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SMOKING-ATTRIBUTABLE FRACTION (SAF) OF MEDICAL CARE COSTS FOR CANCER PATIENTS

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Abstract:

Objectives: the economic impact of smoking on developing countries such as Iran has not been well documented still. This study aimed to develop the estimates of the direct costs of medicine for smoking in Iran during 2014. Methods: A prevalence-based approach was used to estimate the annual costs of smoking. Then, an econometric model was applied to estimate the Smoking-Attributable Fraction (SAF) for direct costs (prescription medicine) of smoking-attributable diseases. A variety of sociodemographic, economic, and behavioral factors were controlled by the model. Results: In 2014, the estimated proportions of medicine expenditures attributable to smoking in Tehran (capital of Iran) were totally 8% for chemotherapy and 1% for other medical treatments. Conclusion: Cigarette smoking was found to account for a significant portion of national medical expenditure. The varied range across the individuals was due to the difference in smoking prevalence, health status, and other socioeconomic variables used in the model. The cost methodology presented here can be useful for policy-making. The levels of cigarette taxes and other policies relevant to smoking can be assessed through cost estimates.

Keywords: *Smoking-attributable fraction, smoking-related disease, cost-based treatment, health policy.*

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INTRODUCTION:

Nowdays, the issue of cancer has received a critical attention. The burden that cancer inflicts on health and public sectors is a continuing concern within the field of economics. Cancer is the leading and the second leading causes of deaths in the developed and developing countries, respectively [1]. Drugs comprise a significant portion of the costs of cancer care and hence assessing the Smoking-Attributable Fraction (SAF) of medical care costs was aimed in this article. It is predicted that by 2020, the number of new cases of cancer in the world will enhance to more than 15 million people with an increase of 12 million deaths. Much of the burden of cancer incidence, morbidity, and mortality will occur in the developing world [2].

The high financial burden of cancer can lead to high levels of financial distress forcing patients and their families to adopt cost-coping strategies, which can be detrimental to their physical and emotional well-being. Financial distress changes the content of patient-physician consultations and affects clinical decision-making [3]. The changes experienced through smoking as a risk factor among cancer patients over the past decade have remained unprecedented. A risk factor of cancers can be cigarette smoking whose relationship with financial stress would occur on a common ground. Both would probably affect each other, while the severe financial stress for smoking households can be twice as large as for non-smoking families [4].

Literacy and low education levels, traditional beliefs, Socio-Economic Status (SES), and employment status all influence on cigarette smoking in adult males. Although poor people smoke more frequently and further spend their incomes on cigarettes, other factors like educational level and traditional beliefs have been found to influence on cigarette-smoking practices in men [5]. Some cancers like lung, pharynx, esophagus, bladder, stomach, and kidney cancers are caused by smoking as a well-known risk factor. Compared to cancer-free adults (44%), 57% have been observed to have a smoking history among those representing an active cancer or a past history of cancer. All age groups of any gender with a history of cancer would represent a higher prevalence of smoking history.

Nevertheless, current smoking avoidance is not necessarily resulted from a past history of cancer. 19% of adults with a cancer history and 22% of those without cancer show a similar prevalence of current smoking. Most strikingly, 46% of young adults with a history of cancer appear to be currently smoking compared to 25% of cancer-free adults of the same ages. Based on gender, it can be said that cancer-free women are less likely current smokers than those with a history of cancer. However, this pattern is reverse among men since those with a cancer history display a current smoking rate of 15% as compared to 25% of those without any cancer histories [6].

Findings suggest that the relationships between smoking among adolescents and its social and personal influences as a part of the developmental process of adolescence are similar across all countries. These findings point out the importance of both personal and social impacts of adolescent smoking, which interact in a complex model, regardless of culture and smoking rate.

Smoking is influenced by a host of individual, social, and environmental factors that come together in complex ways [7]. Many behavioral risk factors, chief among them smoking, heavy drinking, and obesity, are the known causes of chronic health conditions. Chronic health conditions like cancer, diabetes, or heart diseases are the primary drivers of healthcare spending, disability, and death in turn [8]. As it has been concluded through a comprehensive systematic review by the World Cancer Research Fund (WCRF) and American Institute for Cancer Research (AICR), obesity is known as a risk factor for several cancers. It can further lead to an increased mortality due to poorer treatment and worse prognosis of cancer. In the medical literature, the correlation between obesity and cancer has been found for several decades [9,10].

