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Original Article

Psychiatry/Mental Health Section

A Cross-sectional Study of Antipsychotic Drugs Induced Sexual Dysfunction among Married Males with Remitted Schizophrenia Attending Tertiary Health Care Centre from Central India

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ABSTRACT

Introduction: Schizophrenia is a chronic debilitating disease having a major impact on the sufferers' lives. Antipsychotic drugs are the mainstay of the treatment of schizophrenia. But, antipsychotics can lead to a variety of sexual dysfunctions among the males with schizophrenia, which may affect their treatment compliance.

Aim: To assess the prevalence and the types of sexual dysfunctions among married males with remitted schizophrenia who were on a single oral antipsychotic drug from either class (i.e., typical or atypical type).

Materials and Methods: The present cross-sectional study was conducted in a tertiary health-care centre from Central India, with a sample size of 100 married males with schizophrenia who were in the remission phase on a single oral antipsychotic drug. Data were collected by using a convenient sampling method. Socio-demographic profile and clinical variables were recorded in a specific case report form prepared for the study using the Arizona Sexual Experiences (ASEX) scale and the Udvalg for Kliniske Undersogelser (UKU) side-effect rating scale to assess the prevalence and the types of oral antipsychotic drugs induced sexual dysfunctions among study participants.

Results: The prevalence of antipsychotic drug induced sexual dysfunction was 54%. The most common type of sexual side-effect of oral antipsychotic treatment was Decreased Sexual Desire/Drive (DSD) as assessed by both ASEX (94.4%) and UKU (63.0%) scales. Sexual dysfunctions like DSD and Ejaculatory Dysfunction (EJD) were associated with the treatment of schizophrenia with typical antipsychotic drugs.

Conclusion: The present study shows that the treatment with typical antipsychotics was significantly associated with sexual side-effects. So, routine inquiry during the follow-ups should be done regarding the evaluation of sexual side-effects of antipsychotic agents in order to improve treatment compliance and disease prognosis.

Keywords: Ejaculatory dysfunction, Sexuality, Sexual desire, Treatment compliance, Treatment emergent sexual dysfunctions

INTRODUCTION

Human sexuality has always been one of the most important subjects in medical science. Sexuality has an important role in human behaviour [1]. Sexual dysfunctions are manifested as disruption in sexual desire and psychophysiological changes associated with the sexual response cycle in both genders [2]. The prevalence of sexual dysfunctions among the general population is high. About 10-52% of the men and 25-63% of the women have sexual dysfunctions [3-5].

According to Diagnostic and Statistical Manual of Mental Disorders 5th Edition (DSM-5) [2], schizophrenia is a psychiatric disorder characterised by disturbance in the relation between thoughts, emotions and behaviours. Schizophrenia leads to functional impairment through loss of acquired capability to earn a livelihood and through the psychosocial impairment [6]. Peak age of onset of schizophrenia is during the reproductive period, so impaired sexual functioning among the persons who have schizophrenia can affect their ability to have their own family, and thus to fulfil traditional social expectations [7].

Antipsychotics are the mainstay drugs in the treatment for schizophrenia. Role of antipsychotic drugs in sexual dysfunction in persons with schizophrenia has become a recent topic of interest for researchers as antipsychotic drugs induced sexual dysfunction is one of the important side-effects leading to poor treatment compliance, particularly among the males than the females as males tend to be more concerned about sexual dysfunctions than females [8-13].

Old or previous antipsychotics are known as typical or First Generation Antipsychotics (FGAs) or Dopamine Receptor Antagonists (DRAs). Newer antipsychotics are known as atypical or Second-Generation Antipsychotics (SGAs) or Serotonin Dopamine Antagonists (SDAs). To improve the treatment adherence and compliance of persons with schizophrenia, it is a need in current period to consider antipsychotic drugs induced sexual dysfunctions, particularly among the persons with schizophrenia taking SGAs. SGAs can improve the symptoms of schizophrenia, but they can also impair ejaculation and orgasm [13-19]. Sexual dysfunction has also been reported amongst the persons with schizophrenia receiving FGA like Haloperidol [20].

