

## Smoking Pattern among Rural Indian Cancer Patients: A Prospective Survey

### Abstract

**Background:** Smoking predisposes to cancer. Prevalence and pattern of smoking among rural Indian cancer patients is unknown. **Aim:** The aim of the study was to estimate the prevalence of smoking in cancer patients. **Objective:** The objective of the study was to estimate the type of smoking and pattern in cancer patients and correlate with clinical and demographic variables through a prospective survey. **Materials and Methods:** All consecutive individual adult (age >18 years) patients diagnosed with any cancer and registered in the medical oncology outpatient department were enrolled for questionnaire-based survey on smoking between July 2017 and October 2017. Demographic variables were also recorded including income, education, and occupation. Frequency distribution and cross tabulation were used for the statistical analysis using SPSS version 17. **Results:** Of 517 cancer patients enrolled, 456 (88%) were rural. The prevalence of smoking was 125/517 (0.24, 95% confidence interval – 0.20–0.27). Among them, 67 (54%) were bidi smokers, while 58 (46%) smoked cigarette. Majority had smoking history of more than 20 years (40%), while 20% were recent smokers, <5 years. Hundred out of one hundred twenty-five (80%) patients were male, while 24/25 (96%) women smoked bidi. More than 56% of the bidi smokers were illiterate, while the majority of cigarette smokers (50%) had completed high secondary schooling. The majority of bidi (63%) and cigarette smokers (62%) had monthly income <Rs. 10,000. Almost 98% of bidi smokers and 77% of cigarette smoking population were rural. Farmers and laborers had higher prevalence of smoking, 35/96 (53%) and 28/70 (40%), respectively, while 11% of housewives were bidi smokers. Nearly 40% of head-and-neck cancer and 48% of lung cancer patients had a smoking history, with 65% and 76% being bidi smokers among them, respectively. **Conclusion:** One in four cancer patients smoke. Most of the smokers are illiterate with low socioeconomic profile and predominantly laborers and farmers. Bidi is the predominant type of smoking.

**Keywords:** Bidi, cancer, rural, smoking

### Introduction

The United States Surgeon General Advisory Committee Report on smoking and health in 1964 was among the first global authorities to conclude that “Cigarette smoking is casually related to cancer of lung in men, the magnitude of the effect of cigarette smoking far outweighs all other factors.”<sup>[1]</sup> It is estimated that 30% of all cancer deaths worldwide are due to smoking, while that risk is quadrupled in heavy smokers.<sup>[2]</sup> While lung and laryngopharyngeal cancers have the highest relative risk, the upper digestive tract and oral cavity are also at high risk.<sup>[3]</sup> Lately, smoking is also established to have a casual association in cancers of the nasopharynx, liver, renal cell carcinoma, urinary bladder, pancreas, cervix, and myeloid

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leukemias.<sup>[4]</sup> Bidi is an old age form of indigenous smoking which is made of raw, dried, and crushed tobacco flakes rolled in tendu leaf or white paper, used commonly in rural India and low socioeconomic urban counterparts.<sup>[5]</sup> Bidi smoking has been linked to several cancers including oral cancers similar to cigarettes, but the prevalence of their use among rural Indian cancer patients remains unexplored.<sup>[6]</sup> We conducted the first prospective survey among adult Indian rural cancer patients in Eastern India to discover the pattern of bidi and cigarette smoking among them.

### Materials and Methods

Our institute is the only government-run State Cancer Institute catering to a population of 120 million residing in Eastern State of India, Bihar. For this study, our team of clinicians prepared a

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questionnaire pertaining to the type of tobacco smoke consumed, either cigarette or bidis along with their duration of consumption in years. We conducted a prospective survey with the above questionnaire in all consecutive adult cancer patients (age >18 years) reported and registered in the medical oncology outpatient department between July 2018 and October 2018. We also simultaneously collected data pertaining to demographic variables such as age, sex, income, education, occupation, and type of family. Clinical variables such as type and site of cancer were also recorded.

