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COVID-19 in Iran: Life style predictors and lessons learned in preparing for the future similar conditions

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***Abstract*---**Background: Today, people all over the world are suffering from COVID-19 pandemic. Certainly, exploring the characteristics of the corona virus and making an effective vaccine are important efforts in preventing and controlling the disease. At the same time, it is

necessary to conduct studies to identify high-risk groups and protect them against disease. Method: This study's research population was 281 people with fever, coughing, and respiratory disorder admitted to an educational hospital affiliated with the Hormozgan University of Medical Sciences in the south of Iran. If RT-PCR test was positive, the patients were considered infected. Infected patients were hospitalized if they had impaired respiratory function. The main kinds of lifestyle information collected from patients were: physical activity data, emotional or spiritual status, tobacco/opium/alcohol use status, sleep, and nutritional data, comorbidity disease data. Multivariable OR (95% CI) regression tests were applied to detect the relation between some important lifestyle variables with the probability of infection by coronaviruses and hospitalization due to respiratory disorder findings. Results: it was identified that 22 from 28 covariates had significant associations with the risk of infection and hospitalization. Among them, stress (OR=3.2(2.89-4.32)) showed strong relation with the probability of infection. Factors such as using hookah and comorbidity diseases also increased the chances of hospitalization in patients (OR=3.7[2.01,4.87] AND OR=3.1[2.039,4.061] respectively). Conclusion: There are some habits in our lives which their role in staying healthy have been underestimated. Corona pandemic showed the world that in the future we should emphasize more and more on the physical and mental health of humans as the best barrier against unknown diseases.

***Keywords*---**COVID-19 pandemic, lifestyle, infection, mental health, physical health.

Introduction

Coronaviruses are a group of respiratory viruses found in the human body and some animals. These viruses cause a variety of health disorders in humans, from the common cold to severe pulmonary dysfunction and death. They have been responsible for Middle East respiratory syndrome (MERS-Cov) and Severe acute respiratory syndrome (SARS) leading to disease and death by as much as 50 percent in infected people [1, 2] In December 2019, a new fatal strain of coronavirus, called Covid-19, was extracted from three infected patients in Wuhan, China [3-7]. The disease spread immediately among the people of China and other countries and became an urgent public health concern, so that the World Health Organization declared the disease a pandemic On January 30, 2020. Since then, more than 66000000 people around the world have been infected, more than 1500000 of whom have died. In Iran, the number of patients with the disease has reached about 600000 since the onset of pandemic and the number of deaths from the disease in this period is estimated to be 32000 [8].

In the first study published in China to investigate the percentage of deaths due to the disease, the death rate of hospitalized patients was estimated at about 4%. The study included 138 consecutive patients admitted to hospital with covid-19

and showed that 47 (34%) patients were discharged and six (4.3% overall mortality) died [9,10, 11, 12]. In another study, morbidity and mortality rates were estimated to be 10 percent and 30 percent lower than those of SARS and Morse, respectively [13]. In two studies conducted in China, however, put the death rate at about 14 percent, indicating that the relatively high rate was due to the choice of the research community among patients with the severe form of the disease [15]. In almost all related studies some demographic, clinical, laboratory, radiological and comorbidity information of patients were also investigated, but information on life style of patients was not provided [8-16]. In this group of studies, valuable information has been obtained regarding the determination of clinical and demographic characteristics predicting the diagnosis and severity of the disease, but the role of lifestyle factors on the likelihood of infection and disease severity remains unclear yet.

The results of a review study of all studies conducted on Covid-19 disease showed that the number of studies that examined disease prediction models was less than 10 studies [16-26]. This study concluded by reviewing the preliminary data of the mentioned studies that although interesting results have been extracted from the studies, but they led to a lack of clarity about the risk factors for the disease due to incompleteness of the information registration process, uncertainty of disease outcome, small sample size and of course, the lack of use of forward-looking (co-group) and not considering all the features that may affect the course of the disease, such as patients lifestyle. It should be noted that in all studies, the effectiveness of age and gender is definite. In a meta-analysis of 46,248 cases, the severity of the risk of underlying diseases was calculated separately. The results showed that the risk of severe form of the disease in cardiovascular disease was higher than in diabetes and high blood pressure [27-34]. Obesity and smoking and being a man are also among the risk factors that have been proven in other studies [13,15,16].

