

ORIGINAL ARTICLE

## An epidemiological study of sexual disorders in south Indian rural population

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### ABSTRACT

**Background:** Sexuality is an important aspect of the personality of an individual and influences psychological, physical and social well-being of both men and women. It is a paradox, that in the country where ‘kamasutra’ (by Vatsyayana) took birth, there is a lack of research publications and sexuality related literature; hence the current study was conducted, to estimate the prevalence and association of sexual disorders with various socio-demographic variables, in the selected rural population.

**Materials and Methods:** Subjects who were sexually active and fulfilled the study criteria were administered Arizona Sexual Experience Scale as screening tool for the presence of sexual problems. Those who were found to be having sexual problems were interviewed further using appropriate questionnaires.

**Results:** 21.15% of the male subjects were diagnosed to have one (or more) sexual disorder. Prevalence of erectile dysfunction was found to be 15.77%, male hypoactive sexual desire disorder (HSDD) 2.56%; premature ejaculation was found to be prevalent in 8.76% of the male subjects. Around 14% of the female subjects were diagnosed to have female sexual disorders. Prevalence of female arousal dysfunction was found to be 6.65%, female HSDD 8.87%, female anorgasmia 5.67%, female dyspareunia 2.34% and female sexual aversion disorder was found to be prevalent in 0.37% of the female subjects.

**Conclusion:** This study concluded that one in five males and one in seven females were suffering from one (or more) sexual disorder. Improving the training of undergraduate medical and nursing students in sexuality related issues, increasing trained individuals in sexual medicine by starting new courses, providing sex education to the general population using media and merging sexual health care with primary care, are likely to play a significant role in addressing the increasing sexual health morbidity.

**Key words:** Epidemiological study on sexual disorders, erectile dysfunction, female arousal dysfunction, female sexual disorders, hypoactive sexual desire disorder, male sexual disorders, premature ejaculation, prevalence of sexual disorders in India, sexual disorders

### INTRODUCTION

Sexuality is an important aspect of health, which can impact the overall wellbeing of men and women.<sup>[1]</sup> Disorders of sexual functioning are common among men and women of all ages, ethnicities, and cultural backgrounds. Despite their apparent

prevalence, only a few epidemiological studies are reported from India. There is a deficit of data on the prevalence of sexual disorders from any large-scale epidemiologic studies. The present epidemiological study was conducted in a south

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Indian rural population to fill this gap. The results obtained from this study might help policy makers and sexual health practitioners to develop appropriate and timely strategies for identifying and treating sexual disorders.

## MATERIALS AND METHODS

The current study was undertaken to estimate the prevalence of sexual disorders and association of sexual disorders with various socio-demographic variables in the selected rural area.

**Study:** It was a descriptive epidemiological study conducted through a door-to-door survey on a sample size of 1529. ( $n = 1529$ ; 742-males; 787- females). Individuals above the age of 18 years, who gave consent and were sexually active were included in the study. Individuals above the age of 18 years but with severe psychotic symptoms, dementia or severe and profound mental retardation and those not fulfilling the inclusion criteria were excluded.

A door to door survey of the entire population residing at Suttur village (25 km from Mysore city in South India; population ~4100 with predominant Hindu community and ~1000 families). There is a primary health center at Suttur run by the Government of Karnataka in collaboration with JSS Medical College and Hospital. Out of 3000 subjects above 18 years, 1529 male and female subjects who fulfilled our inclusion and exclusion criteria were taken up for the study. All individuals were met at their respective homes (working hours were avoided) and briefed about the study. Weight, height, pallor and blood pressure were measured; individuals were educated regarding basic health issues, obesity and diet and referred to a physician if necessary. Privacy and anonymity were ensured.

Individuals who had at least one sexual intercourse in the last 1 year, were considered as sexually active. Those who fulfilled the study criteria were administered Arizona Sexual Experience Scale as a screening tool for identifying the presence of sexual problems. Those who were found to be having sexual problems based on Arizona sexual experience scale were further interviewed in detail to identify the type of sexual disorder. Male sexual disorder assessment was done using International Index of Erectile Function (IIEF), Premature Ejaculation Diagnostic Tool (PEDT); structured questionnaire was prepared for the purpose of this study to assess male Hypoactive Sexual Desire Disorder (HSDD), postcoital dysphoria, anorgasmia, dyspareunia, paraphilias, sexual aversion disorder and gender identity disorders based on International Classification of Disease 10 (ICD-10) and Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition Text Revision (DSM-IV TR) diagnostic criteria. Female sexual disorder assessment was done using female sexual functioning questionnaire and a structured questionnaire which was prepared for the

purpose of this study to assess female postcoital dysphoria, anorgasmia, dyspareunia, paraphilias, female sexual aversion disorder and gender identity disorders based on ICD-10 and DSM-IV TR diagnostic criteria.

