Research Article

POPULATION BASED CANCER INCIDENCE IN NEPAL – 2016

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Abstract

Cancer is a large group of diseases that can start in almost any organ or tissue of the body when abnormal cells grow uncontrollably, go beyond their usual boundaries to invade adjoining parts of the body and/or spread to other organs. The latter process is called metastasizing and is a major cause of death from cancer. A neoplasm and malignant tumor are other common names for cancer. It is an emerging public health problem in Nepal. The trend of cancer incidence is useful for effective planning and police formation to control and prevent the disease. This study aims to determine population based cancer incidence in Nepal for 2016 by using the data from different data sourse of institution of 15 districts of three geographical region i.e. Tarai, Pahad/Hill and Himalaya/Mountain of Nepal. This was a descriptive study with primary and secondary data collection from different data source institution of population based cancer registry programme, since 1st January to 31th December 2016. The mean age at diagnosis in 2016 was 53 yrs. Cancer of bronchus & lung C34 was the common topography followed by cervix uteri C53 and breast C50.The trend of cancer was seen to be increasing day by day. Well organized awareness activities, HPV vaccination and screening programme was recommended to control and prevent the cancer burden in Nepal.

Keywords: Cancer, Incidence, Population based, Trend.

INTRODUCTION

Cancer is the second leading cause of death globally, accounting for an estimated 9.6 million deaths, or one in six deaths, in 2018. Lung, prostate, colorectal, stomach and liver cancer are the most common types of cancer in men, while breast, colorectal, lung, cervical and thyroid cancer are the most common among women (GLOBO CAN 2018). Globally, about 1 in 6 deaths is due to cancer. Approximately 70% of deaths from cancer occur in low- and middle-income countries. Asia accounts for 60% of the world population and half the global burden of cancer. The incidence of cancer cases is estimated to increase from 6.1 million in 2008 to 10.6 million in 2030. According to WHO, India has a cancer mortality rate of 79 per 100,000 deaths and accounts for over 6 percent of total deaths. These numbers are very close to those of high-income countries. Population based cancer registry helps to know the personal and demographic information like age, sex, address, topography and morphology of the cancer patients who lived in a particular geographical area. This type of cancer registry was started in Nepal by B.P.Koirala Memorial Cancer Hospital, for the first time in 2013. This study includes data from fifteen districts of the country situated in Terai, hills and Himalaya. Therefore, the development of this study can be used to infer an overall situation of cancer in Nepal for 2016. Various studies showed that cancer disease is increasing day by day and there are different yearly reports about the prevalence of cancer disease. Therefore the aim of this study is to hit up on the current scenario of cancer and relevant details in Nepal for 2016.

MATERIALS AND METHODS

This was a descriptive study with primary and secondary data of new cancer that are recorded and collected in different data source institution since 1st January to 31th December 2016. The data were entry, edit, and coded based on ICD-O3 rd and ICD -10, published by IARC/WHO. Whereas, analysis was carried out by using SPSS 19.0.