In this study it has been tried to determine the relation between people lifestyle and the probability of acquiring infection and progression of disease. On the other hand, it was investigated that whether the lifestyle could predict the probability of being infected and hospitalized due to Covid-19 disease. Certainly some aspects of lifestyle effect have been explored in articles, but it seems that the more accurate extraction of behavioral and health differences between patients has not yet been done. The question of how these possible differences affect the disease depends on accepting the fact that the pattern of persistence and persistence of the disease is not yet clear. Certainly, if the disease persists in humans for a long time, appropriate preventive measures should be considered in addition to the development of vaccines or prophylactic drugs. Lifestyle and its relationship to the level of the body's immune system is almost the only way to differentiate between drugs and vaccines, which can be a maneuver for health policymakers to prevent disease.

Material and Method

The research population of this study is all people who referred to in paiaambar-e-A'azam hospital affiliated to Hormozgan University of Medical Science in the south of Iran, with symptoms of fever, coughing and respiratory disorder. The

hospital is assigned as a public main center for diagnosing, isolating and managing COVID-19 patients in Hormzgan province. According to the protocol of identification and treatment of patients with Covid-19, all Suspicious patients who directly or indirectly (from comprehensive health centers, doctors' offices and clinics in the city) refer to the hospital are tested for the virus using RT-PCR (Reverse Transcriptase Polymerase Chain Reaction) method. The patients with positive RT-PCR result were categorized to two groups, the group A with respiratory disorder findings proved by Magnetic resonance imaging (MRI) and the group B without respiratory disorder findings. Patients in group A would be hospitalized in infectious disease or intensive care wards according to the severity of their health conditions. The patients in group B would be recommended to be under quarantine in their home and leave the hospital after prescribing medicine and necessary educational points about warning signs (Figure 1).

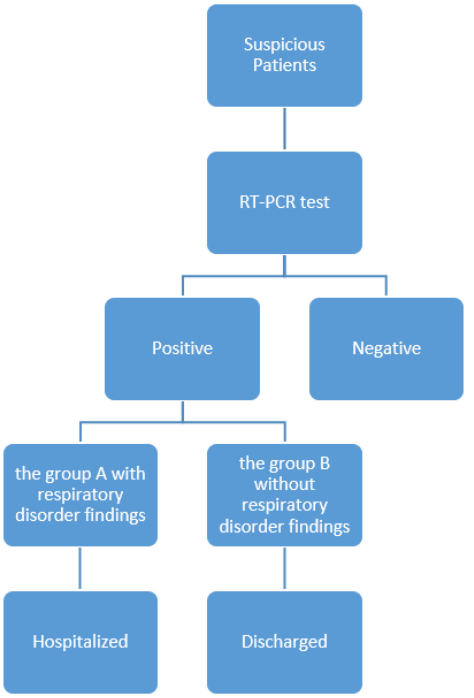

Figure1 Flowchart of Diagnostic-therapeutic steps for people suspected of having COVID-19 infection who are admitted to paiaambar-e-A'azam hospital

To determine the probable relation of being infected with coronavirus or hospitalization with the life style of patients, some related data was collected from all 230 suspicious patients admitted to the hospital from … to… 2020 through questionnaire-based interview with them (if they were able to response the questions) and review their medical records. Patients who were discharged were interviewed using phone-contact and they who had passed away from the disease or not been able to interview, were investigated by contacting with their family members.

The main kinds of lifestyle information collected from patients were: physical activity data, emotional or spiritual status, tobacco/opium/alcohol using status,

sleep and nutritional data, comorbidity disease data and demographic information. The related questions were selected from the Brazilian versions of a Lifestyle Questionnaire [37] with an adequate internal and external consistency for evaluating adult lifestyles and Lifestyle Assessment form [38] NHS Health Check Pathway used by Dudley public health staff as guidance for management and referral options. So, both questionnaires helped us to make a simple form comprise brief but comprehensive questions (Table1).

