

Sputum Characteristics among “Chillum” Smoking ‘Sadhus’ of Kumbh Mela

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Abstract

A chillum consist a mixture of Cannabis and tobacco. Cannabis, also known as marijuana; it is a psychoactive drug from the Cannabis plant intended for medical or recreational use; nowadays widely being abused for getting high and temporary relaxation. Sputum examination of chillum smokers may indicate harmful effects of chillum smoking on lungs. Objectives of present study were to study the sputum characteristics and differential cell count of chillum smoking Sadhus of Kumbh Mela. Present descriptive observational study was conducted among fifty Sadhus of Kumbh Mela of Nashik. Participants were selected using purposive sampling method. In present study all sputum samples showed raised differential cell count and statistically significant association was observed between differential cell like Neutrophils, Lymphocytes and Macrophages with different content present in chillum.

1. Introduction

A chillum was invented in India and culture of chillum-owning and smoking in a chillum has spread from India to the rest of the world since the mid-1960s. Chillum traditionally made of clay; it is a straight conical pipe with end-to-end channel¹. Since the eighteenth century monks known as Sadhus in India have been smoking chillum and this practice could be compared with spiritual practice of drinking red wine by Catholics². The size of the chillum will have direct bearing on the effect that smoking will have. Small chillums will bring hot smoke directly in to mouth. Typically a chillum consist a mixture of Cannabis and tobacco. Cannabis, also known as marijuana; it is a psychoactive drug from the Cannabis plant intended for medical or recreational use; nowadays widely being abused for getting high and temporary relaxation³. The

lungs are normally cleaned by hairs called cilia, but smoking in general damage and paralyze the cilia, when a person smokes, cilia's movement becomes slow and remains impaired for several hours afterward; causing stagnation of all matter including the microbes thus causing chronic inflammation and infection⁴. Cannabis smoke contains a mixture of poisonous gases that are quantitatively similar to that found in tobacco smoke⁵. Many researchers mentioned that cannabis smoking may be even more harmful than tobacco smoking, since the technique for smoking cannabis generally involves unfiltered smoking, larger puffs, deeper inhalation, longer breath holding that leads to three to five times more tar deposition that occurs in the lungs which may lead to undesirable effects on the airways and lung parenchyma.

Our knowledge on effects of Chillum smoking on sputum of Sadhus is limited as they belong to very secluded

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society of the country. With this back ground in mind present study was conducted to study sputum characteristics among chillum smoking sadhus during Kumbh Mela of Nashik.

2. Aims and Objectives

- To study various sputum characteristics among chillum smoking Sadhus.
- To study the differential cell count of sputum of Sadhus exposed to chillum smoke.
- To study cytological characteristic of sputum of Sadhus exposed to chillum smoke.

3. Material and Methods

The present descriptive type of observational study was carried at Kumbh Mela; hosted by holy city Nashik of Maharashtra state. Institutional Ethical Committees (IEC) approval was obtained before conducting a study. Sadhus who have been smoking chillum since 10 years or more and have adequate expectoration were included in this study as long term marijuana smoking is associated with increased respiratory symptoms like cough and expectoration⁸. Those who have active haemoptysis and not willing for participation were excluded. A total 43 sample size was obtained using statistical formula $n = Z^2_{(1-\alpha/2)}(1-P)/d^2$ where 'P' was considered 50% from the pilot study conducted among Sadhus; for calculating sample size, 'Z' was 1.96 at 95% confidence interval and 'd' was 15% absolute precision. Calculated sample was rounded of to 50. Purposive sampling was used for collection of data. After explaining the purpose Sadhus were asked to expectorate into a sterile plastic container. To get a good sample i.e., the thick secretions from the lungs, rather than saliva, the patient were asked to take at least three deep breaths, then force out a deep cough with emphasis on the importance of bringing up sputum. Whole procedure of sputum collection was done away from their residential site. Once collected the container was securely capped and was sent to the lab immediately, without refrigeration. Data was entered in Microsoft excel and statistical analysis was done using SPSS version 21 software.

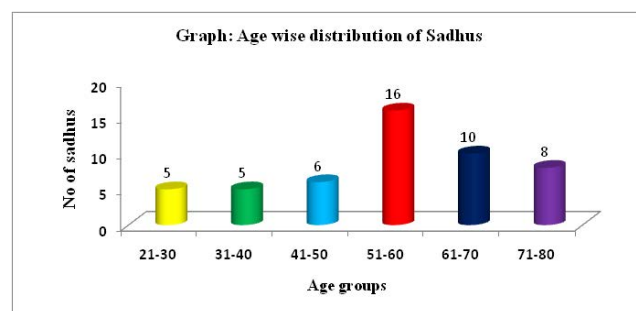
4. Observations and Results

In present study 50 sputum samples of chillum smoking Sadhus were analysed. The mean age of the participants

was 56.38 yrs±14.50 and age wise distribution showed in Table 1.