Socio-demographic data and sexual activity were recorded on a proforma; socioeconomic status was assessed based on modified Prasad's classification.<sup>[2]</sup> Arizona sexual experience scale<sup>[3]</sup> was used as a screening tool. Male sexual disorders were assessed using IIEF<sup>[4]</sup> and PEDT.<sup>[5]</sup> Female sexual functioning was recorded using the female sexual function questionnaire<sup>[6]</sup>; also a structured interview schedule for diagnosing sexual disorders (developed for the purpose of this study) based on DSM IV and ICD-10 criteria was used: This tool was used to interview and diagnose sexual disorders not covered by the other validated questionnaires used in here. (This questionnaire contained items corresponding to various areas of sexual disorders among men and women described in DSM-IV TR<sup>[7]</sup> and ICD-10 classification.<sup>[8]</sup>) The disorders specifically tapped here include, HSDD, anorgasmia, postcoital dysphoria, sexual aversion disorder, paraphilias and gender identity disorders. Questions were framed in simple language of day-to-day use and validation was done.

Both descriptive and inferential statistics were employed in the present study. Contingency coefficient tests were applied to study the association using SPSS for Windows, Version 16.0. Chicago, SPSS Inc.

## RESULTS

A total of 1529 individuals (who fulfilled the inclusion and exclusion criteria) were taken up for the study. This included, 787 female and 742 male subjects. Majority of the males were from 18 to 30 years of age followed by 31-40 and 41-50 years age groups. Married and unmarried males were almost similar in distribution. Agriculturists and daily wage laborers formed the majority of the study group, and most of them were residing in a nuclear family; 20% of the male subjects consumed alcohol. Majority of the males belonged to lower middle and upper lower socioeconomic group. On applying chi-square test, male study subject's distribution was significant for all the above mentioned sociodemographic variables except for marital status.

Majority of the female subjects were from 18 to 30 years of age followed by 31-40 years age group. Most of the females were married, homemaker and literate. Majority of the female subjects were from lower middle socioeconomic group. 2.1% of the females in the study sample consumed alcohol. On applying chi-square test, female study subjects' distribution was significant for all the above mentioned sociodemographic variables.

About 21.15% of the male subjects were diagnosed to be

suffering from one or more male sexual disorder [Table 1.1]. Among those who were diagnosed to have sexual disorders, 26.75% suffered from more than one sexual disorder. Prevalence of erectile dysfunction was found to be 15.77%, male HSDD 2.56% and premature ejaculation in 8.76% of the male subjects [Table 1.2]. Distribution of erectile dysfunction based on severity is given in Table 1.3. No cases of male anorgasmia, postcoital dysphoria or paraphilias were found in our study.

Male sexual disorders are found to be highly prevalent from 41 to 60 years of age when compared to other age groups. Male erectile dysfunction is least among 26-30 years age group (8.6%) and highest among 51-60 years age group (27.6%). Premature ejaculation was not found among 18-25 years age group and in those above 60 years. Prevalence of erectile dysfunction and premature ejaculation was more among unmarried males, whereas HSDD was found to be more among the married males. Male sexual disorders were 2 to 3 times more prevalent among illiterates when compared with the literates. Study subjects with an occupation as student or home maker were very few; considering occupation, male sexual disorders, were highest among daily wage laborers (32.3%), followed by agriculturists (18.6%). Male sexual disorders were found to be more in subjects belonging to a nuclear family (24.4%) compared to those in a joint family (16.4%).

Male sexual disorders are more prevalent among upper lower (29.3%) and lower class (27.6%) compared to upper middle class (11%) and lower middle class (14.6%). Sexual disorders were more among subjects with chronic medical illness compared to those without. 87.5% of the subjects with chronic obstructive pulmonary disease and 57.7% of subjects with hypertension had a diagnosable male sexual disorder. 15.4% of the population with hypertension had premature ejaculation(PME), whereas none had PME, among diabetics and chronic obstructive pulmonary disease patients. 63.8% of males who consumed alcohol had sexual disorders compared to only 10.5% among those who did not consume alcohol [Table 1.4].

Among 3033 rural population, 1503 were females. All the female subjects who fulfilled the inclusion/exclusion criteria were interviewed for female sexual disorders. Fourteen percent of the female subjects were diagnosed to have a sexual disorder [Table 2.1]. Among those who were diagnosed to have sexual disorders, 44.54% had more than one sexual disorder. Prevalence of female sexual arousal dysfunction was found to be 6.65%, female HSDD 8.87%, female anorgasmia 5.67%, dyspareunia 2.34% and female sexual aversion disorder was found to be prevalent in 0.37% of the subjects [Table 2.2]. No cases of postcoital dysphoria or paraphilias were found in females.

Female sexual disorders were more prevalent from 31-50

**Table 1.1: Prevalence of male sexual disorders**

|   | Frequency | Percentage |
|---|-----------|------------|
| Subjects with no diagnosable male sexual disorder | 585       | 78.84      |
| Subjects with a diagnosable male sexual disorder  | 157       | 21.15      |
| Total population screened                         | 742       | 100        |

**Table 1.2: Prevalence based on type of male sexual disorder**

| Prevalence of male sexual disorders    | Percentage |
|--|------------|
| Erectile dysfunction                   | 15.77      |
| Male hypoactive sexual desire disorder | 2.56       |
| Premature ejaculation                  | 8.76       |

**Table 1.3: Distribution of erectile dysfunction based on severity**

| Severity of erectile dysfunction   | Percentage |
|------------------------------------|------------|
| Severe erectile dysfunction        | 9.40       |
| Moderate erectile dysfunction      | 28.20      |
| Mild-moderate erectile dysfunction | 42.73      |
| Mild erectile dysfunction          | 19.65      |

years of age; however majority of males had sexual problems in 41to 60 years age group. Female subjects above 60 years and sexually active were few but no sexual disorder was diagnosed among such subjects. All the cases of sexual aversion disorder were found among 18-25 years age group. Seven out of 13 unmarried sexually active females were found to have a sexual disorder. Females with occupation as daily wage laborer and home maker formed the major groups and had 14.5% and 14.8% prevalence of female sexual disorder respectively. Females with occupation as salaried/business had lesser prevalence of sexual disorder (8.8%).