Data Sources

- District Hospitals, Medical colleges and other hospitals.
- District Public Health Office and other relevant organizations.
- DDC /VDC/Municipality of study area, i.e. office of vital event registration.
- Privet hospitals, Diagnostic labs, hospice etc.
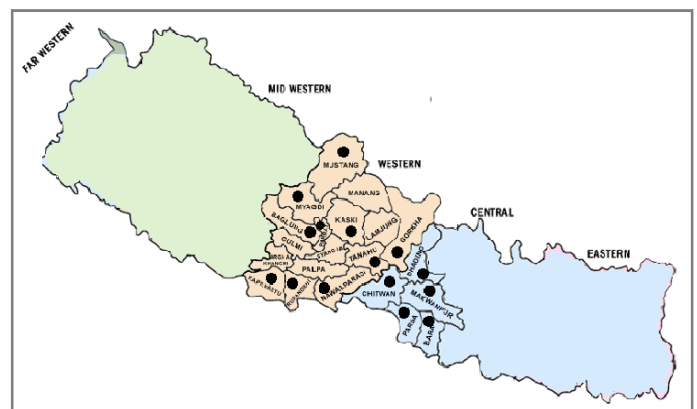
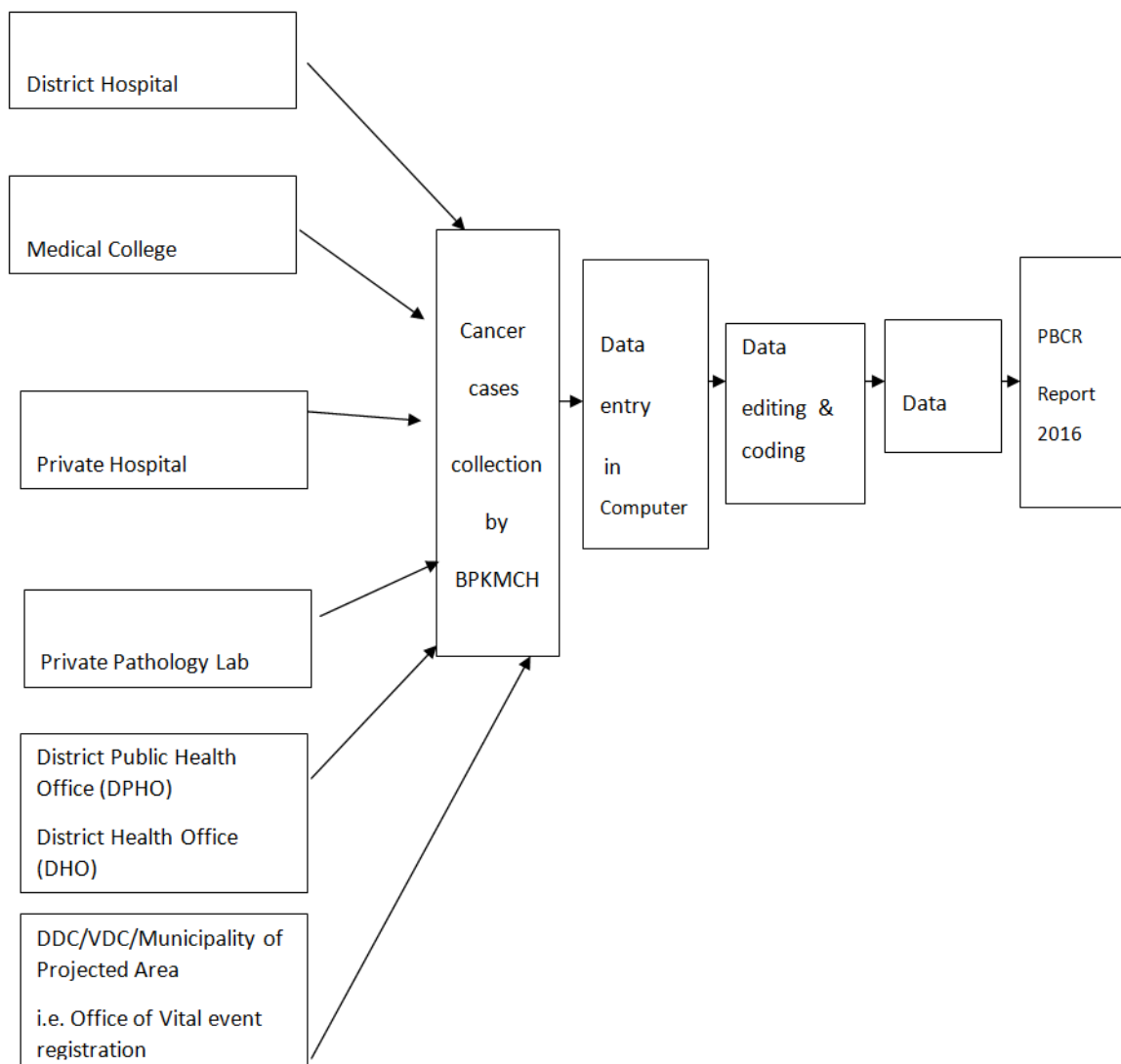### Districts

1. Chitwan	2. Makwanpue	3. Bara
4. Parsa	5. Nawalparasi	6. Rupandehi
7. Kapilvastu	8. Dhading	9. Gorkha
10. Myagdi	11. Tanahun	12. Baglung
13. Parbat	14. Kaski	15. Mustang

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Working Model of Population based Cancer Registry in Nepal

RESULTS

Table 1.

S.N.	District's	Population			New cancer cases			Percent
		Male	Female	Total	Male	Female	Total	
1	Chitwan	298400	297681	658114	45	99	144	4.63
2	Makwanpue	243921	238877	528160	96	124	220	7.08
3	Bara	361920	347026	708947	159	168	327	10.53
4	parsa	322851	305630	628481	98	89	187	6.02
5	Nawalparasi	350017	352031	702048	89	113	202	6.50
6	Rupandehi	456337	445481	901818	65	62	127	1.99
7	Kapilvastu	306323	295986	602309	194	272	466	15.01
8	Dhading	204735	207581	412317	107	124	231	7.44
9	Gorkha	165830	175941	341771	4	3	7	0.22
10	Myagdi	65686	69928	135613	23	38	61	1.96
11	Tanahun	183533	195926	378559	133	166	299	9.63
12	Baglung	154590	166206	320796	56	59	115	3.70
13	Parbat	89095	95287	320796	75	124	199	6.41
14	Kaski	235364	240541	475905	124	179	303	9.76
15	Mustang	9017	8146	17163	98	188	216	6.95
	Total	3447619	3442268	6889887	1366	1738	3104	100.00

