

Title: Treatment seeking behavior for COVID-19 symptoms and its related factors among northern Iranian population: a cross-sectional study

Running Title: Treatment seeking behavior COVID-19 symptoms

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Abstract:

Objective: This study was conducted to investigate the treatment seeking behavior for COVID-19 symptoms among northern Iranian population and its related factors.

Materials and Methods: This hospital-based cross-sectional study was conducted to investigate the treatment seeking behavior for COVID-19 symptoms and its related factors in 602 confirmed COVID-19 cases for a period of 2 months between March and May 2020 in Guilan at the onset of the corona epidemic in Iran.

Results: Professional treatment-seeking was observed in 18.6% of patients and most of patient reported home remedies (50.3%) and self-medication (31.1%) as first reaction to COVID-19 symptoms. The multivariate logistic regression analyses revealed that patients with breathing difficulties symptom and history of respiratory disease had greater odds professional treatment of seeking respectively (adjusted odds ratio (OR) =1.6, P=0.03, (OR) =3.3, P =0.001).

Conclusion: Roughly half of symptomatic COVID-19 patient reported home remedies as first treatment-seeking behaviors and only breathing difficulties symptom and past history of respiratory disease were identified as an independent predictor of professional treatment-seeking. However, we found no more professional treatment -seeking behaviors among elderly, diabetic, hypertensive and obese patients, while there were at risk of severe illness and death from COVID-19 infections. Thus, behavior change interventions in population with underling

disease (including diabetes, hypertension and obesity) and older age is crucial to improve professional treatment -seeking behaviors.

Keywords: Treatment, Seeking Behavior, COVID-19

Introduction

In December 2019, a new virus called corona virus disease 2019 (COVID-19), as an acute respiratory syndrome disease, emerged in Wuhan, Hubei Province, China [1]. The corona virus 2019 spread rapidly to other countries, despite China's extensive efforts to control it and in 2 months infected 25 countries worldwide [2] and on March 11, 2020, WHO declared the Global Pandemic of corona virus as a public health emergency of international concern [3]. As of July 16, 2020, there are roughly 13.700.000 COVID-19 cases and 586.000 deaths worldwide [3].

Following its global outbreak, on February 19, Iranian officials announced the outbreak of corona virus 2019 in the country and Qom and Guilan (Northern provinces of Iran) was the first provinces infected [4]. The virus spread rapidly in Iran and by March 5, 2020, all 31 provinces were infected through person to person transmission. The total number of confirmed cases by July 16 was 264561, with 13410 deaths and 227561 recoveries reported in Iran [3].

Average of incubation period of this virus varies between 5-7 days, so the suspected contacts are recommended to quarantine for 14 days [5]. The most common clinical manifestation at the disease onset includes sore throat, fever, myalgia and cough [6]. Severe illness occurs in about 15% of patients, leading to hospitalization [7].

According to the CDC recommendation, home management may be appropriate for patients who have a mild infection or who can be treated outpatient and isolated in appropriate conditions⁸. The management of such patients should focus on preventing the virus transmission and monitoring the clinical condition to hospitalize immediately if needed [8].

Despite extreme precautions to seek medical attention in case of cough, fever and difficulty breathing, in many cases people with symptoms avoid contacting health care provider. A recent Gallup study shows that in the United States, 14% of adults do not seek treatment for corona virus for themselves or a household member [9]. There have also been frequent reports of patient avoiding professional medical care in low- and middle-income countries [10]. About two-thirds of corona victims in Russia first decided to self-care and then found themselves in critical condition in hospitals [11].

Early detection of individual suspected to COVID-19 and contact tracing is necessary for infection control [12]. Identifying and limiting obstacles to appropriate treatment seeking for symptomatic patient improves disease management and control [13].

Availability of health care providers, perceived susceptibility and severity of disease, social and demographic characteristics of individuals may be affected treatment-seeking behaviors [14].

Since the patients' treatment-seeking behavior can change in different cultures and time periods [15], and considering the importance of the early detection of individual suspected to COVID-

19, Therefore, this study was conducted to investigate the treatment seeking behavior of suspected to COVID-19 infections among northern Iranian population and its related factors.

Method and Materials

Study design:

This hospital-based cross-sectional study was conducted for a period of 2 months between March and May 2020 in Guilan (Northern provinces of Iran) at the onset of the corona epidemic in Iran. The Ethics Committee of Guilan University of Medical Sciences, Rasht, Iran approved the study protocol (Ethics Code: IR.GUMS.REC.1399.005) the study protocol. Written informed consent was obtained from every participating respondent.