Therefore, much attention has been recently paid to obesity and cancer link. Through epidemiological studies, obesity has been shown to be associated with an enhanced risk of several cancers like leukemia, liver, gall bladder, esophagus, breast, gastric, pancreatic, kidney, endometrium, and colon cancers. The biological mechanisms, including energy balance modulation and calorie restriction, varied signaling pathways, growth factors, and inflammatory processes, which are involved in the relationship between cancer and obesity are not well understood [9]. A primary prevention through lifestyle and environmental interventions remains as the main way to reduce the burden of cancers [10]. Other factors, such as risk perception and personality (specifically sensation seeking) provide a robust history in the research performed on seat belt use.

Seat belt use has been reported to be related to some health and driving-related behaviors. Analyses have shown that seat belt use in the back seat together with

regular walking and adequate sleep are positively related to seat belt use in the front seat, whereas being a male and having driving errors and smoking frequency are negatively related to seat belt use in the front seat. The present findings suggest that seat belt use can be considered in the context of driver behaviors, such as driving errors and violations [11].

One framework for understanding belt use could involve demarcating the research on psychology (internal) or social (external) causes of its use as discussed above. Most social scientists would probably argue that belt use, as well as other health behaviors are a combination of psychological and social influences. However, this basic distinction can still help develop a framework, through which the relative strength of each set of forces can be evaluated. Evidence strongly suggests that seat belt use is influenced by a person's perception of risk [12].

Review articles

In the USA, it was estimated that US$2·5 trillion (18%) of the Gross Domestic Product (GDP) had been totally spent on health care in 2009. Compared to the USA $11000 per capita, almost $5000 per capita ($112·8 billion) had been totally spent on healthcare in Australia. Healthcare expenditure of GDP percentage in the USA had highly exceeded those of other countries, while that of France had reached 11%, which was closest to that of the USA among other developed countries. In 2010, nearly 5% (more than $124 billion) of the total health care costs was estimated to have been spent on cancer care in the USA.

Furthermore, 5·6% (£5·86 billion) of the total health expenditure spent during 2009-10 in the UK was reported by the National Health System (NHS) to be related to cancer costs.

Cancer costs of the total health care expenditure have been reported by the diverse healthcare systems to range between 4·1% in the Netherlands to 7% in Sweden, while the US figure has considerably agreed with the data obtained from Europe, Canada, Australia, and New Zealand in 2004. Even a rather higher percentage (9·3%) of the total health care expenditure was allocated to cancer in Japan in 2004 [13].

Hideyuki Akaza (RCAST) noted that in 2011, the United Nations (UN) had identified the top killer diseases around the world, the majority of which were Non Communicable Diseases (NCDs). It is estimated that by 2030, the greatest cause of deaths in all countries, including developing countries, will be cancer [14].

The total economic cost of smoking in 2011 was estimated to be 24679.9 billion Vietnam Dong (VND), which was equivalent to US$1173.2 million (nearly 0.97%) of GDP in the same year. The direct costs of healthcare reached 9896.2 billion VND (US$470.4 million) for inpatients and 2567.2 billion VND (US$122.0 million) for outpatients. Governmental contribution to these expeditures was 4534.3 billion VND (US $215.5 million), i.e., 5.76% of the health care budget spent in 2011. The indirect costs of productivity losses were 2652.9 billion VND (US$126.1 million) for morbidities and 9563.5 billion VND (US $454.6 million) for mortalities, which represented approximately 49.5% of the total costs of smoking [15].

The total therapeutic expenditures attributable to smoking in 1993 were assessed to range from 6.6% to 14.1% and the SAFs related to home care were 8% and 15.9% for nursing at home and in the country as a whole, respectively.

The total Smoking-Attributable Expenditures (SAEs) used for medical care have been estimated to range from $79.6 million to $8.72 billion. The total SAE for the U.S adult residents in 1993 was estimated to be $72.7 billion, which accounted for 11.8% of the total medical expenditures. Of this total cost, $185 billion, $7.7 billion, and $35.9 billion were in ambulatory care, prescription of total medical expenditures, and hospital care, respectively.

On the other hand, the expenditures of prescription medicine use, hospital care SAF, home health services, and nursing home care were 9.6%, 25.7%, 25.4%, and 22.3%, respectively. The health care cost of smoking in African-American cities in 2002 was $626 million. In 1999, $15.9 billion was the total cost of smoking in California, while the costs per resident and smoker were estimated to be $475 and $3331, respectively.

