Table S1: Baseline characteristics of the Golestan Cohort Study participants

Characteristics	Total N=50045	Women N=28811	Men N=21234
Age at baseline			
• <50	24615 (49.19)	14526 (50.42)	10089 (47.51)
• 50-59	15573 (31.12)	9290 (32.24)	6283 (29.59)
• 60-69	7359 (14.70)	3918 (13.60)	3441 (16.21)
• ≥ 70	2498 (4.99)	1077 (3.74)	1421 (6.69)
Ethnicity			
• Turkman	37253 (74.44)	21202 (73.59)	16051 (75.59)
• Others	12792 (25.56)	7609 (26.41)	5183 (24.41)
Marital status			
• Married	43955 (87.83)	23286 (80.82)	20669 (97.34)
• Unmarried*	6090 (12.17)	5525 (19.18)	565 (2.66)
Residence			
• Urban	10034 (20.05)	6100 (21.17)	3934 (18.53)
• Rural	40011 (79.95)	22711 (78.83)	17300 (81.47)
Education			
• No formal schooling	35118 (70.17)	24700 (85.73)	10418 (49.06)
• Primary Education	8463 (16.91)	2914 (10.11)	5549 (26.13)
• Middle school or higher	6464 (12.92)	1197 (4.15)	5267 (24.80)
Wealth score (Quintiles)			
• First	10746 (21.47)	6416 (22.27)	4330 (20.39)
• Second	9288 (18.56)	5450 (18.92)	3838 (18.07)
• Third	10874 (21.73)	6257 (21.72)	4617 (21.74)
• Fourth	9482 (18.95)	5383 (18.68)	4099 (19.30)
• Fifth	9655 (19.29)	5305 (18.41)	4350 (20.49)
Alcohol use			
• Never used	48316 (96.55)	28790 (99.93)	19526 (91.96)
• Ever used	1729 (3.45)	21 (0.07)	1708 (8.04)
Tobacco smoking/Nass chewing			
• Never used	39170 (78.28)	27744 (96.31)	11426 (53.82)
• Ever used	10867 (21.72)	1063 (3.69)	9804 (46.18)
Opium consumption			
• Never used	41545 (83.02)	26458 (91.83)	15087 (71.05)
• Ever used	8500 (16.98)	2353 (8.17)	6147 (28.95)
Physical activity (MET min/week)			
• 1st tertile	17601 (35.25)	4882 (16.98)	12719 (60.07)
• 2nd tertile	15815 (31.68)	11351 (39.84)	4464 (21.08)
• 3rd tertile	16512 (33.07)	12520 (43.54)	3992 (18.85)
Body mass index (kg/m^2)			
• <18.5	2410 (4.82)	1153 (4.00)	1257 (5.92)
• 18.5-24.9	17929 (35.83)	8317 (28.87)	9612 (45.28)
• 25-29.9	16973 (33.92)	9701 (33.67)	7272 (34.26)
• ≥ 30	12725 (25.43)	9637 (33.45)	3088 (14.55)
Vegetable/fruit consumption (g/day)			
• 1st tertile	16390 (33.33)	10393 (36.73)	5997 (28.73)
• 2nd tertile	16390 (33.33)	9544 (33.73)	6846 (32.80)
• 3rd tertile	16390 (33.33)	8358 (29.54)	8032 (38.48)
High blood pressure			
• No	28805 (57.56)	15519 (53.86)	13286 (62.57)
• Yes	21240 (42.44)	13292 (46.14)	7948 (37.43)
Diabetes mellitus			
• No	46601 (93.12)	26464 (91.85)	20137 (94.83)
• Yes	3444 (6.88)	2347 (8.15)	1097 (5.17)

Data are n (%). *Single, divorced, widowed, and others.