A study from central India had observed that among the psychotropic medicines like antipsychotics and antidepressants, sexual dysfunction was highest among the antipsychotic group. This study had divided sexual dysfunction into levels of severity like mild, moderate and severe but did not assessed the various types of sexual dysfunctions due to psychotropic medicines and their respective prevalences [21].

After reviewing the literature, data on this topic from central India was found to be sparse; hence there was a need for a comprehensive study on assessing the prevalence and the types of sexual dysfunction in the persons diagnosed with schizophrenia receiving oral antipsychotic treatment.

Moreover, an international study from 27 countries had observed that the prevalence of sexual dysfunction among the persons with schizophrenia varied significantly across the regions as perceived by the psychiatrists. The same study concluded that the psychiatrists underestimated the presence of impotence and loss of libido significantly compared to the reports from the patients [22]. Such geographical variation was evident in both the perceptions of psychiatrists and the reports of sexual dysfunction by the patients [22].

Therefore, this study aimed to find the prevalence and the types of sexual dysfunction among a clinical sample of males suffering from schizophrenia who were on a single oral antipsychotic treatment from a tertiary health care centre from central India.

MATERIALS AND METHODS

This cross-sectional study was conducted in an Out-Patient Department of Psychiatry of Dr Panjabrao Alias Bhausaheb Deshmukh Memorial Medical College, Amravati, Maharashtra, India; from September 2016 to November 2017. Prior to the commencement, the study was approved by the Institutional Ethics Committee with a reference letter number:-{PDMMC/SS/Ethical 6036/ 2016}. Informed written consent was taken from all the study participants after explaining them the nature and the purpose of the study.

All participants were subjected to detailed clinical and mental state examinations to rule out any major co-morbid medical, surgical, and psychiatric illnesses other than schizophrenia.

Sample size calculation: Based on the fact that the prevalence of sexual dysfunction among males with a diagnosis of schizophrenia is as high as 50% [22], and applying the formula of sample size determination for cross-sectional study design ($n=4pq/L^2$) [23]. In the formula mentioned, 'p' is the prevalence of sexual dysfunction in persons with schizophrenia, q=100-p, and L is an allowable error and it is 20% of the 'p'. So, at p=50% [22], 95% confidence interval and 20% allowable error of margin, the required sample size was 100.

Inclusion criteria: Married males in the age group of 21 to 40 years, those who fulfilled DSM-5 diagnostic criteria for schizophrenia [2], those who were on a single antipsychotic drug of one class (i.e., either typical or atypical antipsychotic drug) within effective therapeutic dose range [24,25] for atleast six months, those who were well maintained/ in remission phase for at least six months [26] (i.e., without any active psychotic symptoms), and those who were willing to give the consent. Remission in schizophrenia working group had defined symptomatically remitted schizophrenia as the relative absence of core positive and negative symptoms of schizophrenia such as hallucination, delusions, and disorganised speech as well as behaviour for at least six months [27].

In the present study, the participants who were on a single antipsychotic agent from the respective classes were chosen, as the previous study had observed that person with schizophrenia who were in combination therapy on both of typical and atypical antipsychotics had more sexual dysfunction than any one class [28]. Among the typical antipsychotic class, males who were receiving Haloperidol (dose range 10 to 20 mg/day) were included while among the atypical antipsychotic class, males who were receiving Olanzapine (does range 10 to 20 mg/day) were included [24,25]. Among the persons with schizphrenia who were receiving Haloperidol, Trihexiphenidyl was given concurrently in a dose range of 2 to 8 mg/day in order to prevent an occurrence of Haloperidol induced Extrapyramidal disorders/Parkinsonism [29].

