Assessment of Smoking as a Cancer Risk Factor among Rural Communities in Greater Noida Villages

SOUVIK SAMANTA[1], SWARNADEEP BISWAS[2], RUNJHUN MATHUR[3], ABHIMANYU KUMAR JHA[4]

[1, 2, 4] Department of Biotechnology, Sharda School of Engineering and Technology, Sharda University, Greater Noida, Uttar Pradesh, India
[3] Department of Environmental Science and Engineering, Dr. A. P. J Abdul Kalam Technical University, Lucknow, India

Abstract— This survey investigates the prevalence of smoking as a cancer risk factor among rural communities in Greater Noida villages, recognizing the escalating global burden of cancer incidence and mortality. Through a survey-based methodology involving 40-50 families, the study elucidates the influence of smoking habits on cancer risk, considering demographics, environmental conditions, and awareness levels. The findings underscore the significant prevalence of smoking, deeply ingrained in local culture, posing substantial health risks. Moreover, environmental factors, including poor sanitation, contribute to compounded health risks within these communities. The results highlight the imperative for targeted interventions to promote smoking cessation and healthier environments, thus mitigating the burden of cancer prevalence.

I. INTRODUCTION

The incidence and mortality of cancer are expected to account for over 20% of all deaths globally in 2020, or 10 million deaths, indicating a rapid increase in the burden of cancer worldwide (Sung et al., 2021). The burden is notably severe in villages, where availability of cancer treatments is often inadequate (Shah et al., 2019). In particular, villages bear a disproportionately large burden of cancer-related mortality, resulting in 65% of all cancer deaths worldwide, while having a lower frequency of the disease than cities. It is projected that by 2030, low- and middle-income nations would account for 75% of cancer-related fatalities worldwide (Mandal et al., 2018). As a consequence of the prevalence of carcinogenic infections such as *Helicobacter pylori*, *hepatitis B virus,* and *human papillomavirus*, villages bear a significant burden of infection-associated cancers, including gastric cancer, hepatocellular carcinoma, and cervical cancer (Shah et al., 2019). During the years 1990 and 2013, the number of cancer cases in India rose annually. In India, there were 1.39 million documented instances of cancer in 2020; by 2021 and 2022, that figure had risen to 1.42 and 1.46 million, respectively. According to research, the number of cancer cases annually will increase to around 1.57 million by 2025, a growth of 12.8% above current projections. At about 2.10 lakh new cases, the northern Indian state of Uttar Pradesh had the highest number of cancer patients in 2023. In this state, there were over 2 lakhs new instances of cancer in 2021. One of the primary risk factors for the development of cancer is smoking. Many toxins, chemicals or carcinogens that are found in tobacco may damage DNA and trigger mutations, which increases the risk of developing cancer (National Cancer Institute, 2020). Numerous researchers have thoroughly examined the sequence of mutations which lead to the evolution of cancer in the lungs (Sato et al., 2007). The molecular aetiology of lung cancer is still not fully understood, though. Tumour microenvironment (TME) and inflammatory pathways involved in carcinogenesis must be taken into account for a complete knowledge of lung cancer pathogenesis, since inflammation seems to perform a significant part in the disease's aetiology (Prendergast et al., 2008).

II. METHODOLOGY

The primary objective of this research was to assess the potential for cancer risk within communities, with a specific focus on smoking habits, and to elucidate the associated factors. The study targeted villages in Greater Noida, recognizing their significance as representative settings for both rural and urban

environments, thus offering insights into diverse lifestyle patterns and environmental conditions. Methodologically, a survey was conducted involving 50 families to gather data on various aspects influencing cancer risk, particularly focusing on smoking habits and their effects. The survey included questions about demographics, smoking habits, environmental factors, and awareness levels regarding the risks of smoking and cancer. The findings revealed a prevalent habit of smoking tobacco deeply ingrained in the local culture, posing significant cancer risks. Moreover, environmental conditions characterized by poor sanitation, including flooded domestic wastes, litter, and concealed drains, further compounded health risks associated with smoking. Despite some awareness of cancer, the findings underscored the urgent need for lifestyle improvements, particularly in smoking cessation, to mitigate cancer prevalence in these communities. This research sheds light on the complex interplay of social, environmental, and behavioural factors influencing cancer risk in village settings, emphasizing the imperative for targeted interventions to promote smoking cessation and healthier environments.

