National and Sub-national Burden of Chronic Diseases Attributable to Lifestyle Risk Factors in Iran 1990 – 2013; Study Protocol

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Abstract

Background: Non-communicable diseases, as the major public health problem, are caused by different risk factors. The main leading lifestyle risk factors for most diseases burden in Iran are unhealthy diet, physical inactivity, and smoking. The aim of this study is to provide data collection and methodology processes for estimating the trends of exposures to the selected lifestyle risk factors and their attributed burden at national and sub-national levels.

Methods: Systematic review will be performed through PubMed/MEDLINE, Scopus and ISI/Web of Science as well as Iranian databases such as IranMedex, Irandoc and Scientific Information Database (SID). In addition, hand searching of unpublished data sources will be used to identify relevant population-based studies. The searched studies will be included only if it is reasonably population-based and representative, and exposure data has been reported or could be plausibly obtained from the study. For risk factors with no surveys identified, other sources of potential data will be considered. The target population is healthy Iranian adult population living within Iran from 1990 to 2013. Other data sources include national censuses, national registration systems, and national and sub-national surveys. Spatio-temporal Bayesian hierarchical model and Bayesian multilevel autoregressive model will be used to overcome the problem of data gaps in provinces, and in some age or sex groups or in urban/rural areas. The problem of misaligned areal units will be also addressed in these models.

Conclusion: National and sub-national assessment of major lifestyle risk factors such as unhealthy diet, physical inactivity, and smoking is necessary for priority setting and policy making in different regions of Iran.

Keywords: Burden of Non-communicable diseases, lifestyle risk factors, nutrition, physical activity, smoking

Introduction

Non-communicable diseases (NCDs) are the major threats to public health and economic growth in developed and most developing countries.[1] NCDs, especially cardiovascular diseases (CVD), cancers, chronic respiratory diseases, and diabetes were responsible for 63 % of all deaths in 2008 worldwide, with higher proportion in low- and middle-income countries.[2] By 2020, these diseases will have caused seven out of every ten deaths in developing countries.[3] CVDs have been a leading cause of death in Iran, responsible for 47 % of all deaths in 1995 compared with 27 % in 1981.[4]

NCDs share common risk factors, such as unhealthy diet, physical inactivity, tobacco use and harmful alcohol consumption, which are amenable to intervention.[5] By eliminating these major risk factors 80 % of heart diseases, strokes, and type 2 diabetes, and over 40 % of cancers could be avoided.[6] According to estimates by WHO, in the absence of preventative measures the number of deaths caused by NCDs will increase by 17 % on a global scale over the next 10 years.[1] The aforementioned behaviors lead to metabolic/physiological changes such as raised blood pressure, overweight/obesity, hyperglycemia and hyperlipidemia.

It was estimated that 13 % of global deaths are attributed to high blood pressure, 9 % to tobacco use, 6 % to high blood glucose, 6 % to physical inactivity, and 5 % to overweight and obesity.[7] In Global Burden of Disease (GBD) study 2010, dietary risk factors and physical inactivity collectively accounted for 10.0 % of global DALYs, with the most prominent dietary risks being diets low in fruits and those high in sodium. In addition, the second leading risk factor was tobacco smoking including second-hand smoke (6.3 % of global DALYs).[8] However, the five leading risk factors of disease burden among Iranian population are dietary risks, high blood pressure, high body-mass index, physical inactivity, and smoking, respectively.[9]

Non-optimal nutrition is a risk factor with several elements. As a result, it is impossible to align varying sources and types of data to generate an overall estimation of unhealthy diet prevalence.[10] It is estimated that up to 2.635 million deaths per year worldwide

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are attributable to low fruit and vegetable consumption. Increasing fruit and vegetable intake up to 600 g per day could reduce the total global burden of disease by 1.8 % and reduce the burden of ischemic heart disease and ischemic stroke by 31 % and 19 %, respectively.[11] Similarly, high salt intake is an important determinant of high blood pressure levels and overall cardiovascular risk.[12] It is estimated that decreasing dietary salt intake from the current global levels of 9 – 12 grams per day to the recommended level of 5 grams per day will have a major impact on reducing the risk.[13] High consumption of saturated fat and trans-fatty acids are other unhealthy behaviors linked to heart disease and type 2 diabetes,[14,15] replacement of which with monounsaturated and polyunsaturated fat reduces the risk.[16]

Physical inactivity, the fourth leading risk factor for death in global scale, is responsible for around 3.2 million deaths per year.[7] This risk factor can account for 22% of ischemic heart disease, 11% of ischemic stroke, 14% of type 2 diabetes, 16% of colon cancer, and 10% of breast cancer.[17] Insufficient physical activity is more prevalent in high-income countries, but currently it goes also to be common in some middle-income countries.[18] Results of national surveys show that more than 80% of Iranian population are physically inactive.[19]

Tobacco smoking is the single greatest preventable cause of death in the world.[20] Almost 6 million people die from tobacco use each year, of which, just over 600,000 are attributable to second-hand smoke exposure, and more than 5 million are due to direct tobacco use. Most of these deaths occur in low- and middle-income countrie.[21] In Iran, smoking was responsible for 11,000 deaths in 2005.[22] Nowadays, about 82 % of 1.1 billion smokers in the world reside in low- and middle-income countries.[23] Recent data in Iran shows 62 % increase in cigarette production from the period of 2000-2004 to 2005 – 2009.[24] National surveys have indicated that 14.6 %, 15.3 % and 11.7 % of Iranian population are smoker.[25–27]

Trend analysis of the attributed adverse health effects of non-optimal nutrition, physical inactivity, tobacco smoking among Iranian population at national and sub-national levels is a sub-component of National and Sub-national Burden of Diseases, Injuries, and Risk Factors study from 1990 to 2013 in Iran.[28] To the best knowledge of the authors of this article, this is the first study which aims to quantify the trends of exposures to lifestyle risk factors and their inequalities and attributed burden at national and sub-national levels. The aim of this article is to provide definitions, data gathering and generating processes and methodology, and statistical methods which will be used in this study.

Methods and Materials

The study is a part of National and Sub-national Burden of Disease (NASBOD) study which will be conducted by Non-Communicable Diseases Research Center (NCDRC), Tehran University of Medical Sciences (TUMS). The technical team includes epidemiologists, nutritionists, and public health researchers from TUMS, University of California, Los Angeles (UCLA), Munich University, and Harvard School of Public Health (HSPH).