Exclusion criteria: Males who did not gave the consent, unmarried males, widower males, who did not fulfilled the DSM-5 diagnostic criteria for schizophrenia [3], those who were not in remission phase, those who were on treatment with more than one antipsychotic drug of same or different classes, those who had a history suggestive of primary sexual dysfunction (i.e., history of sexual dysfunction prior to initiation of antipsychotic medications), those who were suffering from major psychiatric disorders other than Schizophrenia like mood disorders, other psychotic disorders, neurotic disorders and substance dependence except for nicotine [30,31], those who had local injuries to genitalia or had any genital anomalies, those who had major medical and surgical disorders, and those who were on the medications like antihypertensive, antidepressant etc., known to interfere with sexual functioning.

Data were collected by a convenient sampling method after fulfilling inclusion criteria by using a pre-designed, semi-structured questionnaire. It was used to record the socio-demographic data, general examination, systemic examination, and mental status examination of the study participants.

Arizona Sexual Experience Scale (ASEX): It is a clinician administered questionnaire. It is an user friendly 5 item rating scale based on a 6 point Likert scale. It particularly determines modifications and alterations of sexual functions in relation to the intake of medicines or psychotropic substances. Each item explores a particular domain of sexuality, such as "sexual drive, sexual arousal, penile erection, ability to reach orgasm and satisfaction from orgasm". Possible total scores range from 5 to 30, with higher scores indicating more sexual dysfunction. Using the ASEX scale, subjects with a total ASEX score of ≥19, any one item with a score of ≥5, or any three items with a score of ≥4 would have sexual dysfunction. These criteria were used in subsequent analyses to define whether subjects met ASEX criteria for sexual dysfunction [32].

Udvalg for Kliniske Undersogelser (UKU) side-effect rating scale: UKU scale helps in assessing the treatment emergent sexual side-effects of the drugs. Side-effect assessment part is rated on a four-point scale. UKU mainly measures the five components - Increased Sexual Desire (ISD), DSD, ED, EJD, and Orgasmic Dysfunction (OD). For statistical analysis, persons with a score of one or higher on any of the relevant items of the UKU side-effect rating scale were considered [33].

STATISTICAL ANALYSIS

Data from both the ASEX and the UKU clinician rated scales were entered with Microsoft Excel version 2007. Final data were analysed with Statistical Package for the Social Sciences (SPSS) statistical software version 22 (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.). Continuous data were presented as mean and Standard Deviation (SD); categorical data were presented as frequency and percentage. Chi-square and Fisher-exact tests were used to determine the level of significance. Central tendencies and dispersion of variables were studied using the descriptive statistical methods such as mean and SD. Study groups with sexual dysfunction and without sexual dysfunction were matched according to the socio-demographic profiles to identify confounding variables. Matching was performed according to the type of variable using the Chi-square test and the Student's t-test. The level of significance was set at 0.05.

RESULTS

Socio-demographic variables and schizophrenia related variables among the study participants:

[Table/Fig-1] shows that an equal number of participants (50%) were present in age groups 21 to 30 years and 31 to 40 years. The majority of participants were literate (90%), unemployed (74%), from an urban area (79%), and belonged to the Hindu religion (78%).

Among schizophrenia related variables, the majority of participants had 6 to 10 years of illness duration (34%), were on atypical antipsychotic drug (67%), had a duration of antipsychotic exposure for up to 12 months (61%), and had a negative family history of Schizophrenia (51%). The mean dose of typical antipsychotic (Haloperidol) was 17.27±3.14 mg/day. The mean dose of atypical antipsychotic (Olanzapine) was 15.11±3.67 mg/day.

Socio-demographic variables and Schizophrenia related variables	n
Age group (years)	Mean age±SD 31.32±6.05 Range=21-40 years
21-30	50
31-40	50
Education	
Literate	90
Illiterate	10
Employment	
Employed	26
Unemployed	74
Residence	
Urban	79
Rural	21
Religion	
Hindu	78
Muslim	13
Others	9
Duration of Schizophrenia illness (years)	Mean±SD=8.51±5.49
Up to 5	33
6 to 10	34
11 to 15	22
16 and above	11
Antipsychotic medication type	
Typical (Haloperidol)	33
Atypical (Olanzapine)	67
Duration of antipsychotic treatment (months)	Mean±SD=23.39±19.93
Up to 12	61
13 to 36	15
37 and above	24
Doses of antipsychotics (mg/day) Typical	Mean±SD=17.27±3.14
10 to 15	14
16 to 20	19
Atypical	Mean dose±SD=15.11±3.67
10 to 15	43
16 to 20	24
Family history of Schizophrenia	
Present	49
Absent	51

[Table/Fig-1]: Socio-demographic variables and schizophrenia related variables among the males with schizophrenia (n=100).

