INTRODUCTION
Sexual function is the physiological capacity to experience desire, arousal, and orgasm. Sexual dysfunction can result from a wide variety of psychological and physical causes. Among drugs, antihypertensives, diuretics, anti-histamines, antidepressants, benzodiazepines, and antipsychotics are the common agents associated with sexual dysfunction. Schizophrenic patients can develop sexual dysfunction that may not be related to drugs. Studies have shown that a majority of untreated schizophrenic patients have a reduced desire for sex, more in females as compared to males, although arousal and ejaculatory functions remain relatively intact. The schizophrenic men often limit their sexual activity to masturbation, as the negative symptoms limit their ability to maintain relationships. However, while on treatment, they may experience erectile dysfunction and orgasmic difficulties as adverse effects of the medicines, that is, antipsychotics, unless they have no primary organic pathology or comorbid medical conditions contributing to the sexual dysfunction. Thus, the major impact on sexual functioning in schizophrenic patients is by antipsychotics.

MATERIALS AND METHODS
The study sample was taken from the Psychiatry Outpatient Department and it consisted of 25 patients with clinicallystable schizophrenia meeting the ICD-10 criteria; as well as 30 healthy volunteers from among the staff of the hospital and caregivers of patients who were willing to participate in the study. This is a hospital-based study. After obtaining the local ethical committee clearance, the subjects were recruited for the study by the purposive sampling technique during July 2014 to March 2015. The sample (N = 102) was divided into four groups [Table 1]. Group one (G1) consisted of 25 patients on risperidone, and group two (G2) had 30 healthy volunteers. The drug was not administered for the purpose of the study. The patients, who were maintaining remission on this drug, taken in the oral form (tablets), were enrolled into the study during their regular follow up, after their written consent. Study-related assessments were done on the same day of selecting the patients for the study.

The sample consisted of male patients between 18-50 years of age, sexually active (not abstinent) and on regular treatment with a stable dose of risperidone for at least six weeks after achieving clinical stability. Female patients were not included in the study as the types of questions in the SFQ were not suitable for female population of this locality or for their cooperation to answer them. Remission was defined by a score of less than 4 on all items of BPRS. Patients having other comorbid medical and psychiatric illnesses as well as primary sexual dysfunction were not included. Furthermore, those on more than one antipsychotic drug or other drugs affecting sexual function, like benzodiazepines, antidepressants, and antihypertensives were also not included. The only allowed medication along with the above-mentioned antipsychotics was trihexyphenidyl, given to control extrapyramidal side effects.

The sociodemographic and clinical information sheet, BPRS, and SFQ were the tools used for assessing the patients. The SFQ was the modified version of a questionnaire used by Burke et al. The SFQ asked detailed questions about the physical aspects of sexual functioning including libido, physical arousal, masturbation, orgasm (including painful orgasm), and ejaculation. It had been further modified so that it had subscales for the different areas of sexual functioning. It was not necessary for the subject to have a partner in order to complete it. The scale, though not tested adequately for validity, had good psychometric properties and had been used in a number of studies. The SFQ was also tested for reliability as a measure of sexual functioning in a sample of healthy volunteers.
reliability: Cronbach’s a 5 0.90; Guttman’s split-half reliability 5 0.86. For the purpose of statistical analysis, an arbitrary cutoff point of one standard deviation above the mean was taken as the threshold above which sexual dysfunction was said to be present. Taking that into consideration, the subscales of the questionnaire served as continuous variables, which were studied across the study groups.

Table 1: Subtype of schizophrenia

<table>
<thead>
<tr>
<th>Study</th>
<th>Paranoid</th>
<th>Hebephrenic</th>
<th>Catatonic</th>
<th>Undifferentiated</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>G2</td>
<td>1</td>
<td></td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

G1: 5 Risperidone group;

Patients with clinically stable schizophrenia, as per ICD-10 criteria, attending the Department of Psychiatry were interviewed after taking informed consent. After collecting the required sociodemographic and clinical data from the patients, they were rated on BPRS, to rule out any active psychopathology. Subsequently, they were rated on the SFQ to determine the dysfunction in the phases of desire, arousal, and orgasm. Healthy volunteers who were medically fit and not on any medication were asked to fill a sociodemographic data sheet as well as sexual functioning questionnaire. This data from healthy volunteers was collected for statistical purposes, to set a normal mean score on SFQ.

