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Cancer and its Associated Factors in India: A Study Based on the National Family Health Survey (NFHS) 2015-16

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Abstract

According to the NICPR in the year 2010, the average estimated prevalence of cancer was 25 lakhs and incidence was about 07 lakhs in India, there were 5.56 lakh deaths due to cancer. The study is based on data from NFHS (2015-16). Univariate and Bivariate analysis and Poisson regression models were used to establish an association between all independent predictors and outcome variable. Among both women and men, asthma and diabetes emerged as the main determinants for cancer prevalence. Women who smoke tobacco are 1.76 times significantly more likely to get cancer whereas in case of men who smoke are 2.65 times significantly more likely to get cancer. Among both women and men, non-vegetarian diet emerged to be important determinants for cancer prevalence i.e. (IRR=1.58, P<0.05) for women and (IRR=3.17, P<0.05) for men. Among women who are exposed to arsenic through groundwater are 1.81 times significantly more likely to get cancer. From the study, it has been found that asthma and diabetes among biological factors; tobacco and alcohol consumption, consumption of non-vegetarian food and arsenic exposure (only among women) among behavioral factors are the main determinants of cancer prevalence among both men and women in India.

Keywords: Arsenic • Asthma • Cancer • Diabetes • India • NFHS 2015-16 • Poisson regression

Introduction

Cancer is a leading cause of non-communicable disease worldwide. An estimated 14.1 million new cancer cases occurred in 2012 [1]. Lung, breast, cervical, colorectal and stomach cancers accounted for more than 40 per cent of all cases diagnosed worldwide [1]. In men, lung cancer was the most common (16.7 per cent of all new cases in men) whereas breast cancer was by far the most common cancer diagnosed in women (25.2 per cent of all new cases in women). In 2015, cancer was the second leading cause of death globally and was responsible for 8.8 million deaths [1]. Globally, nearly 1 in 6 deaths are accounted to cancer [1]. The most common causes of cancer death are lung cancer (1.69 million deaths), liver (788,000 deaths), and colorectal (774,000 deaths), stomach (754,000 deaths), breast (571,000 deaths) [1]. Around one-third of deaths from cancer are due to the five leading behavioural and dietary risks: High body mass index, low fruit and vegetable intake, lack of physical activity, tobacco use, and alcohol consumption. According to National Institute of Cancer Prevention and Research (NICPR), the average estimated prevalence of cancer in India was 2,500,000 in 2010 and incidence was about 700,000 in the same year, there were 556,000 deaths due to cancer (NICPR). This paper provides the estimates of cancer at National and Sub-national level and also looks into the hotspots of cancers among men and women separately at sub-national level. In addition, this paper also attempts to study how household characteristics interplay with bio-behavioral factors in promoting cancer among men and women in India.

There are various factors which are responsible for the different types of cancers. The risk of oral and lip cancer is associated with tobacco smoking, smokeless tobacco and alcohol consumption. The use of betel quid is also highly related to oral and lip cancer. Alcohol consumption is highly related to the risk of throat cancer. Consumption of tobacco and snus increases the risk of throat cancer. The risk of lung cancer is associated with smoking and second-hand smoking. Arsenic poisoning is also highly associated with lung cancer. Pulmonary tuberculosis is associated with lung cancer. Asthma and lung cancer have high association and also specific chemical and polluted environment exposure increases the risk of lung cancer. The risk of esophageal cancer increases with obesity. The risk of stomach cancer is also related to obesity.

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Consumption of smokeless tobacco or snus elevates the risk of stomach cancer. Meat consumption and dietary behaviour also play a significant role in the risk of stomach cancer. Liver cancer is associated with obesity and inflammation. Heavy smoking and heavy consumption of alcohol are associated with the risk of liver cancer. Arsenic poisoning also increases the risk of liver cancer. Diabetes is associated with the risk of liver cancer and family history. The risk of prostate cancer is associated with family history, dietary pattern, obesity, chronic inflammation and cigarette smoking. A weak association of prostate cancer is found with STI. The risk of gall bladder cancer is primarily related to family history [2,3], smoking behavior [4], exposure to heavy metals and arsenic poising [5]. The risk of colorectal cancer increases with the dietary pattern, consumption of red and processed meat and type II diabetes [6-19]. Alcohol consumption is associated with colon cancer; smoking is associated with rectal cancer [20]. The risk of acquiring rectal cancer increase with an increase in obesity [21]. However, women using oral contraceptive had 15% to 20% lower risks of colorectal cancer [22]. The risk of cervical cancer increases with smoking behaviour [23]. Women who have used oral contraceptives for five or more years have a higher risk of cervical cancer than women who have never used oral contraceptives and family history is also associated with risk of cervical cancer [24-26]. The risk of breast cancer is related to obesity among women [6], breastfeeding reduces the risk of breast cancer among women [7-10]. Alcohol consumption increases the risk of breast cancer [11]. Women who had ever used oral contraceptives had a slight increase in the relative risk of breast cancer compared with women who had never used oral contraceptives [11-14].