Geographical area, population and new cancer cases

Total population of Nepal: 2, 66, 208, 09 (2068)
Total Population of study area : 68,89,887
Coverage 25.88% of total population
Total new cancer cases = 3104 (M = 1366, F = 1738)

Table 2. Cancer cases by age group and sex

S.N.	Age group	Sex				Total	
		Male		Female			
		#	%	#	%	#	%
1	0-4 yrs	35	2.56	8	0.46	43	1.38
2	5-9 yrs	20	1.46	16	0.92	36	1.15
3	10-14 yrs	21	1.53	29	1.66	50	1.61
4	15-19 yrs	42	3.07	36	2.07	78	2.51
5	20-24 yrs	28	2.04	46	2.64	74	2.38
	25-29 yrs	44	3.22	43	2.47	87	2.80
7	30-34 yrs	51	3.73	77	4.43	128	4.12
8	35-39 yrs	57	4.17	112	6.44	169	5.44
9	40-44 yrs	63	4.61	133	7.65	196	6.91
10	45-49 yrs	80	5.85	190	10.93	270	8.69
11	50-54 yrs	109	7.97	201	11.56	310	9.98
12	55-59 yrs	141	10.32	216	12.42	357	11.50
13	60-64 yrs	180	13.17	226	13.00	406	13.07
14	65-69 yrs	166	12.15	165	9.49	331	10.66
15	70-74 yrs	165	12.07	132	7.59	297	9.56
16	75-79 yrs	91	6.66	73	4.20	164	5.28
17	80 + yrs	73	5.34	35	2.01	108	3.47
	Total	1366	100.00	1738	100.00	3104	100.00

Table 3. Distribution of cases by basis of diagnosis and sex

S.N.	Basis of diagnosis	Sex				Total	
		Male		Female			
		#	%	#	%	#	%
1	Endoscopy	0	0.00	5	0.28	5	0.1
2	Biopsy/Histology	352	25.76	585	33. 65	937	30.18
3	Cytology/Haematology	433	31. 69	469	26.98	902	29.05
4	Radiology	254	18.59	278	15. 99	532	17.13
5	Not Available	327	23. 9	401	23.07	728	23.45
	Total	1366	44.00	1738	5.00	3104	100.00

Table 4. Distribution of cases by treatment given and sex

S.N.	Treatment given/taken	Sex				Total	
		Male		Female			
		#	%	#	%	#	%
1	Yes	886	64.86	1084	62.39	1970	61.75
2	No	14	1.02	20	1.50	34	1.09
3	Not accepted	3	0.21	2	0.11	5	0.16
4	Unknown	463	33.89	632	36.36	1095	35.27
	Total	1366	100.00	1738	100.00	3104	100.00

Table 5. Distribution of cases by treatment given and sex (for treatment received only)

S. N.	Extent of disease	Sex				Total	
		Male		Female			
		#	%	#	%	#	%
1	Curative	368	41.53	558	51.47	926	47.00
2	Palliative	134	15.12	141	13.00	275	13.95
3	Not available	384	43.34	385	3551	769	39.03
	Total	886	100.0	1084	100.0	1970	100.00

Table 6. Distribution of cases by treatment received and sex

S.N.	Extent of disease	Sex				Total	
		Male		Female			
		#	%	#	%	#	%
1	Surgery (alone)	123	13.88	176	16.23	299	15.17
2	Radiotherapy	92	10.38	125	11.53	217	11.01
3	Chemotherapy	397	44.80	368	33.94	765	38.83
4	Supportive	63	7.11	68	6.27	131	6.64
5	Symptomatic	23	2.59	26	2.39	49	2.48
6	Surgery & Radiotherapy	27	3.04	29	2.67	56	2.84
7	Surgery & Chemotherapy	66	7.44	130	11.98	196	9.94
8	Radiotherapy & Chemotherapy	66	7.44	114	10.51	180	19.13
9	Surgery, Radiotherapy & Chemotherapy	29	3.27	48	1.18	77	3.90
	Total			886	100.00	1084	100.00	1970	100.00