Data were encrypted and analyzed by International Business Machines Corporation (IBM) Statistical Package for the Social Sciences (SPSS) Software, Ver. 22. Descriptive statistics were used for reporting mean and median. Proportions and means of variables were compared using x^2 test, independent group t test and test respectively. Missing data were unnoticed due to their small number and uniform distribution among the study population. Multivariable OR (95% CI) regression tests was applied to detect the relation between some important lifestyle variables with the Probability of being infected by coronaviruses and being hospitalized due to respiratory disorder findings.

Informed consent obtained from all study participants or their families. This study had no risks to the participants involving the collection of data. Participants' confidentiality was maintained throughout the study. They all be assigned a study identification code by the investigation team for the labeling of questionnaires which not be disclosed elsewhere except by the main investigator if required. The project was approved by HUMS ethics committee.

Results

In total, 281 suspicious patients admitted to the hospital from 1st May to1st august 2020, were participated in the study. The mean age of the patients was 48$\pm$8 years and 61% of them were male (Figure 2).

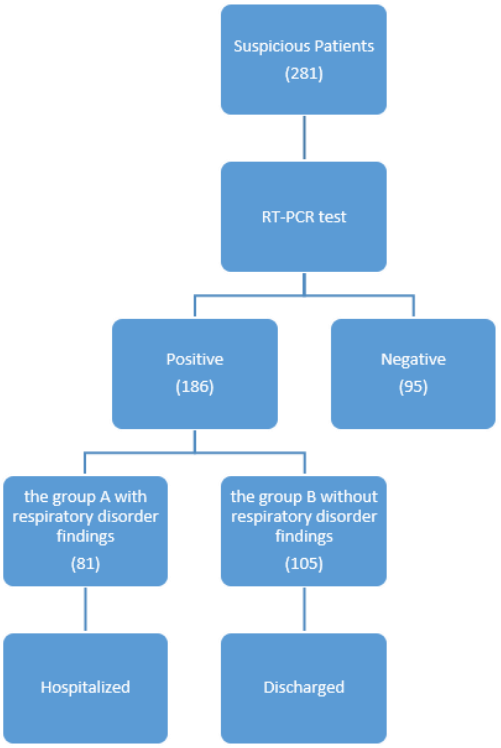

Figure 2. Flowchart of diagnostic-therapeutic steps for 281 people suspected of having COVID-19 infection who were admitted to the paiaambar-e-A′azam hospital

This cross sectional study carried out to clarify two main ambiguities related to covid-19 disease. First, it focused on seeking whether some important lifestyle behaviors and health habits were risk factors for being infected by Covid-19. Second, it aimed to verify whether those variables could have an impact on the severity of covid-19 disease in patients. In some studies, an association between lifestyle determinants and Covid-19 or influenza (the most similar respiratory disease to Covid-19) has been established. However, the type of life style factors studied in previous studies were not completely similar to the factors studied in current research, and the effect of the factors on the severity of the disease was less considered. So, Variables related to life style in positive result patients (infected ones) were compared with negative result patients using independent sample T test and X^2. Then, multiple regression techniques were used to address confounding variables and produce “adjusted” Odds Ratios (ORs) (Table 1 and 2).

Table 1 Questions selected of Brazilian versions of a Lifestyle Questionnaire and Lifestyle Assessment Best Practice Guideline to assess the life style

Domains of life style	Number of questions	Questions	Scale	Range of score
Getting support of the others status	2	1. I have someone to talk about things that are important to me. 2. I love and receive love from my family or friends.	Likert*	0-10
Stress and emotional pressure status	3	1. I feel pressured and frustrated. 2. I feel sad and depressed. 3. I am unable to cope with stress in my life.	Likert	0-15
Feeling pessimistic status	2	1. I am optimist. 2. I feel angry and hostile.	Likert question 2 is coded reversed	0-10
Social position status	1	1. I am satisfied with my job or role in my family or community.	Likert	0-5
Sleep and rest status	2	2. I have a good sleep. 3. I relax and enjoy my free time.	Likert	0-10
Sports activities	3	1. Walking at a steady pace. 2. Cycling to the work or shopping. 3. Regular physical sports.	Likert	0-5
Healthy Nutrition status	2	1. I have a balanced diet (fruits, vegetables, milk, meat product and...). 2. I eat sugar, fat, salt, fast food and snacks).	Likert question 2 is coded reversed	0-10
Physical activity related to the job	5	1. I'm not employed (retired or having physical/psychiatric limitations,	**Binary	0-1

