0.001$).

### Homosexual experience

Homosexual experiences were reported by 20.7% and fantasies by 9% of the participants. Mutual masturbation was the most commonly reported homosexual experience. Males ($\chi^2 = 13.18, P < 0.001$), students from nonscience streams ($\chi^2 = 7.51, P = 0.023$), and married respondents ($\chi^2 = 33.24, P < 0.001$) reported more same-sex experience. Those who perceived nocturnal emissions as a normal phenomenon ($\chi^2 = 20.77, P < 0.001$) or had favorable attitudes toward premarital romantic relations ($\chi^2 = 17.53, P < 0.001$), premarital sexual relationship when in love ($\chi^2 = 49.03, P < 0.001$) or premarital monogamous sexual relationship ($\chi^2 = 11.97, P = 0.003$) reported more homosexual experiences. Students who reported homosexual behavior had higher scores on nonconservative sexual attitudes ($t = -3.99, df = 741, P < 0.001$). Multivariate logistic regression revealed that homosexual experience (gender, discipline of study, marital status, attitude, and knowledge score were entered into the model) was associated with male gender (adjusted OR = 2.54, CI = 1.45–4.45, $P = 0.001$) and higher score on nonconservative attitudes (adjusted OR = 1.2, CI = 1.06–1.36, $P = 0.005$). Marriage seemed to reduce reported homosexual behavior (adjusted OR = 0.09, CI = 0.038–0.25, $P < 0.001$).

### Coercive sexual experiences

A total of 14% of participants reported that they had experienced a coercive sexual act, while 11.3% reported being the aggressor in a forced sexual encounter.

### Paraphilic behavior or fantasy

A total of 19% of the respondents reported a paraphilic behavior or fantasy, more males (24.6%) than females (6.9%).

Factors that were significantly associated with paraphilic behavior were male gender ($\chi^2 = 33.31, P < 0.001$), studying in a nonscience stream ($\chi^2 = 11.59, P = 0.001$) and not feeling comfortable in the family environment ($\chi^2 = 15.23, P < 0.001$). Students who reported a paraphilic behavior or fantasy had higher knowledge ($t = -4.99, df = 950, P < 0.001$) and

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**Table 4: Prevalence of reported sexual behaviors among the respondents**

| Sexual behavior                        | Overall (%) (n=952)* | Men (%) (n=662) | Women (%) (n=275) |
|----------------------------------------|----------------------|----------------|------------------|
| Masturbation                           |                      |                |                  |
| Prevalence                             | 315 (33.1)           | 284 (42.9)     | 26 (9.5)         |
| Frequency/month (mean with SD)         | 7.9 (20.71)          | 8.36 (21.53)   | 1.38 (0.72)      |
| Mean age at initiation in years (SD)   | 17.21 (2.65)         | 17.18 (2.61)   | 17.73 (3.14)     |
| Sexual intercourse                     |                      |                |                  |
| Prevalence                             | 339 (35.6)           | 269 (40.6)     | 65 (23.6)        |
| Frequency/month (mean with SD)         | 2.24 (1.43)          | 2.46 (1.46)    | 1.73 (1.21)      |
| Mean age at initiation in years (SD)   | 19.49 (3.35)         | 19.11 (3.41)   | 21 (2.68)        |
| Oral sexual experience                 | 87 (9.1)             | 66 (10)        | 19 (6.9)         |
| Anal sexual experience                 | 43 (4.5)             | 36 (5.4)       | 6 (2.2)          |
| Sexual experience through social media | 47 (4.9)             | 41 (6.2)       | 5 (1.8)          |
| Homosexual behavior                    |                      |                |                  |
| Fantasies                              | 86 (9)               | 67 (10.1)      | 17 (6.2)         |
| Acts                                   | 197 (20.7)           | 163 (24.6)     | 29 (10.5)        |
| Coercive sexual behavior               |                      |                |                  |
| Victim                                 | 137 (14.4)           | 116 (17.5)     | 19 (6.9)         |
| Perpetrator                            | 108 (11.3)           | 98 (14.8)      | 8 (2.9)          |
| Paraphilic behavior or fantasy         |                      |                |                  |
| Any paraphilic fantasy                 | 125 (13.1)           | 112 (16.9)     | 12 (4.4)         |
| Any paraphilic behavior                | 268 (28.1)           | 180 (27.2)     | 26 (9.5)         |
| Any paraphilic behavior or fantasy     | 247 (26.0)           | 217 (32.8)     | 28 (10.2)        |

*15 respondents did not mention their gender
nonconservative attitude scores \( t = -10.31, \text{df} = 950, \, P < 0.001 \).

