

Impact of Oral Cannabis Consumption on Health: A Cross-sectional Study

Cannabis is one of the common substances of abuse globally as well as in India. Literature reveals that the cannabis is being used for medicinal and religious purposes in India since 1000 BC. It is also recorded in ancient Atharvaveda where it is described as one of the five sacred plants on Earth.^[1] The cannabis commonly used in India is derived from the flowers, leaves, fruit, young twigs, and bark of the stem of the plant *Cannabis sativa*, which belongs to the family Cannabaceae. Cannabis in India is usually used in forms such as hashish, bhang, ganja, and charas.^[1] Interestingly, all other forms of cannabis except bhang are banned as per the Narcotic Drugs and Psychotropic Substances Act, 1985.^[1]

There have been limited studies documenting the prevalence and impact of cannabis use in Indian population, and it seems that the abuse of this illicit substance is underreported in India. In India, 3% of the population consumes cannabis in various forms.^[2]

The worldwide regulatory status of cannabis is complex as consumption of cannabis is illegal in most parts of the world, thus the research on cannabis was at bay for the longest time and its therapeutic value could not be established, despite positive claims in the preclinical and isolated clinical studies. It has been a challenge to understand the impact of cannabis on human health and the reports dangled between useful and harmful arenas for decades.

In many parts of India, cannabis is commonly used unofficially for recreational purposes by oral route. But till date, no authentic data is available to determine the effect of cannabis on the health of population of Jodhpur. Thus, the present study is undertaken to generate data for health impact of cannabis consumption in urban and rural parts of Jodhpur.

The study was conducted in urban and rural areas of Jodhpur, Rajasthan, India. Ethical clearance was obtained from the institutional ethics committee (IEC No.: AIIMS/IEC/2016/175). Informed voluntary consent was obtained from all the participants. The study subjects were selected from the different wards of the urban area. In the rural area, a village from one of the ten blocks of Jodhpur was selected randomly. Only those aged 18 years and above were included in the study. Participants did not receive any compensation for participation.

A structured questionnaire was used to conduct the interview by the trained interviewers to collect data. Snowballing technique was employed to identify subjects who use cannabis or were affected by cannabis use. The patients who gave written informed consent were enrolled in the study. Considering the

importance of trust, confidentiality, and discrete, locations selected for interviews were kept private and confidential.

The detailed information about the cannabis was gathered through a structured questionnaire which included sociodemographic characteristics, for example, area of residence, education, occupation, marital status and duration and frequency of use, method of administration, clinical history, systemic effects of cannabis, and impact of cessation of cannabis consumption. Anthropometric parameters such as height, weight, abdominal circumference, and body mass index were recorded; systolic and diastolic BP, and pulse were also measured as part of patient assessment.

The data were analyzed using SPSS 21.0 (Statistical Package for IBM Social Science version 18 was used for the analysis). Descriptive statistics including simple proportions were used to describe demographics, usage characteristics, medical conditions, and side effects.

The study includes 97 cannabis users above 18 years of age. Thirty-one percent of users were of the age range between 20 and 30 years and only 7% of users were of the age above 70 years of age. When the sociodemographic features of cannabis users were compared with noncannabis users, it was observed that the cannabis consumption had no association with level of education and the marital status.

Although the consumers who were laborers (31.96%) or in business (26.80%) showed a higher percentage of cannabis consumption than in professionals (9.27%), skilled workers (13.40%), retired people (9.28%), and nonworkers (9.28%) [Table 1].

The effect of cannabis consumption on various body systems was also not very significant. In the gastrointestinal system, the most common effect was increase in gastric emptying (95.88%), diarrhea (100%), and gain of appetite (95.88%). Gain in weight was noted in 63% of cannabis users. There was no significant impact on libido and immunity. Among the psychological effects, the most prominent were excessive sleep (91.75%), euphoria (95.88%), and desire to speak more (87.63%) [Table 2].

The most common symptom of cannabis withdrawal was feeling of restlessness (46.93%). Other symptoms such as anger (3.09%), anxiety (6.19%), and depression (20.61%) were not commonly reported on cannabis withdrawal.