The direct cost was 54% of the total (nearly $8.6 billion), while the indirect costs due to lost productivity from illnesses and premature deaths were $1.5 billion (10%) and $5.7 billion (36%), respectively. The costs of smoking for men and women were $9.4 billion and $6.3 billion, respectively. 43137 deaths were attributed to smoking, which exhibited an average value of 12.4 years of life lost per death ($132000) from a total of 535000 years [18]. Significantly smaller SAFs were found for women as 8% and 11.4% of the direct

costs of smoking were represented for women and men, respectively [16].

In 1987, the total medical care expenditure was estimated to be $308.7 billion and the share of smoking was $21.9 billion (7.1%). Hospital, ambulatory physician care, and nursing home care costs attributable to smoking accounted for $11.4 billion, $6.6 billion, and $2.2 billion, respectively [5] .

The direct costs related to 5 smoking-related diseases, including lung cancer, cancers of the upper aero-digestive tract, chronic obstructive pulmonary disease, ischemic heart disease, and stroke were estimated to be $470.4 million [17].

METHOD:

A great economic burden is imposed on the society by smoking. Both the smokers and nonsmokers, who may be exposed to second-hand smoke can be involved in the illness. As a result, healthcare services and subsequent costs are required. Premature deaths are resulted from smoking due to losing time for regular activities. Hence, to reduce smoking impact on the society, understanding its economic burden in terms of both monetary costs and lost time and lives can be helpful.

Data

To estimate SAF in an econometric study, extensive and detailed national data on the sociodemographic characteristics, health and employment statuses, medical conditions, smoking history, and other health risk behaviors of each respondent, as well as determination of annual healthcare costs by type of health care services like inpatient hospitalizations and outpatient visits are required.

This study was conducted in the form of a survey and the data were collected via telephone interviews. The data were recorded on a digital audio recorder. The research was approved by the ethical committee of the university and then an informed consent was obtained from all the patients. The research data were drawn from 3 main sources: Shahid Beheshti Health Center, Tehran, and Iran comprising 35500 cancer patients altogether. The research focus was on the cancer patients residing in Tehran.

In 2014, about 12000 participants were divided into 2 groups: the first group had cancers as a result of smoking according to ICD10 and the second group suffered from cancer not due to smoking.

The first group included ICD (00-C14 (lip, oral cavity, pharynx), C15 (esophagus), C16 (gastric cancer), C25 (pancreas), C32 (larynx), C33-C34 (trachea, lung, bronchus), C53 (cervix, uteri), C64-C65 (kidney and renal pelvis), and C67 (urinary bladder), but not code C92 (acute myeloid leukemia). The second group suffered from other cancers.

The survey design was based on the use of a questionnaire, including light, moderate, and heavy smoking histories, public and private insurance coverages, a range of excellent-to-bad health statuses using Likert index, and social and demographic characteristics, such as age, marital status, education, and family expenditure on a monthly basis. The risk behaviors like obesity and seat belt, as well as annual expenditures for health care services, such as inpatient hospitalization, outpatient visits, ambulatory medical care, medicine, etc. were also addressed.

The successful call rate was about 18% in both groups since some patients did not complete the survey due to deaths and other reasons. This research assessed SAF of medical care costs. Pharmaceutical expenditures comprised a significant portion of cancer care costs including chemotherapy, hormonal therapy, and prescription medication, such as antiemtics, anti-depressants, and stimulants of desire for supportive care. Also, a prevalence-based annual cost approach was applied.

In the mentioned year, the economic burden of smoking was estimated for all the relevant illnesses.

In this research, a questionnaire including such items as a smoking history was utilized. Current smokers were defined as those who currently smoked every day and who had smoked at least 100 cigarettes in their life spans.

Former smokers were defined as those who did not currently smoke, but had smoked 100 cigarettes in their life spans. Finally, never-smokers were defined as those who had not smoked 100 cigarettes during their lifespans. Then, the items were arranged for never-smokers, quit>15 years, quit<15 years, light smokers, moderate smokers, and heavy smokers. For defining current smokers, Hamilton questionnaire was employed with 2 questions and 4 answers for each question, while each answer was scored from 0 to 3.