		unemployed). 2. I spend most of my time at work office 3. I spend most of my time walking or standing at work. 4. My job definitely requires physical activity and effort. 5. My job requires strenuous physical activity and hard work.		
History of physical or emotional shock	1	1. I have experience a traumatic event (emotional or physical) in a year ago	Binary	0-1
History of cigarette tobacco using	2	2. I smoke. 3. I smoke … cigarette(s) in a day.	Binary and If yes: numbers of using in a day	
History of water pipe using	2	1. I use water pipe. 2. I use water pipe … times a day	Binary and If yes: numbers of using in a week	
History of opium using	2	1. I use opium. 2. I use opium … times a week.	Binary and If yes: numbers of using in a week	
History of undescribed drug using		1. I use undescribed drug. 2. I use undescribed drug … times a week.	Binary and If yes: numbers of using in a week	
History of alcohol using	1	1. I use alcohol. 2. I use alcohol … times a week.	Binary and If yes: numbers of using in a week	
BMI		1. Weight (kg) 2. Height (cm)	Numeric	

* Never- Rarely-Sometimes- almost- always, ** yes-no

Table 2 Life style factors in positive RT-PCR test result patients vs. negative RT-PCR test result patients

life style quantitative factors (Range of scores)	Diagnostic test result Positive result	Negative result	P-value	Diagnostic test result Beta coefficient	Standard error	p-value	Multivariable OR (95% CI)
Age	51(4)	32(3)	0.01	-	-	-	-
BMI	22.3(0.5)	23.1(1.2)	0.3	-	-	-	-
Sex(male)	43	38	0.01	2.19	1.074	0.041	2.13(1.09-4.30)
Getting support of the others status	7.40 (2.2)	7.38(2.3)	0.96	-	-	-	-
stress and emotional pressure status	9.86 (1.9)	8.20 (2.2)	0.005	2.60	.36	0.000	3.2(2.89-4.32)
Feeling pessimistic status	2.82 (1.9)	3.38 (1.4)	0.18	-	-	-	-
Having proper social position status	3.35(1.4)	3.67(1.3)	0.38	-	-	-	-
Having enough sleep and rest status	6.5 (2.1)	6.0 (1.9)	0.027	-	-	-	-
Sports activities Status: Having regular daily walks	1.9(1)	1.57(0.7)	0.5	-	-	-	-
Having regular riding bike	1.8(0.1)	2.9(0.01)	0.6	-	-	-	-
Having regular physical exercise	0.35(0.4)	2.85(0.8)	0.04	-	-	-	-
Having healthy nutrition status	2.52(1.4)	3.27(1.4)	0.01	5.04	1.05	0.000	-2.9(-2.03, -4.05)
Positive history of cigarette using	24.3	11.7	0.04	-	-	-	-
Positive history of hookah using	21	10.1	0.03	-	-	-	-
Positive history of opium using	0.8	0.9	-	-	-	-	-
Positive history of alcohol using	1.3	1.1	-	-	-	-	-
Positive history of non-prescribed	35	15.9	0.03	4.39	1.52	0.1	1.94(0.55-2.44)

