THE INTERNATIONAL JOURNAL OF SCIENCE & TECHNOLEDGE

Medical and Non-Medical Interventions to Reduce the Risks of Cancer

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Abstract:
Different types of Cancers found in male and female such as lung, oral, stomach, colon, cervix, breast which are associated with the risks factors of smoking, chewing tobacco, excessive alcohol drinking, ageing, life style and heredity etc. in Nepal. The study focused to identify the medical and non-medical interventions to reduce the risk of cancer in Nepalese context. This qualitative study applied in-depth interview with the health care service providers of hospitals and senior environmental and sanitation engineers to identify the risk and relevant interventions to reduce the risk of developing cancers. Some suggested interventions were awareness on risks factors, training of health workers on precancerous stages identification, onsite better service and training at grass root level health service provider to assess and refer the suspicious cases to the higher centre. Respondents seemed very positive towards preventive clinics in preventing cancers and also minimizing cancer complications. Better record keeping, continuous follow up of patients and research on cancer prevention and treatment found important to improve services to reduce cancer burden. People had low awareness on cancer risks and access to service. Poverty compelled people to visit health facilities at late stage. Some other causes on growing cancer cases might be inadequate knowledge on cancers at grass root level, similarly people had less or no knowledge on adverse effect of smoking or chewing tobacco. Health education and service specifically for cancer in the country was not adequate to aware on risk reduction of cancer.

Keywords: Medical, Non-Medical interventions, Risks, Cancer

1. Introduction

Cancer is a leading cause of death worldwide and accounted for 7.6 million deaths (around 13% of all deaths) in 2008 (297, 2012).Cancer became growing problem in developing countries and Nepal also suffers from it. Types of major cancers found in Nepal based on available studies most common type of cancer in males were lung cancer, followed by the oral cavity and stomach and that in females were cervix uteri, breast and lung. While comprehensive cancer registration data are available for some locations in India and Pakistan, the situation regarding other countries in South Asia is less clear. "Only one publication with cancer incidence data is available in the literature for Nepal, for one hospital in the Western provinces. Shifts in the main cancers were noted with different ages, with leukaemia and lymphomas in young individuals replaced by lung, oral and stomach in middle age and lung, stomach and larynx in the oldest category of males. In females the shift was to breast in young women, then cervix in middle age followed by lung in the very aged. There was also variation between hospitals, but this appeared largely due to the differences in the therapeutic modalities available in different institutions"(Pradhananga, 2009).

There are different underlying causes which might increase cancer risks of Nepalese people, which are socially and culturally accepted habit of smoking, drinking alcohol, education of the people and awareness in risk factors of cancer inducer. Similarly in most of the cooking was from firewood and people has to live in poorly ventilated house causing ill health. Apart from it excessive alcohol drinking, food consumption pattern, geographical situation, population growth, poor nutrition and poor health service availability in remote areas specifically in cancer care etc. could be other causes of increasing number of cancer cases. It is hard to imagine its impact on patients of developing countries where there are almost no health insurance policies and often cost becomes the greatest barrier in availing cancer treatment.

In order to prevent cancers several interventions were suggested during the study which could be effective to reduce cancer risks. The suggested medical interventions were training of health personnel on identification and counselling of people for early signs, symptoms and referral to higher centers for further management in case of suspicion. It was also shown equally important to aware people on cancer causing risks factors. Similarly, cancer screening mobile health camps should organized to identify cancer risks and avail further cancer management. It was also advised that the family with positive family history of cancer, smokers for many years and excessive alcohol drinker etc. should periodically receive health check up. Education and creating awareness on cancer risk factors and prevention, smoking cessation benefit, use of smokeless chulo (stove) promotion will also play a role on lowering risk of cancer. In Nepal adult smoking is 38.5%, which shows the high risk of cancer in the general population due to active and passive smoking.(http://www.nationmaster.com/country/np-nepal/hea-health)

Other activities, reducing risks of cancer might be regular exercise and proper diet and nutrition education to the people. Similarly policy on preparing and implementing a master plan for protecting environment of urban/rural area by promoting renewable energy, non-emissive vehicle promotion and forestation etc., which would improve natural and healthy environment reducing the pollutions and risks of cancers.

