Health-Promoting Lifestyle and Intention to Use Herbal Medicine in COVID-19 Pandemic: A Case Study of Rural Women in Zanjan Province

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ABSTRACT

This study aimed to determine the influences of a health-promoting lifestyle of rural women during the COVID-19 pandemic on the intention to use herbal medicine and to investigate the moderating effects of Corona anxiety on the model. The present research is a cross-section survey conducted using a questionnaire with confirmed validity and reliability. Rural women of Zanjan Province comprised the study population. Multi-stage sampling was performed, and the sample size was calculated as 272 using Cochran's formula. Data were collected between March and May 2020 during the Covid-19 pandemic. The results revealed that the lifestyle of rural women was moderately health-oriented. The results of the hypothesized structural model showed that dimensions of a health-promoting lifestyle explained 68% of the variability in intention to use herbal medicine. The drivers of intention to use herbal medicine for rural women in order of influence were health responsibility, nutrition, self-actualization, and stress management. The findings on the moderating role of Corona anxiety on the conceptual model of the study revealed that Corona anxiety significantly moderates the path relations of health responsibility and interpersonal relationships with intention to use herbal medicine. This study is significant in determining how Covid-19 infection can increase attention to certain aspects of a healthy lifestyle and intention to use herbal medicines. Furthermore, by looking at the underlying variables correlated to the intention to use herbal medicines, the results of this study could be beneficial in explaining appropriate educational interventions for rural women.

Keywords: Health responsibility, Interpersonal relationships, Physical activity, Self-actualization, Stress management.

INTRODUCTION

Outbreaks of Covid-19 worldwide, with high morbidity and mortality, have led to severe restrictions and quarantine practices. In addition to the direct impact of Covid-19, the limitations used to control its prevalence have created unprecedented public health problems (Barmania and Reiss, 2021) that have paved the way for anxiety and lifestyle changes (Mattioli and Ballerini Puviani, 2020). Although an understanding of Covid-19 and drugs effective against it is crucial, a more comprehensive approach requires examining health-oriented behaviors, like

lifestyle, and considering social and cultural conditions (Van den Broucke, 2020). To provide reliable health interventions, one of the most important factors is working on the specific groups who may be disproportionately affected (Hardan-Khalil, 2020; Pan *et al.*, 2020). Health professionals have mostly studied the health-promoting lifestyle as it relates to people with specific illnesses, like hypertension (Huang *et al.*, 2021), or women as a vulnerable group (Ahmadi *et al.*, 2020), such as Arab-American women (Hardan-Khalil, 2020) and urban black women (Hepburn *et al.*, 2021). One group that needs special attention is

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rural women who, in addition to raising the next generation and being wives, play an active role in agriculture (Alireznejhad, 2018). The lifestyle chosen by the rural woman, in addition to affecting the health of the next generation of the country's producers, also affects the production sector, which guarantees food security. Therefore, the present study has focused on rural women as the target population to determine the components of the health-promoting lifestyle, some of its determinants, and its influence on the intention to use herbal medicine during the Corona outbreak to suggest necessary educational interventions.

The Corona pandemic has been a wake-up call to recognize the need for a healthy lifestyle and the pursuit of healthy self-care practices in populations (Uysal and Argın, 2021). In other words, perceived threat significantly affects protective behavior (Karami and Ahmadi, 2022). Unhealthy behaviors contribute noticeably to the epidemic prevalence (Chen *et al.*, 2019; Doraiswamy *et al.*, 2021), but a healthy lifestyle boosts protection from disease (Ahmadi *et al.*, 2020). Pender *et al.* (2011), developers of the health promotion model, defined health promotion behavior as "an expression of human actualizing tendency that is directed toward optimal wellbeing, personal fulfillment, and productive living". The health-promoting lifestyle can be described as a way of living that cues people to realize their maximum potential for health promotion (Chen *et al.*, 2019). A health-promoting lifestyle comprises six components: self-actualization, health responsibility, stress management, physical activity, nutrition, and interpersonal relationships (Alzahrani *et al.*, 2019). Several standards acknowledged worldwide for a healthy lifestyle include having more than five servings of fruits and vegetables per day, forswearing smoking and drinking, consuming less sugar, and controlling body weight. Furthermore, seven to eight hours of uninterrupted sleep per night, engaging in moderate-intensity exercise for about two and a half hours per week, and encouraging an

optimistic emotion are among the standards of stress management, physical activity, and self-actualization for a healthy lifestyle (Doraiswamy *et al.*, 2021). The ability to choose a health-oriented lifestyle is clearly the result of multiple factors that vary according to the characteristics of the population and the environment (Hepburn *et al.*, 2021). Studies have identified different variables that contribute to determining a health-promoting lifestyle, such as gender (Alzahrani *et al.*, 2019), age (Ahmadi *et al.*, 2020; Hardan-Khalil, 2020), level of education (Ahmadi *et al.*, 2020; Alzahrani *et al.*, 2019; Hardan-Khalil, 2020; Huang *et al.*, 2021), number of family members, mass media, social networks (Afshar Kohan and Sharafi, 2016), income (Ahmadi *et al.*, 2020; Alzahrani *et al.*, 2019), culture or religion (Hardan-Khalil, 2020), health self-efficacy (Hardan-Khalil, 2020; Hepburn *et al.*, 2021), social support (Hardan-Khalil, 2020), health beliefs (Chen *et al.*, 2019), and health literacy (Hepburn *et al.*, 2021).

