An Epidemiology of Self-Reported Cancer among women in India: A Decomposition Analysis

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Research article

Keywords: Cancer, Decomposition, India, Inequalities

Posted Date: October 18th, 2019

DOI: <https://doi.org/10.21203/rs.2.16161/v1>

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Abstract

Background Cancer is a leading cause of adult deaths globally. It has a death toll of 7,84,821 people from India in 2018 alone. Huge underlying regional and sectoral (urban-rural) variations, extending to lifestyles and variations in age-specific death rates compels assessment of the geographical and social distribution is essential to frame cancer control programmes.

Methods National Family Health Survey (2015-16) data (also called the Demographic Health Survey of India) has been used for this study.

Results The results of the concentration indices show an overall concentration of cancer towards the richer quintiles. For the socially deprived groups, it is concentrated among the richer quintiles, while for the socially non-deprived groups, it is concentrated among the poorer quintiles. The P80/P20 ratio for cancer incidence is 0.83. The decomposition of the concentration index shows a significant contribution from women hailing from the socially deprived groups of the population.

Conclusion A comprehensive strategy to combat chronic diseases like cancer includes actions minimizing exposure to risk factors at the population level, as well as reducing the risk for individuals at the higher risk level and can aid in furnishing early, medium-term and long-term effects.

Background

Cancer is a global leading cause of deaths amongst adults. The International Agency for Research on Cancer estimated a death toll of 7,84,821 people from cancer in India in 2018 alone, amounting to 8 percent of global cancer deaths and 6 percent of deaths from all causes in India [1]. Additionally, dying from cancer before the age of 75 years is 7.3 percent among men and 6.3 percent among women. The absolute numbers are expected to increase in future in the purview of the increasing population and life expectancy of India. Increases in the age-specific cancer risks of tobacco use will propel the rates of cancer deaths also, by increasing the incidence of quite a few types of cancer [2].

Cancer is a prominent cause of morbidity as well as mortality in many developed and developing countries. Most of the low-and-middle-income countries (LMICs), including India, lack an organized and functional cancer care system [3]. Cancer diagnosis and subsequent treatment, in combination with other acceptable services, can lead to catastrophic health expenditures, pushing entire families below the poverty line [4-6].

Population ageing is often considered to be the main driver of an increased cancer incidence and the death rates and increased costs incurred thereafter [7]. The picture is more complex than that, though. High-income countries (HICs) have age-standardized cancer mortality decreasing across all the age-groups, except the groups with the population aged more than 70 years, in which more than half of the cancer deaths occur. No evidence exists regarding such decrease in the age-standardized cancer mortality rates in India, in spite of low population coverage in data collection. Most of the deaths attributable to cancer also occur in the age-groups with the population less than 70 years of age [8]. Indian population's relatively younger age structure is a little different from other HICs, which may partly contribute to these differences.

Other factors, which may be playing an essential role in the higher rates of cancer deaths in India as compared to other wealthy countries, may be the prevalence of infections and unique local patterns of tobacco consumption within regions in India. Inaccessibility and non-availability of screening and early-stage cancer diagnostic services also seem to explain the paradox of low incidence rates and higher age-specific death rates in India. Improvements in the living standards and Human Development Index (HDI) rankings have traditionally been associated with increase in the occurrence of, e.g., cancers related to sex hormone exposure and those related to reduced average family size___[6]. The gains acquired owing to the economic and social development, dwarf the associated costs incurred due to the increased cancer care.

The GLOBOCAN project has forecasted India's cancer burden in 2035 (approximately 1.7 million new cases) to be almost double the amount of that in 2012 (slightly above 1 million). Consequently, the number of cancer deaths will also escalate from around 680,000 to 1.2 million in the same period⁸. The magnitude of the actual increase in cancer-related mortality and disability will be based on the investment decisions in health care, cancer research, public knowledge of risk factors in the future as well as other developmental and social changes affecting disease incidence and outcomes.