The first question was as this: "How many cigarettes do you smoke each day?" 0, 1, 2, and 3 were given to 10 or less, 11-20, 1-30, and 31 or more cigarettes each day, respectively. The second question was as follows: "How soon do you smoke your first cigarette after you wake up?" The given scores were 3, 2, 1, and 0 for smoking within 5, 5-30, 31-60, and after 60 minutes after waking up, respectively. To

determine Heaviness of Smoking Index (HIS), 2 questions were included, to which the scores of 0-2, 3-4, and 5-6 were given to light, moderate, and heavy addictions, respectively.

Financial stress was defined for one who had had to borrow money or get social assistance to afford food or housing within the last year. The demographic variables included age, for which the 3 dummies of 18 (18≤age<35), 35 (35≤age<65), and 65 (65 >age≥65) years were created, gender (male and female), educational level (illiterate, less than high school, high school graduate, undergraduate, and postgraduate), and marital status (single, married, widowed, and divorced). The socioeconomic variables consisted of monthly expenditure and health insurance coverage (public and private insurance).

Other risk behaviors were Body Weight (BW) status (Body Mass Index (BMI), which was defined as weight in kilogram divided by height in square meters (obesity ≠ 30 kg/m2), smoking-attributable health care expenditure used for prescription medicines, and health status definition (excellent or very good, good, fair, and bad) used to assess smoking-attributable cost for a medical cure. A reduced form of the model was employed as a simplified system, in which each effect was represented as a dependent variable in an equation, while the causal explanatory variables did not include any other effects in the system.

We followed an approach to modeling annual medical expenditures pioneered by Duan et al. (1983). The model was made up of 2 central equations for each type of medical services as a medicine, while the dependent variable in the first equation was as a dummy variable indicating whether an individual had had any positive medical expenses in the category during the year. This equation was estimated as a logistic regression for the independent variable. The dependent variable in the second equation was the natural logarithm of the annual total expense of the medicine, which was positive. The equation was fitted only through the observations, for which the related cost was strongly positive. Some independent variables together with an intercept were incorporated into both equations. For each attribute, 2 fitted values were calculated for medical care expenses. The first and second fitted expenditures set the given values of the independent variables and the value of smoking variable to zero, respectively. Therefore, the second fitted expenditure depended on the individual's expected expense as if he/she was a non-smoker, while all the other factors were held constant.

Then, the 2 estimated expenditures were summed over all the individuals in the sample to produce 2 aggregates of fitted expenditure and fitted expenditure as if anyone was a non-smoker. The difference between them was related to the smoking-attributable cost.

Upon calculating the attributable risk figures, they were multiplied by the estimates of total expenditures for the relevant subset of the cancer population to produce smoking-attributable expenditures for medical care.

Calculation formula based on WHO Toolkit:

The reduced form of the SAF econometric model only consisted of 2 basic equations:

Prob (Xjk>0) = f1 (Sj, Xj, Yj, Zj) …… (Eq IV.10)

Log (Xjk|Xjk>0) = f2 (Sj, Xj, Yj, Zj) …… (Eq IV.11)

Where

Xjk = person j's annual expenditures for healthcare service type k (e.g., inpatient hospitalizations, outpatient visits, and medications) in a given year for all kinds of diseases including smoking-related diseases and other diseases

Log = logarithmic transformation

Sj = person j's smoking status

Xj = person j's sociodemographic characteristics (such as age, race, ethnicity, geographic region, marital status, education, and family income)

Yj = person j's other risk behaviors (such as alcohol drinking and obesity)

Zj = person j's health insurance coverage

Equations (IV.10)-(IV.11) formed the 2-part model for health care expenditures. In Equation (IV.10), the dependent variable was the probability of having positive annual expenditures in a given year. In Equation (IV.11), the dependent variable was the logarithm of annual costs for those persons with positive expenditures. Both equations of the 2-part model contained the same independent variables: smoking history, sociodemographic factors, other risk

behaviors, and health insurance coverage. The first equation was estimated by a probit or logit model. The second equation was estimated by the ordinary least squares method [WHO].

$$SAF = \frac{\sum_{c=1}^{Nc}(EXP_c - EXP_{c\to n}) + \sum_{f=1}^{Nf}(EXP_f - EXP_{f\to n})}{\sum_{n=1}^{Nn}(EXP_n) + \sum_{c=1}^{Nc}(EXP_c) + \sum_{f=1}^{Nf}(EXP_f)} \times 100\%$$