Direct and indirect cost involvement in cancer care is enormous (Bhattacharyya GS, 2009). Therefore, it is extremely important to study the risks and various interventions to minimize the risk which will ultimately support reducing the burden of cancer in Nepal.

2. Method

The study method applied was Qualitative design and the data collected using in-depth interview of doctors, health care service provider serving in cancer hospitals. Most of the respondents had work experience varying from 6 years to 20 years. Altogether, eight medical doctors working in cancer hospitals, one senior nurse and one senior nutritionist participated in the in depth interview along with and two Senior Environment/Sanitation Engineers were also interviewed in the study. The respondents were selected purposively and communicated earlier for their available time and on due time conducted interviews. The selected respondents were only those who had work experience of at least 5 years in the field of cancer treatment and care. The interview with the environmental sanitation specialist was to identify environmental risks and non-medical preventive measures. For minimizing the risk of environmental factors the environmental sanitation specialist provided different suggestions.

3. Result and Discussion

3.1. Demographic Information of Respondents

Most of the respondents were of doctors and allied health personnel providing services to the cancer patients in BP Koirala Memorial Cancer Hospital, Bharatpur, Chitwan. They had work experience varying from 6 years to 20 years, similarly two senior environmental and sanitation engineers were interviewed for their view on minimizing environmental risks.

3.1.1. Risk Factors of Cancers

General risk factors reported by interviewee during the interview based on their experience and knowledge were diverse but some of the risks factors were common for most of them, whereas some new risks mentioned based on their experiences. Following risks factors were found from the interviewee:

3.1.1.1. Life Style

All respondents accepted changing life style as one of the major risks of cancer genesis which includes smoking, excessive alcohol drinking, fast food, low fiber diet and sedentary life style etc. This was also supported by the study of C Gopalan, where it was mentioned that cancers were linked with life style which include Smoking, excessive alcohol drinking, fried food, red meat, sun exposure, infections, stress obesity, and physical inactivity(Gopalan, 1996).

3.1.1.2. Food Habit

In total 60% respondents considered fast food in recent days as threat to health which might also induce cancer. Similarly the consumption of old pickles, high salt, excessive alcohol, roasted meat and stale food were also linked with cancer to 40% respondents. One of the respondents mentioned that excessive salt and sweet consumption, use of excessive spices, salty and old pickles consumption also linked with increased cancer risk. In other studies Diet-related factors are thought to account for about 30% of cancers in developed countries. Obesity increases the risk of cancers in the oesophagus, colorectal, breast, endometrial, and kidney. Alcohol causes cancers of the oral cavity, pharynx, larynx, oesophagus, and liver, and causes a small increase in the risk of breast cancer. Adequate intakes of fruit and vegetables probably lower the risk for several types of cancer, especially cancers of the gastrointestinal tract. The importance of other factors, including meat, fibre, and vitamins, is not yet clear (Dr Timothy J Key, 2002).

The study of Palayo Correa, also mentioned about relation between initial and final stage of gastric cancer which were linked with excessive salt intake (Correa, 1992). In other study PreethaAnand wrote for cancer prevention life style modification was important which requires smoking cessation, increased ingestion of fruits and vegetables, moderate use of alcohol, caloric restriction, exercise, avoidance of direct exposure to sunlight, minimal meat consumption, use of whole grains (Anand, 2008).

During the interview 100% respondents mentioned smoking one of the major risk factors of cancers. There were different types of smokes affecting the health of people inhaled in the Nepalese community or by the people, most common type in recent days are cigarette smoking, indoor smoke with firewood etc. which is risk factors of developing cancers.

3.1.1.3. Environmental Pollution

Growing urbanization, increasing vehicles, deforestation, water and sanitation management problems and stressful environment might increase the risk of cancers. This was supported by 70% respondents that environmental factors might raise risk of cancer genesis.

