

Access this article online
Quick Response Code:

Website: <a href="http://www.jehp.net">www.jehp.net</a>
DOI: 10.4103/jehp.jehp_89_18

# Screening for red flag symptoms of cancer: A community-based cross-sectional study from urban Puducherry, India

Manikandanesan Sakthivel, Yuvaraj Krishnamoorthy, Gokul Sarveswaran, R. Jayalakshmy, Shanthosh Priyan, N. Bharathnag

## Abstract:

**BACKGROUND:** Patients with cancer often delay seeking medical advice in developing countries. In India, only 20%–30% of cancers are being diagnosed in Stages I and II. Screening for red flag symptoms of cancer can be used to identify high-risk individuals in the community.

**METHODOLOGY:** A community-based cross-sectional study was conducted in February 2017 among 302 participants in one of the service areas of Jawaharlal Institute of Postgraduate Medical Education and Research urban health center selected by universal sampling. Data on the presence of red flag symptoms of cancer (persistent cough, persistent change in bowel/bladder habits, nonhealing ulcer, persistent difficulty in swallowing, unexplained weight loss, unexplained lump, persistent unexplained pain, unexplained bleeding, and change in the appearance of mole) and presence of risk factors were collected through interviews. The collected data were entered using EpiData version 3.0.

**RESULTS:** The mean (standard deviation) age of the study participants was 44 (11) years and 50.6% of them were male. At least one red flag symptom of cancer was present in 22 (7.3%) individuals; 9 (2.8%) had unexplained pain, 4 (1.3%) had change in bowel habits, 4 (1.3%) had change in bladder habits, 3 (1%) had cough, 3 (1%) had nonhealing ulcer, 2 (0.6%) had unexplained bleeding, 1 (0.3%) had difficulty in swallowing, 1 (0.3%) had weight loss, 1 (0.3%) had lump, and 1 (0.3%) had change in the appearance of mole.

**CONCLUSION:** Screening for red flag symptoms of cancer is an easy tool that can be used in the community to identify high-risk individuals, which will facilitate early diagnosis of cancer.

## Keywords:

Cancer, community, red flag symptoms, screening, urban

Department of Preventive and Social Medicine, Jawaharlal Institute of Postgraduate Medical Education and Research, Puducherry, India

## Address for correspondence:

Dr. R. Jayalakshmy, Department of Preventive and Social Medicine, Jawaharlal Institute of Postgraduate Medical Education and Research, Puducherry, India. E-mail: [medico.jay@gmail.com](mailto:medico.jay@gmail.com)

Received: 13-04-2018

Accepted: 11-06-2018

## Introduction

Cancer is one of the leading causes of morbidity and mortality worldwide. Globally 17.5 million cancer cases were diagnosed in 2015, an increase by 33% since 2005.<sup>[1]</sup> The same year witnessed about 8.7 million deaths due to cancer, making it the second leading cause of death worldwide, only next to cardiovascular diseases.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: [reprints@medknow.com](mailto:reprints@medknow.com)

Overall, 208.3 million disability-adjusted life years (DALYs) were caused by cancer worldwide in 2015 for both sexes combined, as opposed to 196.3 million DALYs in 2013. In 2013, 56% of incident cases, 62% of deaths, and 70% of DALYs occurred in developing countries.<sup>[2]</sup>

As per the data from the International Agency for Research on Cancer GLOBOCAN

**How to cite this article:** Sakthivel M, Krishnamoorthy Y, Sarveswaran G, Jayalakshmy R, Priyan S, Bharathnag N. Screening for red flag symptoms of cancer: A community-based cross-sectional study from urban Puducherry, India. *J Edu Health Promot* 2018;7:174.

project, which used data only from population- and hospital-based registries in India, 1 million new cancer cases and nearly 700,000 deaths due to cancer occurred in India in 2012. Even the age-standardized incidence rate of cancer deaths was reported to be 94/100,000 population, which was found to be slightly more than half of the global average (182/100,000). The GLOBOCAN had also predicted that cancer burden in India will nearly double in the next 20 years to more than 1.7 million by 2035.<sup>[3]</sup>