There is a dearth of comprehensive cancer incidence and mortality data for India. Only the National Cancer Registry Programme provides some population-based estimates from the extant 28 cancer registries located across India [9], based on which GLOBOCAN estimated the India-level statistics. The limitations, e.g., of over-representation of the urban and south-Indian population and under-representation of the rest of the country as well as of cancer deaths among the older ages still remain. Nevertheless, these estimates are the most reliable for planning and management of cancer across India. According to GLOBOCAN, 14 million new cancer cases were diagnosed globally, and more than 8 million deaths attributable to cancer occurred in 2012 alone. Around a million of these diagnosed cases and 700,000 of the deaths occurred in India, home to approximately 17 percent of the world population [8].

Immigrant Indian populations in the USA and the UK exhibit growing convergence of their cancer experiences with their adjacent communities [10,11]. The Indian burden of disease is distinctly different from its post-industrial counterparts. The more common forms of cancer among Indian men are tobacco-related. Among women in India, the incidence of breast and cervical cancer is the highest among all the forms of cancer [3]. Deaths due to cervical cancer are the second most common cause, even when both the sexes are combined. Ratios of cancer incidence to mortality vary significantly among economically developed and developing countries. India, being no exception to this pattern, is affected by causal variations, stage at diagnosis, and the availability and use of cancer treatments. The cancer mortality is high at a rate of 68 percent of the annual incidence in India, underlining the fact that less than 30 percent of those diagnosed with cancer survive five years or longer after the diagnosis. Data limitations may cause the actual survival rates to be even lower. On the contrary, in North America and Western Europe, the five-year survival rates for all cancers are approximately 60 percent. Delayed diagnoses, incorrect or sub-optimum treatment (including inability of patients to complete or even access apt therapies), may be the principal factors resulting in poor cancer survival in India [12,13].

The burden of disease due to cancer in India varies greatly among regions [10]. Cancer mortality and incidence is predominantly higher in the more affluent states, though mortality rates are constituted substantially by cancer deaths in rural areas too, owing to scarce or non-availability of cancer treatment facilities. Individuals from the lower socio-economic strata are at a higher age-specific mortality risk as compared to their better-off counterparts [14]. Even though cancer causes around 10 percent of all deaths in India annually, the absolute numbers wreak havoc on the public health sector, necessitating better cancer management, widespread awareness and a strong framework for improved care. One way to improve assessments of the national burden would entail making cancer a reported phenomenon, for which establishment of new and improved registries would be a viable solution. Results from thoroughly conducted sample surveys like the Million Deaths Study could also put the issues like regional variations into sharp perspective, thereby aiding in improvement of overall cancer policy and its care. The increased number of new cases of cancer by 2035 are primarily because of an ageing population. In spite of the decrease in age-specific incidence and mortality, increased survival rates, whenever achieved, will propel the overall prevalence of cancer to still increase.

A culturally diverse country like India has huge underlying regional and sectoral (urban-rural) variations, which extend even up to lifestyles and variations in age-specific death rates [15]. So, the assessment of the geographical and social distribution is essential to frame cancer control programmes and specifically target those groups, which require attention, to incite further research into the causes of cancer. Cancer is unequally distributed in societies, people hailing from particular socio-economic groups maybe burdened disproportionately with the disease. A number of socio-demographic (age, social group), behavioural (tobacco consumption) and health-related (body mass index) indicators have been proposed to be explaining this gradient in the occurrence of cancer. This study aims to assess the social and regional variations and the contributions of the selected cancer indicators in the country.

Materials And Methods

Data Sources

The recent round of the National Family Health Survey, 2015-16 data (also called the Demographic Health Survey of India, 2015-16) has been used for the present study. NFHS-4 data provides district level estimates on the socio-economic and demographic characteristics of the Indian population. Additionally, it provides information about important indicators on population, health and nutrition for India and each State/Union Territory. It provides data on 601,509 households, 699,686 women, and 103,525 men.

From the survey, data on females aged 35-49 years have been used for the present study. For supporting information data from Census of India 2011 has been utilized. STATA version 14.0 and MS-Excel have been used to analyse the data.