Study participants were selected by a convenient sampling method from the only referral hospital in the province. The sample size was estimated to be 606 participants, based on the main outcome, namely, treatment seeking behavior and the number of related factors, with confidence level of 95% and test power of 80%. The inclusion criteria were patients who were hospitalized with a confirmed COVID-19 diagnosis. Confirmed case of COVID-19 was defined as positive real-time fluorescent quantitative polymerase chain reaction (RT-PCR) and/or chest CT manifestations including sub pleural ground glass shadows, with or without pulmonary interstitial thickening [16]. If the participant's skipping a question led to missing data, they were excluded from study.

Data collection:

In this study, relevant information was collected in five areas. Section 1 collected data on sociodemographic characteristics of patient, including age, education, gender, occupation, residency, marital status and health insurance. Section 2 collected data on symptom of COVID-19 infection including fever, cough, sore throat, breathing difficulties, coryza, weakness,

muscular pain, confusion, headache, Chest pain, Diarrhea, Nausea and vomiting, Anorexia, Anosmia and Chills. Section 3 collected data on past medical history including diabetes mellitus, hypertension, Respiratory diseases and obesity (Body mass index \geq 30). Section 4 collected data on self-reported first action with onset of COVID-19 symptoms as treatment seeking behavior. Treatment-seeking was classified as following: a) seeking care from professionals including all private or public hospitals, health centers or private doctors. b) Self-medication. c) Traditional care or home remedy.

Data analyses:

Data analyses were performed by SPSS version 17.0 software (SPSS Inc., Chicago, IL, USA). Frequency distribution of the first treatment-seeking behaviors according to characteristics of patient, symptoms of patients and past medical history were compared with chi-square test. Univariate and multivariate logistic regression analysis were performed to identify significant predictors of professional treatment-seeking. Factors with a p value <0.05 on a univariate model were entered into a multivariate logistic regression model. Unadjusted and adjusted odds ratios (ORs) and 95% confidence intervals (CIs) were calculated.

Result

Characteristics of patient:

Of the total 602 subjects who participated in the study (two patients excluded due to incomplete data), 54.7% were men. The age of patient ranged from 19 to 99 years old, with an average age of 54.6 ± 13.9 years. Half of patients (50%) were between the ages of 46–64. The majority of the patients were urban residents (80.0%), were married (82.1%), had diploma or less level of education (72.9%), covered by health insurance (85.9%), and 43.3% of them were employed (Table 1).

One-third of patients had positive family history of corona infection and past history of diabetes, hypertension, respiratory disease and obesity was reported in 19.3%, 9.6%, 6.1% and 31.6% of patient respectively (Table 1).

The most prevalent symptoms of COVID-19 in the study population were anosmia (98.3%) and fever (70.1%) (Table 2).

Treatment-seeking behaviors:

Regarding the first reaction to COVID-19 symptoms, only 18.6% of patients self-report professional treatment- seeking and most of patient reported home remedies (50.3%) as first treatment-seeking behaviors (Table 1). Type of self-medication and home remedies presented in figure 1 and 2, respectively.

The first treatment-seeking behaviors of patients to COVID-19 symptoms according to characteristics of study population are shown in Table 1. Home remedies were significantly ($P=0.021$) more common in less educated patient (53.5%) than more educated (41.7%). Also, older patient (≥ 60 years) were significantly ($P =0.004$) more likely to seek home remedies behaviors (59.1%) than younger ones (45.3%). Self-medication were significantly ($P =0.029$) more common in Patient with family history of corona infection (38.3%) than those with no history (27.2%). Professional treatment-seeking increased significantly ($P =0.002$) in patient with a history of respiratory disease (40.5%), than those with no history (17.2%).

As shown in Table 2, patient with symptom of breathing difficulties, headache, muscular pain, confusion, chest pain, diarrhea and sore throat) were significantly more likely to seek professional treatment.(All $P <0.05$).