Thus, the bio-behavioral factors constitute the focal point in the discussion while studying Cancer prevalence and therefore, deserves a suitable analytical plan to examine its interplay with other dimensions of Cancer. In this backdrop, the paper attempts to find the factors associated with cancer prevalence in India.

Materials and Methods

The 2015-16 National Family Health Survey (NFHS-4), the fourth in the NFHS series, provides information on population, health, and nutrition for India and each state and union territory. In the interviewed households, 723,875 eligible women age 15-49 were identified for individual women's interviews. Interviews were completed with 699,686 women, with a response rate of 97 per cent. In all, there were 122,051 eligible men aged 15-54 in households selected for the state module. Interviews were completed with 112,122 men, with a response rate of 92 per cent.

In this study, the dependent variable was cancer prevalence, coded as yes and no. The independent variables taken for the study were grouped into three categories, namely, background, biological and behavioural factors. The age of respondent, type of residence at the date of interview, education of respondent, wealth index, caste, and religion was clubbed under background factors whereas nutritional status, tuberculosis, asthma, diabetes and Sexually Transmitted Infections (STI) (STI, genital ulcer/sore and discharge from genital) were clubbed into biological factors. Smokeless tobacco consumption (chewing tobacco, snuff, gutkha or paan masala, paan with tobacco, khaini), smoking tobacco (smokes cigarette, smokes bidi, smokes cigar, smokes pipe and smokes hookah), frequency of cigarette and bidi (Per day), alcohol consumption, use of oral contraceptive pills, status of breastfeeding, Non-vegetarian food consumption (egg, chicken and fish), vegetarian food consumption (milk or curd, pulses or beans, green leafy vegetables, fruits) and arsenic exposure through groundwater were included under behavioural factors.

Associations between socioeconomic status, behavioral predictors, biological variables and Cancer among men and women were analyzed by bivariate analysis using Pearson's Chi-square tests. All the socio-economic, behavioral and biological predictors were further analyzed using Poisson regression models to establish associations between all independent predictors and the outcome variable (cancer). Poisson regression (58) (59) is used when the outcome variable is a count data and also the outcome variable is rare, I have not further proceeded to other models of Poisson regression because the problem of over-dispersion did not arise (60).

Results

Table 1 show the frequency distribution of various backgrounds, behavioral and biological factors among men and women aged 15-49 and 15-54 across India. Table 2 depicts the percentage distribution of cancer among men and women concerning several background factors. The total weighted percentage distribution of cancer among women according to NFHS-4 is 0.17 (i.e. 170 per Lakh) per cent in India. The background factors among women which are significantly associated with cancer are age, type of residence, education. In contrast, wealth, caste and religion do not seem to be significantly associated with cancer prevalence. The total weighted percentage distribution of cancer among men according to NFHS-4 is 0.28 (i.e. 280 per Lakh) per cent in India. Among men, the background factors which are significantly associated with cancer are age, wealth index, caste and religion whereas the type of residence and education are not found to be significantly associated with cancer. Moving on to women, the bio-behavioral factors which appear significantly associated with cancer are nutritional status, tuberculosis, asthma, Sexually Transmitted Infections (STI), diabetes, smoking tobacco, alcohol consumption, consumption of oral contraceptive pills, status of breastfeeding and consumption of non-vegetarian food. In contrast, the factors that do not come up with a significant association are consumption of smokeless tobacco and consumption of vegetarian food. The bio-behavioral factors significantly associated with cancer among men are tuberculosis, asthma, Sexually Transmitted Infections (STI), diabetes, smokeless tobacco, frequency cigarette consumption per day, alcohol consumption, consumption of oral contraceptive pills and consumption of vegetarian food while nutritional status and frequency bidi consumption per day appear to be insignificantly associated with cancer.