Table S2: Causes of death in the Golestan Cohort Study (2004-Aug 2017)*

Disease classification based on ICD-10 (Version:2016)	ICD code	<70	>=70	All
All		4018	2329	6347
I Certain infectious and parasitic diseases	**A00-B99**	**112 (2.79)**	**98 (4.21)**	**210 (3.31)**
Tuberculosis	A15-A19	36 (32.14)	16 (16.33)	52 (24.76)
Others		76 (67.86)	82 (83.67)	158 (75.24)
II Neoplasms	**C00-D48**	**858 (21.35)**	**384 (16.49)**	**1242 (19.57)**
Malignant neoplasm of oesophagus	C15	153 (17.83)	83 (21.61)	236 (19.00)
Malignant neoplasm of stomach	C16	155 (18.07)	83 (21.61)	238 (19.16)
Malignant neoplasm of colorectal	C18-20	47 (5.48)	18 (4.69)	65 (5.23)
Malignant neoplasms of hepatobiliary organs	C22-24	52 (6.06)	23 (5.99)	75 (6.04)
Malignant neoplasm of pancreas	C25	52 (6.06)	27 (7.03)	79 (6.36)
Malignant neoplasms of other digestive organs		7 (0.82)	1 (0.26)	8 (0.64)
Malignant neoplasm of bronchus and lung	C34	61 (7.11)	22 (5.73)	83 (6.68)
Malignant neoplasm of breast	C50	27 (3.15)	1 (0.26)	28 (2.25)
Malignant neoplasms of female genital organs	C51-58	56 (6.53)	6 (1.56)	62 (4.99)
Malignant neoplasms of male genital organs	C60-63	9 (1.05)	16 (4.17)	25 (2.01)
Malignant neoplasms of urinary tract	C64-C68	24 (2.80)	11 (2.86)	35 (2.82)
Malignant neoplasms of eye, brain and other parts of central nervous system	C69-72	47 (5.48)	10 (2.60)	57 (4.59)
Malignant neoplasms, stated or presumed to be primary, of lymphoid, haematopoietic and related tissue	C81-96	61 (7.11)	29 (7.55)	90 (7.25)
Other Malignant neoplasms		104 (12.12)	53 (13.80)	157 (12.64)
D00-D48In situ, benign, or unknown	D00-D48	3 (0.35)	1 (0.26)	4 (0.32)
III Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	**D50-D89**	**1 (0.02)**	**1 (0.04)**	**2 (0.03)**
IV Endocrine, nutritional and metabolic diseases	**E00-E90**	**54 (1.34)**	**14 (0.60)**	**68 (1.07)**
Diabetes mellitus	E10-E14	47 (87.04)	13 (92.86)	60 (88.24)
Others		7 (12.96)	1 (7.14))	8 (11.76)
V Mental and behavioural disorders	**F00-F99**	**30 (0.75)**	**61 (2.62)**	**91 (1.43)**
VI Diseases of the nervous system	**G00-G99**	**35 (0.87)**	**36 (1.55)**	**71 (1.12)**
VII Diseases of the eye and adnexa	**H00-H59**	**0**	**0**	**0**
VIII Diseases of the ear and mastoid process	**H60-H95**	**0**	**0**	**0**
IX Diseases of the circulatory system	**I00-I99**	**1669 (41.54)**	**922 (39.59)**	**2591 (40.82)**
Ischaemic heart diseases	I20-I25	864 (51.77)	371 (40.24)	1235 (47.66)
Cardiac arrest	I46	180 (10.78)	95 (10.30)	275 (10.61)
Heart failure	I50	106 (6.35)	67 (7.27)	173 (6.68)
Cerebrovascular diseases	I60-I69	473 (28.34))	354 (38.39)	827 (31.92)
Others		46 (2.76)	35 (3.80)	81 (3.13)
X Diseases of the respiratory system	**J00-J99**	**175 (4.36)**	**142 (6.10)**	**317 (4.99)**
Acute infection	J00-J22	43 (24.57)	55 (38.73)	98 (30.91)
Chronic lower respiratory diseases	J40-J47	117 (66.86)	75 (52.82)	192 (60.57)
Others		15 (8.57)	12 (8.45)	27 (8.52)
XI Diseases of the digestive system	**K00-K93**	**125 (3.11)**	**57 (2.45)**	**182 (2.87)**
Diseases of Liver	K70-77	75 (60.00)	22 (38.60)	97 (53.30)
Others		50 (40.00)	35 (61.40)	85 46.70)
XII Diseases of the skin and subcutaneous tissue	**L00-L99**	**3 (0.07)**	**1 (0.04)**	**4 (0.06)**
XIII Diseases of the musculoskeletal system and connective tissue	**M00-M99**	**9 (0.22)**	**0**	**9 (0.14)**
XIV Diseases of the genitourinary system	**N00-N99**	**74 (1.84)**	**50 (2.15)**	**124 (1.95)**
Renal failure	N17-N19	71 (95.95)	48 (96.00)	119 (95.97)
Others		3 (4.05)	2 (4.00)	5 (4.03)
XV Pregnancy, childbirth and the puerperium	**O00-O99**	**0**	**0**	**0**
XVI Certain conditions originating in the perinatal period	**P00-P96**	**0**	**0**	**0**
XVII Congenital malformations, deformations and chromosomal abnormalities	**Q00-Q99**	**2 (0.05)**	**0**	**2 (0.03)**
XVIII Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	**R00-R99**	**185 (4.60)**	**150 (6.44)**	**335 (5.28)**
XIX Injury, poisoning and certain other consequences of external causes	**S00-T98**	**9 (0.22)**	**6 (0.26)**	**15 (0.24)**
XX External causes of morbidity and mortality	**V01-Y98**	**235 (5.85)**	**52 (2.23)**	**287 (4.52)**
Transport accidents	V01-V99	166 (70.64)	33 (63.46)	199 (69.34)
Others		69 (29.36)	19 (36.54)	88 (30.66)
XXI Factors influencing health status and contact with health services	**Z00-Z99**	**0**	**0**	**0**
XXII Codes for special purposes	**U00-U85**	**0**	**0**	**0**