**DISCUSSION**

Sexual attitudes and behavior are complex and influenced by physiological, psychological, social, and cultural factors. In conventional Indian society, discussions regarding sex are not encouraged. This leads to ignorance and lack of awareness, misconceptions, biased attitudes, psychological conflicts, low self-esteem, distress, and high-risk behavior. A lack of knowledge can also make an individual vulnerable to physical or sexual abuse, unethical treatment practices and result in unsatisfactory interpersonal relationships.

Though sexual health is considered an important contributor to overall health and wellbeing, it has been largely ignored, both at the individual and public health level. This survey attempted to assess the knowledge, prevailing attitudes, and beliefs toward sexuality and common sexual practices among college students.

**Sexual knowledge**

Knowledge and awareness about sexual health among youth have been reported to be inadequate the world over and especially in the developing countries. This survey found that the majority of participants cited their friends as their main source of information regarding sex. This could also partly explain the high rates of sexual misconceptions noted in this survey, as wrong information is likely to be circulated among the peer group. Similar findings have been reported in previous studies from this region. It is interesting to note that the internet and visual media have replaced many traditional sources of information in this age group. This suggests that these media can be useful to disseminate information and awareness among the youth.

Despite the many intervention programs that have targeted the youth, this study highlights the inadequacies in knowledge regarding reproductive physiology, the legal age in India for consent for sex, pregnancy and contraception, STDs, and available reproductive health services. Poor knowledge regarding these issues can lead to serious medicolegal complications, high-risk behavior, and its consequences.

**Sexual attitudes**

Attitudes toward sexuality are generally colored by the sociocultural milieu. However, they may be startlingly different from those that are traditionally expected. Many young people are comfortable with the notion of premarital romantic and/or sexual relationships, signaling a shift from an earlier largely conservative attitude, toward a more liberal and ‘Western’ outlook. The concept of ‘virginity till marriage’, considered the norm in traditional Indian society, also appears to be gradually changing.

Many participants believed that condoms reduce pleasure during sexual intercourse, which could result in a reluctance to use them. Attitudes about medical termination of pregnancy and homosexuality reflected the traditional religious and sociocultural views of this region that appear to be unchanged despite the recent legal rulings and debates on the topic.

Despite the widely prevalent traditional view that disapproves of sex education programs in schools, it was encouraging to note that the youth in this sample felt it is an essential component of education. Such an attitudinal change could augur well for the nation, as it has been demonstrated that school-based comprehensive sex education programs are one of the most effective strategies for improving sexual health.

A small proportion of participants in this survey did not feel that sex was an important aspect of life; these were mostly women and married individuals. This may be a statistical limitation as single respondents vastly outnumbered married subjects; it is possible that women and married subjects may consider sex less of a priority in the midst of their other responsibilities and may consider other aspects in a relationship to be more important rather than the ‘romantic’ and sexual aspects. Men and nonscience students seemed to have more permissive attitudes regarding premarital romantic relationships and sexual intercourse; the former finding has been reported earlier.

**Sexual misconceptions**

Similar to previous reports, the common sexual misconceptions we found were the beliefs regarding semen loss and retention on the body and mind, and beliefs regarding the frequency and age of initiation of sexual intercourse. Individuals resort to a variety of interventions in response to these beliefs, which at times may be more harmful than helpful. Science students, with presumably better awareness, were found to have a lower prevalence of sexual misconceptions as compared to others. Unlike earlier reports, marriage did not seem to reduce the prevalence of misconceptions.

**Sexual behavior**

The average age for initiation of sexual intercourse was later for women than men, similar to earlier reports. Women were more likely to be celibate than men, as
expected. The more restrictive the home environment was perceived to be, the higher the likelihood of having had sexual intercourse, suggesting that the sexual behavior is in defiance to the controlling atmosphere at home.

One-third of the respondents practiced masturbation, in contrast to previous reports where the prevalence was estimated to be around 80%.\cite{15,32,33} The locally prevalent beliefs about the ill-effects of masturbation may be a deterrent to the practice.