Distribution of cut-off scores of ASEX and prevalence of Alterations of Sexual Functions in Males with Schizophrenia:

[Table/Fig-2] shows that out of 100 males with schizophrenia, 54 had antipsychotic induced alterations of sexual functions.

Profile of Distribution of Types of Alterations of Sexual Functions in Males with Schizophrenia according to ASEX Scale Scores:

[Table/Fig-3] shows that out of 54 males with antipsychotic induced alterations of sexual functions, based on the ASEX scale scores, the most common alteration of the sexual function was low sexual drive which was present in 51 (94.4%).

ASEX cut-off scores	Persons with Schizophrenia on antipsychotic treatment having sexual dysfunction according to ASEX cut-off scores n, (%)
ASEX total score of ≥19	11 (20.4%)
ASEX scores of 4 in three domains but a total score of <19	33 (61.1%)
ASEX score of 5 in 1 domain but total score of <19	10 (18.5%)

[Table/Fig-2]: Distribution of cut off scores of ASEX in males with schizophrenia (n=54).
ASEX: Arizona sexual experience scale

Types of alterations of sexual functions according to ASEX scale	n (%)
Low sexual drive/desire	51 (94.4)
Difficulty in sexual arousal	46 (85.2)
Erectile Dysfunction (ED)	36 (66.7)
Difficulty in reaching orgasm	30 (55.6)
Dysfunction of orgasmic satisfaction	24 (44.4)

[Table/Fig-3]: Distribution of types of alterations of sexual functions according to ASEX scores in males with schizophrenia receiving oral antipsychotic treatment (n=54).
ASEX: Arizona sexual experience scale

Profile of distribution of types of sexual dysfunction according to UKU scale scores in males with Schizophrenia receiving antipsychotic treatment:

[Table/Fig-4] shows that based on UKU scale scores, 63 had DSD, 43 had ED, 44 had EJD, and 42 had OD.

Types of sexual dysfunction according to UKU scale	n
Diminished Sexual Desire (DSD)	
Present	63
Absent	37
Erectile Dysfunction (ED)	
Present	43
Absent	57
Ejaculatory Dysfunction (EJD)	
Present	44
Absent	56
Orgasmic Dysfunction (OD)	
Present	42
Absent	58

[Table/Fig-4]: Distribution profile of types of sexual dysfunction according to UKU scores in males with schizophrenia (n=100).
UKU: Udvalg for KliniskeUndersogelser side-effect rating scale

Relationship between Socio-demographic Variables as well as Schizophrenia-related Variables and Types of Alterations of Sexual Functions According to ASEX Scale Scores:

[Table/Fig-5] shows that, among the socio-demographic variables, study participants in age group of 31 to 40 years had significant penile ED and those belonged to urban area of residence had impaired sexual drive/desire. Among the schizophrenia related variables, presence of family history of schizophrenia was associated with impaired sexual drive/desire, impaired sexual arousal, ED and absence of orgasmic satisfaction.

Relationship between Socio-demographic Variables as well as Schizophrenia Related Variables and Types of Sexual Dysfunction According to UKU Scale Scores:

[Table/Fig-6] shows that the antipsychotic induced sexual dysfunctions like DSD, EJD and OD in males with schizophrenia were associated with illiteracy. Rest of the socio-demographic variables were not associated with any type of sexual dysfunction.