According to the Environment and sanitation engineering specialist, Mr. S Poudel and Mr B Bhattarai major environmental pollution were different in urban and rural area. Mostly air pollution in rural areas were due to firewood and house without or small window which cannot ventilate adequate air, similarly other types causes were dampness, improper use of pesticide whereas in urban area vehicular emissions, radiation, mass waste production and improper disposal, stressful environment which might be the attributing risk factors of generating not only cancers but other diseases as well which might affect the health severely in Nepalese context. Based on

paper of Preetha Anand where it was mentioned that 90 to 95% have all cancer roots in the environment and lifestyle (Anand, 2008). Air pollution is already known to increase risks for a wide range of diseases, such as respiratory and heart diseases. The experience of 60% respondent working in cancer care shared different types of smokes from vehicle, cigarette, firewood, dust particles; gases also pose to increase risk of mostly lung cancer. Studies indicate that in recent years exposure levels have increased significantly in some parts of the world, particularly in rapidly industrializing countries with large populations. The most recent data indicate that in 2010, 223 000 deaths from lung cancer worldwide resulted from air pollution. The most widespread environmental carcinogen "The air we breathe has become polluted with a mixture of cancer-causing substances," says Dr Kurt Straif, Head of the IARC Monographs Section. "We now know that outdoor air pollution is not only a major risk to health in general, but also a leading environmental cause of cancer deaths"(Wrold Health Organization, 2013).Therefore, cancer prevention requires smoking cessation, increased ingestion of fruits and vegetables, moderate use of alcohol, caloric restriction, exercise, avoidance of direct exposure to sunlight, minimal meat consumption, use of whole grains, In this review, we present evidence that inflammation is the link between the agents/factors that cause cancer and the agents that prevent it. In addition, we provide evidence that cancer is a preventable disease that requires major lifestyle changes (Anand, 2008).

3.1.1.4. Stress
Stress causes physical changes which might distort normal physiology of human body which increases risk of cancer. Amongst the respondents 90% viewed stress as the risk of cancer. The study of Lily L Wua mentioned the mechanism of changes with stress as "reactive oxygen species (ROS) produced either endogenously or exogenously can attack lipid, protein and nucleic acid simultaneously in the living cells. In nuclear and mitochondrial DNA, 8-hydroxydeoxyguanosine (8-OHdG), an oxidized nucleoside of DNA, is the most frequently detected and studied DNA lesion. Upon DNA repair, 8-OHdG is excreted in the urine. Numerous evidences have indicated that urinary 8-OHdG not only is a biomarker of generalized, cellular oxidative stress but might also be a risk factor for cancer, atherosclerosis and diabetes."(Lily L. Wua, 2004).

3.1.1.5. Ageing
The factors that determine the risk of developing clinical Prostate Care not well known, although three established risk factors have been identified increasing age, ethnicity, and heredity. One of the respondents gave 3M: (Middle age, Mongolian, Man)at the increased cancer risk of Nasopharynx.

3.1.1.6. Past Medical History
For 70% respondents past medical history of old TB patient, diabetes, obesity, Hypertension and people with recurrent infection were at increased risk of cancer.

3.1.1.7. Nutrition
Food production in the countries of South and South-East Asia has shown a general upward trend during the last decade. Despite the considerable increase in population in many of these countries, food production per capita in 1988-90 was significantly higher as compared to 1979-81 figures, the increase being specially marked in such countries as Vietnam, Cambodia, Indonesia, and Malaysia. Available daily calorie supply was adequate to meet the requirement. The overall pattern of food production however has shown little change, with cereal production continuing to account for a predominant part of food production. There is no evidence of a significant uptrend with respect to production of pulses, milk, horticultural products, poultry or meat production in most countries. A unique and unfortunate feature of the nutrition situation in South-Asian countries is that the incidence of low birth weight deliveries is as high as 34% (1990), ranging from 25% in Sri Lanka to 50% in Bangladesh (as against less than 7% in the countries of Europe and North America). Even in countries of Africa where the overall food and nutrition situation is worse than in South Asia, the incidence is well below 20%. This is a reflection of the poor state of maternal nutrition in pregnancy. Florid nutritional deficiency diseases have shown a steep decline over the last two decades, but goitre and iron deficiency anemia continue to be major public health problems, though some headway has been made with regard to the control of the former. Severe forms of growth retardation in children have declined but the majority suffers from mild and moderate forms of growth retardation. Countries of the Region are in varying stages of developmental transition. Among the burgeoning middle classes in some of these countries there are evidences of escalation of degenerative diseases such as diabetes and coronary heart disease. With increasing life expectancy, geriatric nutritional problems will demand increasing attention (Gopalan, 1996).