The prevalence rates of homosexual behavior, homoerotic fantasies, and nonconsensual sexual behavior were slightly higher than reported previously.\cite{15,32} About one-fourth of all respondents reported some form of deviant sexual behavior, with men reporting more of these than women, similar to earlier findings.\cite{34} Public health initiatives to identify and deal with people with such behaviors are required in view of the high prevalence and the distress they cause to the victims and maybe the individuals themselves.

**Importance of sexual surveys in the youth**

Young people are unable to discuss their sexual concerns freely in India due to cultural taboo. Family members and healthcare practitioners focus on health and functioning, and sexual concerns are routinely avoided. There is a lack of political will for effective public health initiatives, which further worsens the situation. Thus, sexual worries remain unresolved, leading to distress, unsafe behaviors, psychiatric morbidity, and poor quality of life.

**Strengths and limitations of the study**

Few systematic surveys have assessed sexual knowledge, attitude, and behavioral patterns among college students in this part of India. The sample size obtained was sufficiently large to extrapolate the conclusions of the study to college students in the region. The questionnaire was designed to obtain adequate information without being too lengthy. Social desirability bias was addressed by keeping the survey anonymous.

However, given the sensitive nature of the topics explored, it is still possible that participants might have felt unable to express their views freely. There are no well-defined criteria or norms to determine normal sexuality and attitude toward it, as these are influenced by a complex interplay of individual and cultural expectations and can change over time. It is possible that use of open-ended questions may have yielded more information.

**Recommendations and future directions for research**

Further research is required to better understand the cultural aspects, beliefs, and practices regarding sexuality among the youth. A culturally sensitive approach is required to develop validated tools and appropriate sex education modules for India.

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**Conflicts of interest**

There are no conflicts of interest.

**REFERENCES**

1. World Health Organization. Defining sexual health. Report of a technical consultation on sexual health [monograph on the internet]. Geneva: World Health Organization; 2006. Available from: http://www.who.int/iris/ handle/10665/66836. [Last cited on 2018 Oct 23].

2. World Health Organization. Sexual relations among young people in developing countries: Evidence from WHO case studies [monograph on the internet]. Geneva: World Health Organization; 2001. Available from: http://www.who.int/iris/ handle/10665/66836. [Last cited on 2018 Oct 23].

3. Dutt S, Manjula M. Sexual knowledge, attitude, behaviors and sources of influences in urban college youth: A study from India. Ind J Soc Psychiatry 2017;33:319-26.

4. Sujay R. Premarital sexual behaviour among unmarried college students of Gujarat, India. Health and Population Innovation Fellowship Programme Working Paper, No 9 [monograph on the internet]. New Delhi: Population Council; 2009. Available from: https://www.popline.org/node/217527. [Last cited on 2018 Oct 23].

5. Rao TS, Gopalakrishnan R, Kuruvilla A, Jacob KS. Social determinants of sexual health. Indian J Psychiatry 2012;54:105-7.

6. Cleland J, Ingham R, Stone N. Asking young people about sexual and reproductive behaviours: Illustrative core instruments. United Kingdom: World Health Organization; 2005. Available from: https://www.gov.uk/dfid-research-outputs/asking-young-people-about-sexual-and-reproductive-behaviours-illustrative-core-instruments. [Last cited on 2018 Oct 23].

7. Weinberg MS, Lottes IL, Gordon LE. Social class background, sexual attitudes, and sexual behavior in a heterosexual undergraduate sample. Arch Sex Behav 1997;26:625-42.

8. Francoeur RT, Noonan RJ. Continuum Complete International Encyclopedia of Sexuality. New York and London: The Continuum International Publishing Group; 2004.

9. Velezmorro R, Negy C, Livia J. Online sexual activity: Cross-national comparison between United States and Peruvian college students. Arch Sex Behav 2012;41:1015-25.

10. Fogel J, Fajiram S, Morgan PD. Sexual health information seeking on the internet: Comparisons between White and African American college students. ABNF J 2010;21:79-84.