drug using							
Positive history of emotional/physical shock experience	37.1	36.3	0.8	-	-	-	-
Positive history of comorbidity disease	51	12	0.001	2.06	.007	0.000	2.3(1.07-3.05)
Physical activity related to the job: Retired	20	26	0.07	-	-	-	-
Physical activity related to the job: A job that is done sitting down	15	19.6	0.7	-	-	-	-
Physical activity related to the job: A job that requires walking or standing	20.8	23.6	0.06	-	-	-	-
Physical activity related to the job: A job that requires physical work	18.4	11.6	0.04	1.06	.22	0.01	1.94(1.55-3.44)
Physical activity related to the job: A job that requires severe physical work	25	19.2	0.03	4.02	1.3	0.01	2.98(2.01-4.66)
Frequency of alcohol using in a week	1.2(0.01)	0	-	-	-	-	-
Frequency of opium using in a week	1.5(0.01)	0.9(0)	-	-	-	-	-
Frequency of cigarette using in a day	2(0.3)	2(0.1)	0.31	-	-	-	-
Frequency of hookah using in a day	1.2(0.2)	1.9(0.02)	0.1	-	-	-	-
Frequency of non-prescribing drug using in a week	2.4(0.5)	1.1(0.02)	0.07	-	-	-	-

*Standard Deviation
*P< 0.05

In Table 2, it could be seen that the relative frequency of men in positive result group is more than negative result group (43% vs. 38%). The positive result group is older than the group (51(4) vs. 32(3) years old). The mean score of stress and emotional pressure status in positive result patients is significantly more than negative result group. The percent of having comorbidity diseases in positive and negative result groups are 51% and 12% respectively (P-value: 0.001). It should be also considered that the mean score of having healthy nutrition in positive and negative result group were 2.52(1.4) and 3.27(1.4) respectively. Moreover, the

percent of using non-prescribed drug, cigarette, hookah and the mean frequency of using all of them in positive result group are more than negative result group. In the following, it could be seen that relative frequency of people who have a job with physical activity in positive result patients is higher than negative result ones (18.4 vs11.6, p-value=0.04 in jobs with physical activity and 25 vs. 19.2, p-value= 0.03 jobs with severe physical activity).

In the last four columns of the same table, the results of multivariate regression test to determine the factors related to having positive diagnostic result have been shown. As totally it could be seen ….from 28 covariates had significant associations with risk of being infected in multi-variable analyses. Factors which affected the probability of being infected are sex (male) (OR = 2.13[1.09,4.30],P < 0.001), healthy nutrition (OR= -2.9[-2.03 ,-4.05], P < 0.001) Stress and emotional pressure status (OR = 3.2 [2.89,4.32], P < 0.001), Positive history of comorbidity disease (OR=2.3[1.07,3.05], P < 0.001), A job that requires physical work (OR= 1.94[1.55,3.44], P=0.01), a job that requires severe physical work (OR=2.98(2.01,4.66), P=0.01) (Table 2). It could be also seen that history of smoking and hookah using are related to the diagnostic result. In addition, using non-prescribed drug showed relation with the probability of positive diagnostic result (OR= 1.94[0.55-2.44], P= 0.001).

In Table 3, it could be seen that the mean of age, BMI, stress/emotional pressure status, frequency of non-prescribing drug using in a week, frequency of cigarette and hookah using in a day, in positive criteria group are more than negative criteria group. Besides, the relative frequency of being man, having comorbidity diseases, having positive history of emotional/physical shock experience are more in positive hospitalization criteria group (48% vs. 30% [p-value = 0.001], 72% vs. 19% [p-value = 0.001], 6% vs. 2% [p-value= 0.01] and 30% vs. 17% [p-value = 0.01] respectively). On the other hand, the mean score of feeling pessimistic status, having enough sleep and rest status, having all types of sports activities, having healthy nutrition were higher in negative hospitalization criteria group in comparison to positive hospitalization criteria group. Relative frequency of having a job that requires severe physical work was less prevalent in hospitalized group (%10 vs. %41).

Table 3 Life style factors in hospitalized patients vs. non-hospitalized patients.

life style quantitative factors (Range of scores)	Respiratory disorder findings (hospitalization criteria)			Respiratory disorder findings (hospitalization criteria)			
	Positive result	Negative result	P-value	Beta coefficient	Standard error	p-value	Multivariable OR (95% CI)
Age	56(1.5)	34(2.3)	0.001	2.19	1.07	0.041	1.3(1.02,1.98)
Sex(male)	24.5(1.7)	21.7(2)	0.01	2.02	.12	0.03	2.1(1.74,4.25)
BMI	48	30	0.001	10.42	1.64	0.01	2.8(2.05,3.76)
Getting support of the others status	6.3(0.2)	8.1(1.2)	0.001	-	-	-	-
stress and emotional pressure status	7.1(0.2)	5.2(0.3)	0.001	-	-	-	-