Table 1: Frequency distribution of background, biological and behavioral variables among women respondents (N=699,686), and men respondents (N=112,122).

Variables	Women		Men	
	Frequency	Percent	Frequency	Percent
Background variables				
Age (Years)				
15-24	244500	34.94	35,363	31.54
25-34	211823	30.27	30,776	27.45
35+	243363	34.78	45,983	41.01
Type of residence				
Urban	2,42,296	34.63	42,955	38.31
Rural	4,57,390	65.37	69,167	61.69
Education				
No education	1,92,156	27.46	14,592	13.01
Primary	87,215	12.46	14,090	12.57
Secondary	3,31,019	47.31	64,008	57.09
Higher	89,296	12.76	19,432	17.33
Wealth				
Poorest	1,24,933	17.86	16,437	14.66
Poorer	1,37,888	19.71	20,902	18.64
Middle	1,43,196	20.47	23,689	21.13
Richer				
Richest	1,47,087	21.02	26,115	23.29
Castes				
Others	1,89,034	27.02	31,277	27.89
Obc	3,03,910	43.44	48,848	43.57
Sc	1,42,611	20.38	22,136	19.74
St	64,132	9.17	9,867	8.8

Religion				
Hindu	5,63,760	80.57	91,390	81.51
Muslim	96,450	13.78	14,790	13.19
Christian	16,624	2.38	2,550	2.27
Others	22,852	3.27	3,391	3.02
Biological factors				
Obesity (BMI)				
Below-18.5 (u-weight)	1,53,325	21.91	21,222	18.93
18.5-24.99 (normal)	3,90,152	55.76	65,270	58.21
25-29.99 (overweight)	1,05,053	15.01	17,600	15.7
30-above (obese)	51,156	7.31	8,030	7.16
Tuberculosis				
No	6,98,130	99.78	111693	99.62
Yes	1,556	0.22	429	0.38
Asthma				
No	6,86,118	98.06	1,10,496	98.55
Yes	13,568	1.94	1,626	1.45
STI				
No	6,89,186	98.5	1,06,470	94.96
Yes	10,500	1.5	5,652	5.04
Diabetes				
No	6,87,955	98.32	1,09,726	97.86
Yes	11,731	1.68	2,396	2.14
Behavioral factors				
Smokeless tobacco consumption				
No	6,60,558	94.41	79,506	70.91
Yes	39,128	5.59	32,616	29.09

Frequency cigarette (per day)				
No	N.A	N.A	96,982	86.5
1-10/day	N.A	N.A	12,330	11
11 and above/day	N.A	N.A	2,810	2.51
Frequency bidi (per day)				
No	N.A	N.A	96,163	85.77
1-10/day	N.A	N.A	8,917	7.95
11 and above/day	N.A	N.A	7,041	6.28
Smokes tobacco				
No	6,94,275	99.23	N.A	N.A
Yes	5,411	0.77	N.A	N.A
Alcohol consumption				
Never or occasionally	6,98,129	99.78	108017	96.34
everyday	1,557	0.22	4105	3.66
Consumption of OC pills				
No	6,44,978	92.18	N.A	N.A
Yes	54,708	7.82	N.A	N.A
Status of Breastfeeding				
Breastfeeding	1,74,240	24.9	N.A	N.A
Others	5,15,379	73.66	N.A	N.A
Never	10,067	1.44	N.A	N.A
Non-Vegetarian food consumption				
Never or occasionally	6,38,186	91.21	1,02,082	91.05
Daily	61,500	8.79	10,040	8.95
Vegetarian food consumption				
Daily or occasionally	6,32,394	90.38	1,04,299	93.02
Never	67,292	9.62	7,823	6.98

Arsenic (ground water)				
No	594,883	85.02	97,266	86.75
Yes	104,803	14.98	14,856	13.25

Note: N.A (not applicable)

Table 2: Percentage distribution of Cancer in background, biological and behavioral variables among women respondents (N=699,686) and men respondents (N=112,122).