Statistical analysis

The statistical analysis of data was performed using SPSS for Windows (version 12.0) and Microsoft Excel.

Descriptive statistics were applied to obtain the means and frequencies of sociodemographic and clinical data of the sample.

To analyze the sexual dysfunction, the mean scores of the sexual functioning questionnaire on the domains of desire, arousal/erection, orgasm/ejaculation, and overall sexual impairment was obtained. The SFQ is designed such that the higher the score, more severe is the sexual dysfunction. An arbitrary cut off point of 1 SD above the mean score of healthy volunteers (G2) was taken as the threshold above which sexual dysfunction was said to be present. The mean scores of the domains were compared across the study groups using the Chi square test, as proportions and level of significance were calculated from this.

RESULTS

The groups were evenly matched with respect to key clinical variables, such as, age, duration of illness, duration of clinical stability, and treatment duration as shown in Tables 2 and 3. A majority of them were educated above higher secondary school. Illiterates constituted 7.8%. The occupation of most of the study subjects was agricultural farming (26.5%) and the family income of most of them (28.4%) was in the range of Rs 2000-3000 per month. Two-thirds of the subjects were from extended families and the same proportion was married. A majority of them had received the diagnosis of paranoid schizophrenia (62.5%).

It was important to look for the normality of distribution of data on the SFQ, before applying for the statistical tests. This was analyzed by applying the Kolmogorov-Smirnov test. It was found that a majority of
Sexual side effects — Frequency and severity
Sexual side effects was compared on SFQ for frequency as well as severity of all the domains, that is, desire, arousal/erection, orgasm/ejaculation, and overall sexual impairment. The Sexual Functioning Questionnaire is a sensitive tool, with 38 items that assess sexual functioning. About 23% of the healthy volunteers had their score above 1 SD of the mean, thus having some impairment in one or the other domain of sexual functioning. For the medication group this was 96, for risperidone. Desire was most commonly impaired in the risperidone group (80%). Erectile dysfunction was 40% in the risperidone group. Orgasmic dysfunction was common to the risperidone. This is shown in Table 6.

Table 4: Test of normality on sexual functioning questionnaire scores.

<table>
<thead>
<tr>
<th>Items on Scale</th>
<th>Study groups</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desire</td>
<td>G1 (N = 25)</td>
<td>0.156</td>
</tr>
<tr>
<td></td>
<td>G2 (N = 30)</td>
<td>0.042</td>
</tr>
<tr>
<td>Arousal/ Erection</td>
<td>G1 (N = 25)</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>G2 (N = 30)</td>
<td>0.073</td>
</tr>
<tr>
<td>Orgasm/ Ejaculation</td>
<td>G1 (N = 25)</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>G2 (N = 30)</td>
<td>0.000</td>
</tr>
<tr>
<td>Overall sexual functioning</td>
<td>G1 (N = 25)</td>
<td>0.200</td>
</tr>
<tr>
<td></td>
<td>G2 (N = 30)</td>
<td>0.200</td>
</tr>
</tbody>
</table>

In this study risperidone was associated with the most frequent overall sexual impairment (96%), although it was not statistically significant. Melkersson has also reported an overall sexual dysfunction of 89% due to risperidone. Up to 93% of risperidone-treated patients reported an overall impairment of sexual functioning in yet another study.[16]

Desire
Impaired desire is the most frequently reported sexual dysfunction in the present study. An assessment of changes in libido associated with psychotropic medications can be difficult, because psychiatric illnesses can significantly affect sexual interest. In symptomatic cases of schizophrenia with prominent negative symptoms, the frequency of sexual fantasy is much reduced. Nevertheless, several factors influence desire. Failure of erection may itself adversely affect a patient’s desire. A patient’s socioeconomic status and quality of life also influence his libido. Libido was the most frequently reported sexual dysfunction with both haloperidol (58%) and clozapine (50%), in one of the studies.[18] Of late, another study reported that impaired desire (44%) was the most common sexual dysfunction due to risperidone.[19] One more study reported that impaired libido is commonly seen even with quetiapine.[19] These findings are supported by the present study, which reports an impaired libido of 80% with risperidone.