The survey was conducted through medical social workers who helped patients to understand the questionnaire in simple vernacular language and assisted in data collection and recording. They also acted as the unbiased third party between clinical staff and patients, who collected smoking data and demographic profiles only, while clinical indicators and profiles were collected and recorded by physician staff members. Informed written consent was obtained from all patients enrolled in this study and institutional ethical committee approval was obtained.

Descriptive statistics including frequency distribution and cross-tabulation was used in SPSS software version 17.0, (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY, USA: IBM Corp.) for data collection, recording, analysis, and reporting.

## Results

Between July 2018 and October 2018, 517 adult individual consecutive cancer patients were enrolled for this prospective survey. Four hundred and fifty-six (88%) of them were from rural areas. The prevalence of smoking was 125/517 (0.24, 95% confidence interval – 0.20–0.27). Among them, 67 (54%) were bidi smokers, while 58 (46%) smoked cigarettes. Thirty-six of sixty-six (55%) and 13/58 (22%) smokers smoked for more than 20 years, bidi and cigarettes, respectively. Contrary to this, the majority of cigarette smokers, 18/53 (34%), had a history of <5 years of smoking, while the numbers for the same were 6/66 (9%) among the bidi smokers.

Among all smokers, 100/125 (80%) were male. Bidi was the unanimous choice (24/25) among females who smoked. More than 56% of bidi smokers were illiterate, while the majority of cigarette smokers (50%) had completed at least higher secondary schooling. Majority of bidi (63%) and cigarette (62%) smokers had a monthly income of < Rs 10000. Among several occupation groups, farmers and laborers had a higher prevalence of smoking, 35/96 (53%) and 28/70 (40%), respectively. Compared to this, only 23/215 (11%) of housewives smoked bidi [Table 1].

Seventeen of one hundred and twenty-nine (13%) patients living in the nuclear family smoked cigarette, while 64/388 (16%) of those living in joint family preferred

to smoke bidis. The higher number of Muslim smokers preferred bidi, 19/72 (26%), while among Hindus, 48/445 (11%) and 53/445 (12%) smoked bidi and cigarette, respectively [Table 1].

Among several cancer cohorts, lung cancer had a higher percentage of smokers, 17/35 (48%). Majority of lung cancer patients who smoked preferred bidi 13/17 (76%). Similarly, 23/59 (39%) of head-and-neck cancer patients smoked; among them, 15/23 (65%) smoked bidi. Twelve of thirty-seven (32%), 28/106 (26%), and 6/47 (13%) of genitourinary, gastrointestinal, and gynecological cancer patients smoked, respectively. Contrary to this, only 1/35 (3%) of breast cancer patients smoked [Table 2].

## Discussion

Thirty percent of the Indian population either smoke or chew tobacco.<sup>[7]</sup> Smoking is associated with increased mortality not only due to the high incidence of cancers but also due to its casual association with tuberculosis, respiratory, and cardiovascular deaths. Smoking is associated with 1 in 20 deaths in females and 1 in 5 deaths in men with a reduction in median survival of 8 years and 6 years, respectively, in India.<sup>[8]</sup> Before a ban on cigarette advertisements, many adults lighted their first cigarette in late adolescence and then got addicted to smoke, thus transforming themselves into chronic smokers.<sup>[9]</sup> They are the prime high-risk cohort to suffer from varied life-threatening illnesses including cancer, chronic obstructive pulmonary disease, and cardiovascular events. Smoking is proven to have a causal relationship among several malignancies, chiefly lung and oral cavity cancers in India.<sup>[10,11]</sup> However, there is a paucity of information regarding the prevalence of smoking among rural Indian cancer patients suffering from several varied malignancies.