Variables Used in the Study

Outcome Variable

The self-reported prevalence of cancer is used as the outcome of interest. The types of cancer included breast, oral and cervical cancer.

Predictor Variable

Based on the factors discussed in existing literature, exposure variables include various socio-economic, demographic and behavioural indicators like age in years (35-39; 40-44; 45-49), Social group (Scheduled Caste/Tribes; Others (Non-Scheduled Caste/Tribes)), Years of Schooling (no education; 1-4; 5-9; 10 or more), Place of residence (Urban; Rural), Religion (Hindu; Muslim; Others (Non Hindu/Muslim)), Region (Southern; North-eastern; Eastern; Northern; Central; Western), Children ever born (None; 1-2; 3 or more), Ever used

contraceptives like IUD/Hysterectomy/Sterilization (Not used; used), and, Tobacco Use (No; Yes).

Statistical analysis

At the first place the study computed unadjusted and age-adjusted prevalence (per 10000 women) of cancer amongst women in the age-group of 35-49 years followed by logistic regression to assess the adjusted effect of different factors along with tobacco use on the occurrence of cancer.

The study further calculated the Wagstaff's Concentration Index and decomposition of concentration indices to investigate regarding the inequalities in the prevalence of cancer amongst selected women in India. The indicators mentioned above along with body mass Index (normal/underweight; overweight/obese) was used for assessing their contributions to the concentration indices. Socio-economic inequalities in cancer occurrence were quantified with the concentration index and subsequently decomposed into associated factors using decomposition analysis. A concentration index (CI) provides a measure of socioeconomic inequality in a health variable. It ranges from -1 to +1 [16]: a value close to zero indicating near equality, a value near -1 showing a greater concentration of the health variable among the poor (pro-poor) while a value increasing to +1 indicating greater concentration amongst the wealthier groups (pro-rich). The CI is calculated as twice the area between the concentration curve and the line of perfect equality, or as twice the weighted covariance between the outcome (in our case, cancer occurrence and non-occurrence) and the fractional rank in the wealth distribution divided by the health variable mean [16].

$$CI = \frac{2}{\mu} Cov_w(h_i r_i)$$

where, CI is the concentration index; h is cancer occurrence; r is the fractional rank of the individual i in terms of wealth (SES) distribution; m is the weighted mean value of the cancer occurrence variable; and, cov_w is the weighted covariance.

Besides, a P80/P20 ratio is used to show the inequality in health care utilization according to the socio-economic status of the population. Ratios, such as the P80/P20 which compares the health variable's prevalence for those at the 80th income percentile (a person who is at the top 20 percent of the income distribution) with those at the 20th income percentile (a person who is at the bottom 20 percent of the income distribution). Five groups (Q1, Q2, Q3, Q4, and Q5) were derived, where Q1 represents the poorest and Q5 the wealthiest. The P80/P20 ratio is the ratio between the figures for the population affected by cancer for the Q5 (wealthiest) and Q1 (poorest).

As shown by Wagstaff et al. [17], the CI can be visualized as the sum of the contribution to inequality of an array of factors, ranging from socio-economic, demographic to geographical and policy indicators (the 'deterministic' or explained component), as well as an unexplained residual component. The original decomposition method assumes an underlying Ordinary Least Squares (OLS) regression model [5]. Decomposition analyses can also be undertaken with dichotomous outcomes (like cancer occurrence, in this case) if based on a linear approximation of the model [18,19].

Cross-sectional survey weights have been applied in all analyses to account for varying response rates among the sampled population and clustering of data at the household level.

Results

The unadjusted and age-adjusted prevalence of cancer classified by different socio-economic and demographic characteristics is depicted in **Table 1**. The unadjusted prevalence of cancer among women in India is 21 per 10000 women. However, the prevalence increased to 25 per 10000 women when data is age-adjusted.