Socio-demographic variables and schizophrenia related variables	Alterations of sexual functions according to ASEX scale scores													
	Sexual drive/ desire (n=100)			Sexual arousal (n=100)			Penile erection (n=100)			Ability to reach orgasm (n=100)			Orgasmic satisfaction (n=100)		
	- (n1 =51)	+ (n2 =49)	p	- (n1 =46)	+ (n2 =54)	p	- (n1 =36)	+ (n2 =64)	p	- (n1 =30)	+ (n2 =70)	p	- (n1 =24)	+ (n2 =76)	p
Age group (years)															
21 to 30	26	24	0.84	23	27	0.99	14	36	0.04*	18	32	0.09	13	37	0.63
31 to 40	25	25		23	27		22	28		12	38		11	39	
Education															
Literate	46	44	0.94	40	50	0.37	32	58	0.77	27	63	0.97	23	67	0.30
Illiterate	5	5		6	4		4	6		3	7		1	9	
Occupation															
Employed	14	12	0.73	11	15	0.66	12	14	0.21	8	18	0.92	5	21	0.50
Unemployed	37	37		35	39		24	50		22	52		19	55	
Residence															
Urban	44	35	0.03*	39	40	0.09	29	50	0.38	22	57	0.36	19	60	0.98
Rural	7	14		7	14		7	14		8	13		5	16	
Religion															
Hindu	44	34	0.09	36	42	0.99	29	49	0.89	24	54	0.86	22	56	0.17
Muslim	5	8		6	7		4	9		4	9		1	12	
Other	2	7		4	5		3	6		2	7		1	8	
Duration of Schizophrenia (years)															
Up to 5	17	16	0.86	12	21	0.52	6	27	0.06	10	23	0.18	9	24	0.76
6 to 10	19	15		18	16		16	18		14	20		6	28	
11 to 15	10	12		10	12		10	12		5	17		6	16	
16 and above	5	6		6	5		4	7		1	10		3	8	
Duration of antipsychotic treatment (months)															
Up to 12	32	29	0.84	25	36	0.37	19	42	0.10	21	40	0.26	16	45	0.22
13 to 36	8	7		9	6		9	6		5	10		1	14	
37 and above	11	13		12	12		8	16		4	20		7	17	
Doses of antipsychotics (mg/day)															
10 to 15	26	29	0.40	28	27	0.27	18	37	0.45	19	36	0.27	11	44	0.30
16 to 20	25	20		18	27		18	27		11	34		13	32	
Family history of Schizophrenia															
Present	34	15	0.0003*	34	15	0.01*	29	20	0.01*	18	31	0.07	17	32	0.01*
Absent	17	34		12	39		7	44		12	39		7	44	

[Table/Fig-5]: Relationship between socio-demographic variables as well as schizophrenia related variables and different types of alterations of sexual functions determined by ASEX scale scores.
*Statistically significant; "+": present, "-": absent; Chi-square and Fisher exact tests were used

Among the schizophrenia related variables, none were associated with the sexual dysfunction assessed by UKU scale scores.

Relationship between Types of Antipsychotic Drugs and Types of Alterations of Sexual Functions Assessed by ASEX Scale:

[Table/Fig-7] shows that none of the types of alterations of sexual functions according to ASEX scale scores were associated with any particular type of antipsychotic drugs.

Relationship between Types of Antipsychotic Drugs and Types of Sexual Dysfunction Assessed by the UKU Scale:

[Table/Fig-8] shows that sexual dysfunctions like DSD (p=0.02) and EJD (p=0.02) in males with schizophrenia were associated with the treatment with typical antipsychotic drugs.

DISCUSSION

Socio-demographic profile of the study participants: In the present study, there were 100 males with schizophrenia in the age range of 21 to 40, with mean age of 31.32±6.05 years [Table/Fig-1]. Minimum age of the study participants was kept at 21 years because the legal age of marriage for Indian males is 21 years. The maximum age of the study participants was kept at 40 years because 40% of the males are affected by sexual dysfunction, mainly by the Erectile Dysfunction (ED) at this age [27]. In the present study, majority of study participants (79%) were from the urban area [Table/Fig-1]. Present study finding reflects that access to experts like sexologists, urologists and andrologists is available primarily to men living in urban areas, where there is a higher concentration of tertiary health care hospitals and specialists [34]. A study from rural Northern India had concluded that, there is a shortage of trained psychiatrists in rural areas. Therefore, it is a need of the hour to train primary care physicians in identifying and treating less severe or referring complicated cases of sexual health disorders to specialists [35].