There was no significant difference in the prevalence of female sexual disorder between females living in nuclear vs joint family. Female sexual disorders were found to be highest among upper socioeconomic class females and least among lower socioeconomic class but these two groups had fewer study population. Upper middle, lower middle, upper lower socioeconomic class females formed the major study population and had 15.6%, 11.2% and 11.4% prevalence of sexual disorders respectively. Except for subjects with diabetes mellitus, none of the female subjects with hypertension or chronic obstructive pulmonary disease had any diagnosable sexual disorder. Eight out of 18 female subjects who consumed alcohol had a sexual disorder [Table 2.3].

## DISCUSSION

In our study, 21.15% (211/1000 population) of the male subjects were diagnosed to have a sexual disorder. Epidemiologic data are relatively scant to compare our findings but a few available community studies show the prevalence of male sexual disorders to be ranging from 10%

**Table 1.4: The association between male sexual disorders and various sociodemographic variables**

|                                       | Prevalence of male sexual disorder % | Erectile dysfunction % | Male hypoactive sexual disorder % | Premature ejaculation % | P value |
|---------------------------------------|--------------------------------------|------------------------|-----------------------------------|-------------------------|---------|
| <b>Age groups (years)</b>             |                                      |                        |                                   |                         |         |
| 18-25                                 | 15.20                                | 13.00                  | 2.20                              | 0.00                    | 0.000   |
| 26-30                                 | 13.20                                | 8.60                   | 1.30                              | 3.30                    |         |
| 31-40                                 | 17.00                                | 9.90                   | 2.20                              | 4.90                    |         |
| 41-50                                 | 29.40                                | 16.90                  | 2.80                              | 9.60                    |         |
| 51-60                                 | 33.70                                | 27.60                  | 3.10                              | 3.10                    |         |
| 61-65                                 | 15.60                                | 15.60                  | 0.00                              | 0.00                    |         |
| 66-75                                 | 14.30                                | 14.30                  | 0.00                              | 0.00                    |         |
| <b>Marital status</b>                 |                                      |                        |                                   |                         |         |
| Married                               | 20.10                                | 13.50                  | 2.30                              | 4.30                    | 0.000   |
| Unmarried                             | 29.80                                | 19.00                  | 1.20                              | 9.50                    |         |
| <b>Education</b>                      |                                      |                        |                                   |                         |         |
| Illiterate                            | 29.50                                | 19.30                  | 3.50                              | 6.60                    | 0.000   |
| Primary education                     | 15.50                                | 8.60                   | 0.00                              | 6.90                    |         |
| High school                           | 9.80                                 | 6.90                   | 0.60                              | 2.30                    |         |
| Undergraduation/graduation            | 7.10                                 | 7.10                   | 0.00                              | 0.00                    |         |
| <b>Occupation</b>                     |                                      |                        |                                   |                         |         |
| Student                               | 25.00                                | 25.00                  | 0.00                              | 0.00                    | 0.000   |
| Daily wage laborer                    | 32.30                                | 21.40                  | 5.20                              | 5.70                    |         |
| Agriculture                           | 18.60                                | 12.20                  | 0.80                              | 5.60                    |         |
| Salaried/business                     | 8.50                                 | 5.90                   | 0.80                              | 1.70                    |         |
| <b>Socioeconomic status</b>           |                                      |                        |                                   |                         |         |
| Upper class                           | 17.60                                | 17.60                  | 0.00                              | 0.00                    | 0.000   |
| Upper middle class                    | 11.00                                | 8.10                   | 0.00                              | 2.90                    |         |
| Lower middle class                    | 14.60                                | 11.10                  | 0.40                              | 3.10                    |         |
| Upper lower class                     | 29.30                                | 18.90                  | 3.90                              | 6.60                    |         |
| Lower class                           | 27.60                                | 10.30                  | 6.90                              | 10.30                   |         |
| <b>Chronic medical illness</b>        |                                      |                        |                                   |                         |         |
| Diabetes mellitus                     | 20.70                                | 20.70                  | 0.00                              | 0.00                    | 0.000   |
| Hypertension                          | 57.70                                | 42.30                  | 0.00                              | 15.40                   |         |
| Chronic obstructive pulmonary disease | 87.50                                | 87.50                  | 0.00                              | 0.00                    |         |
| <b>Alcohol consumption</b>            |                                      |                        |                                   |                         |         |
| Does not consume alcohol              | 10.50                                | 5.60                   | 2.00                              | 2.90                    | 0.000   |
| Consumes alcohol                      | 63.80                                | 48.30                  | 2.70                              | 12.80                   |         |

**Table 2.1: Prevalence of female sexual disorders**

| Subjects with female sexual disorder                | Frequency | Percentage |
|---|-----------|------------|
| Subjects with no diagnosable female sexual disorder | 677       | 86.00      |
| Subjects with a diagnosable female sexual disorder  | 110       | 14.00      |
| Total population screened                           | 787       | 100        |