IV.   RESULT AND DISCUSSION

The survey reveals that smoking, particularly hookah and bidi use, is a prevalent habit among villagers, significantly increasing the risk of cancer. Hookah smoking, often perceived as less harmful than cigarette smoking, actually poses comparable if not greater risks due to the concentration of hazardous and carcinogenic chemicals in hookah smoke as shown in Figure1.
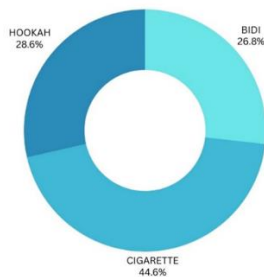

Figure 1: Percentage of the individuals consuming Hookah, bidi and cigarettes

Furthermore, the survey indicates a concerning prevalence of cancer and other diseases within the surveyed population. While 53% report a healthy normal life, 8.9% have been diagnosed with cancer, and 35.6% are affected by other diseases as shown in Figure 2. The co-occurrence of cancer with other health conditions like diabetes, hypertension, and allergies underscores the complexity of health challenges faced by the community. Environmental pollution emerges as a significant concern, with direct effects on health and indirect impacts on water supplies and agricultural practices. These findings emphasize the critical importance of implementing policies to reduce pollution and safeguard public health.
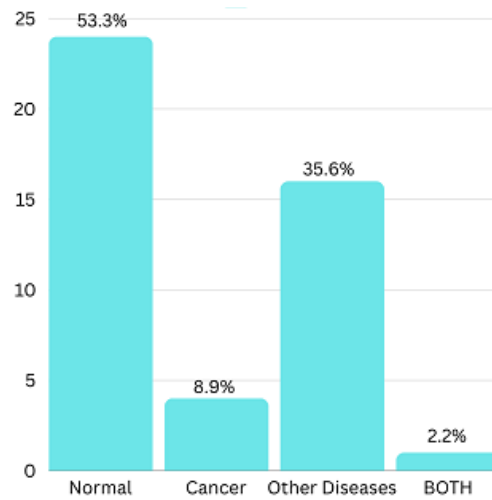

Figure 2: Percentage of Individuals having healthy normal life, cancer, and other diseases

CONCLUSION

The study highlights the prevalence of smoking as a significant cancer risk factor among rural communities in Greater Noida villages. Smoking, particularly hookah and bidi use, poses substantial health risks, contributing to the burden of cancer and other diseases within these communities. Despite some awareness of cancer, lifestyle improvements, particularly in smoking cessation, are urgently needed to mitigate cancer prevalence.

REFERENCES

[1] Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. *CA Cancer J Clin*, 2021. 71(3): p. 209–249. doi: 10.3322/caac.21660 [PubMed] [CrossRef] [Google Scholar]

[2] Shah SC, Kayamba V, Peek RM Jr, Heimburger D. Cancer Control in Low- and Middle-Income Countries: Is It Time to Consider Screening? *J Glob Oncol*, 2019. 5: p. 1–8. doi: 10.1200/JGO.18.00200 [PMC free article] [PubMed] [CrossRef] [Google Scholar]

[3] Mandal R, Basu P. Cancer screening and early diagnosis in low- and middle-income countries: Current situation and future perspectives. *Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz*. 2018. Dec;61(12):1505–1512. English. doi: 10.1007/s00103-018-2833-9 [PubMed] [CrossRef] [Google Scholar]

[4] Sato M, Shames DS, Gazdar AF, Minna JD. A translational view of the molecular pathogenesis of lung cancer. *J Thorac Oncol* 2007; 2:327–343. [PubMed] [Google Scholar]

[5] Prendergast GC. Inflammatory mediators in cancer etiology and targets for therapy and prevention. *Cancer Reviews Online* 2008; 9:17–18. [Google Scholar]