Selection of risk factors
Lifestyle risk factors were selected through some expert panel meetings, review of Global Burden of Disease and Risk Factor study, and global evidences on the effect size of each lifestyle risk factor exposure.[8,17,29–31] Nutritional risk factors, physical inactivity, and smoking were included in the study. To estimate burden of non-optimal nutrition, we based our framework on GDB Nutrition and Chronic Disease Expert Group 2010.[32] The reason behind such selection is the similarity between framework (comparative risk assessment) and objective of study (assess the impact of sub-optimal nutrition on CVD, diabetes and cancer). However, there are some minor differences between our approach and the aforementioned study. After consultation with key informants and also based on the evidence provided by other researchers we included "fish" as an independent food group.[33] In addition, the "dairy group" was included instead of "milk" which was used in GBD.

Definitions of lifestyle risk factors of interest
To facilitate comparability across regions, time periods and each risk factor assessment methods, we created standardized optimal exposure definitions and units of measure for each risk factor (Table 1). We selected these units of measure to be 1) as similar as possible to the corresponding values in epidemiological studies or trials used to quantify the harmful or protective effects of each risk factor on major NCDs such as CVD, diabetes and cancer risk; 2) most interpretable from biologic and policy perspectives when considering diet, physical activity and smoking, and 3) as similar as possible to common definitions used to ascertain exposure data in Iran.

The practical definitions of risk factors exposures were formed based on the availability of data, methodology, and the effect size of risk factors in different levels of exposures (Table 1). Practical definition of non-optimal nutrition is based on Micha et al. study.[32]

Research objectives
The objective of this study is to determine the prevalence and trends of lifestyle risk factors exposure for each year, sex, age, and province from 1990 to 2013 among Iranian population at national and sub-national levels. Moreover, attributed burden of diseases will be estimated for selected lifestyle risk factors exposures, as well as attributed deaths and disability-adjusted life years (DALY) for the same period of time in Iran. Finally, socioeconomic and geographical distribution of risk factors exposures and their determinants will be evaluated.

Data sources and retrieval
Systematic searches and reviews will be performed to identify representative studies to extract mean and standard deviation of lifestyle risk factors exposures or reported prevalence based on time periods, sex- and age-specific groups. Standardized protocols have been developed to allow collection, analysis and extraction of data in a systematic and consistent manner which includes standardized systematic literature searches, identification and inclusion of relevant surveys, survey quality assessment and data extraction.

Systematic Literature Review
We will search for nationally representative surveys which have provided exposure data on the lifestyle risk factors of interest. Multiple sources have been selected through the scientific panel, including PubMed/MEDLINE, Institute of Scientific Information (ISI), and Scopus as international electronic databases, as well as Iranian databases such as IranMedex, Irandoc and Scientific Information Database (SID) as comprehensive national electronic

Table 1. Practical Definition of Lifestyle Risk Factors

Risk Factor	Definition	Optimal unit of measure
Components of non-optimal nutrition†		
Fruit	Total fruit intake	g/day (ideally energy adjusted)
Fruit Juice	Total fruit juices intake	g/day (ideally energy adjusted)
Vegetable	Total vegetable intake Exclude salted or pickled vegetables, vegetable juices, starchy vegetables	g/day (ideally energy adjusted)
Beans, legumes	Total intake of beans and legumes, Including tofu, excluding soy milk	g/day (ideally energy adjusted)
Nuts, seeds	Total intake of nuts and seeds	g/day (ideally energy adjusted)
Whole grain	Total intake of whole grain foods	g/day (ideally energy adjusted)
Red meat	Total red meat intake	g/day (ideally energy adjusted)
Processed meat	Total processed meat intake (for example, processed deli or luncheon meats (ham, turkey, pastrami, etc.), bacon, salami, sausages, bratwursts, frankfurters, hotdogs)	g/day (ideally energy adjusted)
Milk	Total milk intake (combined non-fat, low-fat and full-fat milk).	g/day (ideally energy adjusted)
Sugar-sweetened beverages	Total sugar-sweetened beverages intake defined as any sugar-sweetened beverage with X50 kcal per 8 oz (226.8 g) serving, including carbonated beverages, soft drinks, sodas, energy drinks, fruit drinks	g/day (ideally energy adjusted)
Saturated fat	Total saturated fat intake from all dietary sources	g/day (ideally energy adjusted)
Omega-6 polyunsaturated fat	Total omega-6 fatty acid intake from all dietary sources	g/day (ideally energy adjusted)
Seafood omega-3 fat	Total dietary EPA&DHA (eicosapentaenoic, docosahexaenoic) intake	mg/day (ideally energy adjusted)
Plant omega-3 fat	Total dietary ALA (α-linolenic acid) intake	mg/day (ideally energy adjusted)
Trans fatty acid	Total trans fatty acid intake from all dietary sources	% kcal (energy contribution)
Dietary cholesterol	Total dietary cholesterol from all dietary sources	mg/day (ideally energy adjusted)
Dietary fiber	Total dietary fiber intake from all dietary sources	g/day (ideally energy adjusted)
Dietary sodium	Total dietary sodium intake from all dietary	mg/day (ideally energy adjusted)
Dietary calcium	Total dietary sodium intake from all dietary	mg/day (ideally energy adjusted)
Components of Physical Inactivity	Physical inactivity is activity level insufficient to meet present recommendations‡.	
Components of Smoking	Tobacco smoking including second-hand smoke, Tobacco smoking excluding second-hand smoke, second-hand smoke	
Tobacco smoking	Type of smoking: Tobacco smoking (cigarette, hooka, pipe, chopogh) Duration of smoking: Ever smoked, Past smoked, Current smoked (Daily or Occasionally) Severity of smoking: Mild, Moderate, Heavy smoker	
Second-hand smoke	Exposure to second-hand smoke from several sources, including parents, siblings, spouses, co-workers, and from persons in public settings.	

†components of non-optimal nutrition based on framework suggested in Micah et al study
‡Physical activity recommendation (adults 18 – 64 year old):
1- Accumulate at least 150 minutes of moderate-intensity aerobic physical activity throughout the week or do at least 75 minutes of vigorous intensity aerobic physical activity throughout the week or an equivalent combination of moderate- and vigorous intensity activity
2- Aerobic activity should be performed in bouts of at least 10 minutes duration
3- For additional health benefits, adults should increase their moderate-intensity aerobic physical activity to 300 minutes per week, or engage in 150 minutes of vigorous-intensity aerobic physical activity per week, or an equivalent combination of moderate- and vigorous-intensity activity

databases. In addition, hand searching of unpublished databases such as government reports, projects reports, conference presentations and reference lists of identified studies and direct contact with authors will be used to identify relevant population-based studies performed between 1990 and 2013. The search will be limited to human studies conducted in Iran with no language restriction.

The search through international databases will be performed using MeSH terms, Entry terms, Emtree, and related key words. Persian key words will be mostly developed based on their English equivalents, and some expert panels will be also conducted to review any probable key word with no English equivalent. Search terms are presented in Appendix in detail.