**Table 2.2: Prevalence based on type of female sexual disorder**

| Prevalence of female sexual disorders among 811 interviewed South Indian rural female subjects | Percentage |
|--|------------|
| Female arousal dysfunction   | 6.65       |
| Female hypoactive sexual desire disorder   | 8.87       |
| Female anorgasmia  | 5.67       |
| Dyspareunia  | 2.34       |
| Female sexual aversion disorder  | 0.37       |

to 52%.<sup>[9-12]</sup> In our study, prevalence of erectile dysfunction was found to be 15.77%. Few community studies have estimated erectile dysfunction rates to be between 3% and 9%.<sup>[13-16]</sup> Kinsey *et al.* found that erectile dysfunction occurs in <1% of the male population before age 19, increasing to 25% by age 75.<sup>[17]</sup> In our study premature ejaculation

was found to be prevalent in 8.76% of the male subjects. A review of community studies revealed an estimate of the 1 year prevalence of a premature ejaculation range to be 4%-5%.<sup>[18-23]</sup> In our study prevalence of male HSDD was found to be 2.56%. Studies have reported the prevalence rates of male HSDD to be ranging from 1% to 7%.<sup>[24,25]</sup> Laumann *et al.* reported prevalence of male HSDD, to be 16% in the general population, which is higher when compared to other studies.<sup>[23]</sup> The reason for these discrepant estimates can be attributed to difference in methodology adopted. No cases of male anorgasmia, postcoital dysphoria or paraphilias were found in our study. Other Indian studies by Bagadia *et al.*<sup>[26]</sup> and Avasthi *et al.*<sup>[27]</sup> also did not report any cases with these problems. This probably reflects the rare prevalence of these disorders among Indian population.

In our study male sexual disorders are found to be highly prevalent among 41-50 and 51-60 years age groups compared to other age groups. Erectile dysfunction is least among 26-30 years age group and highest among 51-60 years age group. Data from the Massachusetts male aging study has shown that 34.8% of men aged 40 to 70 years have

**Table 2.3: The association between female sexual disorders and various sociodemographic variables**

|                                       | Female sexual disorder present % | Female arousal dysfunction % | Female hypoactive sexual desire disorder % | Female anorgasmia % | Dyspareunia % | Female sexual aversion disorder % | P value |
|---------------------------------------|----------------------------------|------------------------------|--|---------------------|---------------|-----------------------------------|---------|
| Age groups (years)                    |                                  |                              |  |                     |               |                                   |         |
| 18-25                                 | 13.30                            | 4.40                         | 5.00                                       | 2.20                | 0.00          | 1.70                              | 0.000   |
| 26-30                                 | 9.50                             | 4.80                         | 4.80                                       | 0.00                | 0.00          | 0.00                              |         |
| 31-40                                 | 16.10                            | 0.00                         | 11.00                                      | 3.20                | 1.80          | 0.00                              |         |
| 41-50                                 | 24.80                            | 4.30                         | 14.90                                      | 2.10                | 3.50          | 0.00                              |         |
| 51-60                                 | 4.20                             | 0.00                         | 4.20                                       | 0.00                | 0.00          | 0.00                              |         |
| 61-65                                 | 0.00                             | 0.00                         | 0.00                                       | 0.00                | 0.00          | 0.00                              |         |
| 66-75                                 | 0.00                             | 0.00                         | 0.00                                       | 0.00                | 0.00          | 0.00                              |         |
| Marital status                        |                                  |                              |  |                     |               |                                   |         |
| Married                               | 13.40                            | 2.30                         | 7.90                                       | 1.70                | 1.20          | 0.40                              | 0.000   |
| Unmarried                             | 46.20                            | 15.40                        | 23.10                                      | 7.70                | 0.00          | 0.00                              |         |
| Education                             |                                  |                              |  |                     |               |                                   |         |
| Illiterate                            | 12.30                            | 1.90                         | 8.00                                       | 0.80                | 1.50          | 0.00                              | 0.000   |
| Primary                               | 17.50                            | 0.00                         | 12.40                                      | 3.10                | 2.10          | 0.00                              |         |
| High school                           | 17.70                            | 4.80                         | 7.50                                       | 3.80                | 0.00          | 1.60                              |         |
| Undergraduation/graduation            | 6.50                             | 6.50                         | 0.00                                       | 0.00                | 0.00          | 0.00                              |         |
| Occupation                            |                                  |                              |  |                     |               |                                   |         |
| Student                               | 0.00                             | 0.00                         | 0.00                                       | 0.00                | 0.00          | 0.00                              | 0.000   |
| Daily wage laborer                    | 14.50                            | 5.80                         | 4.30                                       | 1.40                | 2.90          | 0.00                              |         |
| Homemaker                             | 14.80                            | 2.40                         | 9.40                                       | 1.40                | 1.10          | 0.50                              |         |
| Agriculture                           | 6.70                             | 0.00                         | 6.70                                       | 0.00                | 0.00          | 0.00                              |         |
| Salaried/business                     | 8.80                             | 1.50                         | 1.50                                       | 5.90                | 0.00          | 0.00                              |         |
| Socioeconomic status                  |                                  |                              |  |                     |               |                                   |         |
| Upper class                           | 35.70                            | 3.60                         | 28.60                                      | 0.00                | 3.60          | 0.00                              | 0.035   |
| Upper middle class                    | 11.20                            | 1.20                         | 7.50                                       | 1.90                | 0.00          | 0.60                              |         |
| Lower middle class                    | 15.60                            | 2.40                         | 9.00                                       | 2.10                | 1.50          | 0.60                              |         |
| Upper lower class                     | 11.40                            | 3.30                         | 5.30                                       | 1.60                | 1.20          | 0.00                              |         |
| Lower class                           | 10.00                            | 5.00                         | 5.00                                       | 0.00                | 0.00          | 0.00                              |         |
| Chronic medical illness               |                                  |                              |  |                     |               |                                   |         |
| No chronic medical illness            | 14.50                            | 2.50                         | 8.60                                       | 1.90                | 1.10          | 0.40                              | 0.000   |
| Diabetes mellitus                     | 21.10                            | 10.50                        | 5.30                                       | 0.00                | 5.30          | 0.00                              |         |
| Hypertension                          | 0.00                             | 0.00                         | 0.00                                       | 0.00                | 0.00          | 0.00                              |         |
| Chronic obstructive pulmonary disease | 0.00                             | 0.00                         | 0.00                                       | 0.00                | 0.00          | 0.00                              |         |
| Alcohol consumption                   |                                  |                              |  |                     |               |                                   |         |
| Does not consume alcohol              | 13.30                            | 2.20                         | 8.10                                       | 1.80                | 0.80          | 0.40                              | 0.000   |
| Consumes alcohol                      | 44.40                            | 16.70                        | 11.10                                      | 0.00                | 16.70         | 0.00                              |         |