Table 7. Number of cases by site and sex

S.N.	ICD - 10	Topography	Male	Female	Total	Percent
1	C 00	Lip	5	4	9	0.28
2	C 02	Other and unspecified parts of tongue	47	16	63	2.02
3	C 03	Gum	7	4	11	0.35
4	C 04	Floor of mouth	3	3	6	0.19
5	C 05	Palate	4	3	7	0.22
6	C 06	Other and unspecified parts of mouth	45	11	56	1.80
7	C 07	Parotid gland	2	8	10	0.32
8	C 08	Other and unspecified major salivary glands	1	4	5	0.16
9	C 09	Tonsil	4	1	5	0.16
10	C 10	Oropharynx	3	2	5	0.16
11	C 11	Nasopharynx	14	7	21	0.67
12	C 12	Pyriform sinus	21	4	25	0.80
13	C 14	Other & ill-defined sites in lip, oral cavity & pharynx	3	1	4	0.12
14	C 15	Esophagus	31	16	47	1.51
15	C 16	Stomach	85	77	162	5.21
16	C 17	Small intestine	3	3	6	0.19
17	C 18	Colon	31	22	53	1.70
18	C 19	Rectosigmoid junction	3	1	4	0.12
19	C 20	Rectum	37	30	67	2.15
20	C 21	Anus and anal canal	5	3	8	0.25
21	C 22	Liver and intrahepatic bile duct	34	31	65	2.09
22	C 23	Gall bladder	37	73	110	3.54
23	C 24	Other and unspecified parts of biliary tract	6	19	25	0.80
24	C 25	Pancreas	13	17	30	0.96
25	C 26	Other and ill-defined digestive organs	6	6	12	0.38
26	C 30	Nasal cavity and middle ear	12	9	21	0.67
27	C 31	Accessory sinus	1	5	6	0.19
28	C 32	Larynx	68	19	87	2.80
29	C 34	Bronchus and lung	225	171	396	12.75
30	C 37	Thymus	3	2	5	0.16
31	C 38	Heart, mediastinum, and pleura	2	2	4	0.12
32	C 40	Bones, joints and articular cartilage	19	13	32	1.03
33	C 41	Bones,joints & articular cartilage of other & unspecified sites	22	18	40	1.28
34	C 42.2	Spleen	1	0	1	0.03
35	C 43	Skin melanoma	2	3	5	0.16
36	C 44	Skin other	12	6	18	0.57
37	C 47	Peripheral nerves and autonomic nervous system	1	0	1	0.03
38	C 48	Retroperitoneum and peritoneum	1	3	4	0.12
39	C 49	Connective, subcutaneous and other soft tissues	16	11	27	0.86
40	C 50	Breast	6	266	272	8.76
41	C 51	Vulva	0	9	9	0.28
42	C 52	Vagina	0	3	3	0.09
43	C 53	Cervix uteri	0	377	377	12.14
44	C 54	Endometrium	0	12	12	0.38
45	C 55	Uterus	0	9	9	0.28
46	C 56	Ovary	0	127	127	4.09
47	C 57	Other and unspecified female genital organs	0	2	2	0.06
48	C 60	Penis	11	0	11	0.35
49	C 61	Prostate gland	30	0	30	0.96
50	C 62	Testes	22	0	22	0.70
51	C 63	Other and unspecified male genital organs	1	0	1	0.03
52	C 64	Kidney	18	6	24	0.77
53	C 67	Bladder	60	23	83	2.67
54	C 68	other and unspecified urinary organs	1	0	1	0.03
55	C 69	Eye and adnexa	7	1	8	0.25
56	C 70	Meninges	1	2	3	0.09
57	C 71	Brain	82	41	123	3.96
58	C 72	Spinal cord, cranial, nerves, and other parts of CNS	4	1	5	0.16
59	C 73	Thyroid gland	9	43	52	1.67
60	C 74	Adrenal gland	0	2	2	0.06
61	C 75	Other endocrine glands and related structures	0	1	1	0.03
62	C 76	Other and ill-defined sites	17	15	32	1.03
63	C 77	Lymph nodes (different site)	10	11	21	0.67
64	C 80	Unknown primary site	12	12	24	0.77
65	C 81	Hodgkin's disease	31	22	53	1.70
66	C 85	NHL	41	21	62	1.99
67	C 90	Multiple myloma	14	12	26	0.83
68	C 91	Leukemia/lymphoid	65	38	103	3.31
69	C 92	Leukemia/myloid	31	17	48	1.54
70	C 95	Leukemia unspecified	45	24	69	2.22
71	**	Unspacified	13	13	26	0.83
Total			1366	1738	3104	100.00

Table 8. Top ten cancer cases for both sex

S.N.	ICD - 10	Topography	#	%
1	C 34	Bronchus and lung	1342	13.26
2	C 53	Cervix uteri	912	9.01
3	C 50	Breast	904	8.93
4	C 16	Stomach	499	4.93
5	C 56	Ovary	392	3.87
6	C 23	Gall bladder	387	3.82
7	C 91	Leukemia/lymphoid	313	3.09
8	C 32	Larynx	289	2.85
9	C 71	Brain	279	2.75
10	C 20	Rectum	259	2.56
11	**	Other cancers	1264	40.72
Total			3104	100.00