The age-standardized prevalence of any smoking among Indian men is 24%.<sup>[12]</sup> Bidi is the most common form of smoking, especially in rural India.<sup>[13]</sup> Low socioeconomic status, illiteracy, and increasing age were important factors where bidi smoking prevalence triumphs over the cigarette.<sup>[12-14]</sup> Bidi smoke is considered to have about 2–3 times greater nicotine and tar inhalation compared to cigarette, hence, compounding the risk of several cancers and fatal cardiovascular events.<sup>[5,6]</sup> A larger amount of bidi smoked per day and longer duration of smoking directly increase lung cancer risk.<sup>[15]</sup> In a cross-sectional study of tobacco use among the healthy population in rural Bihar, smoking prevalence was 28% with bidi smoking as the most prevalent form (80%).<sup>[16]</sup>

In our survey of adult individual consecutive cancer patients, one in four smoked. Bidi edged cigarette as the most common form of smoking. We found a gradual shift toward the choice of smoke with long-term chronic smokers and older males having bidi as a predominant choice, but recent, newly addicted consumers of tobacco smoke

**Table 1: Demographic and socioeconomic profile of bidi, cigarette smokers, and nonsmokers**

| Demographic/social variables | Smoking history/type |                         |                          | Total (n=517) |
|------------------------------|----------------------|-------------------------|--------------------------|---------------|
|                              | Bidi (n=67), n (%)   | Cigarette (n=58), n (%) | Nonsmoker (n=392), n (%) |               |
| Sex                          |                      |                         |                          |               |
| Male                         | 43 (14)              | 57 (19)                 | 197 (67)                 | 297           |
| Female                       | 24 (11)              | 1 (0.5)                 | 195 (88.5)               | 220           |
| Married                      |                      |                         |                          |               |
| Yes                          | 67 (13)              | 58 (12)                 | 371 (75)                 | 496           |
| No                           | 0                    | 0                       | 21 (100)                 | 21            |
| Family type                  |                      |                         |                          |               |
| Joint                        | 64 (16)              | 41 (11)                 | 283 (73)                 | 388           |
| Nuclear                      | 3 (2)                | 17 (13)                 | 109 (85)                 | 129           |
| Religion                     |                      |                         |                          |               |
| Hindu                        | 48 (11)              | 53 (12)                 | 344 (77)                 | 445           |
| Muslim                       | 19 (26)              | 5 (7)                   | 48 (67)                  | 72            |
| Education                    |                      |                         |                          |               |
| Illiterate                   | 38 (24)              | 7 (4)                   | 116 (72)                 | 161           |
| Primary school only          | 15 (15)              | 10 (10)                 | 74 (75)                  | 99            |
| Secondary school only        | 7 (8)                | 15 (16)                 | 70 (76)                  | 92            |
| Tenth standard only          | 4 (6)                | 14 (22)                 | 46 (72)                  | 64            |
| Twelfth standard only        | 2 (5)                | 6 (15)                  | 33 (80)                  | 41            |
| Graduates                    | 1 (2)                | 4 (8)                   | 46 (90)                  | 51            |
| Postgraduates                | 0                    | 2 (22)                  | 7 (78)                   | 9             |
| Income                       |                      |                         |                          |               |
| <5000                        | 7 (15)               | 2 (4)                   | 37 (81)                  | 46            |
| 5000-10,000                  | 42 (13)              | 36 (11)                 | 248 (76)                 | 326           |
| 10,000-20,000                | 16 (20)              | 13 (16)                 | 52 (64)                  | 81            |
| 21,000-30,000                | 2 (6)                | 3 (9)                   | 28 (85)                  | 33            |
| 31,000-50,000                | 0                    | 3 (11)                  | 25 (89)                  | 28            |
| >50000                       | 0                    | 1 (33)                  | 2 (67)                   | 3             |
| Occupation                   |                      |                         |                          |               |
| Skilled agriculture          | 16 (16)              | 19 (20)                 | 61 (64)                  | 96            |
| Elementary occupation        | 17 (24)              | 11 (16)                 | 42 (60)                  | 70            |
| Managers                     | 1 (25)               | 0                       | 3 (75)                   | 4             |
| Armed forces                 | 1 (50)               | 0                       | 1 (50)                   | 2             |
| Professionals                | 1 (3)                | 4 (12)                  | 28 (85)                  | 33            |
| Technicians                  | 0                    | 0                       | 10 (100)                 | 10            |
| Clerical support             | 0                    | 5 (45)                  | 6 (55)                   | 11            |
| Service/sales                | 2 (7)                | 7 (26)                  | 18 (67)                  | 27            |
| Craft related                | 4 (18)               | 5 (23)                  | 13 (59)                  | 22            |
| Plant/machine operators      | 2 (15)               | 4 (31)                  | 7 (54)                   | 13            |
| Housewives                   | 23 (11)              | 2 (1)                   | 190 (88)                 | 215           |
| Students                     | 0                    | 1 (7)                   | 13 (93)                  | 14            |