moderate to complete erectile dysfunction, which is strongly related to age, , health status, and emotional function.<sup>[28]</sup> Kinsey *et al.* found that erectile dysfunction occurs in <1% of the male population before age 19, increasing to 25% by age 75 suggesting that as age increases sexual disorders also increase.<sup>[17]</sup> The prevailing cultural beliefs and stigma in India might discourage and inhibit the older individuals to consult a doctor and discuss their sexual life leading to increased prevalence of sexual disorders among elderly individuals. Also, age related physiological changes like andropause can attribute to increased sexual disorder prevalence rates among elderly individuals.

The unmarried had a higher prevalence of male sexual dysfunction compared to the married population. It was observed that prevalence of erectile dysfunction and premature ejaculation was more among the unmarried, whereas HSDD was found to be more among the married. This finding is not in accordance with few other Indian studies which have shown that there is a slightly higher

prevalence of sexual disorders among married compared to the unmarried.<sup>[29,30]</sup> These differences reflect that both the married and unmarried population have sexual disorders and both the groups should be assessed adequately. Our study findings might be due to performance anxiety or changing life style in the Indian society with premarital sexual activity being on the rise, which could lead to higher prevalence of sexual disorders among the unmarried.

Male sexual disorders were 2 to 3 times more prevalent among illiterates compared to literates. Male subjects with occupations such as daily wage laborers had the highest prevalence followed by agriculturists. The lower classes had a higher prevalence of male sexual disorders, compared to the middle class population. Gebhard and Johnson found that male subjects who did not attend college were 3 times more likely to experience erectile dysfunction when compared to males who had studied upto the college level. <sup>[31]</sup> A study done in America concluded that elevated risks associated with low educational attainment and minority status attest

to the fact that better-educated individuals are healthier and have lifestyles that are physically and emotionally less stressful.<sup>[23]</sup>

The current study concluded that male sexual disorders were more among subjects with chronic medical illness compared to those without chronic medical illness. Many researches have shown that prevalence of sexual disorder increases with age, history of heart disease, diabetes, treated hypertension, untreated ulcer, arthritis, allergy, and smoking.<sup>[21,32,33]</sup> Sexual dysfunction was found to be significantly related to subjective poor health and diabetes mellitus. Data suggests that, although sexual dysfunction is more common in the aged, it is more often related to comorbid illness than aging alone.<sup>[34]</sup>

The present study found that 63.8% of the male subjects who consumed alcohol had a sexual disorder compared with 10.5% among those males who did not consume alcohol. HSDD in males was almost equally prevalent among both the groups but erectile dysfunction and premature ejaculation were more prevalent among those males who consumed alcohol. Study by Van Thiel and Lester reported that 61% of patients dependent on alcohol reported sexual dysfunction, the most common being erectile dysfunction followed by reduced sexual desire.<sup>[35]</sup> Vijayasanen,<sup>[36]</sup> found that 71% of the subjects with alcohol dependence had sexual dysfunction. Studies show that all aspects of the human sexual response are affected by alcohol especially sexual desire and erection.<sup>[37]</sup>

The current study concluded that 14% of the female subjects were diagnosed to have female sexual disorder. Population-based study in China by Parish *et al.*<sup>[38]</sup> showed a 35% prevalence of female sexual dysfunction. Shifren and colleagues<sup>[39]</sup> did a study in the United States, in 31,581 household samples and found prevalence of female sexual dysfunction to be 43%. Although our study adopted a well validated interviewing methodology, lesser prevalence of female sexual dysfunctions was noted compared to studies from China and America, which can be due to cultural factors and the different diagnostic tools used in these different studies.