Table 1. Age wise distribution of Sadhus

Sr.no.	Age groups (Yrs)	No of participants
	21-30	5 (10.00%)
	31-40	5 (10.00%)
	41-50	6 (12.00%)
	51-60	16 (32.00%)
	61-70	10 (20.00%)
	71-80	8 (16.00%)
	Total	50 (100%)



Most common content of chillum was cannabis/ganja only (37, 74%) followed by mixture of ganja, beedi and tobacco (09, 18%) and ganja and charas mixture (04, 8%). Expectoration colour was white in 73% sample, yellow and green coloured was seen in 20.0% and 07.0% of sample respectively (Table 2).

Types of smokers	Frequency	Percentage
Ganja, beedi	37	74.00%
Tobacco	9	18.00%
Ganja and charas mixture	4	8.00%
Total	50	100.00%

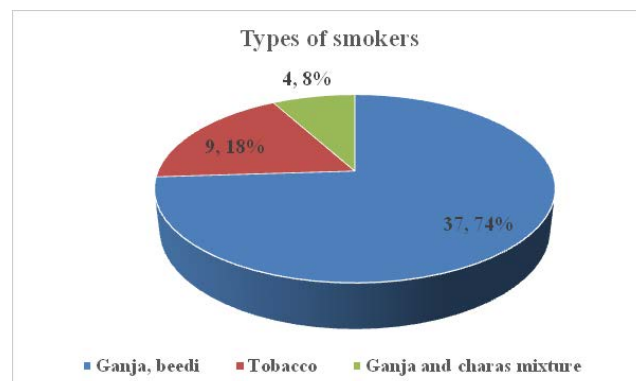
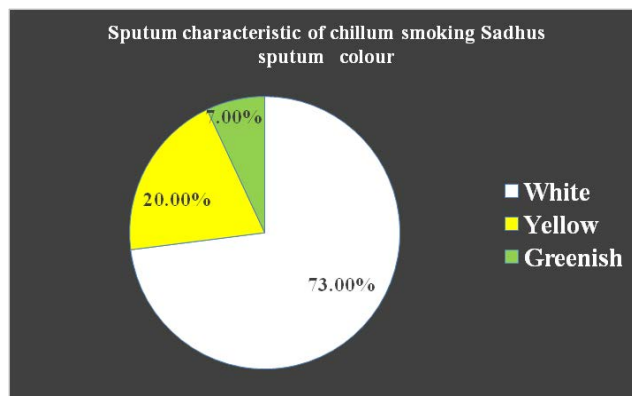


Table 2. Sputum characteristic of chillum smoking Sadhus

Ailment	Characteristic	Percent	Quantity of expectoration	
Cough	Productive	100%	5-7.5 ml	
	C O L O U R	White		73.00%
		Yellow		20.00%
		Greenish		07.00%

**Table 3.** Differential cell count of chillum smoking Sadhus

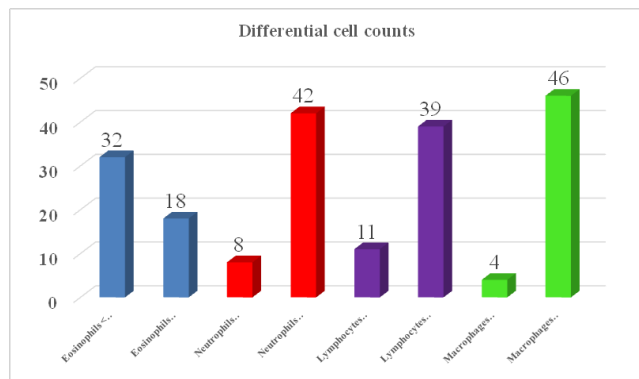
Sr.no.	Differential cell counts	Frequency (%)	Sr.no.	Differential cell counts	Frequency (%)
	Eosinophils			Lymphocytes	
1.	< 05	32(64.0%)	1.	< 30	11 (22.0%)
2.	≥ 05	18 (36.0%)	2.	≥ 30	39 (78.0%)
	Neutrophils			Macrophages	
1.	< 50	08(16.0%)	1.	<60	04 (08.0%)
2.	≥ 50	42 (84.0%)	2.	≥ 60	46 (92.0%)

Table 4. Differential cell count and content of chillum

Differential cell count	Content of chillum			Total	χ^2 , d.f. P Value
	Ganja only	Ganja & Beedi Tobacco	Ganja & Charas		
Eosinophils					
< 05	25	05	02	32	$\chi^2= 0.3034$, df.1 P=0.5818 Non-Significant
≥ 05	12	04	02	18	
Total	37	09	04	50 (100%)	
Neutrophils					
< 50	03	03	02	08	$\chi^2=4.53$, df.1 P=0.03331 Significant
≥ 50	34	06	02	42	
Total	37	09	04	50 (100%)	
Lymphocytes					
< 30	05	03	03	11	$\chi^2=4.222$, df.1 P=0.03991 Significant
≥ 30	32	06	01	39	
Total	37	09	04	50 (100%)	
Macrophages					
<60	01	02	01	04	$\chi^2=3.011$, df.1 P=0.08274 Significant
≥ 60	36	07	03	46	
Total	37	09	04	50 (100%)	

Presentation of differential cell count of sputum sample depicted in Table 3.

Differential cell count viz., Neutrophils, Lymphocyte and macrophage showed statistical significant association with various content of chillum (Table 4).