The findings from the unadjusted prevalence of cancer depicts that the prevalence varies from 15 per 10000 women in the age-group of 35-39 years to 26 per 10000 women in the 45-49 years age-group. The prevalence of cancer, when classified by years of schooling, is the highest for the women with 5 to 9 years of schooling and only marginally lower for those with 10 or more years of schooling. Women with no children have a higher prevalence of cancer (36 women out of 10000), as compared to those with 3 or more children (18 women out of 10000). The prevalence is 38 women out of 10000 who have ever used intra-uterine device, undergone hysterectomy or sterilization. Among the women who do not consume tobacco, the prevalence of cancer is 19 per 10000 women.

In case of age-adjusted results, the prevalence of cancer, when classified by years of schooling, is the highest for the women with 5-9 years of schooling and only marginally lower for those with 10 or more years of schooling. Women in the caste category SC/ST had a higher prevalence of cancer (27 per 10000 women) as compared to the women from non-SC/ST category (22 per 10000 women). Also, the age-adjusted prevalence of cancer was found to be higher amongst the respondents from urban areas (21 per 10000 women) as compared to their rural counterparts (23 per 10000 women). Women with no children have a higher prevalence of cancer (45 women out of 10000), as compared to those with 3 or more children (21 women out of 10000). Among the women who do not consume tobacco, the prevalence of cancer is 25 per 10000 women.

[Insert Table 1 here]

The adjusted odds of tobacco consumption results are not significant. As the years of schooling increase, the odds of developing cancer are more as compared to those with no education. Those with 5-9 years of schooling are 1.4 times more likely (OR=1.4, $p<0.1$) to have cancer as compared to those without any formal education, as is the case with those with 10 or more years of schooling, who have 1.5 times more odds (OR-1.46, $p<0.1$) as compared to those with no education [Table 2].

[Insert Table 2 here]

The results of the concentration indices show an overall concentration of the health variable (cancer) towards the richer quintiles (Table 3). Among the population classified on the basis of age, for those aged between 35-44 years, the occurrence of the health variable is concentrated among the rich while for those from the higher age group, i.e., 45-49 years, it is concentrated towards the poorer quintiles. For the socially deprived groups, it is concentrated among the richer quintiles, while for the socially non-deprived groups, it is concentrated among the poorer quintiles. In urban areas on the basis of place of residence and Muslim population among the religions, the concentration is pro-poor, while rural areas and religions other than Muslim populations have a pro-rich concentration. For the women population with three or more children ever born, the concentration is pro-poor, while for those with less than three children, the concentration is pro-rich. The use or non-use of contraceptives like intra-uterine devices or opting for hysterectomy or sterilization shows a pro-rich concentration. For those who consume tobacco in any form (chew, smoke), the concentration is pro-rich, while it is pro-poor for the population not consuming tobacco in any form.

The P80/P20 ratio for cancer incidence is 1.2 (**Table 3**). For the population with years of schooling between 5-9 years, the P80/P20 ratio is 0.11, while it is 0.04 for those with 10 or more years of schooling. For the urban population, the P80/P20 ratio in the distribution of

cancer is 0.05, while it is 2.56 for the rural population. For those who have ever used IUD or opted for hysterectomy or sterilization, the ratio is 1.00, while it is 0.54 for those who haven't opted for the aforementioned methods.

[Insert Table 3 here]

The decomposition of the concentration index shows significant contribution from women aged between 40-44 years, those with years of schooling between 5-9 years, those hailing from the socially deprived groups of the population as well as women who have ever used contraceptives like IUD or have undergone hysterectomy or sterilization, as compared to the other indicators (**Table 4**).