Feeling pessimistic status		4.8(1.1)	5.7(1.3)	0.01	-	-	-	-
Having proper social position status		3.5(1.2)	3.1(1.4)	0.45	-	-	-	-
Having enough sleep and rest status		4(1.7)	6(1.3))	0.001	2.12	1.03	0.01	-2.1(-1.94,-2.51)
Sports activities Status	Having regular daily walks	1.1(0.01)	2.8(0.1)	0.001	-	-	-	-
	Having regular riding bike	2.1(0.11)	3.1(0.1)	0.01	-	-	-	-
	Having regular physical exercise	0.2(0.01)	2.9(0.1)	0.001	-9.34	1.08	0.001	-2.3(1.21,4.09)
Having healthy nutrition status		3.1(2.1)	5.6(1.6)	0.01	6.99	2.43	0.001	-3.1(-2.44,-4.25)
Positive history of cigarette using		32	6	0.001	5.6	2.92	0.01	2.7(2.41,3.87)
Positive history of hookah using		8	0.5	0.001			0.01	3.7(2.01,4.87)
Positive history of opium using		2	2	0.1	-	-	-	-
Positive history of alcohol using		2	1.6	0.1	-	-	-	-
Positive history of non-prescribed drug using		21	15	0.01	-	-	-	-
Positive history of emotional/physical shock experience		30	17	0.001	3.065	.97	0.01	2.1 (1.39-3.49)
Positive history of comorbidity disease		72	19	0.001	8.9	1.05	0.001	3.1(2.039,4.061)
Physical activity related to the job	Retired	22	18	0.1	-	-	-	-
	A job that is done sitting down	17	19	0.1	-	-	-	-
	A job that requires walking or standing	19	17	0.1	-	-	-	-
	A job that requires	10	41	0.001	1.8	2.04	0.01	-3.2(-2.9,-3.61)

physical work							
A job that requires severe physical work	0	22	0.001	2.13	1.05	0.01	-3.1(-2.81,-4.02)
Frequency of alcohol using in a week	0.8(0.001)	0.7(0.02)	0.1	-	-	-	-
Frequency of opium using in a week	0.5(0.001)	0	0.1	-	-	-	-
Frequency of cigarette using in a day	3.4(0.1)	1.1(0.2)	0.001	3.13	1.17	0.007	2.1(1.84,2.43)
Frequency of hookah using in a day	2.1(0.4)	0.5(0.01)	0.01	9.9	4.66	0.03	2.5(2.11,3.10)
Frequency of non-prescribing drug using in a week	3.4(0.0)	1.2(0.02)	0.001	1.7	1.03	0.02	1.7(1.37,2.49)

In the last four columns of the same table, the results of multivariate regression test to determine the factors related to the probability of being hospitalized have been shown. As totally it could be seen ….from 28 covariates had significant associations with risk of progression of disease in multi-variable analyses. Factors which affected the probability of hospitalization are sex (male) (OR=2.1(1.74 - 4.25), P= 0.03), BMI (OR= 2.8(2.05,3.76), P= 0.01), age (OR=1.3(1.02 - 1.98), P= 0.04), Positive history of comorbidity disease (OR=3.1(2.039-4.061), P 0.001), positive history of cigarette using (OR=2.7(2.41-3.87), P= 0.01), positive history of hookah using (OR=3.7[2.01,4.87], P= 0.01), having emotional/physical shock experience during last year (OR=2.1 (1.39-3.49), P= 0.001), regular exercise (OR=-2.3(-1.21,-4.09), P= 0.001), having a job that requires physical work (OR= -3.2[-2.81,-4.02] and OR= -3.2[-2.9,-3.61] for severe and moderate physical work respectively), having healthy nutrition (OR=-3.1(-2.44,-4.25), P= 0.001), having enough sleep and rest status (OR=-2.1(-1.94 ,-2.51), P= 0.01), positive history (OR=1.7(1.37- 2.49), P= 0.02), frequency of cigarrette using in a day (OR= 2.1(1.84-2.43), P=0.007), non-prescribed drug using (OR= 1.7(1.37,2.49), p= 0.02) and hookah using in a day (OR=2.5(2.11- 3.10), P= 0.03).