11. International Institute for Population Sciences & Population Council. Youth in India: Situation and Needs 2006-2007 [monograph on the internet]. Mumbai: IIPS; 2010. Available from: https://www.popcouncil.org/uploads/
Mukherjee, et al.: Knowledge and attitudes toward sexual health and common sexual practices among college students

diffs/2010PGY_YouthInIndiaReport.pdf. [Last cited on 2018 Oct 23]. –
12. Nag M. Sexual behaviour in India with risk of HIV/AIDS transmission. Health Transit Rev 1995;5:293-305.
13. Abraham L. Bhai-behen, true love, time pass: Friendships and sexual partnerships among youth in an Indian metropolis. Cult Health Sex 2002;4:337-53.
14. Dave VR, Makwana NR, Yadav BS, Yadav S. A study on high-risk premarital sexual behavior of college going male students in Jamnagar city of Gujarat, India. Int J High Risk Behav Addict 2013;2:112-6.
15. Kaur U, Sahni SP, Bambery P, Kumar B, Chauhan A, Chawla YK, et al. Sexual behaviour, drug use and hepatitis B infection in Chandigarh students. Nat Med J India 1996;9:156-9.
16. Kakar S. Intimate Relations: Exploring Indian Sexuality. India: Penguin Books; 1989.
17. Jain D, Koolwai GD, Gehlot S, Kumar S, Awasthi A. Sexual attitudes and myths among medical and non-medical students: An exploratory study. J Ment Health Hum Behav 2011;16:95-101.
18. Sachdev P. Sex on campus: A preliminary study of knowledge, attitudes and behaviour of university students in Delhi, India. J Biosoc Sci 1998;30:95-105.
19. Mizuno Y, Purcell DW, Latka MH, Metsch L, Gomez CA, Latkin CA. Beliefs that condoms reduce sexual pleasure-gender differences in correlates among heterosexual HIV-positive Injection Drug Users (IDUs). J Urban Health 2007;84:523-36.
20. Randolph ME, Pinkerton SD, Bogart LM, Cecil H, Abramson PR. Sexual pleasure and condom use. Arch Sex Behav 2007;36:844-8.
21. Rao TS, Jacob KS. Homosexuality and India. Indian J Psychiatry 2012;54:1-3.
22. Kirby DB, Laris BA, Rolleri LA. Sex and HIV education programs: Their impact on sexual behaviors of young people throughout the world. J Adolesc Health 2007;40:206-17.
23. Nair MK, Paul MK, Leena ML, Thanikachi Y, George B, Russell PS, et al. Effectiveness of a reproductive sexual health education package among school going adolescents. Indian J Pediatr 2012;79(Suppl 1):64-8.
24. Tripathi N, Sekher TV. Youth in India ready for sex education? Emerging evidence from national surveys. PLoS One 2013;8:e71584.
25. Flynn KE, Li Lin MS, Bruner DW, Cyranowski JM, Hahn EA, Jeffery DD, et al. Sexual satisfaction and the importance of sexual health to quality of life throughout the life course of US adults. J Sex Med 2016;13:1642-50.
26. Varghese KM, Bansal R, Kekre AN, Jacob KS. Sexual dysfunction among young married women in southern India. Int Urogynecol J 2012;23:1771-4.
27. Bhatia MS, Malik SC. Dhat syndrome--a useful diagnostic entity in Indian culture. Br J Psychiatry 1991;159:691-5.
28. Chaturvedi SK, Chandra PS, Isaac MK, Sudarshan CY, Rao S. Is there a female Dhat syndrome? NIMHANS Journal 1993;11:89-93.
29. Chhabra V, Bhatia MS, Gupta R. Cultural Bound Syndromes in India. Delhi Psychiatry J 2008;11:15-8. Available from: http://medind.nic.in/daa/08/11/daat08i1p15.pdf. [Last accessed on 2019 Jun 14].
30. Prakash O. Lessons for postgraduate trainees about Dhat syndrome. Indian J Psychiatry 2007;49:208-10.
31. Udina M, Foulon H, Valdés M, Bhattacharyya S, Martín-Santos R. Dhat syndrome: A systematic review. Psychosomatics 2013;54:212-8.
32. Sharma R. More than a quarter of India's youngsters have premarital sex. BMJ 2001;322:575.
33. Gerressu M, Mercer CH, Graham CA, Wellsing K, Johnson AM. Prevalence of masturbation and associated factors in a British national probability survey. Arch Sex Behav 2008;37:266-78.
34. Sadock B, Sadock VA, Ruiz P, editors. Kaplan and Sadock's Comprehensive Textbook of Psychiatry. 9th Revised ed. Philadelphia: Lippincott Williams and Wilkins; 2009.