Sexual dysfunction profile among the study participants: In the present study, according to ASEX scale score, prevalence of sexual dysfunction in clinical population of schizophrenia receiving antipsychotic drugs was 54% [Table/Fig-2]. This finding was similar to previous study finding where the prevalence of sexual dysfunction among persons with Schizophrenia was 50% [22]. In contrast to present study, Aggarwal S et al., observed a low prevalence of sexual dysfunction among persons with schizophrenia and it was relatively 40.8% [36]. The low prevalence in their study might be due to the fact that they had not assessed impact of antipsychotics in causation of sexual dysfunction in persons with schizophrenia [36].

Socio-demographic Variables and schizophrenia related variables	Different types of sexual dysfunction according to UKU scale scores										
	DSD (n=100)		p	ED (n=100)		p	EJD (n=100)		p	OD (n=100)		p
	+ (n1=63)	- (n2 =37)		+ (n1=43)	- (n2 =57)		+ (n1=44)	- (n2 =56)		+ (n1=42)	- (n2 =58)	
Age group (years)												
21 to 30	34	16	0.30	23	27	0.54	25	25	0.22	25	25	0.10
31 to 40	29	21		20	30		19	31		17	33	
Education												
Literate	54	36	0.03*	37	53	0.20	36	54	0.03*	35	55	0.03*
Illiterate	9	1		6	4		8	2		7	3	
Occupation												
Employed	18	8	0.44	12	14	0.70	14	12	0.24	14	12	0.15
Unemployed	45	29		31	43		30	44		28	46	
Residence												
Urban	47	32	0.15	31	48	0.14	32	47	0.17	30	49	0.11
Rural	16	5		12	9		12	9		12	9	
Religion												
Hindu	50	28	0.75	34	44	0.93	36	42	0.22	33	45	0.12
Muslim	7	6		5	8		3	10		3	10	
Other	6	3		4	5		5	4		6	3	
Duration of Schizophrenia (years)												
Up to 5	25	8	0.23	18	15	0.32	17	16	0.55	19	14	0.10
6 to 10	21	13		11	23		15	19		14	20	
11 to 15	11	11		9	13		7	15		6	16	
16 and above	6	5		5	6		5	6		3	8	
Duration of antipsychotic treatment (months)												
Up to 12	43	18	0.10	28	33	0.54	30	31	0.09	28	33	0.13
13 to 36	9	6		7	8		8	7		8	7	
37 and above	11	13		8	16		6	18		6	18	
Doses of antipsychotics (mg/day)												
10 to 15	32	23	0.27	21	34	0.28	21	34	0.19	23	32	0.96
16 to 20	31	14		22	23		23	22		19	26	
Family history of Schizophrenia												
Present	31	18	0.95	23	26	0.43	23	26	0.56	20	29	0.81
Absent	32	19		20	31		21	30		22	29	

[Table/Fig-6]: Relationship between socio-demographic variables as well as schizophrenia related variables and different types of sexual dysfunction determined by UKU scale scores.
*Statistically significant; UKU: Udvalg for kliniske undersogelser side-effect rating scale, DSD: Diminished sexual desire/ drive, ED: Erectile dysfunction, EJD: Ejaculatory dysfunction, OD: Orgasmic dysfunction, "+": present, "-": absent; Chi-square and Fisher exact tests were used

Types of alterations of sexual functions assessed by ASEX scale	Types of Antipsychotic drugs		p-value
	Typical (Haloperidol) n1=33 (%)	Atypical (Olanzapine) n2=67 (%)	
Sexual drive/desire			
Absent	14 (42.4)	37 (55.2)	0.22
Present	19 (57.6)	30 (44.8)	
Sexual arousal			
Absent	14 (42.4)	32 (47.8)	0.61
Present	19 (57.6)	35 (52.2)	
Penile erection			
Absent	10 (30.3)	26 (38.8)	0.40
Present	23 (69.7)	41 (61.2)	
Ability to reach orgasm			
Absent	9 (27.3)	21 (31.3)	0.67
Present	24 (72.7)	46 (68.7)	
Orgasmic satisfaction			
Absent	5 (15.2)	19 (28.4)	0.14
Present	28 (84.8)	48 (71.6)	