Table 3 reveals the results univariate and multivariate logistic regression to explore the predictors of professional treatment -seeking. Only breathing difficulties symptom and past

history of respiratory disease were identified as an independent factors associated with professional treatment-seeking. Patient with breathing difficulties symptom had greater odds (Adjusted OR = 1.6, $P = 0.03$) of professional treatment seeking. Also, patient with history of respiratory disease had greater odds (Adjusted OR = 3.3, $P = 0.001$) of professional treatment seeking. There was no independent association of demographic factor and past history of diabetes, hypertension and obesity with professional treatment-seeking (Table 3).

Discussion

The study sought to determine the treatment seeking behaviors for COVID-19 symptoms and its related factors in northern Iranian population. In study demonstrate that roughly half of symptomatic patient reported home remedies as first treatment-seeking behaviors and only breathing difficulties symptom or past history of respiratory disease were identified as an independent factors associated with professional treatment –seeking. Although, the use of home remedies is common in patients experience flu-like symptoms such COVID-19, worldwide [17-19], but it can increase the risk of developing more severe symptoms specially in patient with comorbidities such as diabetes, hypertension, cancer and respiratory disease[20].Elderly, diabetics, hypertensive's and obese patients were at increased risk for severe illness and death from COVID-19 infections [21, 22]. National guidelines for diagnosis and treatment of COVID-19 recommended that early detection by RT-PCR and early therapy with Chloroquine may be beneficial in symptomatic high risk patient [23].

The results of current study revealed that the independent determinants of professional treatment-seeking were breathing difficulties symptom and past history of respiratory disease .It might be due to participant's awareness of importance and risk of respiratory involvement and take necessary precautionary measures. The mass media played a role in increase this knowledge and

attitude [10, 24]. However, we found no independent association of demographic factor and past history of diabetes, hypertension and obesity with professional treatment-seeking, while elderly and these underlying diseases were at risk of severe illness and death from COVID-19 infections [20]. Thus, sensitizing patients with underlying disease and older age to seeking professional treatment is crucial.

Although, patient with symptom of muscular pain, confusion, chest pain, diarrhea and sore throat were meaningfully more likely to seek professional treatment, but this association disappeared after fully adjustment for other medical and demographic factors. Since, the symptom screening has become a universal tool to limit further spread of COVID-19(25). Our results indicate that it is critical to raise population's awareness of initial and mild symptoms of COVID-19.

However, in this situation, without specific anti-viral drug regime for COVID-19(26), research on efficacy and limitation of home remedies and traditional therapies for COVID-19 might be an interesting issue that needs to be explored and communication of updated evidence to the public would help improve appropriate seeking treatment. This study has a limitation, due to the hospital based design and selection of more severe illness that limited generalizability of findings.

Conclusion

The results of current study indicated that roughly half of symptomatic COVID-19 patient reported home remedies as first treatment-seeking behaviors and only breathing difficulties symptom and past history of respiratory disease were identified as an independent predictor of professional treatment –seeking. However, we found no more professional treatment -seeking behaviors among elderly, diabetic, hypertensive and obese patients, while there were at risk of severe illness and death from COVID-19 infections. Thus, behavior change interventions in

population with underlying disease (including diabetes, hypertension and obesity) and older age is crucial to improve professional treatment-seeking behaviors.

Compliance with ethical guidelines

Participants were screened, provided informed consent, and completed a battery of self-report questionnaires in her preferred language (Persian) prior to intervention participation. The Institutional Review Board at Guilan University of Medical Sciences, Rasht, Iran approved all study procedures and assessments. (Ethics Code: IR.GUMS.REC.1399.005).

Availability of data and materials

Datasets used during the study are available from the corresponding author on reasonable request.

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Author contributions

FJ and MA and SM were involved in the study design and data analysis. DA and BZ data collection and contributed to data interpretation. SY literature searched. FJ, MA, FM-G AND MN wrote the initial draft of the manuscript, MN and MA and FA and FM-G contributed toward its final version. FJ generated of figures. All authors were involved in writing the paper and had final approval of the submitted and published versions

Conflict of interest

The authors declare that they have no competing of interest.