Table 9. Top ten cancer cases for male

S.N.	ICD - 10	Topography	#	%
1	C 34	Bronchus and lung	798	16.9
2	C 16	Stomach	284	6.04
3	C 32	Larynx	223	4.74
4	C 91	Leukemia/lymphoid	213	4.5
5	C 67	Bladder	198	4.21
6	C 71	Brain	174	3.7
7	C 20	Rectum	150	3.19
8	C 85	NHL	141	3
9	C 02	Other and unspecified parts of tongue	139	2.95
10	C 22	Liver and intrahepatic bile duct	136	2.89
11	**	Other cancers	603	44.14
Total			1366	100.00

Table 10. Top ten cancer cases for female

S.N.	ICD - 10	Topography	#	%
1	C 53	Cervix uteri	912	16.02
2	C 50	Breast	874	16.12
3	C 34	Bronchus and lung	544	10.03
4	C 56	Ovary	392	7.23
5	C 23	Gall bladder	269	4.96
6	C 16	Stomach	215	3.96
7	C 73	Thyroid gland	174	3.21
8	C 22	Liver and intrahepatic bile duct	118	2.17
9	C 20	Rectum	109	2.01
10	C 71	Brain	105	1.93
11	**	Other cancers	494	28.42
Total			1738	100.00

Table 11. Summary of total cancer cases by years for both sex

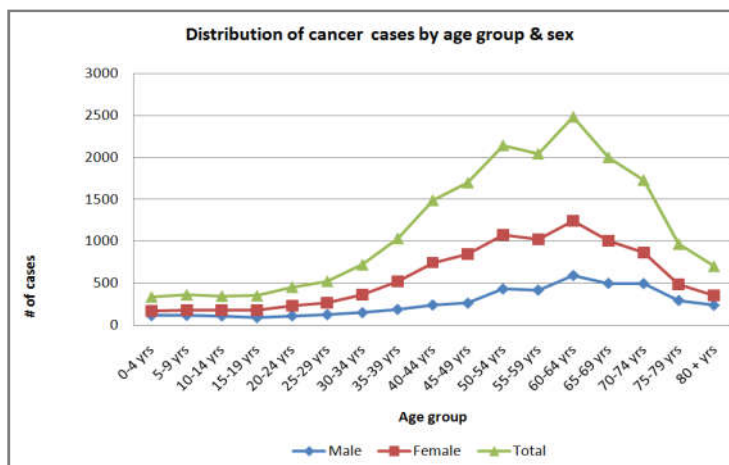| S.N.	Years	Sex				Total cases
		Male		**Female**		
		#	%	#	%	
1	2013	1113	45.1	1356	54.9	2469
2	2014	1088	41.5	1532	58.5	2620
3	2015	1271	43.1	1679	56.9	2950
4	2016	1366	44.0	1738	55.9	3104