Variables	**Women**		**Men**	
	Yes (std. error)	**P-value**	**Yes (std. error)**	**P-value**
Background factors				
Age (Years)		0.001		0.007
15-24	0.13 (0.0071)		0.21 (0.0240)	
25-34	0.15 (0.0083)		0.27 (0.0300)	
35+	0.24 (0.0106)		0.34 (0.0274)	
Type of residence		0.04		0.262
Urban	0.17 (0.0092)		0.29 (0.0284)	
Rural	0.17 (0.0059)		0.28 (0.0189)	
Education		0.019		0.704
No education	0.20 (0.0099)		0.27 (0.0425)	
Primary	0.18 (0.0143)		0.32 (0.0474)	
Secondary	0.16 (0.0070)		0.26 (0.0198)	
Higher	0.16 (0.0142)		0.34 (0.0437)	
Wealth index		0.324		0.011
Poorest	0.15 (0.0105)		0.33 (0.0422)	
Poorer	0.17 (0.0110)		0.20 (0.0290)	
Middle	0.18 (0.0112)		0.34 (0.0370)	
Richer	0.17 (0.0108)		0.34 (0.0381)	
Richest	0.19 (0.0119)		0.21 (0.0303)	

Caste		0.281		0.001
Others	0.19 (0.0103)		0.16 (0.0235)	
Obc	0.16 (0.0075)		0.35 (0.0284)	
Sc	0.18 (0.0121)		0.33 (0.0405)	
St	0.19 (0.0122)		0.20 (0.0319)	
Religion		0.052		0.001
Hindu	0.18 (0.0058)		0.29 (0.0185)	
Muslim	0.17 (0.0134)		0.18 (0.0340)	
Christian	0.20 (0.0195)		0.91 (0.1083)	
Others	0.09 (0.0162)		0.10 (0.0425)	
Biological factors				
Nutritional status		0.015		0.599
Below-18.5 (u-weight)	0.17 (0.0106)		0.26 (0.0354)	
18.5-24.99 (normal)	0.17 (0.0064)		0.27 (0.0197)	
25-29.99 (overweight)	0.16 (0.0129)		0.31 (0.0433)	
30-above (obese)	0.24 (0.0238)		0.39 (0.0778)	
Tuberculosis		0.002		0.001
No	0.17 (0.0050)		0.28 (0.0157)	
Yes	0.40 (0.1524)		1.18 (0.4995)	
Asthma		0.001		0.001
No	0.1 (0.0037)		0.1 (0.0096)	
Yes	4.1 (0.1875)		12.36 (0.8778)	
STI		0.001		0.005
No	0.17 (0.0050)		0.27 (0.0158)	
Yes	0.33 (0.0535)		0.55 (0.0993)	
Diabetes		0.001		0.001
No	0.1 (0.0038)		0.09 (0.0089)	

Yes	4.4 (0.2100)		9.07 (0.6196)	
Behavioral factors				
Smokeless tobacco consumption		0.916		0.001
No	0.17 (0.0052)		0.32 (0.0206)	
Yes	0.16 (0.0160)		0.18 (0.0221)	
Smokes tobacco		0.001		N.A
No	0.17 (0.0049)		N.A	
Yes	0.39 (0.0690)		N.A	
Frequency cigarette (per day)		N.A		0.005
No	N.A		0.24 (0.0159)	
1-10/day	N.A		0.45 (0.0578)	
11 and above/day	N.A		0.91 (0.1561)	
Frequency bidi (per day)		N.A		0.614
No	N.A		0.28 (0.0170)	
1-10/day	N.A		0.33 (0.0594)	
11 and above/day	N.A		0.28 (0.0598)	
Alcohol consumption		0.001		0.005
Never or occasionally	0.17 (0.0049)		0.24 (0.0177)	
Everyday	1.05 (0.2165)		0.38 (0.0326)	
Consumption of OC pills		0.005		N.A
No	0.18 (0.0052)		N.A	
Yes	0.15 (0.0163)		N.A	
Status of Breastfeeding		0.001		N.A
Breastfeeding	0.14 (0.0089)		N.A	
Others	0.18 (0.0060)		N.A	

Never	0.32 (0.0538)		N.A	
Non-Vegetarian food consumption		0.001		0.001
Never or occasionally	0.17 (0.0050)		0.23 (0.0150)	
Daily	0.26 (0.0226)		0.74 (0.0905)	
Vegetarian food consumption		0.1		0.01
Daily or occasionally	0.17 (0.0052)		0.27 (0.0160)	
Never	0.19 (0.0160)		0.46 (0.0716)	
Arsenic (ground water)		0.001		0.001
No	0.16 (0.0052)		0.31 (0.0179)	
Yes	0.25 (0.0159)		0.06 (0.0203)	

Note: N.A (not applicable)

In the analysis, two models have been used i.e. Model 1 (reduced effect model) in which only the behavioral and background factors have been controlled and model 2 (full effect model) in which all the factors, i.e. biological, behavioral and background elements have been controlled. Model-1 (women): In the respective model, the risk of cancer is 1.76 times higher in respondents who smoke tobacco in any form (IRR=1.76, p-value<0.05) than who do not smoke tobacco in any kind. The respondents who consume alcohol on a daily basis are 2.58 times more likely to get cancer (IRR=2.58, p-value<0.05) than those who do not drink alcohol daily (Table 3).