In our study, among those who were diagnosed to have female sexual disorder, 44.54% were having more than one that is, comorbid sexual disorder. Women had a higher prevalence of comorbid sexual disorder compared to males. A study done in the Portuguese population concluded that more women than men had presented with a secondary diagnosis.<sup>[40]</sup> Most studies have shown a considerable overlap among sexual disorders, specifically female dysfunctions.<sup>[11]</sup>

A review of seven studies has shown prevalence estimates for female HSDD ranging from 5% to 46%.<sup>[21,41]</sup> Our findings of 8.87% for female HSDD is well within the range of the above

findings. With depression prevalence rates increasing, the incidence of hypoactive sexual desire has been found to be increasing by few studies, which makes way for the possible hypothesis that increase in depression is leading to increased prevalence of HSDD as part of depressive symptomatology. Goggin and colleagues have reported a positive correlation between HSDD, depressive symptoms and low life satisfaction.<sup>[42]</sup>

Levine and Yost in their community study have found prevalence rates of female arousal dysfunction to be 11% in the general population.<sup>[43]</sup> Schover *et al.* have reported that 14% of their study sample indicated sexual arousal difficulties on the basis of the sexual history form.<sup>[15]</sup> Our study finding of 6.65% is lesser compared to western studies. Possibly methodology and cultural variation might be responsible for these diverse prevalence rates.

We concluded that 5.67% of the female subjects had anorgasmia. Prevalence rates of female orgasmic disorder range from 4% to 7% based on the analysis of three large population sample studies.<sup>[18,21,44]</sup> Another Indian study by Avasthi *et al.*<sup>[45]</sup> found that 9% of the subjects had difficulty reaching orgasm. Levine and Yost<sup>[43]</sup> found that 5% of their female study population was anorgasmic. Our study finding is in accordance with the above study findings.

Western studies have shown prevalence of dyspareunia to be ranging from 3% to 18% in the general population.<sup>[21,44,46]</sup> Though Avasthi and Colleagues<sup>[45]</sup> have reported the prevalence of dyspareunia to be 7% in a North Indian study sample, in the South Indian study sample which we studied, the prevalence was found to be 2.34%. This relatively large difference in range needs further exploration.

Our study found female anorgasmia and female arousal disorder to be almost equally prevalent among the female population. A similar finding was reported by Spector and Carey in their review article that female arousal disorder and female orgasm disorder disorders are equally prevalent in the community.<sup>[47]</sup>

Female sexual disorders were more prevalent among 31-40 and 41-50 years age groups compared to other age groups. Female subjects above 60 years and sexually active were few, but no sexual disorder was diagnosed among them. All the cases of sexual aversion disorder were found among 18-25 years age group. An American study<sup>[23]</sup> observed that female sexual disorders were more prevalent in younger age groups. A study conducted in Nigeria<sup>[48]</sup> also concluded that younger age was a risk factor for female sexual disorders. Since young women are more likely to be single, their sexual activities might involve higher rates of partner turnover as well as periodic spells of sexual inactivity and performance anxiety. In Indian rural population poor sexual knowledge can also be a factor. This instability, coupled

with inexperience, generates stressful sexual encounters, providing the basis for sexual pain and anxiety which later on leads to a sexual disorder.

Unlike in males, female sexual disorders were less prevalent among illiterate females compared to literate females in our study. Females with occupation as daily wage laborer and home maker formed the major groups and had 14.5% and 14.8% prevalence of female sexual disorders respectively. Females with occupation as salaried/business had lesser prevalence of sexual disorder. Studies done in both Nigeria<sup>[48]</sup> and Malaysia<sup>[49]</sup>, have reported an association between higher education and the lesser prevalence of female sexual disorders. Lower economic position due to lower education levels or low-income occupation leads to poor economic status, and with most housewives being dependent on their husband, there is poor economic independence. This poor socioeconomic status can induce stress which in turn affects sexual functioning.

Unlike in males, females with chronic medical condition had lesser prevalence of female sexual disorders compared to females without chronic medical illness in our study. Except for subjects with diabetes mellitus, none of the female subjects with hypertension, chronic obstructive pulmonary disease, cataract, chronic kidney disease, migraine had diagnosable female sexual disorders. South Indian studies have found similar results that the risk factors for the development of male sexual disorders such as hypertension, diabetes mellitus, hyper-lipidemia, and a history of cardiac diseases were not strongly correlated to the presence of sexual disorder among females.<sup>[50-52]</sup>

In our study, 21% of the female subjects with diabetes mellitus had a sexual disorder. Similar findings were reported by other studies that female sexual disorders were associated with diabetes mellitus. Vascular diseases secondary to diabetes might preclude adequate arousal, hence higher prevalence of sexual disorder among diabetic females.<sup>[53]</sup>

#### Implications of this study

- The study findings reflect the current sexual health scenario in Indian rural areas and also signify the need for more studies in the field of sexology
- The current findings may serve as a good foundation for the policy makers and the research councils to take necessary steps so as to improve the health care facilities catering to the needs of those with sexual disorders. Inclusion of sexology in the training of undergraduate and postgraduate medical students should be considered, in order to meet the increasing need for trained professionals in this specialty.