Arousal/erection
Erectile problem was the second most frequent sexual side effect in the current study 40 % of the patients using risperidone were associated with erectile dysfunction. However, it was easier to measure and quantify erectile dysfunction compared to libido, due to the availability of procedures like measuring nocturnal tumescence and penile plethysmography. One study reported erectile difficulties associated with antipsychotic drugs in 38% schizophrenic patients,[19] followed by 47% in another study.[24] and 52% in yet another.[10] However, these studies included typical antipsychotics too. In one of the studies on Indian population, the erectile dysfunction was 53% with typical antipsychotics and 31% with atypical antipsychotics and it differed significantly (P < 0.025). However, the tool used for assessment was the UKU side effect rating scale. No comprehensive questionnaire was used.[19] The frequency of erectile dysfunction reported in the current study, however, falls in the range of that reported in earlier studies.

Orgasm/ejaculation
In a majority of the published studies, orgasmic and
ejaculatory problems were less commonly reported than the desire and erection problems associated with antipsychotics. This is especially true in the case of atypical antipsychotics. A common problem in assessing orgasmic and ejaculatory problems is the co-occurrence of erectile dysfunction. In such cases the patient cannot satisfactorily recognize their ejaculatory and orgasmic function. As he cannot achieve complete erection, he may not ejaculate and experience orgasmic joy even though his orgasmic capacity is intact. This limitation could not be answered in our study too. Orgasmic and ejaculatory problems were least affected among the patients in the present study. Thirty-two percent of the patients on risperidone have orgasmic/ejaculatory problems. In a study by Wirshing and co-workers, orgasmic and ejaculatory difficulties were found in 86% of the patients on risperidone as compared to 20% on clozapine. Nevertheless, the sample size was too small (n = 14 for risperidone and n = 5 for clozapine) and a Type II error was clearly evident. [20]

Only the clinically stable patients were incorporated with a careful assessment on BPRS, as the patients’ account is less reliable during the symptomatic phase. However, full remission is rarely achieved in schizophrenia, especially with respect to negative and cognitive symptoms. The current study is, to some extent, similar in methodology to that of Smith and colleagues. [21] However, the latter has not used BPRS. They have used the Calgary Depression Inventory to rule out depression among patients with schizophrenia, and the UKU side effect rating scale to assess the autonomic side effects. Various questionnaires addressing sexual function have been used in different studies. [2,21‑23] The problem with most of them is that the same questionnaire is not replicated in several further studies to enhance its validity. Furthermore, the reliability and validity of data collected by means of questionnaires are jeopardized by intentional nonreporting or over-reporting, incomplete recall, misunderstanding of survey questions, and selective participation. Therefore, the questionnaire is not entirely responsible for the credibility of the data. The current study has used the original SFQ, designed by Smith and colleagues, without any modification. It was based on the evidences that men with schizophrenia were able to answer direct questions regarding concrete aspects of sexual functioning. A sexual partner was not necessary to answer the questions in SFQ. In our patient population, the frequency of sexual dysfunction was much higher than in the original study by Smith and colleagues.

The duration of antipsychotic exposure is an important factor in impaired sexual functioning. In case of risperidone, the literature says that it behaves as a typical antipsychotic in doses of more than 6 mg/day. However, it might have the same effects even in lower doses when given for several years. Thus both dose and duration may have equally important roles.

**CONCLUSION**

The sexual dysfunction with risperidone is found to be significant in our study.

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**REFERENCE**