Although the incidence of cancer was less than the global average, as per the data collected between 2009 and 2011, only 43% of breast cancers were diagnosed at an early stage (Stage I or Stage II) in India, as opposed to 62% in the US. Thus, cancer poses significant threat to the Indian population with higher mortality rates, about four to six times higher than the US. The baseline cost of treatment in India, which was estimated to be \$4443–5924, was found to be higher than the annual household income of about 80%–85% of households.<sup>[4]</sup>

Cancer, when identified early, is more likely to respond to effective treatment, resulting in a greater probability of surviving as well as less morbid and less expensive treatment.<sup>[5]</sup> Lack of awareness and screening for cancers was found to be a significant factor contributing to the late stage of cancer presentation in India.<sup>[6]</sup> Efforts at the primary health-care level are critically important for early detection of cancer, since majority of the patient contacts in India occur at the primary care level.<sup>[7]</sup> Cancer Research UK has listed out ten symptoms, which includes persistent cough, persistent change in bowel/bladder habits, nonhealing ulcer, persistent difficulty in swallowing, unexplained weight loss, unexplained lump, persistent unexplained pain, unexplained bleeding, and change in the appearance of mole as the red flag symptoms/signs of cancer, which can be used at all levels of health care to screen for cancer.<sup>[8,9]</sup>

The WHO has recommended a strategy named “Down staging” for early detection of cancer at primary health-care level.<sup>[10]</sup> Although originally recommended for cervical cancer, it can generally be termed as a process of screening for cancer using clinical approaches for early detection. This WHO-recommended methodology can be helpful in the detection of cancers at a less advanced stage, especially in resource-poor settings including India. Given the existing level of resources and the meager budget allotted to health sector, it may also not be possible to implement full-fledged cancer screening programs at primary health-care level in India. Thus, early clinical diagnosis by screening for signs and symptoms of cancer in the community with proper referral linkage with secondary or tertiary care center could be a more widely applicable early detection approach in primary care setting.

Hence, this study was conducted with an aim to determine the prevalence of the red flag symptoms of cancer among adult population of age  $\geq 30$  years, in the selected ward of urban Puducherry.

## Methodology

This was a community-based cross-sectional study done among the adults residing in a selected ward of urban Puducherry, namely Vaithikuppam, which has a total population of around 200 households. It is one of the four service areas of urban primary health center of Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), a government tertiary care center well equipped with all superspecialty departments, including a regional cancer center. The study was conducted during the month of February 2017. All the adults belonging to the age group of 30 years and above were included in the study. Those who were diagnosed already with any cancer were excluded from the study.

Sample size was not calculated since this study has been done as a part of service component to find the yield of screening for red flag symptoms of cancer at community. All the households in the study area were approached and all the participants meeting the eligibility criteria were included in the study. Data were collected among these selected individuals after obtaining informed consent. Purpose and procedure involved in the study were explained before the administration of questionnaire. Participants were also assured regarding the confidentiality of the information.

A semi-structured questionnaire was used for collecting information about the following three sections: the first section included information regarding sociodemographic variables such as age, gender, education, and occupation; the second section comprised of information regarding risk factors for cancer (tobacco and alcohol use, betel nut or pan-chewing habits, presence of sharp tooth, family history of cancer, radiation exposure, age at menarche, age at first child birth, number of pregnancies, and age at menopause); and the third section contained information regarding ten red flag symptoms of cancer (persistent cough, persistent change in bowel habits, persistent change in bladder habits, nonhealing ulcer, persistent difficulty in swallowing, unexplained weight loss, unexplained lump, persistent unexplained pain, unexplained bleeding, and change in the appearance of mole) in the past 2 months. This questionnaire was standardized for our research in local language by forward translation, expert panel back translation, and pretesting of the questionnaire.

The questionnaire was administered by trained interns to the participants by making house visit. If the house

was found to be locked in the first visit, then attempts were made to find the individual with second visit within 1 week of the first visit. The houses which were closed even after two visits were excluded from the study. If the participant had any of the above-mentioned red flag symptoms, then he/she was followed up with the help of postgraduates posted in urban health training center and the field staffs for the participants to get evaluated for that particular symptom in JIPMER. A time period of 2 months was provided for symptom evaluation. After 2 months, outcome of the evaluation was assessed.