3.1.1.8. Overall
General risk factors of cancer which is prevailed in the world: tobacco, cigarette smoking as risk factors for all respondents, along with these 80% also included excessive alcohol consumption and heredity as major risks. Similarly 40% respondents admitted other risks as unsafe sex, infections, low fiber diet, pesticide use, water and sanitation.

3.1.2. Ways of Risk Reduction
Actual cause of cancer is not yet found but several risks are found to develop cancer. Theoretically and practically different medical and non medical approaches are found in previous studies and from the experience of working health care service providers and allied persons. In this study also the data was described in medical and non medical perspective of identifying and reducing cancer risks.

3.2. Medical Ways to Reduce Risk of Cancer

There are different cancer risks which can be screened by medical tests, early signs and symptoms and training of health workers which will support on reducing cancer risks.

3.2.1. Role of Preventive Clinic

70% of the respondents thought that role of preventive clinics were very effective in different ways such as Identification of at risk people, providing support on counselling, life style modification and nutrition. 30% respondents also advised for use of vaccinations, and regular check-ups to reduce cancer risks in different cancers. The people whose family history is positive for cancer, the people with excessive smoker for long duration, the person who consume alcohol in excess, the malnourished, the people with recurring infections, person with lung disease, people over age 50, people with Diabetes, hypertension should be continuously monitored periodically. The persons deviation from normal health should be monitored closely and sensitively so that there will be less chance of over or under diagnosis. Early detection has long been seen as a powerful weapon in the battle against cancer. But some experts now see it as double-edged sword (BECK, 2014).So it is important to test and examine with sensitive tools and also close monitoring of the results.

Early detection of colorectal cancer found to effective in with just colonoscopy as considered the most accurate diagnostic procedure at early stage according to Mohammad Hosein in his study (Baghianimoghadam, 2012).

Nepal being a developing country is lagging behind in almost all its healthcare services and hence Oncology is also in its primitive stages. In this review, effort is being made to outline the historical perspectives regarding evolution of Oncology in Nepal, with a brief overview of cancer scenario in the country. This review also highlights the challenges, constraints and successes that are associated in initiation and nurturing of Oncology in developing countries. It also emphasizes the history, current status, challenges of academic training in oncology and also portrays the effort of various national and international organisations and government trying to achieve recent advancements and expensive modern technology (Acharya, 2012).

3.2.2. Early Diagnosis, Screening for Disease, Better Service Onsite

Awareness on early signs and symptoms accessibility of health facility 60% respondents gave emphasis on early signs symptoms teaching/training to the health workers at grass root level. Two doctors advised to develop strategies where patients should refer from GP, camping, training of local health workers in the peripheral health centers. Other ways to reduce cancer risks admitted by 90% interviewee were early rich: general free check up every year, screening, Pap smear, use of portable devices to detect abnormalities onsite during visits which could provide better opportunity to detect and early detection of certain cancer and also better treatment outcome with aid of different examination method: CT, X ray, in case of Breast/Cervix/Colon. Among the respondents 80% gave experience of early detection and referral cured around 75 percent cure in cases of Ca Cervix, Breast, and Lymphoma. They also said these were cost effective method of treatment outcome. The preventive clinic was effective and important for 70% respondents but outcome may not be measurable in short time so it should be continued. Other 20% participants added conducting research in the outcome of preventive clinic.

In total 40% participants advised for specialist professional development, early referral mechanism, better networking and coordination with different institutions to reduce the burden of cancers. 10% responds by giving suggestions as decentralization and prevention should be included in policy level. Among the respondents 20% suggested for Coordination with local organization and multiple development partners on various behavior change, awareness and activities of early cancer detection and care to minimize the risk of cancer morbidity and mortality.

One of the respondents suggested some simple yet valuable screening tests of urine and stool which could be applied to detect blood in stool or urine indicator of some abnormality for further investigations. In this regard study of Lily L. Wua was valuable where it was found elevated level of urinary 8-OHdG has been detected in patients with various cancers. In human atherosclerotic plaques, there were increased amounts of oxidatively modified DNA and 8-OHdG. Elevated urinary 8-OHdG and leukocyte DNA were also detected in diabetic patients with hyperglycemia, and the level of urinary 8-OHdG in diabetes correlated with the severity of diabetic nephropathy and retinopathy(Lily L. Wua, 2004).