    * Cause of death not yet determined in 797 mortality cases: 442 deaths <70 and 355 deaths ≥70 years. In columns, n (%) of each main subgroups are calculated (Bold); also, within subgroups n (%) are shown, separately.

Table S3: The top 10 causes of death (Global Health Estimation, WHO Methods) in the Golestan Cohort Study[*], after exclusion of deaths within the first year of follow-up

	40-49 years N=357		50-59 years N=1213		60-69 years N=1710		All premature death (<70) N=3280	
1	IHD[a]	125 (35.01)	IHD[a]	385 (31.74)	IHD[a]	589 (34.44)	IHD[a]	1099 (33.51)
2	Road injury	45 (12.61)	Stroke	153 (12.61)	Stroke	274 (16.02)	Stroke	461 (14.05)
3	Stroke	34 (9.52)	Road injury	59 (4.86)	Stomach cancer	95 (5.56)	Stomach cancer	159 (4.85)
4	Esophagus cancer	19 (5.32)	Stomach cancer	58 (4.78)	Esophagus cancer	83 (4.85)	Esophagus cancer	153 (4.66)
5	Cirrhosis[b]	10 (2.80)	Esophagus cancer	51 (4.20)	COPD[c]	64 (3.74)	Road injury	151 (4.60)
6	Breast cancer Kidney diseases	9 (2.52) 9 (2.52)	COPD[c]	38 (3.13)	Road injury	47 (2.75)	COPD[c]	106 (3.23)
7	Liver cancer Brain cancers[d]	7 (1.96) 7 (1.96)	Kidney diseases	32 (2.64)	Kidney diseases	42 (2.46)	Kidney diseases	83 (2.53)
8	Diabetes mellitus Stomach cancer	6 (1.68) 6 (1.68)	Colorectal cancers[e] Cirrhosis[b]	25 (2.06) 25 (2.06)	Lung cancers[f]	35 (2.05)	Lung cancers[f]	63 (1.92)
9	Lung cancers[f] LRT infection[g]	5 (1.40) 5 (1.40)	Pancreas cancer Lung cancers[f]	23 (1.90) 23 (1.90)	Alzheimer[h]	33 (1.93)	Cirrhosis[b]	62 (1.89)
10	Ovary cancer Asthma	4 (1.12) 4 (1.12)	Ovary cancer	20 (1.65)	Cirrhosis[b]	27 (1.58)	Pancreas cancer	48 (1.46)

[*]After redistribution of the garbage codes (295 Cardiovascular disease cases: I10, I26.9, I46, I47.2, I49.0, and I50; 4 Cancer cases: C76, C80, and C97; and 8 External cause cases: Y10-Y34 and Y87.2); and 158 cases of symptoms, signs and ill-defined conditions (R00-R94, R96-R99). Excluded: 441 undetermined mortality causes.