Selection criteria
We will include cross-sectional studies which include the fol-

lowings: representative sample size, results of baseline surveys of population-based cohort studies, control groups in case control studies (if they are selected from general population), and baseline data from community-based trials. The study will be included only if it is reasonably population-based and representative, and exposure data has been reported or could be plausibly obtained from the study. For risk factors with no surveys identified, other sources of potential data will be considered.

Moreover, all national, provincial, district and community studies which have reported prevalence of food/nutrient, physical inactivity, and smoking exposures among their general population will be included. The target population is healthy Iranian adult population living in Iran from 1990 to 2013.

Case reports, case series, clinical trials with small sample size, and also non population-based surveys will be excluded. Furthermore, studies with no report on the sampling method or studies in

which participants had been selected via non-random sampling methods will be excluded. Population-based studies which had included the following groups will be excluded: 1) Unhealthy populations such as patients in a hospital or a clinic; 2) Those with special physiological conditions such as pregnant and lactating mothers; 3) specific population groups based on their (un) employment, occupation or education status (e.g. doctors or university students); 4) immigrants.

Process of Study Selection

Study selection will be performed in three phases. In the first step, the reviewer will scan titles according to the selection criteria. The accepted titles will be entered into the abstract review phase to identify studies for eligibility. In the next phase, abstracts will be reviewed and the study will be excluded if the reviewer finds that the study meets one or more exclusion criteria. The last phase will be performed independently by two reviewers to determine if the full texts should be included for data extraction. Disagreements regarding full text article inclusion will be resolved by discussion and consensus adjudication or by a third party.

Other data sources

Other data sources which will be used in this study include national censuses, national registration systems, and national and sub-national Surveys. Sex, age and province- specific data will be obtained from Iran censuses of 1986, 1996, 2006, and 2011. A list of identified national and sub-national surveys and related risk factors exposure (suboptimal nutrition, physical inactivity and smoking) are listed in Table 2.

Data extraction

Details from eligible studies will be extracted using a pre-designed data extraction form on Microsoft Excel database. This form includes general information and data information (Table 3). Required data include mean, standard deviation, standard error (SE) of mean, and number of observations for each risk factor by age, sex, province/district of the country. For the articles without mean or standard deviation, we will contact the authors to request the related data. If a paper meets the inclusion criteria without reporting data based on age and sex, we will contact its author to invite them to join the Collaborating Group.

Quality assessment

Article quality will be assessed according to both sampling and measurement criteria using an adopted quality assessment form. The form has three parts: general information, sampling quality, and measurement quality. Each article has a unique code and the name and characteristics of the corresponding author will be inserted on the top of the form. Other general information of interest include study source, study design, scope of study, and level of study.

Sampling quality refers to the sample representativeness, response rate, sample size, and sampling method. Quality of measurement includes type of measurement tools, calibration of tools or validity of methods/questionnaires used for assessing diet, physical activity, or smoking. A ranking scale has been developed to assess the quality of identified surveys and studies and the validity of the measurement tools used. Accordingly, each item obtains a score (Table 4), and the quality score will be calculated for all included papers.

Statistical methods and analysis plans

Data scarcity will be expected in our work regardless of a comprehensive search and access to national surveys. To overcome the problem of data gaps in provinces, and in some age or sex groups or in urban/rural areas, two distinct statistical models; i.e. Spatio-temporal model and multilevel autoregressive model were designed. Using these models, mean (whatever measure is) and its uncertainty interval by sex, age, year, and province will be estimated. Inputs for the models will include data of specific age, sex, province or area, as well as data obtained from other ages, other years, and other provinces. The problem of misaligned areal units will be also addressed in these models. Misalignment means that parts of some provinces have been separated in the time period of interest. Using both models helps us to make sure that there is no model dependency in the results.

Spatio-temporal Bayesian Hierarchical model

One of the solutions for the aforementioned statistical issues is Spatio-temporal Bayesian hierarchical modeling with conditional autoregressive (CAR) prior for spatial random effects.[34] In spatial modeling, it is assumed that data closer to the space will be more correlated than the farther data. This model helps to produce individual estimates for areas with missing values or in age/sex by "borrowing information" from neighbors of each area. Spatio-temporal misalignment modeling will be also applied to combine incompatible areal units between data sources and/or over the years. In addition, we will employ Spatio-temporal misalignment modeling to combine incompatible areal units between data sources and/or over the years. The model includes covariates effects, non-linear age trend, study quality, and source of data variations.

Bayesian Multilevel Autoregressive model

Bayesian multilevel autoregressive model is another method to overcome the problem of data scarcity and misalignment.[35] In this procedure, observations are hierarchically nested in districts, provinces, sub-regions, regions, and national levels respectively. In this hierarchical model, higher levels borrow information to the lower levels and units of each level borrow information to each other depending on the degree of data availability. The model considers several different components including linear time trends, nonlinear change over time, covariate effects, nonlinearity associated with age, heterogeneity of data sources, and age variability among studies. Time-varying covariates at the district- level or province-level covariates inform the estimates if practical.

In both modeling framework, the MCMC methods will be used for their general applicability and ease of implementation to perform Bayesian inference. All programs will be written in R statistical packages (version 3.0.1).

The other statistical issue in this study is summary statistics which have been reported in different classification. We will do cross walk between continuous and categorical measures of variables using regression models.

Discussion

In the current study, burden of major NCDs attributable to lifestyle risk factors will be assessed at national and sub-national levels in Iran between 1990 and 2013. Most studies of disease,