[Table/Fig-7]: Relationship between types of antipsychotic drugs and types of sexual dysfunction according to ASEX scale scores.
ASEX: Arizona sexual experience scale; Chi-square and Fisher exact tests were used

They had assessed the relationship between the schizophrenia and sexual dysfunction without an attempt to study the association of sexual dysfunction with any specific antipsychotic drugs [36].

There is ample evidence that antipsychotics lead to high rate of sexual dysfunction ranging from 30-80% [37], which was similar to present study finding. A study has found that 38.1% persons with schizophrenia had sexual dysfunction while on treatment with haloperidol [20]. Same study had also found that 35.3% of the persons with schizophrenia with sexual dysfunction were on olanzapine, 18.2% were on Quetiapine, and 43.2% were on Risperidone [20]. Prevalence of sexual dysfunction in persons with schizophrenia was investigated as a part of a large (n=7655), prospective, international (27 countries) study. Based on the patient reports, sexual dysfunction affected approximately 50% of the persons, and the prevalence of complaints varied significantly between the regions (p<0.0001) [22].

In the present study, out of those 54 persons who had sexual dysfunction according to ASEX scale scores, majority (94.4%) had low sexual drive [Table/Fig-3]. Findings similar to present study was observed by Aggarwal S et al., where in majority of the study participants (44.7%) had low sexual drive according to ASEX scale score [36]. In the present study, according to UKU scale scores, majority (63%) had DSD, which also matches with finding on ASEX

Types of sexual dysfunction assessed by UKU scale	Types of Antipsychotic drugs		p-value
	Typical (Haloperidol) n1=33 (%)	Atypical (Olanzapine) n2=67 (%)	
Decreased Sexual Desire (DSD)			
Present	26 (78.8)	37 (55.2)	0.02*
Absent	7 (21.2)	30 (44.8)	
Erectile Dysfunction (ED)			
Present	16 (48.5)	27 (40.3)	0.43
Absent	17 (51.5)	40 (59.7)	
Ejaculatory Dysfunction (EJD)			
Present	19 (57.6)	25 (37.3)	0.02*
Absent	14 (42.4)	42 (62.7)	
Orgasmic Dysfunction (OD)			
Present	15 (45.5)	27 (40.3)	0.62
Absent	18 (54.5)	40 (59.7)	

[Table/Fig-8]: Relationship between types of antipsychotic drugs and types of sexual dysfunction according to UKU scale scores.
*Statistically significant; UKU: Udvalg for kliniske undersogelser side-effect rating scale; Chi-square and Fisher exact tests were used

scale where low sexual drive/desire was the most common sexual dysfunction based on ASEX scale scores (94.4%) [Table/Fig-3,4]. Nagaraj AK et al., found that according to UKU scale score, majority of their study participants (41.7%) had ED, which is in contrast to present study finding [38]. Such a difference in profile might be secondary to differences in inclusion criteria adopted for studies.

Nagaraj AK et al., had included study participants of ages between 18 to 50 years which was broader than present study age range [38]. In their study, ED was most common sexual dysfunction which might be due to fact that about 40% of men above age 40 years suffer from ED [27]. A study had observed that among men, less desirability for sex, less achievable, and maintainable penile erection, premature ejaculation, and reduced orgasmic satisfaction were noted [22].