....(Eq IV.12)

Where

EXPn = predicted expenditures for a never-smoker n

EXPc = predicted expenditures for a current smoker c

EXPf = predicted expenditures for a former smoker f

EXPc□n = predicted expenditures for a hypothetical "nonsmoking current smoker" c, who has the identical characteristics of a current smoker except that he/she is assumed to be a never-smoker

EXPf□n = predicted expenditures for a hypothetical "nonsmoking former smoker" f, who has the identical characteristics of a former smoker except that he/she is assumed to be a never-smoker

Nn = total number of never-smokers

Nc = total number of current smokers

Nf = total number of former smokers

RESULTS:

A hallmark of cancer, cost, and pain were the major problems in the public and health sectors. There was a common sense for the fact that one of the most important risk factors could cause a cancer. It is worthwhile to note that Social Impact Assessment (SIA) has become a part of project planning, policy evaluation, and environmental impact assessment. Moreover, gender, age, monthly expenditure, marital status, education level, medical insurance status, safety-belt fastening, obesity, and financial stress are controlled by all such models.

Table 1: Number of patients in each group completing the questionnaire as participants, as well as the lost sample rate due to death

All participants	11294 patients	12.2% died	
Not Attributed to Smoking	8431 patients	8% died	1565 participants
Attributed to Smoking	2863 patients	24.3% died	521 participants

Table 2: the descriptive statistics of demographic and SES variables

Variables		Attributed to smoking	Not Attributed to smoking
Sex		66%	39.2%
	Male	34%	60.8%
Age	Female	4.4 %	8.6%
	<35 years	56.3%	56.9%
	35-<65 years	39.1%	34.4%
Educational Status	>65 years	15.3	10.6
	Illiterate	26.6	21
	Elementary	13	12.9
	School	24.3	30.8
	High school	4.6	4.3
	Bachelor	9.2	14.7
	Undergraduate	4.4	4.2
	Master's degree	1.5	1.3
Job status	P.H.D. Employee Jobless Housewife Retired Others	25.1% 9.8% 25.7% 37.9% 1.5%	15.5% 10% 42.3% 28% 0.2%
Material status	Marie d Single Divorced Widow	86.3% 3.5% 1.9% 8.1%	79.6% 8.6% 1.3% 10.5%
Obesity	Under obesity status Obese	86.2% 13.8%	80.1% 19.9%
Financial stress	Having a financial stress Lacking a financial stress	54.7% 45.3%	48% 52%
Seat belt fastening	Fastening a seat belt Failing to wear a seat belt	84.8% 15.2%	93.1% 6.9%
Health status	Excellent, very good Good Fair Bad	3.4% 29.9% 36.6% 29.9%	13.5% 45.6% 29.9% 11%
Public insurance	Having public insurance Lacking public insurance	96.5% 3.5%	98.4% 1.6
Private insurance	Having a Private insurance Lacking a private insurance	60.5% 395%	63.9% 36.9%
Smoking history	Never smoking Quit<15 years Quit>15 years Moderate smoking Heavy smoking	53.2% 18.4% 11.5% 6.1% 10.7%	99%

Table 3: Estimates and test statistics for each parameter in SAF of medical care expenditure

Variables	Probability of positive medical expense		Log of medical expense	
	Estimate	$\chi 2$		T statistics
Intercept	-0.229457	-0.355411	6.627987	4.035563
Male	0.206869	1.309926	0.177017	0.426195
Married state	-0.325808	-1.137431	-1.186091	-1.449587
Singleness	0.212133	0.352054	0.450947	0.302345
Divorced state	*-0.463511	-2.043104	-1.205405	-1.901703
Income	*0.408195	7.749703	1.182153	*9.141487
35-<65 years old	0.133525	0.502731	0.258715	0.347261
>65 years old	0.462946	1.587459	1.126568	1.403840
BMI	-0.321910	-1.882880	-1.020495	*-2.164410
Good health status	0.257674	1.079427	0.880450	1.304660
Fair health status	0.073936	0.302838	0.336260	0.487387
Bad health status	*0.709118	2.342617	2.155437	*2.737285
Public insurance	-0.312570	-0.563919	-0.757572	*-0.565845
Private insurance	-0.145656	-0.956848	-0.446154	-1.121335
Passivity	0.164774	0.986886	0.227930	0.531021
Seatbelt use	*0.646231	2.534041	1.538990	*2.527949
Under high school education	-0.119806	-0.528556	-0.392641	-0.676130
Undergraduate	-0.311561	-1.398974	-0.941930	-1.635738
Postgraduate	-0.438351	-1.240949	-0.975504	-1.059665
Quit smoking<15 years	0.012197	0.040974	0.403881	0.552607
Quit smoking<15 years	0.195909	0.498265	0.429456	0.482336
Heavy smoking	0.083132	0.156511	0.690896	0.561275