Table 2. Identified surveys from 1990 to 2013 among Iranian Population

Survey and abbreviation	Year	Survey Explanation	Risk Factor exposure
Non-Communicable Disease Surveillance Survey (NCDSS)	First Survey: 2005 Second Survey: 2006 Third Survey: 2007 Fourth Survey: 2008 Fifth Survey: 2009 Sixth Survey: 2011	NCDSS was surveillance of risk factors for non-communicable disease conducted based on World Health Organization (WHO) STEPwise approach in 6 different years at provincial and sub provincial levels. The study sample was representative subjects aged 15-65 years, selected via multistage cluster sampling method from urban and rural population of all provinces in Iran.	○Smoking ○Physical Activity ○Nutrition
National Health Survey (NHS)	1989, 1999	This survey was designed to gain comprehensive knowledge and information about health care problems and difficulties throughout in Iran. It combined home interview and health examinations which are performed by trained personnel. The survey repeats each ten years and so far, the result of two surveys has been published. One of the major aims of the survey is to assess risk factors and indicators of health and illness in Iranian population.	○Smoking ○Physical Activity ○Nutrition
Isfahan Healthy Heart Program(IHHP)	Phase I: 2000–2001 Phase II:2001–2005 Phase III: 2006–2007	IHHP is a longitudinal study aimed to control CVD risk factors and to reduce CVD related morbidity and mortality in Isfahan Province, a central region in Iran. It comprisedof 3-phase study of situation analysis, integrated community-based interventions, and outcome evaluation. Phase I was situation analysis which provided data on basic characteristics of Isfahan, Najaf-Abad and Arak residents. Phase II was a community- based, action-oriented intervention program. Isfahan and Najaf-Abad were two intervention sites whereas Arak was the control site. Phase III was an evaluation study to see whether such interventions has been successful in reaching its goals.	○Smoking ○Physical Activity ○Nutrition
Tehran Lipid and Glucose Study (TLGS)	Phase I: 1999–2000 Phase II: follow up, every three years	TLGS is a cohort longitudinal study aimed to prevent NCD by development of a healthy lifestyle and reduction of NCD risk factors in an urban district (district 13) of Tehran. In Phase I, 15005 participants over 3 years of age were selected by multistage cluster random sampling and provided baseline information on NCD prevalence and associated risk factors. Phase II was a follow up study in which lifestyle interventions were implemented in 5630 people and 9375 individuals served as controls, and NCD risk factors were evaluated. Collection of data will be repeated every 3 years to assess the effects of different interventions in the intervention group as compared to control group. The study begun in 1999, is ongoing, to be continued for at least 20 years.	○Smoking ○Physical Activity ○Nutrition
Golestan Cohort Study (GCS)	2004–2012	he study is an ongoing population-based cohort to identify risk factors for Oesophageal Cancer in Golestan Province, located in North-East of Iran. It provided baseline information on 50000 healthy individuals who were enrolled between January 2004 and June 2008 and were followed to May 2011. The participants are being followed up actively every 12 months and the follow-up is expected to continue for a minimum of 10 years.	○Smoking ○Physical Activity ○Nutrition
Persian Gulf Healthy Heart Study (PGHHS)	Phase I: 2003–2004 Phase II: follow up -continued	It is a ten year longitudinal study to establish healthy lifestyle in Northern Persian Gulf Area. Phase I was a cross-sectional prevalence study which used a multi-stage cluster sampling to provide a baseline survey on unhealthy lifestyles and CVD risk factors. Phase II comprised a multiple intervention project aimed to reduce CVD through several interventional studies at the community level. For program evaluation, WHO MONICA protocol was used to report daily coronary artery risk factors, morbidity and mortality of coronary artery disease as well as stroke.	○Smoking ○Physical Activity ○Nutrition
Iranian Multicenter Osteoporosis Study(IMOS)	2000, 2011	The aim of this cross-sectional study was to establish reference values for Bone Mineral Density among Iranian population. It also aimedto provide information regarding the current calcium and vitamin D status in target population. In 2000 the study was conducted in five cities including Tehran, Tabriz, Mashhad, Shiraz and Bushehr, and in 2011 just in two cities, Arak and Sanandaj.	○Smoking ○Physical Activity

Household Expenditure (HHE)	1984–2011	It is a time series study which provides annual information on nationwide market value of Iranian Good Basket at household level. The Iranian Good Basket consists of "edible as well as tobacco" and "nonedible". It is a proxy ofnationwide food group intake since it provides information on amount of food bought by each household in the previous month/week/day.	○Smoking ○Nutrition
Childhood & Adolescence Surveillance and Prevention of Adult Non-communicable disease (CASPIAN Study)	CASPIAN I: 2003–2004 CASPIAN II: 2007–2008 CASPIAN III: 2009–2010 CASPIAN IV: 2011–2012	CASPIAN is a nationwide school-based survey aimedto provide information on NCD-related risk behaviors and risk factors in childhood and adolescent. It is repeated every two years to update information on risk factors. Questionnaires are based on WHO STEPwise approach to NCD and the WHO Global School Health Survey (GSHS).	○Smoking
Multinational Monitoring of Trends and Determinants in Cardiovascular Diseases (MONICA)	2004	The MONICA Project is designed to measure the trends in mortality and morbidity from coronary heart disease (CHD) and stroke, and to assess the extent to which they are related to changes in known risk factors in different populations in 27 countries. The MONICA was a cross-sectional study in Tehran. It aimed to determine cardiovascular risk factors among adults residing in district 17 of Tehran, Capital of Tehran.	○Smoking ○Physical Activity
Nutritional Knowledge, Attitude and Practice of Rural and Urban Iranian Household as well as Health Practitioners in three provinces (Pilot study) and NUTRIKAP Survey	2004, 2012	The pilot cross-sectional study in 2004, aimed to determine nutritional knowledge, attitude and practice of Iranian households residing inrural and urban areas of Bushehr, Sistan o Baloochestan and Golestan Province. The NUTRIKAP survey was a nationwide cross-sectional study aimed to determine nutritional knowledge, attitude and practice of Iranian households residingin urban and rural areas.	○Nutrition
Comprehensive Project on Household Food Pattern and Nutritional Status	1999	This nationwide cross-sectional study aimed to determine intake of food groups and nutrients at household level.	○Nutrition

injuries and risk factor burden have been at the national or global scale.[8,32,36–41] However, there are a few sub-national analyses of the burden of disease,[42,43] as well as some sub-national analyses of mortality.[44,45]

Selected lifestyle risk factors for the underlying NCDs in this study include non-optimal nutrition, physical inactivity, and smoking which are targeted as the leading risk factors for most disease burden in GBD 2010,[8] as well as in many other burden studies. In GBD study 1997, attributable burden to each of the 10 major risk factors were made by specialists on each topic: tobacco, alcohol, illicit drugs, occupation, air pollution, poor water supply, sanitation, and personal and domestic hygiene, hypertension, physical inactivity, malnutrition, and unsafe sex.[40]

In Mexico and its states, deaths and DALYs were estimated in 2004 from a comprehensive list of diseases and injuries and from 16 risk factors. Selected lifestyle risk factors included tobacco smoking, low fruit and vegetable intake, physical inactivity, alcohol use, and unsafe sex.[42] Differences in health levels and health determinants across three epidemiological sub regions of WHO region for Europe was summarized using the results of the GBD 2000 and the associated CRA (Comparative Risk Assessment) project. In that study, 10 risk factors were evaluated including: High blood pressure, tobacco, alcohol, high cholesterol, high body mass index, low fruit and vegetable intake, physical inactivity, illicit drugs, lead, and unsafe sex.[46]

The followings are the strengths and advantages of our study: covering major lifestyle risk factors; using different comprehensive nationally representative sources of data such as vital registration and national censuses, as well as national and sub-national health surveys and population-based epidemiological studies; combining national and sub-national analyses; quantifying uncertainty; applying new statistical models such as Spatiotemporal Bayesian hierarchical model and Bayesian Multilevel Autoregressive model, which are developed for the first time in Iran to overcome the challenge of low quality of data; determining inequalities between regions, ages, and sexes, for designing efficient health policies and programs.