Table 3: Poisson regression computing Incidence Rate Ratio (IRR).

Biological factors				
	Women		**Men**	
Asthma	Model 1	Model 2	Model 1	Model 2
No®	-	1	-	1
Yes	-	18.42*(15.86,21.4)	-	18.58*(13.59,25.42)
Diabetes				
No®	-	1	-	1
Yes	-	16.14*(13.81,18.85)	-	32.55*(23.39,45.31)
Nutritional Status				
Below-18.5 (u-weight)®	-	1	-	1

18.5-24.99 (normal)	-	0.97 (0.81,1.15)	-	0.96 (0.69,1.33)
25-29.99 (overweight)	-	0.74*(0.59,0.94)	-	0.76 (0.49,1.17)
30-above (obese)	-	0.78 (0.59,1.04)	-	0.71 (0.41,1.24)
Tuberculosis				
No®	-	1	-	1
Yes	-	0.9 (0.43,1.92)	-	1.44 (0.57,3.62)
STI				
No®	-	1	-	1
Yes	-	1.34 (0.94,1.93)	-	0.9 (0.58,1.39)
Behavioural factors				
Tobacco				
No®	1	1	N.A	N.A
Yes	1.76*(1.16,2.65)	1.3 (0.86,1.97)	N.A	N.A
Frequency cigarette (per day)				
No	N.A	N.A	1	1
1-10/day	N.A	N.A	1.47*(1.04,2.08)	1.2 (0.84,1.71)
11 and above/day	N.A	N.A	2.65*(1.66,4.24)	1.71*(1.05,2.78)
Frequency bidi (per day)				
No	N.A	N.A	1	1
1-10/day	N.A	N.A	0.65 (0.41,1.04)	0.64 (0.4,1.03)
11 and above/day	N.A	N.A	0.56*(0.33,0.95)	0.58 (0.33,1.01)
Alcohol consumption				
Never or occasionally®	1	1	1	1
Everyday	2.58*(1.32,5.05)	1.87 (0.96,3.65)	1.23 (0.94,1.62)	1.13 (0.86,1.5)
Non-Vegetarian food consumption				
Never or occasionally®	1	1	1	1

Daily	1.58*(1.29,1.95)	1.28*(1.04,1.58)	3.17*(2.36,4.26)	1.61*(1.18,2.2)
Arsenic (ground water)				
No	1	1	1	1
Yes	1.81*(1.55,2.11)	1.82*(1.55,2.13)	0.26*(0.14,0.49)	0.48*(0.25,0.92)
Status of Breastfeeding				
Breastfeeding®	1	1	N.A	N.A
Others	1.15 (0.97,1.37)	1.02 (0.85,1.21)	N.A	N.A
Never	1.79*(1.15,2.79)	1.42 (0.91,2.21)	N.A	N.A
Consumption of OC pills				
No®	1	1	N.A	N.A
Yes	0.57*(0.43,0.75)	0.6*(0.45,0.79)	N.A	N.A
Smokeless tobacco consumption				
No®	1	1	1	1
Yes	0.84 (0.66,1.06)	0.82 (0.65,1.04)	0.45*(0.33,0.6)	0.72*(0.52,0.99)
Vegetarian food consumption				
Daily of occasionally®	1	1	1	1
Never	1.20 (0.99,1.46)	1.07 (0.88,1.31)	1.5*(1.04,2.16)	1 (0.7,1.45)

Note: ®Reference group for logistic regression, P<0.05 *, N.A (not applicable) Background variables (Age of respondent, type of residence, Education of respondent, Wealth index, Caste, Religion) are controlled while running regression analysis.