[Insert Table 4 here]

Figure 1 depicts a quintile map for cancer prevalence across the districts of India shows a disparate picture. There are 129 districts with prevalence of cancer between 0.346 to 6.137 per 1000 population, some of which are Ramanathapuram, Tirunelveli, Kanniyakumari in Kerala, Prakasam, West Godavari in Andhra Pradesh, Purba Medinipur, South 24-Parganas, North 24-Parganas, Kolkata, Howrah in West Bengal, Dibang Valley, East Siang in Arunachal Pradesh, Baramula in Jammu and Kashmir. India has 123 districts with cancer prevalence between 0.132 to 0.345 per 1000 individuals, some of which are Kollam, Palakkad, Pathanamthitta in Kerala, Nellore in Andhra Pradesh, Tiruvannamalai, Vellore in Tamil Nadu, Bharuch in Gujarat, Ujjain, Shahpur in Madhya Pradesh. The other 391 districts in India have even lesser prevalence of cancer.

[Insert Figure 1 here]

Discussion

Potentially modifiable lifestyle factors have been deemed to be associated with the risk of cancer [20, 21]. Lifestyle variations include differences in the level of tobacco consumption, dietary pattern and environmental factors [22-25]. The findings depict the prevalence of cancer characterized by the selected socio-economic and demographic characteristics among women aged between 35-49 years in India. The inequalities in cancer prevalence were further decomposed in the study.

The prevalence of cancer is more among women in the age bracket of 45-49 years, in comparison to the women from younger age-groups. The present finding ratifies the existing literature which establishes age as one of the prominent predictors of cancer occurrence. This may be because of the existing linkage between age and other preventable chronic conditions, avoidable exposures and modifiable risky behaviours which are associated with the occurrence of cancer [26, 27].

Women with three or more children were found to be significantly less likely to have cancer, as compared to the women with no children. Pregnancy and number of children ever born have been found to be associated with the occurrence of cancer amongst women, but these evidences have been scarce and restricted to breast cancer. These studies suggest that pregnancy and breast-feeding (which is an essential part after pregnancy) reduces the women's lifetime in menstruation cycle, thus reducing the women's exposure to endogenous hormones produced during menstruation. Studies highlighted the association of exposure to endogenous hormones to increase in breast cancer risk [28].

Another major reason for this could be the direct effect of pregnancy on, maturation of breast cells, which makes them resistant towards their transformation to cancer cells [29, 30].

The findings from the study corroborate the popular notion of cancer being likely to affect the educated people as compared to their lesser educated counterparts. Education level of any individual is strongly linked to prediction of lifestyle behaviours. Several studies in Finnish [31], Hungarian [32], Japanese [33], Slovak [34] and Swedish [35] adolescents have documented, with some exceptions, social differences dictating health risk behaviours.

The P80/P20 ratio also sheds light on the disparities in the prevalence of cancer by economic characteristics. On the basis of classification by education, among those with 5-9 years of schooling, the rich are less likely to be affected by cancer as compared to the economically deprived section of the population, while among those with 10 or more years of schooling, the rich are less likely to be affected as compared to their economically deprived counterparts [25].

Eastern and Southern states were found to have a higher prevalence of cancer amongst all the regions of the country. Women from the Northern and Western states were less likely to be affected with cancer, as compared to their counterparts from the southern states. This finding reiterates the advent of demographic transition in the southern parts of the country [36] far sooner than the rest of India.

Conclusions

Studies on smoking and tobacco use and their association with cancer in extant literature also focus more on explanations accounting for factors linked to peer-groups and their educational trajectories [37]. The Indian cancer burden is intrinsically linked to the country's socio-economic inequalities in health care access and utilization. A more equitable distribution of power and resources is necessary for redressing the existent situation as well as being better prepared for the future burden [38]. Social inequalities dilute the advances gained by increased survival rates and increase the costs associated with cancer incurred by individuals and also the society at large [39].

A plethora of treatment options and national programmes exist for communicable diseases, but the same cannot be said for non-communicable diseases. The National Cancer Control Programme was the first programme dedicated to a chronic disease. Most health programmes have been designed around a technological response and often set targets, which health workers strive to achieve. A different approach needs to be adopted whilst dealing with chronic diseases involving multi-component interventions, which may affect several behaviours. The HIV prevention programmes launched in the recent past show some promise in this direction, as they also warranted major behavioural changes, and can be hoped to pave the path for chronic disease control programmes. State-subsidised healthcare, though available for chronic diseases, is primarily concentrated in the urban centres. Mushrooming of private tertiary-care hospitals provide short and long-term care for chronic diseases, but they are insufficiently available in rural primary-care settings, sometimes even smaller towns and cities find themselves without proper healthcare facilities for chronic diseases.