Like other population-based studies, our study will have limitations. First of all, because of limited reports of risk factor, some important risk factors such as alcohol use, drug abuse, and opium use in Iran were not included in this study, since limited reports of risk factor–disease relationships is available for them. The estimation of HIV infection that is attributable to unsafe sexual practices as well as other sexually transmitted infections will be reported in another study.[47] The second limitation of this study was the currently constructed CRA model which does not fully capture all relevant dimensions of exposure. For example, the study estimates the burden of disease associated with each risk factor separately, acting in isolation from other risk factors. Only very approximate estimates of the joint effects of risk factors acting together will be provided.

Third, data of relative risks (RRs) will be obtained from large international meta-analyses, as the Inter-heart study shows that these RRs are consistent across countries after accounting for study design and methodological differences.[48] Fourth, we will use disability weights from global studies, and they are not cal-

Table 3. Data extraction form

A: General information
(I) ID
The ID will include an abbreviation for risk factor (for example; smo. for smoking), province code according to standardized coding, and a number for each study.
(II) Study name
If the study has a special name, it is written in the "Study name" column.
(III) Citation
The Citation consists of authors' name, the title of study, journal name, publication year, volume or number of journal and pages.
(IV) Corresponding author 's characteristics
The Fist name, Family name, affiliation, location, and contact information of the corresponding author (telephone, fax and email address) will be inserted in this column.
(V) Article code
For PubMed articles "PMID" and for ISI articles "DOI" will be recorded.
(VI) Publication and Study year
It refers to the year that article has been published, and he year survey has been conducted.
(VII) Practical definition
The description of risk factors according to each survey is recorded and the appropriate finalized definition will be determined based on discussion and consensus adjudication.
(VIII) Subgroup
If the study population is categorized by ethnicity, the subgroups are recorded according to a standardized coding.
(VIIII) Study Included/Excluded by, and Study Cross-checked by
The name of people who will include, exclude and cross-check the studies are inserted in this part.
(X) Study source
0. Iranian databases 1. Foreign databases 2. Non-indexed Iranian journals 3. Health surveys 4. Abstract of congress 5. Theses 6. Other un-published reports
(XI)Study design
1. Cross-sectional 2. Case-control 3. Cohort 4. Others
(XII) Scope of study
1. Rural 2. Urban 3. Both
(XIII) Level of study
1. National 2. Provincial 3. District 4. Community 5. Sub-region (two or more provinces with similar ethnicity and race) 6. Two or more sub-regions
(XIIII) Sample weight (The target group proportionate to Iranpopulation's sex and age)
0. No 1. Yes
B: Data information
Age of participants:
Range: ____ - _____ median:_____
Sex:
Male Female Both
Sample size
The sample size in each sex and age group of the study population.
Point prevalence
The point estimate, mean, SD, SE, lower level and upper level of confidence interval are extracted from the included surveys.
Data extracted by, and data cross-checked by
The name of people who will extract and cross-check the data.

Table 4. Ranking scales to assess the quality of identified surveys

A: Sampling Quality

(I) Sampling method

1. Multi-level clustering random sampling
2. One-level clustering random sampling
3. Simple random sampling
4. Others

(II) Sample size

0. Less than 250
1. 250 to 500
2. 500 to 1000
3. More than 1000

(III) Response rate

0. Less than 59 %
2. 60 to 74 %
4. 75 to 89 %
6. More than 90 %

B: Measurement Quality (for nutrition studies only)

(IV) Diet Assessment Method

1. Multiple ($\geq$2) short-term (up to 1 week) diet recalls/ records (with or without) correction for within-person variation
2. Food frequency questionnaires
3. Single short-term diet recalls/ records
4. Household availability/ budget survey

(V) Data collection techniques

5. Self-administered questionnaire
6. Telephone interview
7. Personal interview

(VI) Food record has been

1. Non-Weighting
2. Weighting

(VII) Validation (for FFQ)
1. Yes
2. No

culated specifically for the country. Fifth, data sources may be heterogeneous, which will be managed by statistical methods. Finally, despite our extensive data pursuing, we have three types of scarcity; geographical scarcity; temporal scarcity; and old-age scarcity.

Results of this study help us to model a number of intervention scenarios. For example, if we find burden of diseases attributable to nutritional risk factors among Iranians, promoting public awareness about diet through mass media, and a general shift toward the Guidelines diet should be implemented. In specific cases such as reducing blood pressure, specific efforts will be made to reduce the use of salt as an additive in manufactured foods. Further potential examples include some interventions in our oil industry to reduce the amount of trans fatty acids in hydrogenated vegetable oils, and restrictions on marketing of foods and beverages high in salt, fats and sugar. Findings from the burden of diseases attributable to physical inactivity or tobacco smoking will result in formulating policy approaches to encourage physical activity, or to reduce smoking among the Iranian population. Protecting people from tobacco and banning smoking in public places, warning about the dangers of tobacco use, regular and significant increases in the price of cigarettes, and raising taxes

on tobacco are some potential interventions to decrease levels of smoking in the population.

In addition to these low-cost solutions, which work everywhere to reduce the hazards of lifestyle risk factors on NCDs, there is strong evidence, though currently a shortage of cost-effectiveness research, for the following interventions: healthy nutrition environments in schools, nutrition information and counseling in health care, national physical activity guidelines, school-based physical activity programmes for children, workplace programmes for physical activity and healthy diets, community programmes for physical activity and healthy diets, and designing the built environment to promote physical activity. Mass media can be used to educate people about healthy nutrition, food labels, and healthy snacks. To encourage people to undertake physical activity, the government can announce automobile-free days and built bicycle lanes in cities. Smoking can be banned in workplaces or public places and smoking cessation clinics can be organized by the government to decrease rates of smoking.

Little is known about distributions and quantitative effects of specific lifestyle risk factors on chronic diseases in different regions of Iran. The current study will systematically assess and compile nationally representative data on exposure distributions

and heterogeneity of major lifestyle risk factors across regions and among sex- and age-specific groups. Such national and sub-national assessment is necessary for priority setting and policy making in different regions of our country, allowing identification and targeting of the dietary factors, as well as physical activity and tobacco smoking behaviors, with greatest impact on CVD, diabetes and cancer events and deaths. This study is also critical to understand reasons for and thus to reduce health disparities across different regions of Iran.