#### CONCLUSION

The current study was a door to door epidemiological study

covering the population of an entire rural area and about one in five males and one in seven females were found to have sexual disorders. Even with increasing literacy, sex is still a taboo in India. Sexual knowledge is poor among most of the individuals and those suffering from sexual disorders don't often seek treatment. There is a need to address the raising prevalence rates of sexual disorders by providing sex education via media and health centers. There is also a necessity to include sexology in undergraduate and postgraduate medical curriculum, so that we can meet the treatment needs and increase identification of cases in the general population; also health care professionals need to educate and treat such individuals at the earliest.

#### REFERENCES

1. Masters WH, Johnsons VE. Human Sexual Response. Boston: MA Brown; 1966.
2. Prasad BG. Social classification of Indian families. J Indian Med Assoc 1961;37:250-1.
3. McGahuey CA, Gelenberg AJ, Laukes CA, Moreno FA, Delgado PL, McKnight KM, *et al.* The Arizona Sexual Experience Scale (ASEX): reliability and validity. J Sex Marital Ther 2000;26:25-40.
4. Rosen RC, Riley A, Wagner G, Osterloh IH, Kirkpatrick J, Mishra A. The International Index of Erectile Function (IIEF): A multidimensional scale for assessment of erectile dysfunction. Urology 1997;49:822-30.
5. Symonds T, Perelman MA, Althof S, Giuliano F, Martin M, May K, *et al.* Development and validation of a premature ejaculation diagnostic tool. Eur Urol 2007;52:565-73.
6. Quirk FH, Heiman JR, Rosen RC, Laan E, Smith MD, Boolell M. Development of a sexual function questionnaire for clinical trials of female sexual dysfunction. J Womens Health Gend Based Med 2002;11:277-89.
7. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 4<sup>th</sup> ed. Text Revision (DSM-IV-TR). Washington, DC: American Psychiatric Association; 1994.
8. World Health Organization. The ICD-10 classification of mental and behavioural disorders: Clinical description and diagnostic guidelines. Geneva: WHO; 1992.
9. Frank E, Anderson C, Rubinstein D. Frequency of sexual dysfunction in "normal" couples. N Engl J Med 1978;299:111-5.
10. Rosen RC, Taylor JF, Leiblum SR, Bachmann GA. Prevalence of sexual dysfunction in women: Results of a survey study of 329 women in an outpatient gynecological clinic. J Sex Marital Ther 1993;19:171-88.
11. Bancroft J, Graham C, McCord C. Conceptualizing women's sexual problems. J Sex Marital Ther 2001;27:95-103.
12. Rosen RC. Medical and psychological interventions for erectile dysfunction: Toward a combined treatment approach. In: Leiblum SR, Rosen RC, editors. Principles and Practice of Sex Therapy 3<sup>rd</sup> ed. New York: Guilford Press; 2000. p. 276-304.
13. Ard BN Jr. Sex in lasting marriages: A longitudinal study. J. Sex Res 1977;13:274-85.
14. Schover LR, Friedman JM, Weiler SJ, Heiman JR, LoPiccolo J. Multiaxial problem-oriented system for sexual dysfunctions: An alternative to DSM-III. Arch Gen Psychiatry 1982;39:614-9.
15. Schover LR, Evans RB, von Eschenbach AC. Sexual rehabilitation in a cancer center: Diagnosis and outcome in 384 consultations. Arch Sex Behav 1987;16:445-61.
16. Nettelblad P, Uddenberg N. Sexual dysfunction and sexual satisfaction in 58 married Swedish men. J Psychosom Res 1979;23:141-7.
17. Kinsey AC, Pomeroy WB, Martin C. Sexual Behavior in the Human Male. Philadelphia: W. B. Saunders; 1948. p. 14-47.
18. Ernst C, Földényi M, Angst J. The Zurich Study: XXI. Sexual dysfunctions and disturbances in young adults. Data of a longitudinal epidemiological study. Eur Arch Psychiatry Clin Neurosci 1993;243:179-88.
19. Fugl-Meyer AR, Fugl-Meyer KS. Sexual disabilities, problems, and satisfaction in 18-74 year old Swedes. Scand J Sexol 1999;3:79-105.
20. Schiavi RC, Mandeli J, Schreiner-Engel P, Chambers A. Aging, sleep disorders, and male sexual function. Biol Psychiatry 1991;30:15-24.
21. Ventegodt S. Sex and the quality of life in Denmark. Arch Sex Behav 1998;27:295-307.
22. Solstad K, Hertoft P. Frequency of sexual problems and sexual dysfunction in middle-aged Danish men. Arch Sex Behav 1993;22:51-8.