[a]Ischemic heart disease, [b]Cirrhosis of the liver, [c]Chronic obstructive respiratory diseases, [d]Brain and nervous system cancers, [e]Colon and rectum cancers, [f]Trachea, bronchus, lung cancers, [g]Lower respiratory tract infection, [h]Alzheimer and other dementias.

Table S4: Hazard ratios for associations between demographic and lifestyle risk factors and premature mortality after exclusion of deaths within the first year of follow-up, in the Golestan Cohort Study*

Variable	Adjusted HR (95% CI) **
Sex	
• Women	1
• Men	1.39 (1.25-1.54)
Ethnicity	
• Turkman	1
• Non-Turkman	0.99 (0.91-1.08)
Marital Status	
• Married	1
• Other	1.17 (1.05-1.31)
Residence	
• Urban	1
• Rural	0.91 (0.82-1.02)
Education	
• No formal schooling	1
• Primary Education	0.86 (0.77-0.96)
• Middle school or higher	0.84 (0.73-0.97)
Wealth Score	
• 1st quintile	1
• 2nd quintile	0.88 (0.79-0.97)
• 3rd quintile	0.69 (0.62-0.77)
• 4th quintile	0.70 (0.63-0.79)
• 5th quintile	0.56 (0.49-0.64)
Alcohol Use	
• Never	1
• Ever used	1.02 (0.87-1.21)
Tobacco Smoking/Nass chewing	
• Never	1
• Ever used	1.39 (1.25-1.54)
Opium Consumption	
• Never	1
• Ever used	1.67 (1.52-1.83)
Physical Activity (MET min/week)	
• 1st Tertile	1
• 2nd Tertile	0.83 (0.76-0.90)
• 3rd Tertile	0.68 (0.62-0.75)
Body Mass Index (kg/m^2)	
• <18.5	1.38 (1.20-1.59)
• 18.5-24.9	1
• 25-29.9	0.97 (0.89-1.06)
• ≥30	0.93 (0.84-1.03)
Vegetable/Fruit Consumption (g/day)	
• 1st Tertile	1
• 2nd Tertile	0.97 (0.89-1.06)
• 3rd Tertile	0.88 (0.80-0.97)
High Blood Pressure	
• No	1
• Yes	1.50 (1.39-1.62)
Diabetes Mellitus	
• No	1
• Yes	2.39 (2.14-2.66)

*Exclude: age ≥70 years at baseline and history of ischemic heart disease, stroke, or cancer. **Adjusted for age at enrolment and all variables listed.

Table S5: Hazard ratios for associations between demographic and lifestyle risk factors and premature mortality based on sex, in the Golestan Cohort Study*

Variable	Men HR (95% CI) **	Women HR (95% CI) **
Ethnicity		
• Turkman	1	1
• Non-Turkman	0.94 (0.83-1.06)	1.03 (0.91-1.17)
Marital Status		
• Married	1	1
• Other	1.44 (1.13-1.84)	1.08 (0.96-1.23)
Residence		
• Urban	1	1
• Rural	0.84 (0.72-0.97)	0.96 (0.83-1.12)
Education		
• No formal schooling	1	1
• Primary Education	0.83 (0.73-0.94)	0.95 (0.75-1.20)
• Middle school or higher	0.87 (0.75-1.02)	0.41 (0.24-0.70)
Wealth Score		
• 1st quintile	1	1
• 2nd quintile	0.87 (0.76-0.99)	0.98 (0.85-1.13)
• 3rd quintile	0.71 (0.62-0.82)	0.70 (0.60-0.82)
• 4th quintile	0.72 (0.61-0.83)	0.75 (0.63-0.88)
• 5th quintile	0.54 (0.45-0.64)	0.67 (0.55-0.81)
Alcohol Use		
• Never	1	1
• Ever used	1.05 (0.89-1.24)	0.58 (0.08-4.10)
Tobacco Smoking/Nass chewing		
• Never	1	1
• Ever used	1.42 (1.27-1.58)	1.45 (1.18-1.79)
Opium Consumption		
• Never	1	1
• Ever used	1.51 (1.36-1.69)	2.01 (1.74-2.32)
Physical Activity (MET min/week)		
• 1st Tertile	1	1
• 2nd Tertile	0.84 (0.74-0.95)	0.75 (0.66-0.85)
• 3rd Tertile	0.83 (0.73-0.95)	0.55 (0.48-0.64)
Body Mass Index (kg/m^2)		
• <18.5	1.47 (1.24-1.73)	1.27 (1.01-1.58)
• 18.5-24.9	1	1
• 25-29.9	1.00 (0.90-1.13)	0.90 (0.79-1.02)
• ≥30	1.06 (0.91-1.23)	0.82 (0.72-0.95)
Vegetable/Fruit Consumption (g/day)		
• 1st Tertile	1	1
• 2nd Tertile	0.92 (0.82-1.04)	0.99 (0.88-1.11)
• 3rd Tertile	0.84 (0.75-0.95)	0.90 (0.79-1.03)
High Blood Pressure		
• No	1	1
• Yes	1.48 (1.34-1.63)	1.52 (1.36-1.69)
Diabetes Mellitus		
• No	1	1
• Yes	2.48 (2.12-2.91)	2.29 (1.98-2.63)