Data were entered into EpiData v 3.01 software (EpiData association, Odense, Denmark)<sup>[11]</sup> and analysis was done using SPSS version 19.0 (IBM, Armonk, New York, USA). Continuous variables were summarized as mean (standard deviation [SD]). Categorical variables were summarized as proportions. Prevalence of each of the red flag symptoms was summarized as proportion with 95% confidence interval (CI).

## Results

Of the total 220 households available in the area, 50 houses were locked during the first visit. The first visit was made during the day time and the subsequent visit for the locked houses was made during evening time. About 38 houses were found to be locked and could not be contacted even after two visits. All the available individuals in the remaining 182 households were contacted for the study. Out of 329 individuals who were available during the survey, 302 consented for the study with a response rate of 91.8%.

Table 1 shows the sociodemographic characteristics of study participants. Of the total 302 individuals consented to participate in the study, the number of males 153 (50.7%) and females 149 (49.3%) was almost equal. Mean (SD) age of the study participants was 43.7 (11.4) years. Majority of the study participants (54.6%) had no formal education and only 21.1% had primary education. While 111 (36.8%) study participants were unemployed, fishing (54.4%) was found to be the major occupation among those who were employed.

Table 2 shows the prevalence of ten red flag symptoms of cancer among the study participants. The symptom of “persistent unexplained pain” had the highest prevalence of 2.9% (95% CI: 1.6%–5.6%), followed by “persistent change in bladder habits” (1.3%, 95% CI: 0.5%–3.4%) and “persistent change in bowel habits” (1.3%, 95% CI: 0.5%–3.4%). The prevalence of other red flag symptoms was found to be <1%. Of the total 302 participants, 22 (7.3%, 95% CI: 4.8%–10.7%) had at least one red flag symptom of cancer.

**Table 1: Sociodemographic characteristics of the study participants (n=302)**

Sociodemographic details	n (%)
Mean (SD) age in years	43.7 (11.4)
Gender	
Male	153 (50.7)
Female	149 (49.3)
Education	
No formal education	165 (54.6)
Primary (1 <sup>st</sup> -5 <sup>th</sup> )	64 (21.1)
Secondary (6 <sup>th</sup> -10 <sup>th</sup> )	39 (12.9)
Postsecondary (12 <sup>th</sup> and above)	34 (11.2)
Occupation	
Unemployed*	111 (36.8)
Employed	191 (63.2)

\*Includes homemakers, pensioners, and retired persons. SD=Standard deviation

**Table 2: Prevalence of red flag symptoms of cancer among adults in urban Puducherry (n=302)**

Red flag symptoms	Frequency (%)
Persistent unexplained pain	9 (2.8)
Persistent change in bowel habits (bowel cancer)	4 (1.3)
Persistent change in bladder habits (bladder cancer/prostate cancer)	4 (1.3)
A sore or ulcer that does not heal (for>2 weeks)	3 (0.9)
Persistent cough or hoarseness (lung cancer)	3 (0.9)
Unexplained bleeding	2 (0.6)
Unexplained lump	1 (0.3)
Unexplained weight loss	1 (0.3)
Persistent difficulty in swallowing (esophageal cancer)	1 (0.3)
A change in the appearance of mole (melanoma)	1 (0.3)