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23. Laumann EO, Paik A, Rosen RC. Sexual dysfunction in the United States: Prevalence and predictors. *JAMA* 1999;281:537-44.
24. Simons JS, Carey MP. Prevalence of sexual dysfunctions: Results from a decade of research. *Arch Sex Behav* 2001;30:177-219.
25. Schiavi RC, Stimmel BB, Mandeli J, White D. Chronic alcoholism and male sexual function. *Am J Psychiatry* 1995;152:1045-51.
26. Bagadia VN, Deve KP, Pradhan PV, Shah LP. A study of 258 male patients with sexual problems. *Indian J Psychiatry* 1972;14:143.
27. Avasthi A, Basu D, Kulhara P, Banerjee ST. Psychosexual dysfunction in Indian male patients: Revisited after seven years. *Arch Sex Behav* 1994;23:685-95.
28. Feldman HA, Goldstein I, Hatzichristou DG, Krane RJ, McKinlay JB. Impotence and its medical and psychosocial correlates: Results of the Massachusetts Male Aging Study. *J Urol* 1994;151:54-61.
29. Verma KK, Khaithan BK, Singh OP. The frequency of sexual dysfunctions in patients attending a sex therapy clinic in North India. *Ach Sex Behave* 1998;27:309-13.
30. Nakra BR, Wig NN, Varm VK. A study of male potency disorders. *Indian J Psychiatry* 1977;19:13.
31. Gebhard PH, Johnson AB. The Kinsey Data: Marginal Tabulations of the 1938-1963 Interviews Conducted by the Institute for Sex Research. Philadelphia: W. B. Saunders; 1979.
32. Mannino DM, Klevens RM, Flanders WD. Cigarette smoking: An independent risk factor for impotence? *Am J Epidemiol* 1994;140:1003-8.
33. Panser LA, Rhodes T, Girman CJ, Guess HA, Chute CG, Oesterling JE, *et al.* Sexual function of men ages 40 to 79 years: The Olmsted County Study of Urinary Symptoms and Health Status Among Men. *J Am Geriatr Soc* 1995;43:1107-11.
34. Thomas M, Sheldon RM, Vernon CM, Cynthia BB. The role of aging and chronic disease in sexual dysfunction. *J Am Geriatr Soc* 1988;36:520-4.
35. Van Thiel DH, Lester R. The effect of chronic alcohol abuse on sexual function. *Clin Endocrinol Metab* 1979;8:499-510.
36. Vijayasenana ME. Alcohol and sex. *N Z Med J* 1981;93:18-20.
37. Miller NS, Gold MS. The human sexual response and alcohol and drugs. *J Subst Abuse Treat* 1988;5:171-7.
38. Parish WL, Laumann EO, Pan S, Hao Y. Sexual dysfunctions in urban china: A population-based national survey of men and women. *J Sex Med* 2007;4:1559-74.
39. Shifren JL, Monz BU, Russo PA, Segreti A, Johannes CB. Sexual problems and distress in United States women: Prevalence and correlates. *Obstet Gynecol* 2008;112:970-8.
40. Nobre PJ, Pinto-Gouveia J, Gomes FA. Prevalence and comorbidity of sexual dysfunctions in a Portuguese clinical sample. *J Sex Marital Ther* 2006;32:173-82.
41. Chiechi LM, Granieri M, Lobascio A, Ferreri R, Loizzi P. Sexuality in the climacterium. *Clin Exp Obstet Gynecol* 1997;24:158-9.
42. Goggin K, Engelson ES, Rabkin JG, Kotler DP. The relationship of mood, endocrine, and sexual disorders in human immunodeficiency virus positive (HIV+) women: An exploratory study. *Psychosom Med* 1998;60:11-6.
43. Levine SB, Yost MA Jr. Frequency of sexual dysfunction in a general gynecological clinic: An epidemiological approach. *Arch Sex Behav* 1976;5:229-38.
44. Línal E, Stefánsson JG. The lifetime prevalence of psychosexual dysfunction among 55 to 57-year-olds in Iceland. *Soc Psychiatry Psychiatr Epidemiol* 1993;28:91-5.
45. Avasthi A, Kaur R, Prakash O, Banerjee A, Kumar L, Kulhara P. Sexual behavior of married young women: A preliminary study from north India. *Indian J Community Med* 2008;33:163-7.
46. Moody GA, Mayberry JF. Perceived sexual dysfunction amongst patients with inflammatory bowel disease. *Digestion* 1993;54:256-60.
47. Spector IP, Carey MP. Incidence and prevalence of the sexual dysfunctions: A critical review of the empirical literature. *Arch Sex Behav* 1990;19:389-408.
48. Fajewonyomi BA, Orji EO, Adeyemo AO. Sexual dysfunction among female patients of reproductive age in a hospital setting in Nigeria. *J Health Popul Nutr* 2007;25:101-6.
49. Sidi H, Puteh SE, Abdullah N, Midin M. The prevalence of sexual dysfunction and potential risk factors that may impair sexual function in Malaysian women. *J Sex Med* 2007;4:311-21.
50. Shivananda M, Darshan MS, Tandon A. Male issues in elderly sexuality. In: Rao TSS, Gupta S, Tandon A (editors). *Intimacy matters: Elderly Sexuality*. Published by Indian Association of Geriatric Mental Health 2011(Mysore): 131-43.
51. Enzlin P, Mathieu C, Van Den Bruel A, Vanderschueren D, Demyttenaere K. Prevalence and predictors of sexual dysfunction in patients with type 1 diabetes. *Diabetes Care* 2003;26:409-14.
52. Davis SR. Androgens and female sexuality. *J Gend Specif Med* 2000;3:36-40.
53. Rao TSS, Darshan MS, Harsha GT, Kalaiah P, Krishna VS, Brahmabhatt R. Sexual disorders: General perspectives. In: Rao TSS, Gupta S, Tandon A (Eds). *Intimacy Matters: Elderly Sexuality*. Published by Indian Association for Geriatric Mental Health 2011(Mysore):53-83..

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