Figure 1. Distribution of cancer cases by age group and sex
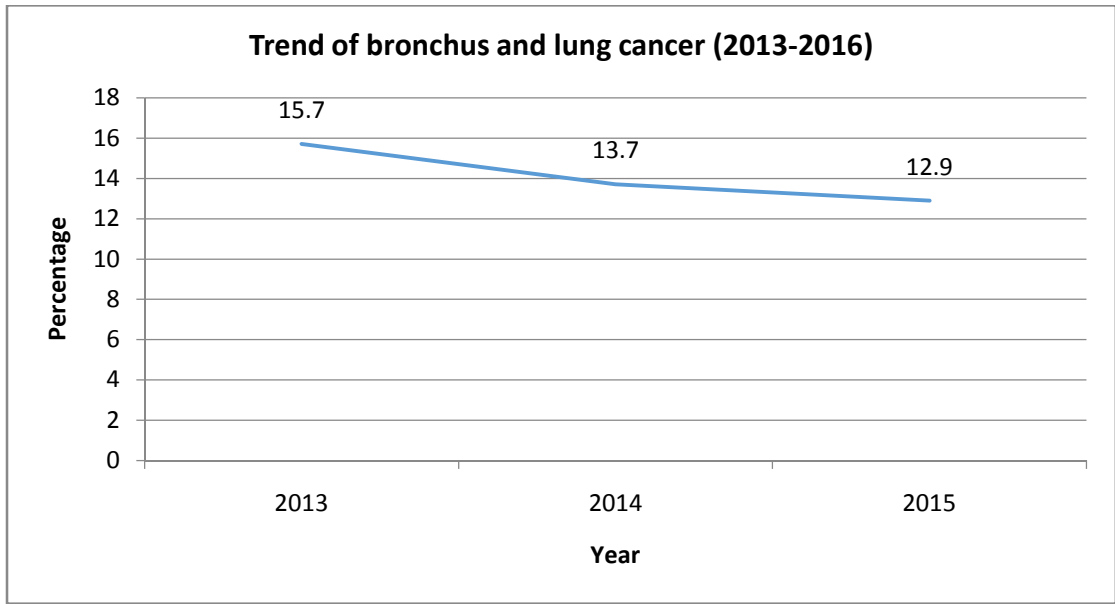
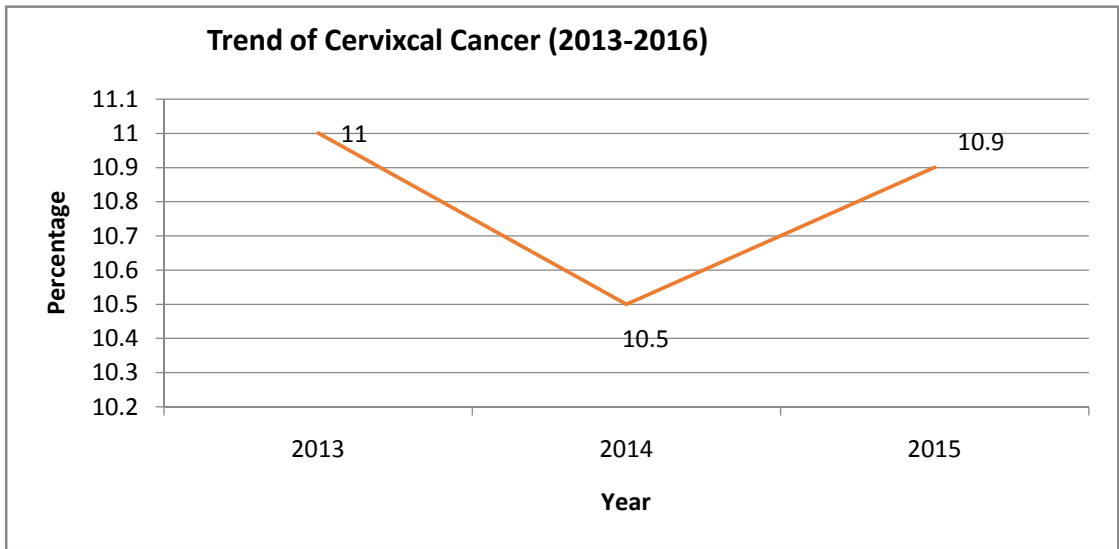**Figure 2: Trend of bronchus and lung cancer (2013-2016)**
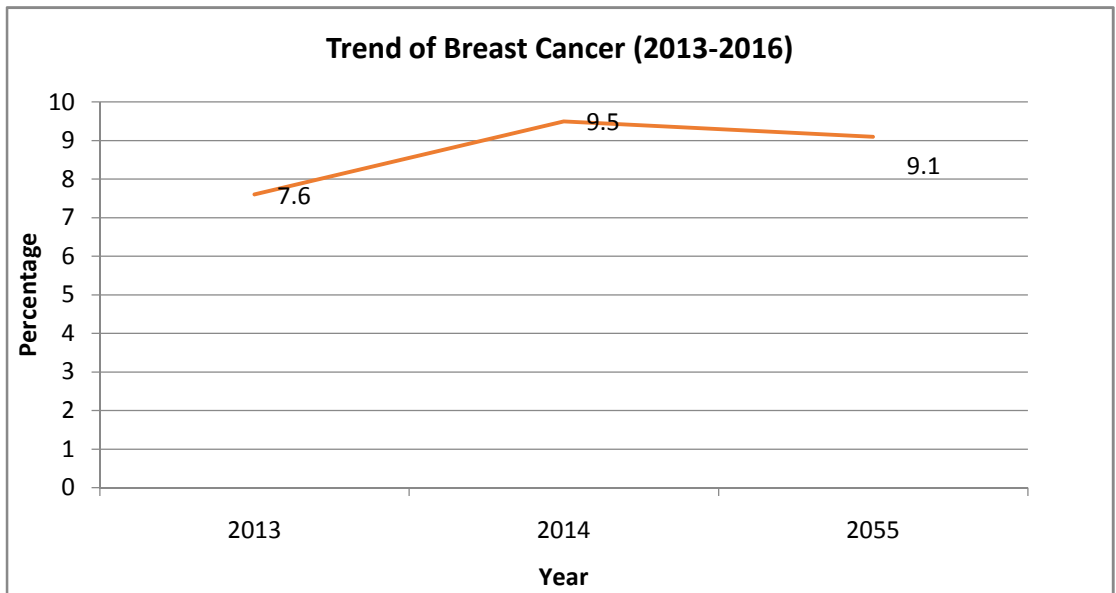