Similarly, the respondents who consume non-vegetarian food daily are 1.58 times significantly more likely to get cancer (IRR=1.58, p-value<0.05) than who don't. The respondents who are at risk of exposure of Arsenic are 1.81 times more likely to get cancer (IRR=1.81, p-value<0.05) than those who are not at risk of arsenic exposure. Women who had never breastfed are 1.79 times more likely to get cancer (IRR=1.79, p-value<0.05) than who did. Model-2 (women): In this model, the respondents who have Asthma are at 18.42 times more risk of developing Cancer (IRR=18.42, p-value<0.05) than the respondents who do not have Asthma. The respondents having Diabetes are at 16.14 times more risk of developing Cancer (IRR=16.14, p-value<0.05) than the respondents who do not have Diabetes. The respondents who consume non-vegetarian food daily are 1.28 times significantly more likely to get Cancer (IRR=1.28, p-value<0.05) than who don't consume it daily. The respondents who are at risk of exposure of Arsenic are 1.82 times more likely to get Cancer (IRR=1.82, p-value<0.05) than those who are not at risk of Arsenic exposure.

Model-1 (Men): The respondents who smoke 1-10 and 11 or more cigarettes per day are at 1.47 and 2.65 times more risk of developing cancer respectively (IRR=1.47, p-value<.05 and IRR=2.65, p-value<.05) than who do not smoke a cigarette. The respondents who consume non-vegetarian food daily are 3.17 times significantly more likely to get cancer (IRR=3.17, p-value<0.05) in comparison to those who don't consume it daily. The respondents who never consume vegetarian food daily have 1.50 times more likelihood of

getting cancer (IRR=1.50, p-value<0.05) than who consume it. Model-2 (men): In this model, men who have Asthma are at 18.58 times more risk of developing Cancer (IRR=18.58, p-value<0.05) than the respondents who do not have asthma. Men who have diabetes are at 32.55 times more risk of developing cancer (IRR=32.55, p-value<0.05) than who do not have diabetes. The respondents who smoke 11 or more cigarettes per day are at 1.71 times more risk of developing cancer (IRR=1.71, p-value<.05) than who do not smoke a cigarette. The respondents who consume non-vegetarian food daily are 1.61 times significantly more likely to get cancer (IRR=1.61, p-value<0.05) than who don't consume it daily.

Discussion

Lung cancer is associated with prolonged asthma; similar results were found in the current research that respondents having asthma were more likely to get cancer. It has been found that the overall risk of cancer is high among diabetes patients as seen in the study based on population in Italy [19]. The present study has given this similar kind of result that respondents having diabetes are more likely to get cancer. Many studies have been conducted showing that smoking tobacco causes oral cancer; the study also shows that respondents who consume tobacco are more likely to get cancer. Further, it has been found that respondents who drink alcohol daily are at increased risk of cancer [17,20,27-30]. Respondents who drink alcohol daily are more likely to acquire cancer in the current study as well. Evidence of the present study have been found matching with many case-control studies which show that high intake of non-vegetarian food is highly associated with increased risk of cancer [3,30]. The fact that arsenic consumption is highly associated with gall bladder and skin cancer is evident from the present study which says that respondents who are at risk of arsenic exposure are more likely to get cancer. The current study revealed that breastfeeding reduces the risk of breast cancer [8,9]. Consumption of oral contraceptive pill and cancer risk seems to have a very vague relation; however, current study suggests that use of oral contraceptive pill reduces the risk of cancer by 43%. It is evident from the research that women who consume pills for more than five years are at reduced risk of developing ovarian cancer [12].

Conclusion

Regression analysis reveals that diabetes and asthma are highly associated with the cancer epidemic among both men and women. More specifically, tobacco and alcohol consumption among women and cigarette smoking among men is highly associated with cancer whereas, consumption of non-vegetarian diet among both men and women has an adverse effect of causing malignancy in their body. Among women who never breastfeed and who are exposed to arsenic; and men who never consume vegetarian food are at higher risk of getting cancer. The current study debates those women who consume oral contraceptive pills are protected from a certain type of cancers.

The data on cancer which is available in the NFHS is 15-54 and 15-49 for women respectively. Cancer prevalence can be found among people aged less than 15 years as well as for people aged 55 years and above. For example, more than half of the breast cancer in India is diagnosed in women over 50 years and they are not included in the survey. All the associated factors of cancer including those which are found from the existing literature were not available in the dataset. The question about cancer was not specified according to the different types of cancer i.e. lung cancer, breast cancer, cervical cancer, liver cancer etc. Due to this limitation, a holistic study on the different types of cancer and their prevalence was not possible. The definition of "cancer prevalence" was coded as yes/no in the interview schedule of NFHS with no support in regards to the existence of malignant disease.

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