

Socioeconomic status and gastroesophageal reflux among adults in PERSIAN Guilan cohort study

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Abstract

Background and objective: The development of health indexes in recent years draw more attention to everyday life style and the impacts of socioeconomic status (SES) on individual's health state. In this regard, we aimed to investigate the socioeconomic status (SES) among the PERSIAN Guilan cohort population by considering the prevalence of gastroesophageal reflux disease (GERD) in these participants.

Materials and methods: This cross-sectional study was conducted based on the PERSIAN cohort study from October 2014 to January 2017 on 10520 individuals. Data including age, gender, body mass index (BMI), educational level, habitat, and SES of patients were collected from all individuals and analyzed using SPSS.16 with a significant level <0.05 .

Results and conclusion: The results illustrated that out of 10520 participants, 1385 patients had GERD that its distribution was 34.9%, 33.6%, and 31.6% in low, moderate, and high levels of SES, respectively. Due to results, age, gender, educational status, and habitat significantly associated with GERD according to three levels of SES ($P<0.05$). GERD was more frequent in patients with low, moderate, and high levels of SES, respectively. Age, gender, educational status, and habitat, represented a significant association with different levels of SES among patients with GERD ($P<0.05$). This large population-based study indicated the increased risk of GERD in the low SES group compare to middle and high-SES groups, which highlighted the role of SES in the health status of individuals.

Keywords: Cohort study, Gastroesophageal reflux, Socioeconomic status

1. Introduction

Gastroesophageal reflux disease (GERD) as one of the highly prevalent diseases has a considerable economic burden on the society all around the world and decreases the quality of life [1,2]. Various factors were reported to be associated with GERD including age, gender, educational level, and obesity [3–5].

The GERD related complications continue to deteriorate with the prevalent cases increasing from 441.57 million in 1990 to 783.95 million in 2019 [2]. This upsurging trend of GERD in both developed and developing countries is concerning [4,6]. GERD affects 10-25% of the western population [7,8], and the same prevalence of GERD was reported in Iran [9,10] that a high

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prevalence of this disease has been reported following an increasing incidence pattern [6,11]. There is much information in western countries about GERD that can be partially generalized to the Iranian population. Enhancing of GERD awareness among the Iranian population is helpful to elevate their quality of life. In this regard, the GERD associated risk factors are essential to be correctly addressed [12].

Despite the overall improvement of the world's economic and social status, prevalence of some diseases is increasing due to the exotic life styles and habitus. It's important for both government and healthcare system to identify, plan, and manage healthcare protocols by modifying related risk factors. On the other hand, to determine the socioeconomic inequalities in GERD, we aimed to investigate prevalence of GERD according to different levels of socioeconomic status (SES) association among the PERSIAN Guilan cohort study population.

2. Materials and methods

2.1. Patients and study design

This cross-sectional study was conducted based on the PERSIAN cohort study [13] in Sowmeh' E Sara, Guilan, north of Iran, and engaged 10520 participants aged 35 to 70 years from October 2014 to January 2017 [14]. The collected data included age, gender, BMI as low weight ($BMI < 18.5 \text{ kg/m}^2$), normal weight ($BMI = 18.5 - 24.99 \text{ kg/m}^2$), overweight ($BMI = 25 - 29.9 \text{ kg/m}^2$), and obese ($BMI \geq 30 \text{ kg/m}^2$), habitat (urban and rural), and educational status (illiterate, elementary school, diploma, and university degree) of patients were recorded. Economic and social status (SES) was classified in three levels low, middle, and high. The participants were classified into GERD and non-GERD groups according to the status of SES.

Written consent was taken from each participant after informing the purpose and importance of the study. To ensure confidentiality of the participants' information, codes were used whereby

name and/or any identifier of the participants was not written on the questionnaire. This study was approved by ethics committees of Ministry of Health and Medical Education, Digestive Diseases Research Institute (Tehran University of Medical Sciences), and also Guilan University of Medical Sciences (P/3/132/215).

2.2. Statistical analysis

Chi square was used to compare the variables that were reported in number and percentage by 95% CI. The analyses were performed using IBM SPSS, version 16.0 (IBM Corp., Armonk, NY, USA). Differences were significant at $P < 0.05$.

3. Results and discussion

The data of 10520 participants are demonstrated in Table 1. A total number of 1385 (13.2%) patients had GERD. The mean age of patients with and without GERD was 51.64 ± 8.77 and 51.49 ± 8.91 years old, respectively. GERD was more frequent in individuals with low, moderate, and high levels of SES, ($n=483$), ($n=465$), ($n=437$), respectively, but no statistically significant association was reported ($P=0.224$). A total number of 834 females and 551 males had GERD. Age ($P=0.020$), gender ($P=0.003$), educational status ($P < 0.001$), and habitat ($P < 0.001$), represented a significant association with different levels of SES among patients with GERD. A higher frequency of GERD was reported in age group 45-55 years old, female gender, rural residents, and individuals with diploma ($P < 0.05$). According to the levels of SES, in low and middle-SES groups, GERD was more common in females, overweighs, individuals with diploma, and rural residents, while in high-SES group, GERD was more frequent in urban residents. Moreover, GERD was reported higher in age group upper 55 years old in middle and high-SES groups, while in low-SES, it was more frequent in age group 45-55 years old. All variables showed significant association among the patients with GERD ($P < 0.05$), except for BMI ($P=0.043$).