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Table1- The first Treatment-seeking behaviors of patients to COVID-19 symptoms according to characteristics of study population

	Professional treatment N=112	Self- medication N=187	Home remedy N=303	p- value*
total participants (n=602)	18.6%	31.1%	50.3%	
Gender				0.924
Male (n=329, 54.6%)	61(18.5%)	102(31%)	166(50.5%)	
Female (n=273, 45.4%)	51(18.7%)	85(31.1%)	137(50.2%)	
Age				0.004
<60 (n=382, 63.5%)	75(19.6%)	134(35.1%)	173(45.3%)	
≥60 (220, 36.5%)	37(16.8%)	53(24.1%)	130(59.1%)	
Residency				0.162
Rural (n=117,19.4%)	17(14.5%)	31(26.5%)	69(59%)	
Urban (n=485, 80.6%)	95(19.6%)	156(32.2%)	234(48.2%)	
Educational level				0.021
Diploma or less (n=439, 72.9%)	80(18.2%)	124(28.2%)	235(53.5%)	

More than diploma (n=163, 27.1%)	32(19.6%)	63(38.7%)	68(41.7%)	
Occupation				0.273
Unemployed (n=211, 56.7%)	35(16.6%)	65(30.8%)	111(52.6%)	
Employed (n=161, 43.3%)	35(21.7%)	54(33.5%)	72(44.7%)	
Marital status				0.286
Not married /Widowed /Divorced (n=108, 17.9%)	10(26.3%)	12(31.6%)	16(42.1%)	
Married (n=82.1%)	87(17.6%)	161(32.6%)	246(49.8%)	
Health insurance				0.584
No (n=85, 14.1%)	94(18.2%)	158(30.6%)	265(51.3%)	
Yes (n=517, 85.9%)	18(21.2%)	29(34.1%)	38(44.7%)	
Family history of corona infection				0.029
No (n=393, 65.2%)	76(19.3%)	107(27.2%)	210(53.4%)	
Yes (n=209, 34.8%)	36(17.2%)	80(38.3%)	93(44.5%)	
Past medical history				
Diabetes mellitus				0.082
No (n=486, 80.7%)	96(19.8%)	156(32.1%)	234(48.1%)	
Yes (n=116, 19.3%)	16(13.8%)	31(26.7%)	69(59.5%)	
Hypertension				
No (n=544, 90.4%)	104(19.1%)	166(30.5%)	274(50.4%)	0.534
Yes (n=58, 9.6%)	8(7.1%)	21(36.2%)	29(50%)	
Respiratory diseases				
No (n=565, 97(17.2%)	97(17.2%)	180(31.9%)	288(51%)	0.002

93.9%)					
Yes (n= 37,	15(40.5%)	7(18.9%)	15(40.5%)		
6.1%)					
Obesity					
No (n=407,	74(18.2%)	133(32.7%)	200(49.1%)	0.587	
68.4%)					
Yes (n=188,	37(19.7%)	53(28.2%)	98(52.1%)		
31.6%)					
Data are expressed as number (percentages).					
* Statistical significance based on the Chi-square or Fisher's Exact test					

Table 2. The frequencies and percentages of COVID-19 symptoms in the study population by first Treatment-seeking behaviors

symptom	Professional treatment N=112	Self-medication N=187	home remedy N=303	Total N=602	p-value*
Breathing difficulties	78(69.6%)	98(52.4%)	141(46.5%)	317(52.7%)	0.001
fever	80(71.4%)	133(71.1%)	209(69%)	422(70.1%)	0.871
Cough	65(58%)	106(56.7%)	164(54.1%)	335(55.6%)	0.737
Sore throat	22(19.6%)	31(16.6%)	26(8.6%)	79(13.1%)	0.003
Coryza	9(8.1%)	18(9.6%)	19(6.3%)	46(7.6%)	0.819
Muscular pain	59(52.7%)	78(41.7%)	105(34.7%)	242(40.2%)	0.003
Confusion	40(35.7%)	46(24.6%)	51(16.8%)	137(22.8%)	0.001
Headache	38(33.9%)	62(33.2%)	64(21.1%)	164(27.2%)	0.003
Chest pain	42(37.5%)	54(28.9%)	57(18.8%)	153(25.4%)	0.001
Diarrhea	31(27.7%)	35(18.7%)	44(14.5%)	110(18.3%)	0.009
Weakness	8(7.1%)	12(6.4%)	35(11.6%)	55(9.1%)	0.164

Nausea and vomiting	10(8.9%)	17(9%)	22(7.2%)	49(8.1%)	0.297
Anorexia	2(1.8%)	11(5.9%)	15(5%)	28(4.7%)	0.283
Anosmia	110(98.2%)	182(97.3%)	300(99%)	592(98.3%)	0.329
Chills	20(17.8%)	31(16.6%)	60(19.8%)	111(18.4%)	0.174

Data are expressed as number (percentages).