An effective public-health response entails actions to reduce the risk of chronic diseases: policy measures, including those for tobacco control, production and distribution of healthy food items, regulation of unhealthy foods, increase knowledge, awareness and adoption of healthy behaviour, early detection of individuals at a high risk of development of chronic diseases, secondary prevention for people who have already been affected with chronic ailments as well as cost-effective life-saving acute care. A comprehensive strategy includes actions minimizing exposure to risk factors at the population level, as well as reducing risk for individuals at the higher risk level and aid in furnishing early, medium and long-term effects.

Abbreviations

CI: Concentration Index

HDI: Human Development Index

IIPS: International Institute for Population Sciences

NFHS: National Family Health Survey

Declarations

Ethical approval and consent to participate

The secondary data used for the study does not contain any identifiable information on the study subjects. Thus, no ethical approval was required.

Consent for publication

Not applicable

Availability of data and materials

The dataset analysed during the current study is available in the data repository on the Demographic Health Survey website and can be obtained on furnishing a data request form. In order to obtain the data, following link can be used.

<https://dhsprogram.com/data/available-datasets.cfm>

Competing Interest

Authors declare no competing interest.

Funding

No funding has been received from any external source by the authors for this research.

Author's Contributions

SKS has conceptualized and designed the study. His suggestions, comments and vision for the study have been instrumental in addressing the research gap this study aims to bridge. AB has performed the data analysis and the write-up of the study. PP has performed additional analysis for the study. All the authors read and approved the final manuscript. Additionally, all the authors have reviewed, discussed, and agreed to their individual contributions.

Acknowledgements

The Authors are thankful to all the co-ordinators of National Family Health Survey (NFHS-4), 2015-16 for their relentless support in providing community-based estimates at National and Sub-national levels.

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Tables

Table 1 Unadjusted and age-adjusted prevalence of cancer by demographic characteristics, NFHS 4 (2015-16)

Demographic characteristics	Frequency	Unadjusted Prevalence (Per 10000)	Age-adjusted Prevalence (per 10000)
Age (in years)			
35-39	61,957	15.17	
40-44	76,211	19.81	
45-49	72,222	25.75	
Ethnicity			
SC/ST	73,135	20.65	26.62
Non-SC/ST	1,28,569	18.82	21.89
Years of Schooling			
No education	1,00,179	18.87	19.91
1 to 4	15,799	15.19	15.37
5 to 9	52,973	23.60	32.41
10 or more	41,439	22.44	31.26
Place of residence			
Urban	64,619	21.20	27.25
Rural	1,45,771	20.17	23.34
Religion			
Hindus	1,58,642	19.54	25.13
Muslim	24,560	23.21	23.93
Others	27,188	23.54	21.50
Region			
South	32,413	27.77	30.06
Northeast	29,989	23.01	18.27
East	35,596	25.85	37.73
North	67,852	15.03	14.65
Central	26,144	19.51	18.39
West	18,396	14.68	16.07
Children ever born			
None	8,442	35.54	44.88
1 or 2	71,246	23.30	29.06
3 or more	1,30,702	17.98	21.00
Tobacco use			
No	1,77,661	20.83	24.93
Yes	32,729	18.64	18.22
Total	2,10,390	20.49	24.76

Table 2 Odds ratios of having cancer by selected demographic and socio-economic characteristics, NFHS 4 (2015-16)