Most of the studies reporting the effect of cannabis in health include the subjects consuming cannabis by smoking, and data are not much available to justify if the similar adverse effects are observed with oral route.^[3,4]

Table 1: Sociodemographic features of various cannabis-consuming age groups

Variable	20-30, n (%)	31-40, n (%)	41-50, n (%)	51-60, n (%)	61-70, n (%)	71 and above, n (%)	Total, n (%)
Marital status							
Single	1 (1.03)	3 (3.09)	2 (2.06)	1 (1.03)	0	0	7 (7.22)
Married	7 (7.21)	15 (15.46)	28 (28.86)	19 (19.59)	13 (13.40)	7 (7.21)	89 (91.75)
Others	0	0	0	0	1 (1.03)	0	1 (1.03)
Educational qualifications							
Illiterate	2 (2.06)	0	4 (4.12)	2 (2.06)	4 (4.12)	0	12 (12.97)
Primary	0	5 (5.15)	5 (5.15)	1 (1.03)	2 (2.06)	0	13 (13.40)
Middle school	1 (1.03)	2 (2.06)	5 (5.15)	4 (4.12)	3 (3.09)	5 (5.15)	20 (20.62)
High school	4 (4.12)	3 (3.09)	7 (7.21)	5 (5.15)	3 (3.09)	2 (2.06)	24 (24.74)
Graduate	1 (1.03)	6 (6.18)	9 (9.28)	8 (8.24)	1 (1.03)	0	25 (25.77)
Postgraduate	0	2 (2.06)	0	0	1 (1.03)	0	3 (3.09)
Employment status							
Professional	1 (1.03)	2 (2.06)	2 (2.06)	3 (3.09)	1 (1.03)	0	9 (9.27)
Business	1 (1.03)	4 (4.12)	12 (12.97)	5 (5.15)	3 (3.09)	1 (1.03)	26 (26.80)
Laborer	5 (5.15)	9 (9.27)	8 (8.24)	5 (5.15)	4 (4.12)	0	31 (31.96)
Skill worker	0	0	5 (5.15)	5 (5.15)	1 (1.03)	2 (2.06)	13 (13.40)
Retired	0	0	0	1 (1.03)	4 (4.12)	4 (4.12)	9 (9.28)
Not working	1 (1.03)	3 (3.09)	3 (3.09)	1 (1.03)	1 (1.03)	0	9 (9.28)
Family type							
Nuclear	4 (4.12)	10 (10.30)	21 (21.64)	12 (12.97)	4 (4.12)	2 (2.06)	54 (54.64)
Joint	1 (1.03)	6 (6.18)	8 (8.24)	8 (8.24)	8 (8.24)	5 (5.15)	36 (37.11)
Alone	3 (3.09)	2 (2.06)	1 (1.03)	0	2 (2.06)	0	8 (8.25)
Locality							
Urban	4 (4.12)	13 (13.40)	27 (27.84)	18 (18.56)	14 (14.43)	7 (7.21)	83 (85.56)
Rural	4 (4.12)	5 (5.15)	3 (3.09)	2 (2.06)	0	0	14 (14.43)