Discussion

In this study, a significant relation was shown between being a man with to be infected by Covid-19 and hospitalized. This finding has been already proven in 10 similar cross-sectional studies published during pandemic time. Although, did not find any difference between men and women in proceeding to severe-stage of disease [39]. According to the high communicability of the virus, it seems that in communities in which men often have more responsibility for doing outdoor duties, infection is more prevalent among them [40].

This study showed that cigarettes and hookah using increase the risk of infection and hospitalization, consistent with those of previous studies [39-44]. Further analysis of smoking pattern information in tobacco users showed that the higher the daily consumption of cigarettes and hookah, the more likely they are to be hospitalized with corona disease. In fact, the positive history of tobacco use and the frequency of its use both have an increasing effect on the likelihood of exacerbation of disease symptoms. It has been proved that structural changes include bronchiolar inflammation and fibrosis, increased mucosal permeability, impairment of mucociliary clearance, changes in pathogen adherence, and disruption of the respiratory epithelium [45]. These changes may alter both susceptibility to infection and the course of an infection and compromise the ability to mount appropriate immune and inflammatory responses [46-48]. Meliska and Hersey reported that natural killer cell cytotoxic activity increased in smokers who quit smoking compared to current smokers. This could explain why current smokers have a higher risk than never- or ex-smokers [49-50].

Increased age was the other factor which showed significant role in acquiring disease and being hospitalized. In a one meta-analyzed research including 40 articles it was proved that age is the most important determinant for severity of disease [43]. Due to a lack of in-depth research on the effects of regular exercise and physical activity on Acute respiratory distress syndrome (ARDS), it sounds that we have found a novel finding regarding the relationship between exercise and the risk of being infected and hospitalized caused by covid-19. On the other hand, it was shown that if a person is very physically active due to a hard job, he/she is more likely to get infection (OR=2.98[2.01-4.6]) . This finding could indicate that having hard physical jobs increases the risk of acquisition of infection due to the bigger possibility of unprotected high-risk contacts and perhaps the reluctance of employees to use the mask for its cumbersome nature. However in the continuation of the study we found that having any physical activity, whether in the form of job-related physical activity or regular exercise, can reduce the likelihood of disease progression and hospitalization. In other words, although people with physical occupations are more prone to infection, they are less likely to be hospitalized than others if they acquire infection (OR=-3.1[-2.81,-4.0] for very hard jobs and OR= -2.3(1.21,4.09) foe regular exercise) . Physiologists have reported the beneficial effects of physical activity on H1N1 infection or other upper respiratory tract infection (URTI), which was attributed to the proper immunological effects of exercise. It has been suggested that exercise was associated with a lesser decline in circulating T-cell function with viral clearance, specific antibody production, and neuroendocrine changes in the immune system [51-55]. So that, However, In a study carried down on H1N1 acquisition and its risk factors, physical activity failed to show a significant effect on disease in multivariate analysis [54].

The other finding of this study was the Importance of unhealthy diet factor in the probability of acquiring disease and also being hospitalized. Unhealthy diet was defined as a diet with excess sugar, fat, salt, fast foods and insufficiency of cereals, fruits and vegetables, milk, meat products. In few previous studies, it was suggested that consuming some kinds of Micronutrients such as vitamins (especially vitamin D), affect the susceptibility to flu-infection due to control the macrophage reaction by decreasing the amount of inflammatory cytokines and

chemokines they also found that Vitamin C deficiency increases the lung pathology of flu-infection. One randomized controlled trial showed that vitamin supplementation showed a lower rate of self-reported common cold and influenza symptoms. [56-58]. It should be considered that most unhealthy diets lack the minerals and vitamins the body needs. Moreover, the Unhealthy diet, as is defined in this study, has not been yet considered in the covid-19 articles but, proving a significant association between low socioeconomic status and Covid-19 disease in some of them could indirectly explain the reason for the higher consumption of unhealthy food in patient group. On the other hand, since poor quality food is often bought from unhygienic restaurants, the probability of transmitting the virus among these unhealthy food consumers rises.