*** Statistical significance based on the Chi-square or Fisher's Exact test**

Table 3. Univariate and Multivariate logistic regression analysis for predictors of professional treatment-seeking for COVID-19 symptoms

Variables	Professional treatment						
	Unadjusted			Adjusted*			
	OR	(95% CI)	p-value	OR	(95% CI)	p-value	
Demographic factors							
Age (year)							
<60(ref)	1						
≥60	0.83	0.59-1.27	0.335	-	-	-	
Educational level							
Diploma and less(ref)	1						
More than diploma	1.07	0.64-1.71	0.681	-	-	-	

Gender						
Male (ref)	1					
Female	0.99	0.65- 1.49	0.965	-	-	-
Residency						
Rural (ref)	1					
Urban	1.43	0.81- 2.51	0.209	-	-	-
Occupation						
Unemployed (ref)	1					
Employed	1.39	0.82- 2.35	0.219	-	-	-
Marital status						
Not married /Widowed /Divorced (ref)	1			-	-	-
Married	0.71	0.42- 1.17	0.182	-	-	-
Health insurance						
No (ref)	1					
Yes	1.20	0.68- 2.13	0.511	-	-	-
Family history of corona infection						
no(ref)						
yes	0.89	0.51- 1.37	0.564	-	-	-
Symptoms						
Breathing difficulties						
no(ref)						
yes	2.47	1.59- 3.71	0.001	1.64	1.02- 2.71	0.035

Sore throat						
No(ref)						
yes	1.85	1.08- 3.18	0.025	0.94	0.41- 1.89	0.862
Chest pain						
No(ref)						
yes	2.06	1.35- 3.18	0.001	1.27	0.71- 2.18	0.481
Muscular pain						
No(ref)						
yes	1.84	1.21- 2.86	0.003	1.23	0.78- 2.02	0.401
Confusion						
No(ref)						
yes	2.21	1.48- 3.52	0.001	1.48	0.73- 2.41	0.261
headache						
No(ref)						
yes	1.49	0.91- 2.37	0.079	-	-	-
Diarrhea						
No(ref)						
yes	1.91	1.24- 3.26	0.005	1.41	0.89- 2.52	0.141
fever						
No(ref)						
yes	1.08	0.68- 1.70	0.734	-	-	-
Cough						
No(ref)						
yes	1.12	0.74- 1.70	0.573	-	-	-

				1.70			
Weakness							
	No(ref)	1					
	yes	0.72	0.33-	0.419	-	-	-
			1.58				
Nausea and vomiting							
	No(ref)	1					
	yes	1.44	0.66-	0.358	-	-	-
			3.14				
Anorexia							
	No(ref)	1					
	yes	0.32	0.07-	0.129	-	-	-
			1.38				
Anosmia							
	No(ref)	1					
	yes	0.91	0.19-	0.909	-	-	-
			4.3				
Chills							
	No(ref)	1					
	yes	0.35	0.12-	0.178	-	-	-
			1.1				
Coryza							
	No(ref)	1					
	yes	1.48	0.78-	0.284	-	-	-
			4.29				
Underlying disease							
Respiratory diseases							
	No(ref)						
	yes	3.2	1.6-6.5	0.001	3.316	1.63-	0.001
						6.91	
Diabetes mellitus							

No (ref)	1						
Yes	0.65	0.36-	0.141	-	-	-	
		1.15					

Hypertension							
No (ref)	1						
Yes	0.67	0.31-	0.325	-	-	-	
		1.47					

Obesity							
No (ref)	1						
Yes	1.10	0.71-	0.663	-	-	-	
		1.71					

CI = confidence interval, OR= Odds Ratio
***Adjusted for all variables that were significant in univariate analyses.**