Author's Contributions

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Appendix: Keywords used for search in International and National databases

Nutrition
•*PubMed*
○**Fruit** ("fruit" [MeSH] OR "fruit" [tiab] OR "fruits" [tiab])
○**Fruit juice** ("fruit juice" [tiab] OR "fruit juices" [tiab] OR "juice" [tiab] OR "juices" [tiab])
○**Vegetable** ("Vegetables" [MeSH] OR "Vegetables" [tiab] OR "Vegetable" [tiab])
○**Whole grain** ("Whole grains" [tiab] OR "Whole grain" [tiab])
○**Beans and legumes** ("Bean" [tiab] OR "Beans" [tiab] OR "legumes" [tiab] OR "legume" [tiab])
○**Nuts and seeds** ("Nuts" [MeSH] OR "Nuts" [tiab] OR "Nut" [tiab] OR "Seeds" [MeSH] OR "Seeds" [tiab] OR "Seed" [tiab])
○**Meat** ("meat" [Mesh] OR "meat" [tiab] OR "meats" [tiab])
○**Milk and dairy** ("Milk" [MeSH] OR "Milk" [tiab]OR "Yogurt" [MeSH] OR "Yogurt" [tiab] OR "Yoghurt" [tiab] OR "Cheese" [MeSH] OR "Cheese" [tiab] OR "Cheeses" [tiab] OR "Ice Cream" [MeSH] OR "Ice Cream" [tiab] OR "Ice Creams" [tiab] OR "Cream" [tiab] OR "Dairy" [tiab] OR "Dairy Products" [MeSH] OR "Dairy Products" [tiab] OR "Dairy Product" [tiab] OR "Cultured Milk Products" [MeSH] OR "Cultured Milk Products" [tiab] OR "Cultured Milk Product" [tiab] OR "Milk Product" [tiab] OR "Milk Products" [tiab])
○**Sweetened beverages** ("beverages" [MeSH] OR "beverages" [tiab] OR "beverage" [tiab])
○**Fatty acids** "Fatty Acids, Omega-6"[MeSH] OR "Fatty Acids, Omega-3"[MeSH] OR "Fatty Acids, Unsaturated"[MeSH] OR "Fatty Acids, Monounsaturated"[MeSH] OR "Trans Fatty Acids"[MeSH] OR "monounsaturated"[tiab] OR "mono-unsaturated"[tiab] OR "MUFA"[tiab] OR "unsaturated"[tiab] OR "polyunsaturated"[tiab] OR "PUFA"[tiab] OR "saturated"[tiab] OR "SFA"[tiab] OR "trans-unsaturated"[tiab] OR "trans-fatty"[tiab] OR "trans fatty"[tiab] OR "trans unsaturated"[tiab] OR "trans fat"[tiab] OR "TFA"[tiab] OR "omega-6"[tiab] OR "omega-3"[tiab] OR "n-6"[tiab] OR "n-3"[tiab] OR "alpha-linolenic"[tiab] OR "oleic"[tiab] OR "linoleic"[tiab]
○**Fiber** ("Dietary Fiber" [MeSH] OR "Dietary Fiber" [tiab] OR "Dietary fibers" [tiab] OR "Dietary fibre" [tiab] OR "Dietary fibres" [tiab] OR "Fiber intake" [tiab])
○**Cholesterol** ("Cholesterol, Dietary" [MeSH] OR "Dietary cholesterol" [tiab] OR "cholesterol intake" [tiab])
○**Sodium** ("Sodium, Dietary" [MeSH] OR "Dietary Sodium" [tiab] OR "sodium intake" [tiab])

○**Calcium**
("Calcium, Dietary" [MeSH] OR "Dietary Calcium" [tiab] OR "calcium intake" [tiab])

○**Fish**
("Fishes" [MeSH], OR "Fish" [tiab] OR "Fishes" [tiab] OR "Fish products" [MeSH] OR "Fish products" [tiab] OR "Fish product"[tiab] OR "Seafood" [MeSH] OR "Seafood" [tiab] OR "Sea food" [tiab] OR "Sea foods" [tiab] OR "Seafoods" [tiab] OR "Marine" [tiab])

○**Processed meat**
("Meat products" [MeSH] OR "Meat products" [tiab], OR "Meat product" [tiab] OR "Poultry products" [MeSH], OR "Poultry products" [tiab] OR "Poultry product" [tiab] OR "Processed meat" [tiab] OR "Processed poultry" [tiab] OR "Processed fish" [tiab] OR "Smoked meat" [tiab] OR "Smoked fish" [tiab] OR "Salted meat" [tiab] OR "Salted fish" [tiab])

•*ISI*

○**Fruit**
("fruit" OR "fruits")

○**Fruit juice**
("fruit juice" OR "fruit juices"OR "juice" OR "juices")

○**Vegetable**
("Vegetable" OR "Vegetables")

○**Whole grain**
("Whole grains" OR "Whole grain")

○**Beans and legumes**
("Bean" OR "Beans" OR "legumes" OR "legume")

○**Nuts and seeds**
("Nuts" OR "Nut" OR "Seeds"OR "Seed")

○**Meat**
("meat" OR "meats")

○**Milk and dairy**
("Milk" OR "Yogurt" OR "Yoghurt" OR "Cheese" OR "Cheeses" OR "Ice Cream" OR "Ice Creams" OR "Cream" OR "Dairy" OR "Dairy Products" OR "Dairy Product" OR "Cultured Milk Products" OR "Cultured Milk Product" OR "Milk Product" OR "Milk Products")

○**Sweetened beverages**
("beverages" OR "beverage")

○**Fatty acids**
"Fatty Acids, Omega-6" OR "Fatty Acids, Omega-3" OR "Fatty Acids, Unsaturated" OR "Fatty Acids, Monounsaturated" OR "Trans Fatty Acids" OR "monounsaturated" OR "mono-unsaturated" OR "MUFA" OR "unsaturated" OR "polyunsaturated" OR "PUFA" OR "saturated" OR "SFA" OR "trans-unsaturated" OR "trans-fatty" OR "trans fatty" OR "trans unsaturated" OR "trans fat" OR "TFA" OR "n-6" OR "n-3" OR "alpha-linolenic" OR "oleic" OR "linoleic"

○**Fiber**
("Dietary Fiber" OR "Dietary fibers" OR "Dietary fibre" OR "Dietary fibres" OR "Fiber intake")

○**Cholesterol**
("Dietary cholesterol" OR "cholesterol intake")

○**Sodium**
("Dietary Sodium" OR "sodium intake")

○**Calcium**
("Dietary Calcium"OR "calcium intake")

○**Fish**
("Fishes", OR "Fish" OR "Fish products" OR "Fish products" OR "Seafood" OR "Seafood" OR "Seafoods" OR "Sea foods" OR "Marine")

○**Processed meat**
("Meat products" OR "Meat product" OR "Poultry products" OR "Poultry product" OR "Processed meat" OR "Processed poultry" OR "Processed fish" OR "Smoked meat" OR "Smoked fish" OR "Salted meat" OR "Salted fish")