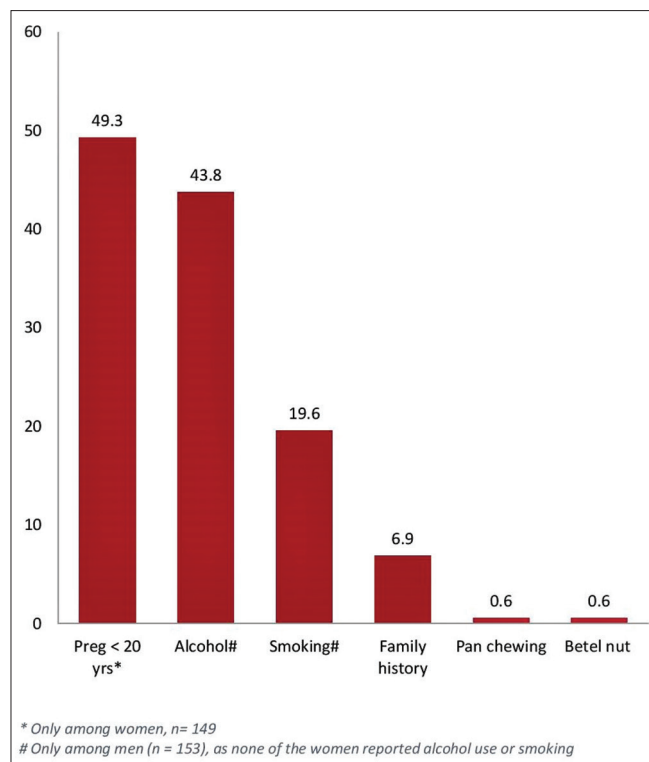
A symptom was considered “persistent” or “unexplained” if it was present for >2 weeks

Among the 22 participants who had symptom(s) and referred to JIPMER for further evaluation, two participants (9.1%) were diagnosed with cancer; one with colon cancer and the other with cervical cancer.

Figure 1 shows the distribution of common risk factors of cancer among the study participants. About 49.3% of female participants had early pregnancy (before the age of 20 years). The prevalence of alcohol use and smoking among men was found to be 43.8% and 19.6%, respectively. Since none of the female participants reported alcohol use and smoking, the prevalence had been calculated and reported only among men. The prevalence rates of other risk factors such as family history of cancer, pan chewing, and betel nut chewing were relatively low, which were 6.9%, 0.6%, and 0.6%, respectively.

## Discussion

This was a community-based cross-sectional study done among adults belonging to the age group of 30 years and



**Figure 1:** Distribution of risk factors of cancer among adults in urban Puducherry (n = 302)

above to determine the prevalence of red flag symptoms. The most common red flag symptom seen among the study participants was “persistent unexplained pain,” which had the highest prevalence of 2.9%. This was followed by “persistent change in bladder habits” and “persistent change in bowel habits,” which had the next highest prevalence of 1.3%. All the other red flag symptoms had the prevalence <1%. In total, around 7.3% of the study population had at least one red flag symptom for cancer during the point of screening.

Even though we could not find any similar studies done in India, studies done in developed countries such as Denmark showed a higher prevalence (14%) of at least one alarm symptom for cancer among their respective study population.<sup>[12]</sup> A study done in the United Kingdom showed that more than half of the study participants experienced at least one red flag symptom in the past 1 year.<sup>[13]</sup> This contrast finding in the current study can be attributed to the duration for which symptom screening was done. Since we have considered symptoms for the past 2 months to identify the red flag symptoms, it might have underestimated the prevalence.

In contrast to the current study, most of the studies reported persistent cough as the most common red flag symptom among the general population.<sup>[9,10]</sup> However, persistent change in the bowel and bladder habits was

one of the most common alarm symptoms among various studies which are comparable to the current study finding.<sup>[9,10,14]</sup> Hence, disease-specific symptom screening for cancer needs to be done through population-based approaches.

One of the major strengths of the study was the range of symptoms that was covered from the very common symptom of persistent unexplained pain to the very rare symptom of difficulty in swallowing. Higher response rate (91.8%) was another added strength to the study. The current study also adds to the limited literature available regarding the prevalence of red flag symptoms for cancer among the general population. Participants with red flag symptom were also followed up with the help of postgraduates and field staff to get evaluated for that particular symptom in the tertiary care center through proper and quick referral mechanism.

The study has certain limitations. Retrospective screening for red flag symptoms might have led to recall bias which could have underestimated the prevalence. However, this was limited to a certain extent by keeping the time span for screening as 2 months. Treatment-seeking behavior for the alarm symptoms and delay in seeking the health-care facility could have been assessed.

Even though majority of the patients who have experienced red flag symptoms do not have cancer, it is important for the patients to identify the symptom and report to the health facility immediately for achieving an earlier diagnosis. From the experience gained during this study, we found that majority of the study participants were not aware of the red flag symptoms of cancer. Hence, knowledge, attitude, and practice of the general population toward the red flag symptoms of cancer need to be explored to identify the target population and develop public health campaigns accordingly.