*Exclude: age ≥70 years at baseline and history of ischemic heart disease, stroke, or cancer. **Adjusted for age at enrolment and all variables listed.

Table S6: Hazard ratios for associations between demographic and lifestyle risk factors and premature mortality based on age, in the Golestan Cohort Study*

Variable	<55 years HR (95% CI) **	≥55 years HR (95% CI) **
Sex		
• Women	1	1
• Men	1.48 (1.30-1.70)	1.23 (1.06-1.42)
Ethnicity		
• Turkman	1	1
• Non-Turkman	1.01 (0.90-1.14)	0.98 (0.86-1.11)
Marital Status		
• Married	1	1
• Other	1.42 (1.20-1.67)	1.00 (0.86-1.16)
Residence		
• Urban	1	1
• Rural	0.94 (0.81-1.08)	0.87 (0.75-1.02)
Education		
• No formal schooling	1	1
• Primary Education	0.83 (0.72-0.94)	0.88 (0.73-1.05)
• Middle school or higher	0.81 (0.68-0.96)	0.90 (0.70-1.15)
Wealth Score		
• 1st quintile	1	1
• 2nd quintile	0.87 (0.77-1.00)	0.95 (0.82-1.10)
• 3rd quintile	0.70 (0.61-0.80)	0.70 (0.60-0.81)
• 4th quintile	0.74 (0.63-0.86)	0.70 (0.59-0.82)
• 5th quintile	0.55 (0.46-0.66)	0.61 (0.50-0.75)
Alcohol Use		
• Never	1	1
• Ever used	0.99 (0.80-1.23)	1.10 (0.86-1.41)
Tobacco Smoking/Nass chewing		
• Never	1	1
• Ever used	1.53 (1.34-1.75)	1.23 (1.07-1.42)
Opium Consumption		
• Never	1	1
• Ever used	1.71 (1.52-1.93)	1.67 (1.47-1.91)
Physical Activity (MET min/week)		
• 1st Tertile	1	1
• 2nd Tertile	0.86 (0.76-0.96)	0.76 (0.67-0.86)
• 3rd Tertile	0.68 (0.60-0.78)	0.67 (0.57-0.78)
Body Mass Index (kg/m^2)		
• <18.5	1.53 (1.28-1.83)	1.26 (1.03-1.53)
• 18.5-24.9	1	1
• 25-29.9	1.04 (0.92-1.17)	0.87 (0.77-0.99)
• ≥30	1.00 (0.88-1.15)	0.82 (0.70-0.95)
Vegetable/Fruit Consumption (g/day)		
• 1st Tertile	1	1
• 2nd Tertile	0.97 (0.86-1.08)	0.94 (0.83-1.06)
• 3rd Tertile	0.88 (0.78-1.00)	0.86 (0.75-0.98)
High Blood Pressure		
• No	1	1
• Yes	1.53 (1.39-1.69)	1.46 (1.31-1.62)
Diabetes Mellitus		
• No	1	1
• Yes	2.45 (2.10-2.84)	2.31 (1.99-2.68)

*Exclude: age ≥70 years at baseline and history of ischemic heart disease, stroke, or cancer. **Adjusted for age at enrolment and all variables listed.