We have merged two categories Ganja and Beedi Tobacco and Ganja and Charas for getting validity of chi square test (merged cells are given in colours).

In present study none of the patients had malignancy findings on microscopic examination of sputum smear, all cells were mature benign squamous epithelial cells.

5. Discussion

In present study the mean age of the Sadhus was 56.38 yrs \pm 14.50 and maximum were belonged to age group of 51-60 years. Most of sadhus prefer ganja (74), ganja, bidi tobacco 18% and followed by smoking chillum 8% and all were smoking for more than 10 years. Jeanette M, Tetrault MD et al.,⁸ studied effects of marijuana smoking on pulmonary function and respiratory complications and showed long term marijuana smoking was associated with increase risk of respiratory complication causing chronic cough with more sputum production. Our study also supports this finding as in our study chillum smokers more than 10 years had copious sputum (73%), yellow coloured sputum (20%) and greenish sputum (7%).

Differential cells like eosinophils, lymphocytes, neutrophils and macrophages were found to be raised in 18, 39, 42 and 46 samples respectively. Donald, Dr Tashkin⁹ showed peoples who smoke both tobacco and cocaine, cocaine smoking produces more injury to the mucosal lining of the airways than smoking tobacco alone, while our study showed ganja smokers were more harmful than smokers of ganja, bidi and tobacco smokers, as we got

more differential cell in sputum of ganja smokers. Also, Maddela VS in his study showed that marijuana smokers lungs lose their ability for filter harmful chemicals and hence they have more risk of infection, cough and bronchitis.³ Our study also showed increased count of differential cells, neutrophils, lymphocytes and macrophages which indicates infection of airways. NIDA funded studies⁹ showed that alveolar macrophages from crack cocaine smokers are less active than alveolar macrophages from non smokers, causing more infections of airways.

A study conducted by Gorska K et al.,⁷ showed that the chronic obstructive pulmonary diseases patients has increased neutrophils, macrophages and lymphocytes counts which is characteristics feature of inflammatory airway disease. Also they found increased number of eosinophil in COPD and asthma patients they concluded that eosinophils are important inflammatory cells not only in asthma but also in COPD.⁷ But our study did not show a significant association between chillum smoking and sputum eosinophil counts. Sputum cytology findings in cigarette smokers both having increased sputum lymphocyte and neutrophil count.

Maddela VS showed in his study that marijuana smoke irritates the lung and frequent marijuana smokers will have constant respiratory problems like cough, phlegm but researches still not proved whether or not marijuana smokers have more risk for carcinoma.³ In our study also none of the population had malignancy characteristic; all the cells are benign, mature, squamous epithelial cells. But still for this conclusion there should be follow up sputum examination and follow up clinical examination is required which was not possible in our study.³

6. Conclusion

Characteristic of sputum of chillum smoking sadhus was almost whitish, mucoid (73%) yellow (20%), followed by greenish (7%).

Chillum smoking was found to be associated with raised differential cell count viz., Neutrophils, Lymphocytes, and Macrophages in sputum which indicates inflammatory changes in the airways and lung parenchyma.

We did not detect a significant association between chillum smoking and elevated sputum eosinophil counts.

None of the sputum cytology findings had malignancy characteristics.

7. Limitations

However there were few limitations of present pilot study like smaller sample size and no follow up sputum sample examination, further research into this topic with larger studies are warranted.

8. References

1. Cannabis.info. Available from: <https://www.cannabis.info/en/chillum-all-you-need-know-historical-pipe>
2. History and use of chillum. [Internet] [cited on 2017 August 15]. Available from: https://azarius.net/encyclopedia/23/History_and_use_of_the_chillum
3. Maddela VS. How tobacco and cannabis smoking effects human physiology. Research and Review: Journal of Nursing and Health Science. 2016; 1–17.
4. Muller MD. Smoking any substance raises risk of lung infections. NIDA Notes Archives. 1997; 12(1).
5. Hashibe M, Morgenstern H, Cui Y, Tashkin DP, Zhang Z, Cozen W et al. Marijuana use and risk of lung and upper aero-digestive tract cancers: Results of population base case control study. Cancer Epi Biomarkers and Prevention. 2006; 15:1829–34. <https://doi.org/10.1158/1055-9965.EPI-06-0330> PMID:17035389
6. Lawanga SK, Lemeshow S. Sample size determination in health studies: A practical manual. Geneva: WHO; 1991. p. 2, 27.
7. Gorska K, Krenke R, Korczynski P, Kosciuch J, Kulawik JD, Chazan R. Eosinophilic airway inflammation in chronic obstructive pulmonary disease and asthma. Journal of Physiology and Pharmacology. 2008; 59(6):261–70. PMID:19218650
8. Tetrault JM et al. effect of Marijuana smoking on pulmonary function and respiratory complication: A systemic review. Arch Intern Med. 2007 Feb 12; 167(3):221–8. <https://doi.org/10.1001/archinte.167.3.221> PMID:17296876 PMID:PMC2720277
9. Donald P, Tashkin. NIDA notes archive; 1997. p. 315.

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