Figure 3. Trend of Cervical   Cancer (2013-2016)

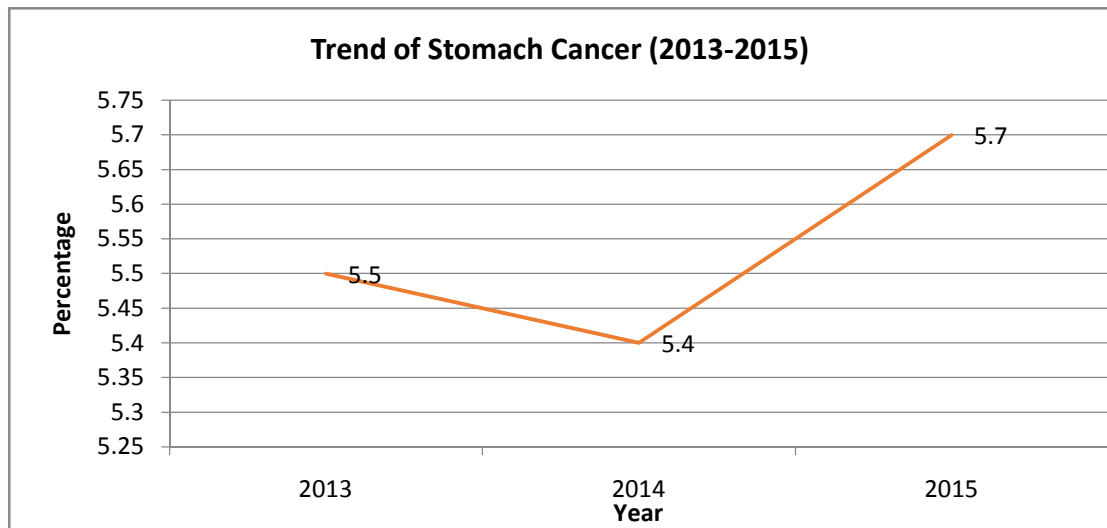**Figure 4. Trend of Breast Cancer (2013-2016)**

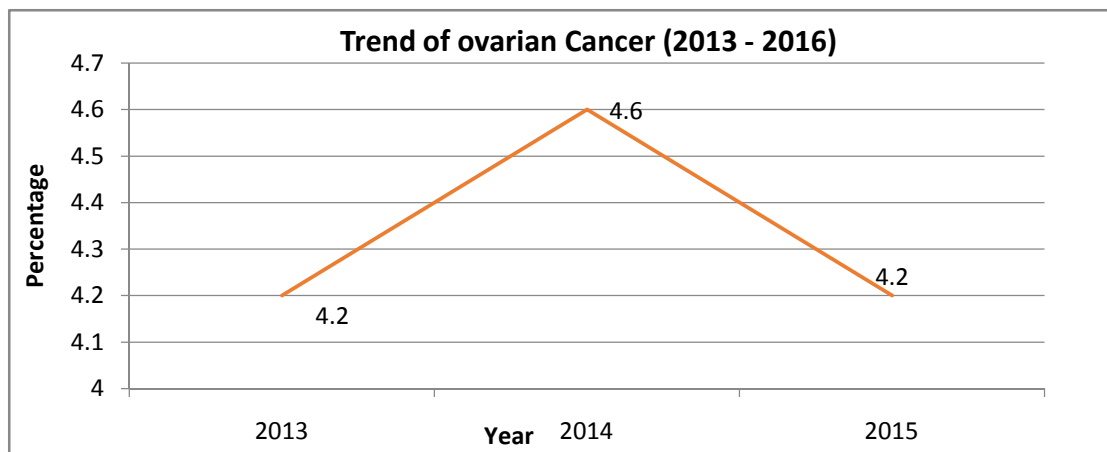**Figure** 5. **Trend of Stomach Cancer (2013-2016)**

Figure 6. Trend of ovarian Cancer (2013 - 2016)