3.2.3. Non-Invasive Method of Screening

Some of the respondents answered various non-invasive method of detecting risks of cancer which were stool test for upper and lower gastrointestinal tract abnormalities but repeated and adjunct tests should also be followed in case of doubt. The people might be comfortable with this kind of easy and cheaper tests yet could be valuable for screening cancer risks. Stress was viewed as one of the risk of cancer for 60% participants, they advised for stress counselling as well as regular check up of such people. Similar result was drawn in the study of Mark T McLaughlin where colorectal cancer screening has also been shown to be cost effective, with a cost of less than US$20,000 per life saved compared with no screening. Simply screening with fecal occult blood testing (FOBT) followed by colonoscopy for positive FOBT, reduces CRC mortality by 15% to 33%. In case of positive FOBT followed by usually colonoscopy, flexible sigmoidoscopy and/or barium enema depending on local resources in a screening population, approximately 40% of positive FOBT will lead to a positive diagnosis (CRC or adenoma) at the time of colonoscopy. It is reasonable to assume that some cases of positive FOBT with negative colonoscopy may be due to an upper gastrointestinal (GI) malignancy(Mark T McLoughlin, 2007).

3.2.4. Advice for Service Improvement

During the interview 70% respondents admitted better service from the service provider can reduce the risk of cancer which includes the good coordination among staffs of various discipline, well trained and experienced staffs, similarly effective risk reduction methods could be minimizing hospital constraints, better and easy support for investigation so that people could access the service in easy way and do not hesitate to visit hospitals for 60% respondents. 20% interviewee viewed training at grass root level worker training for good counselling of people about prevention, treatment etc to reduce fear of post cancer diagnosis. 10% advised for satellite center, branch of BPKMCH for prevention, early detection and proper treatment for increasing affectivity of cancer risk reduction.

Interviewee also made following suggestions for service improvement:
- 20% respondent mentioned that the staffs should have sense of accountability on providing service so that better outcome can be expected
- 100% doctors agreed on good follow up and better recording system, 70 % doctors and personnel advised for good counselling, 80% doctors emphasized on good communication and appointment of Public relation officer and also to monitor treatment outcome from the centres.
- There was need of better follow up system, better machines, more specialist trained, paying clinic, and increased service hours for 80% service provider respondents.
- Among the respondents 30% felt that training of grass root level health worker for creating awareness of the people on early signs and symptoms, referral method, detection methods, treatment etc would be valuable way to reduce cancer risks.

3.3. Non-Medical Ways to Reduce Risk of Cancer

Every individual should be responsible for their health. It can be done by creating awareness through education of people on cancer risks, training of teachers and orientation of students on cancer prevention and periodic visit to the health services nearby for regular check up could improve situation of cancer prevention activity. Non medical ways almost cost none but from the study it was found of great value in terms of cancer risk reduction and cure.

3.3.1. Approach to the People for Early Diagnosis

Different activities on creating awareness on early deviation from normal health and in case of suspicion consult to the medical facility available to the people was viewed extremely important way for 90% respondents.

3.3.2. Lifestyle Modification

During the interview 100% health care service providers mentioned cancer risks could be reduced significantly by avoiding smoking or quitting smoking. One of the respondents also admitted for Breath free program, Stop chewing tobacco and use of tobacco products. They also suggested to avoid junk foods, increase consumption of green leafy vegetables, fruits, drink plenty fluids. Similar suggestions of taking adequate fruit and vegetables probably lower the risk for several types of cancer, especially cancers of the gastrointestinal tract(Dr Timothy J Key, 2002). From the study of R. Sinha wrote about diet as an important factor in cancer etiology and prevention in India. "Indians have one of the most interesting diets, with many unique dietary constituents which might have role in cancer prevention" (Sinha R, 2003).

In total 80% respondents gave emphasis on creating awareness of the people in different ways aware people through mass media, mass education, role play, school education, teachers' orientation/training on risk factors, benefits of screening, active participation in screening program, visiting and referring people in the cancer prevention activities, visiting health camps.

In total 10% respondents mentioned about teachers' orientation on risks of developing cancers from school children, community education on early signs and symptoms of cancer

For 70% respondents creating clean healthy and smoke free environment aware through mass media, camps, local people participation could be effective cancer risk reduction tools.