In this study, it was also realized that high BMI is a risk factor for disease progression and hospitalization. This result is consistent with the results for Covid-19 in a study was done by Simonnet et al that showed that BMI>25 impaired ventilation of the base of the lungs and immune response to the disease (1.69 [0.52-5.48]) [59]. However, in one of the few Covid-19-studies that had been done in this regard, this finding is not supported it is necessary to mention that in 2009, extreme obesity (BMI >40 kg/m2) was established to be independently related with death due to the H1N1 [60]. It should be noted that three factors including excess BMI, inactivity, and poor diet, often exist in a person at the same time, and could be exceed the severity of the disease in a covid-19 patient.

The harmful role of emotional/physical shock experience in a year ago and lack of regular sleep patterns in being hospitalized was the other surprising finding in this study. It was also estimated that the improper impact of stress and emotional pressure on the probability of being infected is significant [58, 59]. Earlier, it was found that psychological pressures, including stress and mood, could influence participants' antibody response to Flu, especially in older adults [63-64]. This finding can be used as a determining criterion to early detecting of covid-19 infection in high-risk groups, especially among the elderly.

Underlying comorbidities have been shown as a powerful factor which could increase the risk of being infected and hospitalized (OR=3.1[2.039, 4.061]). A previous study also has found that the prevalence of comorbidities is more in transferred groups in comparison to cured patients. Having at least on comorbidity disease like hypertension, diabetes, dyslipidemia, cancer, chronic lung disease and cardiovascular disease was higher present in hospitalized group in our study which Indicates that the recovery process in this group of patients may be associated with serious problems [65].

The last finding that needs to be considered is the effect of taking over-the-counter (non-prescribed) medications on the likelihood of acquiring infection. Continued analysis showed that increasing the weekly use of non-prescribed drugs increases the likelihood of the patient's condition worsening and becoming hospitalized. It seems that medications without any professional supervision can reduce the early symptoms of the disease, which if these symptoms appeared and checked in time, might increase the likelihood of identifying and preventing the progression of the disease.

The present study has several limitations. First, the number of cases enrolled was small due to it carried down as a one-centered project in a relative small province. However, we tried to make up for this shortcoming by increasing the accuracy of data collection process, the use of relatively acceptable statistical tests, and the repeated review of the analysis and interpretation of findings. One of the unexpected cases in this study was the low prevalence of opium and alcohol consumption in patients, which made researchers unable to conclude about the possible effects of these two substances on the disease. Although the use of alcohol and opium in Iran is not religiously and legally permissible, but the very low prevalence of their consumption in the study population indicates the reluctance of individuals to express the use of these two substances.

Another shortcoming of the study was the great number of participants with a history of seasonal influenza vaccine fears, which eliminated the possibility of investigating the possible effect of vaccine injection on the onset or progression of the disease. However, a study on a small number people has shown that a Flu shot might decrease Coronavirus infections and the progression of the disease to an adverse stage [66]. So it would be possible to test this hypothesis in the continuation of the project with a with more detailed background information in a larger participants.

Suggestions

The prevalence of coronary heart disease in the world has shown that humans are always exposed to diseases for which there is no specific treatment or vaccine. Evidence of a link between changeable personal characteristics and the likelihood of developing and exacerbating the disease suggests that humans should pay attention to promoting and maintaining their physical and mental health as a barrier resistant to unknown diseases. Evidence of a link between changeable personal characteristics and the likelihood of developing and exacerbating the disease suggests that humans should pay attention to promoting and maintaining their physical and mental health as a barrier resistant to unknown diseases. It seems that if these findings are proven in similar studies, health policy makers should seriously focus on identifying the factors contributing to the disease as an opportunity to prevent life and financial problems caused by future pandemics. Thus, creating and promoting disease prevention opportunities should be one of the main pillars of strategic health planning of different communities.

Declaration of Competing Interest
The authors reported no conflicts of interest in this work.

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Ethical declarations
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