•*Scopus*

○**Fruit**
("fruit" OR "fruits")

○**Fruit juice**
("fruit juice" OR "fruit juices"OR "juice" OR "juices")

○**Vegetable**
("Vegetable" OR "Vegetables")

○**Whole grain**
("Whole grains" OR "Whole grain")

○**Beans and legumes**
("Bean" OR "Beans" OR "legumes" OR "legume")

○**Nuts and seeds**
("Nuts" OR "Nut" OR "Seeds"OR "Seed")

○**Meat**
("meat" OR "meats")

○**Milk and dairy**
("Milk" OR "Yogurt" OR "Yoghurt" OR "Cheese" OR "Cheeses" OR "Ice Cream" OR "Ice Creams" OR "Cream" OR "Dairy" OR "Dairy Products" OR "Dairy Product" OR "Cultured Milk Products" OR "Cultured Milk Product" OR "Milk Product" OR "Milk Products")

○**Sweetened beverages**
("beverages" OR "beverage")

○**Fatty acids**
"Fatty Acids, Omega-6" OR "Fatty Acids, Omega-3" OR "Fatty Acids, Unsaturated" OR "Fatty Acids, Monounsaturated" OR "Trans Fatty Acids" OR "monounsaturated" OR "mono-unsaturated" OR "MUFA" OR "unsaturated" OR "polyunsaturated" OR "PUFA" OR "saturated" OR "SFA" OR "trans-unsaturated" OR "trans-fatty"OR "trans fatty" OR "trans unsaturated" OR "trans fat" OR "TFA" OR "n-6" OR "n-3" OR "alpha-linolenic" OR "oleic" OR "linoleic"
"omega 6 fatty acid" OR "omega 6 fatty acids" OR "n 6 fatty acid" OR "omega 6 polyunsaturated fatty acid" OR "omega 3 fatty acid" OR "omega 3 fatty acids" OR "n 3 fatty acid" OR "n 3 polyunsaturated fatty acid" OR "omega 3" OR "omega 3 polyunsaturated fatty acid" OR "unsaturated fatty acid" OR "unsaturated fatty acids" OR "unsaturated fat" OR "UFA" OR "unsaturated lipid" OR "monounsaturated fatty acid" OR "monounsaturated fatty acids" OR "trans fatty acid" OR "trans unsaturated" OR "trans fatty acids" OR "trans unsaturated fatty acid" OR "unsaturated trans fatty acid"

○**Fiber**
("Dietary Fiber" OR "Dietary fibers" OR "Dietary fibre" OR "Dietary fibres" OR "Fiber intake" OR "Diet fiber")

○**Cholesterol**
("Dietary cholesterol" OR "cholesterol intake" OR "cholesterol feeding")

○**Sodium**
("Dietary Sodium" OR "sodium intake")

○**Calcium**
("Dietary Calcium" OR "calcium intake" OR "Calcium feeding")

○**Fish**
("Fishes", OR "Fish" OR "Fish products" OR "Fish products" OR "Seafood" OR "Seafood" OR "Sea food" OR "Sea foods" OR "Seafoods" OR "Marine")

○**Processed meat**
("Meat products" OR "Meat product" OR "Poultry products" OR "Poultry product" OR "Processed meat" OR "Processed poultry" OR "Processed fish" OR "Smoked meat" OR "Smoked fish" OR "Salted meat" OR "Salted fish" OR "Sausage")

•*IranMedex, SID and Irandoc*

○**Fruit**
"Miveh", "Miveha", "Mivejat", "Morakabat", "Seifijat"

○**Fruit juice**
"Ab Miveh", "Ab Porteghal", " Ab Anar", "Ab Albalou"

○**Vegetable**
"Sabzi", "Sabziha", "Sabzijat"

○**Whole grain**
"Ghalat-e Kamel", "Sabus Dar", "Nan-e Sangak", "Nan-e Jo"

○**Beans and legumes**
"Hoboubat", "Loubia", "Adas", "Nokhod", "Mash", "Lapeh", "Soya"

○**Nuts and seeds**
"Ajil", "Khoshkbar", "Gerdou", "Fandogh", "Pesteh", "Badam", "Tokhmeh", "Konjed", "Shahdaneh"

○**Meat**
"Gousht"

○**Milk and dairy**
"Labaniat", "Labani", "Shir", "Mast", "Dough", "Kashk", "Panir", "Bastani", "Khameh"

○**Sweetened beverages**
"Noshidani", "Noushabeh", "Souda"

○**Fatty acids**
"Charb-e Terans", "Roghan-e Hidrojeneh", "Roghan-e Jamed", "Roghan-e Nimeh Jamed", "Kareh-ye Giahi", "Charb-e Omega", "Charb-e N", "Linoleik", "Arashidonik", "Charb-e Daryaei", "Ikozanoik", "Dokoza Hegzanoik", "Ikoza Pantanoik", "Linolenik", "Roghan-e Mahi", "Charb-e Eshba", "Botirik", "Lorik", "Miristik", "Palmetik", "Palmitat", "Estearik", "Estearat", "Lorat", "Miristat", "Ikozanoik", "Dekanoik", "Arashidik"

○**Fiber**
"Fibr-e Ghaza", "Fibr-e Rejim", "Sabus", "Daryaft-e Fibr", "Masraf-e Fibr"

○**Cholesterol**
"Kolestrol-e Rejim", "Daryaft-e Kolestrol", "Kolestrol-e Daryafti", "Kolestrol-e Ghaza"

○**Sodium**
"Sodiom-e Rejim", "Sodiom-e Ghaza", "Sodiom Koloraid", "Sodiom Kolorid", "Daryaft-e Namak", "Masraf-e Namak", "Namak-e Ghaza"

○**Calcium**
"Kalsiom-e Rejim", "Kalsiom-e Ghaza", "Daryaft-e Kalsiom", "Kalsiom-e Daryafti"

○**Fish**
"Mahi", "Meigou"

○**Processed meat**
"Gousht-e Faravari", "Kalbas", "Sosis", "Hot Dog", "Mahi Doudi", "Namak Soud"