*significant at the confidence level of 90%

The reduced form of the parameter estimating the SAF of medical care costs in cancer patients:
The SAF percentage of chemotherapy expenditure and other medicines were assessed to be 0.0808 (~8% of the total cost of cancer treatment) and 0.012 (~1% of the total cost of cancer treatment), respectively.
Smoking-Attributable Fraction (SAF) would be the fraction of a disease not occurred in a population if the effects associated with smoking are absent.

DISCUSSION:

These assessments are conservative for numerous reasons. We did not take into account costs attributable to passive smoking, fires caused by cigarettes, non-health part costs such as a carriage to providers, and costs of smoking ending programs and other interferences to control smoking.

In which health expenses were modelled with a reduced form model. Our study was based on a causal relationship structure established by L Miller and colleagues,which we believe yields more accurate estimates.

The V Miller and L Miller models are compared in factor elsewhere.Different from L Miller,the current study used more recent data sources. Also, we involved only the ‘‘biological effect’’ in the calculation of SAFs while Miller involved both the ‘‘biological t’’ and the ‘‘mixed effect’’. Because 80–90% of the entire effect came from the biological factor and the biological SAFs were more steady, this development improves the method.

Without the tobacco controller package, smoking associated costs would have been even higher. The

question has been raised as to whether smokers are compensating for their smoking behaviors.

An associated question is whether cigarette taxes are at the suitable level. From an economic perception, the tax should be set of protection the external costs of smoking, the costs enforced by smokers on others. While we did not estimate the percentage of costs that are internal versus external.

However, it must also be well-known that from an equity perspective, if shares of the tobacco tax rise is to be passed on to smokers, the incomes raised up should be used to help them abandon smoking and get health care for smoking related illnesses they may already have. The public health impact of cigarette smoking in IRAN is enormous in terms of the large amount of avoidable illnesses, premature deaths, and high health care costs and productivity losses. Politicians must continue to push legislature and orders that encourage people to abandon or to never take up smoking.

This paper was the first investigation into the SAF of medical care costs in cancer patients in Iran. However, some limitations were inevitable in the study. For example, there were no center-related data available for a smoking history that linked a household expenditure to cancer and the costs of health insurance and private insurance for cancers. Another limitation was that the research was conducted only on a cancer population in one province, regardless of other provinces and other diseases caused by smoking like cardiovascular and respiratory diseases.

The third limitation was the death rate in the cancer patients and time of the survey. The survey was conducted during 2014 on the patients who had registered during 2012, while some of them were lost in the meanwhile. Thus, these limitations might have underestimated SAF of medical care costs. The main focus of the issue in this article is a worthwhile endeavor. The research will pave the way, more specifically, for developing policies to quit smoking with respect to SES. These findings suggest several courses of action for changing policies.
Although the factors included in the model were unable to fully explain the relationship between SES and smoking, the types of services face a number of challenges in supporting more disadvantaged smokers to quit. Most of the identified barriers were related to the individual conditions of these smokers. Therefore, these factors will need to be identified through the services if appropriate tailored behavioral supports are to help us to address them (session Rosemary). SES can be persistent over time due to poor health and affect multiple outcomes of diseases through their risk factors and mechanisms. Tobacco use alone has been found to be responsible for 50%-65% of the difference in the mortality rates based on SES (Session Rosemary). Concerns have arisen in comparing SAF of medical care costs in the health sector with its burden on the public sector because of lacking formal information and transparent data on the incomes and taxes gained from the sale of cigarettes.

Nonetheless, this paper took a new look at the healthcare system. Primary prevention of cancers through lifestyle and environmental interventions remains as the main way to reduce the burden of cancers.
Furthermore, reduction of exposure to the key behavioral and environmental risk factors can lead to the prevention of a substantial proportion of deaths from cancer.

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