Background Characteristics	Odds Ratio	P>z	[95% Confidence	Interval]
Tobacco use				
No	1.00			
Yes	0.87	0.54	0.56	1.35
Age (in years)				
35-39	1.00			
40-44	0.96	0.86	0.59	1.54
45-49	0.84	0.43	0.54	1.30
Ethnicity				
Scheduled Caste/Tribe	1.00			
Other backward Class	0.86	0.44	0.59	1.26
Others	1.14	0.52	0.76	1.72
Years of Schooling				
No education	1.00			
1 to 4	0.65	0.22	0.32	1.30
5 to 9	1.41	0.07	0.98	2.03
10 or more	1.47	0.10	0.94	2.30
Place of residence				
Urban	1.00			
Rural	0.98	0.91	0.70	1.37
Religion				
Hindus	1.00			
Muslim	1.21	0.44	0.75	1.94
Others	1.03	0.92	0.61	1.73
Region				
South	1.00			
Northeast	0.88	0.65	0.50	1.53
East	0.82	0.41	0.52	1.31
North	0.57	0.02	0.36	0.90
Central	0.78	0.35	0.46	1.31
West	0.57	0.08	0.30	1.07
Children ever born				
None	1.00			
1 or 2	0.65	0.19	0.34	1.24
3 or more	0.44	0.01	0.23	0.83
IUD/Hysterectomy/Sterilization				
Not used	1.00			
Used	1.27	0.14	0.92	1.76

Table 3 Concentration indices, P80/P20 ratio and Standard error for cancer indicators, NFHS 4 (2015-16)

Indicator		P80/P20 Ratio	C.I.	S.E.
Overall		0.83	0.01	0.05
Education	No education	4.17	-0.02	0.08
	1-5 years	1.67	-0.29	0.17
	5-9 years	0.11	-0.17	0.08
	More than 10 years	0.04	-0.04	0.09
Age	35-39 years	0.64	0.04	0.1
	40-44 years	1.14	0	0.08
	45-49 years	0.72	-0.01	0.07
Caste	Scheduled Caste/Tribe	1.22	0.15	0.1
	Other backward Caste	0.96	-0.03	0.07
	Others	0.43	-0.1	0.1
POR	Urban	0.05	-0.06	0.06
	Rural	2.56	0.01	0.06
Religion	Hindu	0.98	0.01	0.06
	Muslim	1.41	-0.08	0.14
	Others	0.05	0.29	0.21
Region	South	0.39	-0.06	0.07
	NE	0.38	0.2	0.11
	East	7.69	0.07	0.11
	North	0.31	0.11	0.08
	Central	1.10	0.1	0.07
	West	0.33	0.2	0.18
Children Ever Born	None	0.22	0.14	0.17
	1 or 2	0.19	0.03	0.08
	3 or more	2.13	-0.1	-0.1
Contraception	Not used	1.00	0.25	0.13
	Ster/Hysterec/IUD ever used	0.54	0	0.08

Tobacco use	No	0.79	-0.02	-0.02
	Yes	1.09	0.01	0.1

Table 4 Decomposition of Concentration Index for inequality in cancer occurrence for women above 35 years of age, NFHS 4 (2015-16)

Demographic indicators	Elasticity	Concentration Index	% Contribution
Place of Residence= rural	0.000	-0.022	0.022
Age = 40-44 year	0.001	-0.002	0.228
Age = 45-49 year	0.000	0.003	0.051
Tobacco consumption = yes	0.000	0.064	-0.098
Years of schooling = 1-5 year	0.000	0.017	-0.048
Years of schooling = 5-9 year	0.001	0.012	0.259
Years of schooling = 10 year or more	0.001	-0.018	0.425
Religion= Muslim	0.000	0.039	0.004
Religion = Non-Hindu/Muslim	0.000	-0.035	-0.121
Children Ever Born =1-2	-0.003	-0.001	-1.097
Children Ever Born = 3 or more	-0.005	0.002	-2.018
Ethnicity= Scheduled Caste/Tribe	0.000	0.019	0.138
Ethnicity = Other backward Class	0.000	-0.025	-0.162
Contraceptive = ever used	0.001	-0.033	0.230
IUD/Hysterectomy/Sterilization			
BMI category = overweight/Obese	0.000	-0.341	0.000
Residual		0.326	
Concentration Index (CI)		0.006	