Table 1- The frequency of demographical data of individuals with and without GERD according to economic and social status (SES) among PERSIAN Guilan cohort study population

Variables	GERD n (%) 1385 (13.2%)			P-value	No-GERD n (%) 9135 (86.8%)			P-value	
	SES				SES				
	Low 483 (34.9)	Middle 465 (33.6)	High 437 (31.6)		Low 3014 (33.0)	Middle 3041 (33.3)	High 3080 (33.7)		
Age (year)	35-45	148 (37.6)	130 (33.0)	116 (29.4)	0.020	999 (36.4)	927 (33.8)	819 (29.8)	< 0.001
	45-55	199 (38.3)	165 (31.7)	156 (30.0)		1228 (36.8)	1127 (33.8)	979 (29.4)	
	55<	136 (28.9)	170 (36.1)	165 (35.0)		787 (25.8)	987 (32.3)	1282 (42.0)	
Gender	Male	221 (40.1)	176 (31.9)	154 (27.9)	0.003	1595 (36.8)	1428 (32.9)	1313 (30.3)	< 0.001
	Female	262 (31.4)	289 (34.7)	283 (33.9)		1419 (29.6)	1613 (33.6)	1767 (36.8)	
BMI	<18.5	5 (41.7)	0 (7.0)	7 (58.3)	0.243	20 (15.5)	38 (29.5)	71 (55.0)	< 0.001
	18.5≤BMI<25	116 (35.2)	107 (32.4)	107 (32.4)		691 (28.6)	799 (33.1)	926 (38.3)	
	25≤BMI<30	197 (35.6)	189 (34.2)	167 (30.2)		1298 (35.6)	1195 (32.8)	1151 (31.6)	
	30<	165 (33.7)	169 (34.5)	156 (31.8)		1005 (34.1)	1009 (34.2)	932 (31.6)	
Education status	Illiterate	27 (12.6)	74 (34.4)	114 (53.0)	< 0.001	189 (12.4)	461 (30.3)	1523 (57.3)	< 0.001
	Elementary school	100 (23.9)	160 (38.3)	158 (37.8)		636 (22.0)	1048 (36.2)	1210 (41.8)	
	Diploma	279 (43.0)	207 (31.9)	163 (25.1)		1768 (42.3)	1456 (34.8)	959 (22.9)	
	University degree	77 (74.8)	24 (23.3)	2 (1.9)		421 (78.7)	76 (14.2)	38 (7.1)	
Habitat	Urban	138 (22.2)	227 (36.5)	247 (41.3)	< 0.001	847 (21.2)	1336 (33.5)	1808 (45.3)	< 0.001
	Rural	345 (45.2)	238 (31.2)	180 (23.6)		2167 (42.1)	1705 (33.1)	1272 (24.7)	

In the present study, we investigate the prevalence of GERD in different levels of SES among the PERSIAN Guilan cohort study population. GERD is globally recognized as a major health problem for adults, and due to the impact of SES on individual's lifestyle including diet pattern, it can be considered as a risk factor in people prone to some gastrointestinal disorders such as GERD. In our study, we found that the prevalence of GERD among PGCS population was 13.2%. Different studies from Iran showed various

prevalence rates, ranging between 2.7% to 44% [10]. The previous reported prevalence of GERD in Iran was higher than our results (18.2% vs. 13.2). Also, it was reported to be 26.8% in Tabriz and 25% in Isfahan [15–17], which illustrated that the frequency of GERD in our study's population was lower than other parts of Iran. This diversity could be due to genetics and epigenetics diversity in different ethnicity [18,19]. The current results indicated that individuals in lower SES category had a higher

frequency of GERD but no statistically significant correlation was found. Our results in the terms of SES and GERD, are in line with other community-based studies in Great Britain, Spain, and Germany that showed the associations between low SES and GERD [20–23].

This present study revealed a positive association between low SES and age, gender, habitat, and educational status among patients with GERD. We found a higher frequency of GERD in age group 45-55 years old among low-SES category. According to some studies, no significant correlation between age and GERD was demonstrated [24–26]. BMI was frequently reported as a risk factor for GERD [9,27,28], which in our study, overweight patients who were in low-SES group had more GERD, while no statistically significant association was seen in the comparison between levels of SES ($P>0.05$). Furthermore, we found that most of the patients with GERD had diploma. A study of de Oliveira et al., revealed an association between a high level of education and GERD in different SES categories [29], while studies from Iran and other Asian countries showed opposite results [28,30, 31]. The risk of GERD seems to be associated to the levels of SES regardless of the habitat and the level of education of people. This suggests that lower socioeconomic status can lead to the development or worsening of GERD.

In the Jansson et al.' study, the association between low SES and GERD was not attenuated after adjustment for smoking and BMI, which are risk factors for GERD and exposure that are often more prevalent in low SES groups [24]. This may be due to the poor nutritional and incorrect behavioral habits (such as smoking, alcohol consumption etc.).

The baseline data from the cohort was cross-sectional used, which only involved the people older than 35 years that most of them had low educational degrees (diploma and under diploma). It should be considering that underprivileged people may have lower rate of referral

to the physicians, which could have led to lower diagnosis rate of GERD. We suggest to conduct further case-control study on wider range of age, types of occupation, and different levels of income due to their educational degree.

4. Conclusion

According to the effect of SES on health status of people and presentation of various diseases such as GERD, for health promotion, concordance between healthcare system and public social programs in different regions can be helpful to enhance individuals' quality of life.

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6. Conflict of interests

The authors declare no competing interest.

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