preferred cigarettes. While 80% of smokers were male, it was interesting to note that 11% of housewives in rural Bihar smoked bidi. Similar to previously mentioned studies, bidi smokers were largely illiterate, of lower socioeconomic status and farm laborers predominantly. Preference of cigarette over bidi in nuclear families and those with higher monthly income reiterates the hypothesis that improvement of the standard of living has made people chose a more expensive and refined form of smoke, cigarette.

In our study, 48% of lung cancers and 39% of head-and-neck cancer patients smoked, predominantly bidi,

which is similar to smoking prevalence seen in another major epidemiological Indian study of lung cancer (48%) and higher compared to that seen in oral cavity cancers in rural Indian population (27%), respectively.<sup>[17,18]</sup> Among several cancer cohorts studied, lung and head-and-neck cancers were the first and second cohorts, respectively, in terms of a higher percentage of patients among them having a history of smoking. As it is a cross-sectional study, the tolerance of smokers to antineoplastic drugs, including radiotherapy and surgery, compared to nonsmokers could not be illustrated. We also do not have the data regarding how many smokers among them quit smoking after being

**Table 2: Cancer site distribution among bidi, cigarette smokers, and nonsmokers**

| Cancer site/group | Smoking history/type (%) |           |          | Total |
|-------------------|--------------------------|-----------|----------|-------|
|                   | Bidi                     | Cigarette | No       |       |
| Gastrointestinal  | 9 (8)                    | 19 (18)   | 78 (74)  | 106   |
| Gall bladder      | 7 (8)                    | 4 (5)     | 72 (87)  | 83    |
| Hematolymphoid    | 8 (9)                    | 17 (19)   | 63 (72)  | 88    |
| Head neck         | 15 (25)                  | 8 (14)    | 36 (61)  | 59    |
| Gynecology        | 6 (13)                   | 0         | 41 (87)  | 47    |
| Genitourinary     | 7 (18)                   | 5 (14)    | 25 (68)  | 37    |
| Breast            | 1 (3)                    | 0         | 34 (97)  | 35    |
| Lung              | 13 (37)                  | 4 (11)    | 18 (52)  | 35    |
| Sarcoma           | 1 (11)                   | 0         | 8 (89)   | 9     |
| Others            | 0                        | 1 (6)     | 17 (95)  | 18    |
| Total             | 67 (13)                  | 58 (11)   | 392 (76) | 517   |

diagnosed of cancer. We do not rule out any confounding effect of concurrent oral smokeless tobacco consumption in patients who smoked as well and their impact on the causation of several malignancies, especially head-and-neck cancers.

### Conclusion

One in four cancer patients smoke overall. Most of the smokers are illiterate with low socioeconomic profile and are predominantly laborers and farmers. Bidi is still the predominant type of smoking, but cigarette seems to be replacing bidi in cohorts with an improved standard of living, economics, and education. Half of the lung cancers and four out of ten head-and-neck cancer patients smoke in rural India.

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### Conflicts of interest

There are no conflicts of interest.

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