DISCUSSION

In this study, bronchus & lung cancer generally predominating in males, presumably because of smoking habits, and latter in females (Curado *et al.,* 2007., Moor at al., 2010., Forman *et al.,* 2012). A survey in rural communities of Nepal bt Pandey *et al.* (1988) showed that in the 20+ years age group 85.4% of men and 62.4% of women were tobacco users. The prevalence of smokeless tobacco use, as well as smoking, is high, particularly among males and disadvantaged groups (Sinha at al.., 2012). More recently, it was documented that older women are also very likely to smoke, especially those with a lower socioeconomic status (Pandey and Lin, 2013). An inverse association was observed between education and lung cancer risk also observed higher the lung cancer risk among unmarried personality and lower risk in the individuals who lived in the central region compared to the west (Hashibe *et al.,* 2011). Awareness of lung cancer by tobacco use and other risk factors varied with socioeconomic status amongst residents of Pokhara, Despite their awareness of smoking as a risk factor for lung cancer, most of them still continue to smoke (Chawla *et al.,* 2010). Furthermore, even medical student perceptions about the cause of lung cancer may be influenced by their smoking behavior and there was little knowledge of public health measures for smoking control (Khatiwada *et al.,* 2012). In this study cancer of cervix uteri was the second leading cancer site for both sex and top cancer topography for female.

Among females cancer of cervix uteri is a common cancer site for developing countries but in developed countries breast cancer ranked as a leading cancer. (Curado *et al.,* 2007; Moore *et al.,* 2010; Forman et al., 2012). There is an urgent need for a reinvigorated and tailored approach to cervix cancer prevention among the educated youth in India, Nepal and Srilanka (joy *et al.,* 2011). From this data we have found a significant increase in cancer of cervix uteri in the future, suggesting the need for more focus and resource allocation on cervical cancer screening and treatment (Sathin *et al.,* 2013). Self- collected sampling methods should be the subject of additional research in Nepal for screening HR-HPV, associated with pre-cancer lesions and cancer, in women rural communities with limited access to health services (Johnson *et al.,* 2014). In the context of limited screening services in Nepal, the efforts should be to reduce the diagnostic delay especially patient and health care provider delay for early detection and reduction of mortality rate of cervical cancer (Gyenwali *et al.,* 2014). Risk factors for cancer of cervix uteri like early age a marriage, and early age at first birth, multiparity, poor genital hygiene and infection with HPV virus infection are common in Nepal. Health education programs which are effective not only in increasing knowledge about cervical cancer and pap smear test but also effective in positively changing attitude towards the test should be organized to increase pap smear coverage (Ranabhat *et al.,* 2014). Breast cancer was the third most common cancer for both sex and second leading cancer site in female for 2015.

Cancer of breast proved to have overtaken cervical cancer in terms of incidence, as in the majority of countries of Asia (Curado *et al.,* 2007; Moore *et al.,* 2010; Forman *et al.,* 2012). The fact that young Nepalese women account for over one quarter of all female breast cancers, many being diagnosed at an advanced stage (Sharma *et al.,* 2005; Thapa *et al.,* 2013) is of particular importance. The level of awareness of breast cancer, including knowledge of warning signs and BSE (breast self examination), is sub-optimal among Nepalese women (Sathian *et al.,* 2014). Low knowledge on breast cancer, risk factors and screening practice among female groups (shrestha, 2012). Community interventions have been a focus in Bangladesh (Ansink *et al.,* 2008) and Kolkaata (Basu *et al.,* 2006) and deserve emphasis in the Nepali context. In both breast and cervical cancer cases compliance with both screening guidelines and subsequent referral and treatment are necessary (Dinshaw *et al.,* 2007a;2007b). It Should be noted that BSE has been validated in the Nepalese setting (Tara *et al.,* 2008). In conclusion, cancer of bronchus & lung was ranked as a top leading cancer site for both sex followed by cervix uteri and breast for both registry system for 2013-2015.

In the year 2016, 3438 cancer cases were reported from data source institutions for the process of population based cancer registration. Among them the cases were verified by name, age, sex and disease i.e. topography/morphology. Repeated cases of projected areas i.e. selected 15 districts (n=334) were deleted from data base and total 3104 cases were analyzed for the purpose. The mean age at diagnosis in 2016 was 53 yrs. Cancer of bronchus & lung C34 was the common topography followed by cervix uteri C53 and breast C50. Biopsy/histology was the first basis of diagnosis followed by cytology/hematology and radiology. Out 0f 3104 cases, only 1970 (61.75%) were received treatment, 34 (1.09%) cases did not receive treatment and 5 (0.16%) were not accepted for treatment in 2016. Whereas 1095 (35.27 %) were unknown/unclear about treatment. Most of the patients 765 (38.83%) were treated with chemotherapy followed by surgery alone 299 (15.17%) and radiotherapy 217 (11.01%). Among the cases in the year of 2016, 47.00% cases received treatment for curative purpose, 13.95% for palliative care and 39.03 % cases had unknown/ unclear about treatment modalities.

Conclusion

Among the cases, women were more than men. Biopsy was the first choice of diagnostic method. Bronchus & lung cancer was most common cancer site for both sex followed by cervix uteri and breast. Whereas, bronchus & lung was leading site for men and cervix uteri for women.

Acknowledgements

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