3.3.3. Reducing Environmental Pollution

Various ways were suggested by Environment and Sanitation Engineering Specialist S Poudel and B Bhattarai suggested during the interview to prepare and implement Master plan for environment friendly housing, urban development, water resource, better transportation plan, mass transportation, electrical vehicle promotion, rope way, hospital based waste management, plantation of trees, water recharge, rain water harvesting and most important to aware people on Water, Sanitation, Health and Hygiene. He also suggested for conducting researches and dissemination it properly for further future program to improve environment which might contribute reducing environmental cancer risks. Other 10% interviewee added further on aware people and ways of acquiring access to locally available health care and correct referral method. They also suggested awareness on risks, food preparation and consumption, smokeless environment for better results in cancer detection and cure. Both environmental and sanitation emphasized on implementing better urban master plan, reducing air pollution mostly from vehicular, reduction and proper management of waste, water recharge, and rain water harvesting, plantation of trees to reduce the disease burden.

Other activities suggested by 90% of the respondents were creating awareness on role of exercise, self-consciousness, nutrition, life style modification in cancer risk reduction. 30% respondents' vision was to provide mass counselling, aware local leaders, teachers and students for conducting fight against cancer prevention and cure movement.

40% responds on awareness from grass root level on screening of pre-cancerous risks such as Self Breast Examination, pap smear etc. which found effective in cancer early detection. They also suggested for teachers' orientation, community education to disseminate the message in the community.

60% respondents mentioned hospital extended services in treatment, examinations will create environment to, academic institution, team work, production of quality health personnel, coordination with INGO, NGO better team approach and efficient management leading to reduce cancer risk reduction.

Economic Burden: 100% respondents admitted cancer prevention and early detection could be best way to reduce cost of cancer related expenses which will not only benefit the patients and patients' party but also help in national economy.

3.4. Improve Recording Reporting System

From the non-medical perspective, improvement in proper record keeping system is also one supportive way which indirectly supports to reduce the risk of cancer by identifying cancer risk factors, effective preventive measures, and treatment out outcome etc.

Patient's follow up and better record keeping systems were suggested for good treatment out come as well as reducing cancer risks for 60% doctor and nurse respondents. In total 20% of the respondents advised for appointing Public Relation Officer for specific work to reach in people and educating and aware them. Good record keeping and adequate data was viewed as important tools for research and effective treatment to 20% respondents. Other 40% respondents emphasized on better communication with patients and guardians so that the better treatment could be expected and they could be the messenger to their community on cancer prevention and risks. This will help improving decision making on cancer treatment and preventive measures of health care service provider. The previous study also describes as: "With the increasing costs of oncology treatments and expected changes in reimbursement rules, including requirements for evidence that supports physician decisions, it will become essential to collect data on treatment decisions and treatment efficacy to run a successful program. This study evaluates the current state of informatics systems available for use in oncology programs and focuses on developing an informatics strategy to meet the challenges introduced by expected changes in reimbursement rules and in medical and information technologies" (An informatics strategy for cancer care)(Wright, 2008).

4. Conclusion

There is good chance of reducing cancer risks if the linked risks are avoided. Medical interventions as basic training on early identification and detection to the health personnel for pre-cancerous phase could of great value in saving lives in addition medical camps specifically screening cancers and cancer counselling services will provide better prevention and care. From the non medical perspective awareness and Education on life style modification, quitting smoke, stop tobacco chewing habit, consuming locally available variety good nutritious food, education of children for the risks of cancer causing elements and to avoid such behavior, installation of smoke less stove where ever possible mostly to replace firewood in villages, promotion of non-emission vehicles and alternative energy sources will give better prevention and cure of cancers. Apart from it healthy ageing and minimizing stress can also be helpful on reducing cancer risk as non medical interventions. Awareness on cancer risk, early detection and early treatment is better way of reducing cost in cancer care at personal to National level. It is very important to have better record keeping of cancer patients and suspected people which will improve follow up system and thus help in reducing cancer burden. It is observed that non medical approach is more important in preventing cancers whereas medical interventions mostly focus on cure of cancer. From the study, there is still need of research on role of preventive clinic to identify risks of cancer and potential measures.

5. Acknowledgement

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