Relationship between Socio-demographic Characteristics, Schizophrenia Related Variables and Various Types of Sexual Dysfunctions in Study Participants

In the present study, among the socio-demographic characteristics of study participants, age group of 31 to 40 years was associated with ED and those belonged to urban area of residence had impaired sexual drive/desire based on ASEX scale scores [Table/Fig-5]. Based on UKU scale scores, among the socio-demographic characteristics, only educational status (mainly illiteracy) was associated with presence of various types of sexual dysfunctions mainly decrease sexual desire, EJD and OD [Table/Fig-6]. In contrast to present study finding, Nagaraj AK et al., found that none of the socio-demographic variables had association with sexual dysfunction [38]. Prabhakaran DK et al., concluded that people with higher education level tend to had awareness and less stigmatising attitude towards reporting sexual dysfunction which is in contrast to present study finding [39].

In the present study, among schizophrenia related variables, presence of family history of schizophrenia was associated with impaired sexual drive/desire, impaired sexual arousal, ED and absence of orgasmic satisfaction according to scores on ASEX scale [Table/Fig-5]. In the present study, among schizophrenia related variables, none of variable was associated with sexual dysfunctions assessed by UKU scale scores [Table/Fig-6]. Such a difference in findings using two different scales (i.e., ASEX and UKU) may be due to different types of sexual dysfunctions assessed by these two scales apart from their different structural styles of items/questions included.

Relationship between Doses of Antipsychotics, Duration of Antipsychotic Treatment, Types of Antipsychotic Drugs and Various Types of Sexual Dysfunctions in Study Participants

In the present study, doses of antipsychotics in therapeutic dose range were not associated with any type of sexual dysfunctions based on both ASEX and UKU scale scores [Table/Fig-5,6]. A study observed that typical antipsychotic drug like Haloperidol raises serum prolactin level in therapeutic dose range which leads to sexual dysfunction [15]. Same study concluded that lowering the dosage of offending drug like Haloperidol or switching to a prolactin-sparing antipsychotic like olanzapine often reduces sexual side-effects [15]. In present study, duration of antipsychotic treatment was not associated with occurrence of any type of sexual dysfunction based on both ASEX and UKU scale scores [Table/Fig-5,6]. It was a novel finding in the present study as a systematic review conducted by Costa AM et al., found that none of the studies had assessed the effect of duration of antipsychotic treatment on antipsychotic induced sexual dysfunctions among the persons with schizophrenia [40].

In the present study, none of the types of sexual dysfunctions assessed by ASEX scale scores were associated with any particular type of antipsychotic drugs [Table/Fig-7]. Sexual dysfunctions assessed according to UKU scale scores, like DSD and EJD in persons with schizophrenia were associated with treatment with typical antipsychotic like haloperidol [Table/Fig-8]. Nagaraj AK et al., also observed a similar finding that, sexual dysfunction was significantly higher with typical than atypical antipsychotics [38]. In their study, ED was the most common sexual dysfunction [38]. In the present study, none of the types of sexual dysfunction was associated with treatment with atypical antipsychotic agents [Table/Fig-7,8]. Mahmoud A et al., had observed a similar finding [41]. They concluded that atypical antipsychotics could improve sexual dysfunction in persons with schizophrenia [41]. Bobes J et al., had observed a similar finding that majority of persons with schizophrenia had sexual dysfunction while on treatment with typical antipsychotic like haloperidol [20]. In their study, majority (38.1%) had haloperidol induced sexual dysfunction, while lesser i.e., 35.3% had sexual dysfunction while on olanzapine [20].

Limitation(s)

First, due to the cross-sectional study design, temporal assessment was not done. Secondly, the other fairly key drawbacks were recall bias and social desirability bias. As participants were questioned about details of their sexual functioning, they might have answered in such a way as to portray themselves in a good light. Hence, social desirability bias could be present. Thirdly, future studies should assess the relation between the couples' satisfaction between the males with schizophrenia on treatment with antipsychotics and their wives.

CONCLUSION(S)

In conclusion, persons with schizophrenia receiving antipsychotic treatment frequently experience sexual side-effects. Treatment with typical than atypical antipsychotics was significantly associated with sexual side-effects. So, routine inquiry during follow-ups should be made regarding the evaluation of the sexual side-effects of antipsychotic agents in order to improve treatment compliance and disease prognosis.

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