Training of primary health-care providers toward opportunistic screening for alarming symptoms of cancer should be provided. This followed by proper referral to a higher center for suspected cases can help to improve the case detection rate at the lowest possible level of health care. However, tertiary health-care systems have to be strengthened at the same time since they may not have the adequate capacity to examine all the patients with alarming/red flag symptom for cancer in a timely fashion.

## Conclusion

Prevalence of any red flag symptom among the study population was found to be around 7%. The most common red flag symptom seen among the study participants was “persistent unexplained pain” followed



by “persistent change in bladder habits” and “persistent change in bowel habits.” Out of the total patients screened, two patients were diagnosed to have cancer and started on treatment. Hence, training of primary health-care providers toward opportunistic screening for alarming symptoms of cancer followed by proper referral to a higher center for suspected cases can help to improve the case detection rate from the lowest possible level of health care.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

### References

1. WHO | Cancer. WHO. Available from: <http://www.who.int/mediacentre/factsheets/fs297/en/>. [Last accessed on 2018 Apr 12].
2. Global Burden of Disease Cancer Collaboration, Fitzmaurice C, Dicker D, Pain A, Hamavid H, Moradi-Lakeh M, *et al.* The global burden of cancer 2013. *JAMA Oncol* 2015;1:505-27.
3. Mallath MK, Taylor DG, Badwe RA, Rath GK, Shanta V, Pramesh CS, *et al.* The growing burden of cancer in India: Epidemiology and social context. *Lancet Oncol* 2014;15:e205-12.
4. Ernst & Young: Call for Action: Expanding Cancer Care in India; July, 2015. Available from: [http://www.ey.com/Publication/vwLUAssets/EY-Call-for-action-expanding-cancer-care-in-india/\\$FILE/EY-Call-for-action-expanding-cancer-care-in-india.pdf](http://www.ey.com/Publication/vwLUAssets/EY-Call-for-action-expanding-cancer-care-in-india/$FILE/EY-Call-for-action-expanding-cancer-care-in-india.pdf). [Last accessed on 2018 Apr 12].
5. World Health Organization. Guide to Early Cancer Diagnosis; 2017. Available from: <http://www.apps.who.int/iris/bitstream/10665/254500/1/9789241511940-eng.pdf>. [Last accessed on 2018 Apr 12].
6. Stewart BW, Wild CP. World Cancer Report 2014. Lyon: International Agency for Research on Cancer/World Health Organization; 2014.
7. Sankaranarayanan R, Ramadas K, Qiao YL. Early detection of cancer in primary care in less-developed countries. *Cancer Control* 2013;20:69-72.
8. Hippisley-Cox J, Coupland C. Symptoms and risk factors to identify women with suspected cancer in primary care: Derivation and validation of an algorithm. *Br J Gen Pract* 2013;63:e11-21.
9. Hippisley-Cox J, Coupland C. Symptoms and risk factors to identify men with suspected cancer in primary care: Derivation and validation of an algorithm. *Br J Gen Pract* 2013;63:e1-10.
10. Miller AB, World Health Organization. Cervical Cancer Screening Programmes: Managerial Guidelines/A. B. Miller. Geneva: World Health Organization; 1992.
11. Lauritsen JM, Bruus M. EpiData Entry 3.01. A Comprehensive Tool for Validated entry and Documentation of Data. Odense Denmark: The EpiData Association; 2008.
12. Svendsen RP, Støvring H, Hansen BL, Kragstrup J, Søndergaard J, Jarbøl DE, *et al.* Prevalence of cancer alarm symptoms: A population-based cross-sectional study. *Scand J Prim Health Care* 2010;28:132-7.
13. Whitaker KL, Scott SE, Winstanley K, Macleod U, Wardle J. Attributions of cancer ‘alarm’ symptoms in a community sample. *PLoS One* 2014;9:e114028.
14. Jones R, Charlton J, Latinovic R, Gulliford MC. Alarm symptoms and identification of non-cancer diagnoses in primary care: Cohort study. *BMJ* 2009;339:b3094.