Physical Activity

•PubMed

("Motor Activity"[Mesh] OR "Motor Activity"[tiab]OR"Physical Activity"[tiab]OR" Inactivity"[tiab]"Exercise"[Mesh] OR "Exercise"[tiab] OR "Muscle Stretching Exercises"[Mesh] OR "Muscle Stretching Exercises"[tiab] OR"Muscle Stretching Exercise"[tiab] OR"Plyometric Exercise"[Mesh] OR "Plyometric Exercise"[tiab] OR"Plyometric Exercise"[tiab] OR"Resistance Training"[Mesh] OR "Resistance Training"[tiab] OR"Resistance Trainings"[tiab] OR "Running"[Mesh] OR "Running"[tiab] OR "Jogging"[Mesh] OR "Jogging"[tiab] OR "Swimming"[Mesh] OR "Swimming"[tiab] OR "Diving" [Mesh] OR "Diving" [tiab] OR "Walking" [Mesh] OR "Walking" [tiab] OR "Life Style" [Mesh] OR "Life Style" [tiab] OR "Life Styles" [tiab] OR "Lifestyle" [tiab] OR "Lifestyles" [tiab] "Sedentary Lifestyle"[Mesh] OR "Sedentary Lifestyle"[tiab] OR "television viewing"[tiab] OR "computer use" [tiab] OR "screen time" [tiab] OR "sedentary activities" [tiab] OR "screen-based behavior" [tiab] OR "television watching" [tiab] OR "sedentary pursuits" [tiab] OR "TV/computer time" [tiab] OR "screen-time" [tiab] OR "Risk Reduction Behavior"[Mesh] OR "Risk Reduction Behavior"[tiab]"Sports"[Mesh] OR "Sports"[tiab] OR "Athletic Performance"[Mesh] OR "Athletic Performance"[tiab] OR "Physical Endurance"[Mesh] OR "Physical Endurance"[tiab] OR "Baseball"[Mesh] OR "Baseball"[tiab] OR "Basketball"[Mesh] "Basketball"[tiab] OR "Bicycling"[Mesh] OR "Bicycling"[tiab] OR "Boxing"[Mesh] OR "Boxing"[tiab] OR "Football"[Mesh] OR "Football"[tiab] OR "Golf"[Mesh] OR "Golf"[tiab] OR "Gymnastics"[Mesh] OR "Gymnastics"[tiab] OR "Hockey"[Mesh] OR "Hockey"[tiab] OR "Martial Arts"[Mesh] OR "Martial Arts"[tiab] OR "Mountaineering"[Mesh] "Mountaineering"[tiab] OR "Skating"[Mesh] OR "Skating"[tiab] OR "Snow Sports"[Mesh] OR "Snow Sports"[tiab] OR"Soccer"[Mesh] OR "Soccer"[tiab]OR "Swimming"[Mesh] OR "Swimming"[tiab] OR "Track and Field"[Mesh] OR "Track and Field"[tiab]"Skiing"[Mesh] OR "Skiing"[tiab] OR "Diving"[Mesh] OR "Diving"[tiab] OR "Volleyball"[Mesh] OR "Volleyball"[tiab] OR "Weight Lifting"[Mesh] OR "Weight Lifting"[tiab] OR "Wrestling"[Mesh] OR "Wrestling"[tiab] OR "leisure activity" [tiab] OR "vigorous activity" [tiab])

•ISI

"Motor Activity"OR"Physical Activity" OR " Inactivity" OR "Exercise" OR "Muscle Stretching Exercises" OR "Muscle Stretching Exercise"OR"Plyometric Exercise" OR "Plyometric Exercise" OR "Resistance Training" OR "Resistance Trainings" OR "Running" OR "Jogging"OR "Swimming" OR "Diving" OR "Walking" OR "Life Style" OR "Life Styles" OR "Lifestyle" OR "Lifestyles" OR "Sedentary Lifestyle" OR "Risk Reduction Behavior" "Sedentary Lifestyle" OR "television viewing" OR "computer use" OR "screen time" OR "sedentary activities" OR "screen-based behavior" OR "television watching" OR "sedentary pursuits" OR "TV/computer time" OR "screen-time" OR "Sports"OR "Athletic Performance"OR "Physical Endurance"OR "Baseball" OR "Basketball"OR "Bicycling"OR "Boxing"OR "Football"OR "Golf" OR "Gymnastics" OR "Hockey" OR "Martial Arts" OR "Mountaineering"OR "Skating" OR "Snow Sports" OR"Soccer" OR "Swimming" OR "Track and Field" OR "Skiing" OR "Diving" OR "Volleyball" OR "Weight Lifting" OR "Wrestling" OR "leisure activity" OR "vigorous activity"

•Scopus

"Motor Activity"OR"Physical Activity" OR " Inactivity" OR "Exercise" OR "Muscle Stretching Exercises" OR "Muscle Stretching Exercise"OR"Plyometric Exercise" OR "Plyometric Exercise" OR "Resistance Training" OR "Resistance Trainings" OR "Running" OR "Jogging"OR "Swimming" OR "Diving" OR "Walking" OR "Life Style" OR "Life Styles" OR "Lifestyle" OR "Lifestyles" OR "Sedentary Lifestyle" OR "Risk Reduction Behavior" "Sedentary Lifestyle" OR "television viewing" OR "computer use" OR "screen time" OR "sedentary activities" OR "screen-based behavior" OR "television watching" OR "sedentary pursuits" OR "TV/computer time" OR "screen-time" OR "Sports"OR "Athletic Performance"OR "Physical Endurance"OR "Baseball" OR "Basketball"OR "Bicycling"OR "Boxing"OR "Football"OR "Golf" OR "Gymnastics" OR "Hockey" OR "Martial Arts" OR "Mountaineering"OR "Skating" OR "Snow Sports" OR"Soccer" OR "Swimming" OR "Track and Field" OR "Skiing" OR "Diving" OR "Volleyball" OR "Weight Lifting" OR "Wrestling" OR "leisure activity" OR "vigorous activity"

•IranMedex, SID and Irandoc

"Faaliyat-e Badani", "Adam-e Faalyiat-e Badani", "Varzesh", "Tamrin", "Sargarmi", "Oghat-e Faraghat", "Tafrih", "Tamasha-ye Televizun"

Smoking

•PubMed

 ("Smoking"[Mesh] OR "Smoke"[Mesh]OR "Tobacco Use Disorder"[Mesh] OR "Tobacco Smoke Pollution"[Mesh])

•ISI

(Smoking OR "cigarette smoking" OR "tobacco smoking" OR Smok* OR "Tobacco Use Disorder" OR "nicotine use disorder" OR "tobacco dependence" OR "nicotine dependence" OR "Tobacco Smoke Pollution" OR "passive smoking" OR "secondhand smoking" OR "involuntary smoking")

•Scopus

(Smoking OR "cigarette smoking" OR "tobacco smoking" OR Smok* OR "Tobacco Use Disorder" OR "nicotine use disorder" OR "tobacco dependence" OR "nicotine dependence" OR "Tobacco Smoke Pollution" OR "passive smoking" OR "secondhand smoking" OR "involuntary smoking" OR "tobacco constituent" OR "reverse smoking")

•IranMedex, SID and Irandoc

"Sigar", "Dokhaniat", "Tanbakou", "Nikotin", "Masraf-e Sigar", "Sigar Keshidan"