Table 2: Systemic effects in various age groups consuming cannabis

Symptom	20-30, n (%)	31-40, n (%)	41-50, n (%)	51-60, n (%)	61-70, n (%)	71 and above, n (%)	Total, n (%)
Oral	6 (6.18)	9 (9.27)	15 (15.46)	7 (7.21)	7 (7.21)	3 (3.09)	47 (48.45)
Git							
Increased gastric emptying	8 (8.24)	18 (18.55)	29 (29.90)	18 (18.55)	13 (13.40)	7 (7.21)	93 (95.88)
Constipation	0	1 (1.03)	1 (1.03)	1 (1.03)	0	0	3 (3.09)
Diarrhea	8 (8.24)	18 (18.55)	30 (30.93)	20 (20.62)	14 (14.43)	7 (7.21)	97 (100)
Loss of appetite	0	0	1 (1.03)	0	1 (1.03)	0	2 (2.06)
Increase in appetite	8 (8.24)	18 (18.55)	29 (29.90)	18 (18.55)	13 (13.40)	7 (7.21)	93 (95.88)
Gain in weight	2 (2.06)	11 (11.34)	25 (25.77)	13 (13.40)	8 (8.24)	4 (4.12)	63 (64.98)
Libido	4 (4.12)	12 (12.37)	17 (17.53)	9 (9.27)	2 (2.06)	0	44 (45.36)
Immunity	2 (2.06)	1 (1.03)	2 (2.06)	2 (2.06)	1 (1.03)	0	8 (8.25)
Morning stiffness	2 (2.06)	1 (1.03)	2 (2.06)	1 (1.03)	1 (1.03)	0	7 (7.21)
Psychological effects							
Tremors	3 (3.09)	5 (5.15)	3 (3.09)	2 (2.06)	3 (3.09)	0	16 (16.49)
Excessive sleep	8 (8.24)	18 (18.55)	26 (26.80)	18 (18.55)	12 (12.37)	7 (7.21)	89 (91.75)
Lethargy	8 (8.24)	12 (12.37)	19 (19.59)	13 (13.40)	5 (5.15)	0	57 (58.76)
Feeling of well-being	1 (1.03)	9 (9.27)	19 (19.59)	7 (7.21)	10 (10.30)	3 (3.09)	49 (50.52)
Drowsiness	6 (6.18)	7 (7.21)	3 (3.09)	1 (1.03)	3 (3.09)	0	20 (20.62)
Stimulated feeling	1 (1.03)	6 (6.18)	17 (17.53)	8 (8.24)	4 (4.12)	1 (1.03)	37 (38.14)
Anxiety	1 (1.03)	10 (10.30)	21 (21.6)	8 (8.24)	6 (6.18)	1 (1.03)	47 (48.45)
Reduced attention span	2 (2.06)	4 (4.12)	13 (13.40)	6 (6.18)	6 (6.18)	3 (3.09)	34 (35.05)
Euphoria	8 (8.24)	17 (17.52)	30 (30.93)	18 (18.55)	14 (14.43)	6 (6.18)	93 (95.88)
Impaired judgment skills	3 (3.09)	4 (4.12)	3 (3.09)	3 (3.09)	2 (2.06)	0	15 (15.46)
Desire to speak more freely	8 (8.24)	16 (16.49)	26 (26.80)	17 (17.53)	12 (12.37)	6 (6.18)	85 (87.63)

In the present study, participants did not report any significant adverse effect and were healthy with lesser incidence of neurological, psychological, and other diseases such as diabetes, chronic pain, and glaucoma. The lesser incidence of psychological disturbances in our findings are in contrast with several findings.^[5,6]

Several studies reported that cannabis consumption is often associated with mental disorders,^[7,8] such as depersonalization, amotivational syndrome, and severe cannabis withdrawal symptoms.^[7,9] In our study, we did not encounter any subject with such psychological symptoms.

It is established that the activation of CB₁ receptors by the cannabis compounds leads to inhibition of adenylyl cyclase and blockade of voltage-operated calcium channel; this suppresses neuronal excitability and inhibition of neurotransmission of serotonin.^[10] The same mechanism through activation of CB₁ receptors could be responsible for lesser psychological disturbances reported by cannabis users in our study. Increase in weight was reported by cannabis users in the present study, which could be due to the increase in appetite.

These contrast findings in the present study could be attributed to the known fact that different strains of cannabis plants in various parts of the world have different compositions of the compounds. Cannabis plants grown in some areas of the world may have a higher concentration of cannabis compounds which are associated with the detrimental effects while the species of plants grown in some other part of the globe may have a proportion of favorable cannabis compounds in more composition. Therefore, more research is warranted to analyze the composition of different species so that the beneficial aspects of cannabis may be harnessed. Besides this, the dose optimization along with the adequate dosing schedule needs to be established through pharmacokinetic studies.

In conclusion, the present study exhibits that the cannabis consumption by oral route does not lead to serious adverse effects. Such finding is of importance as various studies are reporting that cannabis has a multifaceted therapeutic implication, but due to the stigma of serious adverse effects associated with it, the therapeutic value of cannabis cannot be used for advantage to human health. Further studies need to be done to observe the effects of cannabis at cellular and molecular levels to relate these symptomatic findings with laboratory findings.

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Conflicts of interest

There are no conflicts of interest.

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