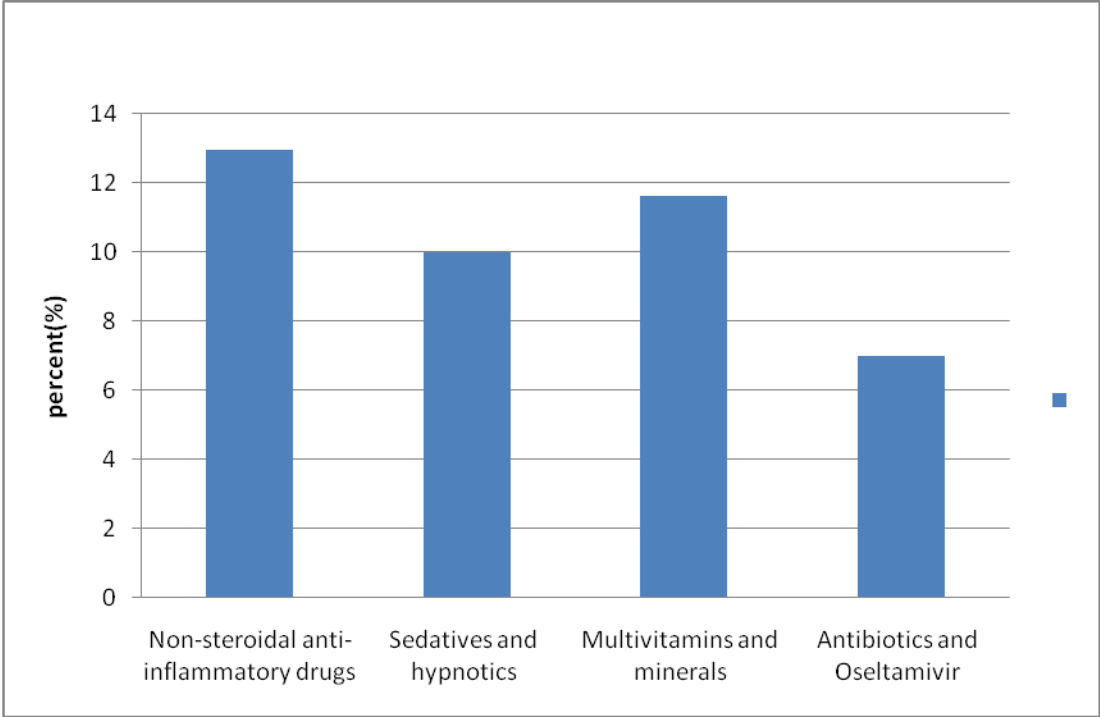


Figure1: Type of self-mediations in patients with COVID-19 symptoms

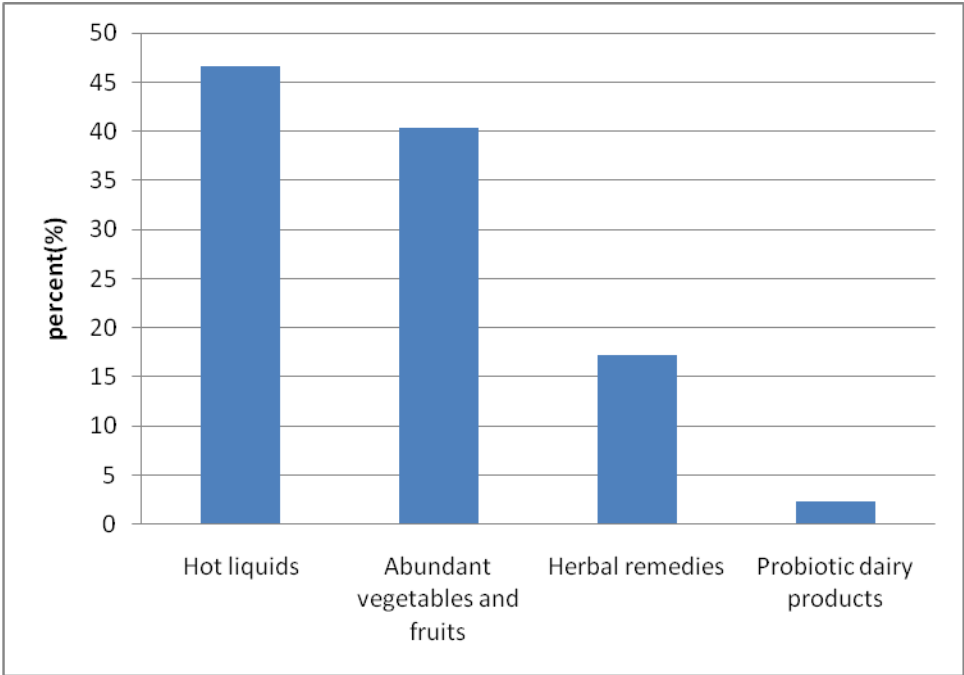


Figure2: Type of home remedies in patients with COVID-19 symptoms