The global epidemic of Covid-19 had many effects on people, and understanding the nature of these effects is vital. One of these effects is anxiety and stress (Hepburn *et al.*, 2021) associated with a health-promoting lifestyle (Hardan-Khalil, 2020). Psychologically, anxiety is the most fundamental feature of a critical and unpredictable situation such as the current state of society due to the Corona epidemic, with which there is no previous experience (Karami and Bayat, 2021). Anxiety can be examined in two main parts: mental and physical (Alipour *et al.*, 2020). Studies performed on the Corona conditions in Tehran, Iran, indicated that the anxiety resulting from Covid-19 negatively affected 77% of health changes (Alizadehfard and Saffarinia, 2020). Corona anxiety affects patients as well as healthy people in the community (Fischhoff, 2020). In societies with a lower level of education (perhaps like rural people), it has had a more severe negative impact on health behavior (Kim *et al.*, 2015). In such situations, people look for a solution to control their anxiety, such as

eating plant-based foods as a system booster (Sari *et al.*, 2021) or using herbal medicines for illness prevention or treatment (Alyami *et al.*, 2020; Nugraha *et al.*, 2020). In the world before Covid-19, almost two-thirds of the world's population used medicinal plants to treat or prevent illness and to maintain and improve their health (Hilal and Hilal, 2017; Oladeji, 2016). The pattern, rate, and reasons for this consumption differ in countries and even in cities and villages (Karami and Bayat, 2021). Consumption in developed countries is more related to believing in a healthier lifestyle using medicinal plants (Edwards *et al.*, 2012), and in developing countries, it is more related to cultural compatibility (Oladeji, 2016). In rural and nomadic communities where man is closer to nature, localism, limited public health infrastructures, availability of medicinal plants, and limited financial capacity for modern medical science have led to a greater tendency to use medicinal plants (Karami and Bayat, 2021). Medicinal plants as a product derived from nature became one of the most popular options in the world during the outbreak of Covid-19 (Alyami *et al.*, 2020), however, there are cases of abuse and misuse (Nugraha *et al.*, 2020). Various studies in the context of Covid-19 have investigated the effects of medicinal plants on increasing the body's immunity and preventing and controlling the Corona Virus (Islam *et al.*, 2021). Most studies have achieved positive results for medicinal plants, but more experiments are needed (Shi *et al.*, 2021). Among the limited studies that have examined the tendency of villagers to use medicinal plants in Iran before Covid-19 pandemic, cultural compatibility and lack of complete recovery with chemical medicine (Sojasi Qhidari and Azizi, 2019) were identified as the most important influential factors of intention to use medicinal plants. In Zanjan Province, Iran, there are 212 species of medicinal plants from 68 different plant genera, of which 49 species such as Compositae, Labiatae, and Rosaceae are known and used by the people (Mousavi, 2004). Fathi *et al.* (2021) announced the readiness in Zanjan Province

for the development of cultivation and consumption of medicinal plants and proposed related short-term courses to be held. Research conducted in rural areas of this province during the Covid-19 pandemic showed that the consumption of medicinal plants increased in part because of positive attitude, social adaptation, medical plants' characteristics and accessibility, indigenous knowledge, and the economic pressure and costs of travel to medical centers imposed on villagers. However, the limited level of respondents' knowledge about medicinal plants may cause misuse or abuse (Karami and Bayat, 2021). Therefore, a deeper identification of factors influencing the intention to use medical plants is required to enact effective strategies for the proper use of them in pandemic conditions, which is the main gap the current study aims to fill. The present study has built on the reviewed literature that indicated that a health-promoting lifestyle is the main factor in preventing conditions (Hepburn *et al.*, 2021) associated with anxiety (Hardan-Khalil, 2020). Thus, we explored the association between a health-promoting lifestyle and the intention to use medicinal plants, and the moderating effect of Corona anxiety on this model (as shown in Figure 1) among rural women who influence the health of the next generation of the country's producers and the production sector, which altogether affect food security. Furthermore, as previous research discussed Covid-19 as having paved the way for lifestyle changes (Mattioli and Ballerini Puviani, 2020), the present study contributes to the body of knowledge by comparing adherence to health-promoting lifestyle dimensions among rural women infected with Covid-19 and women who have not experienced the disease and investigating its correlation with some contextual variables.

MATERIALS AND METHODS

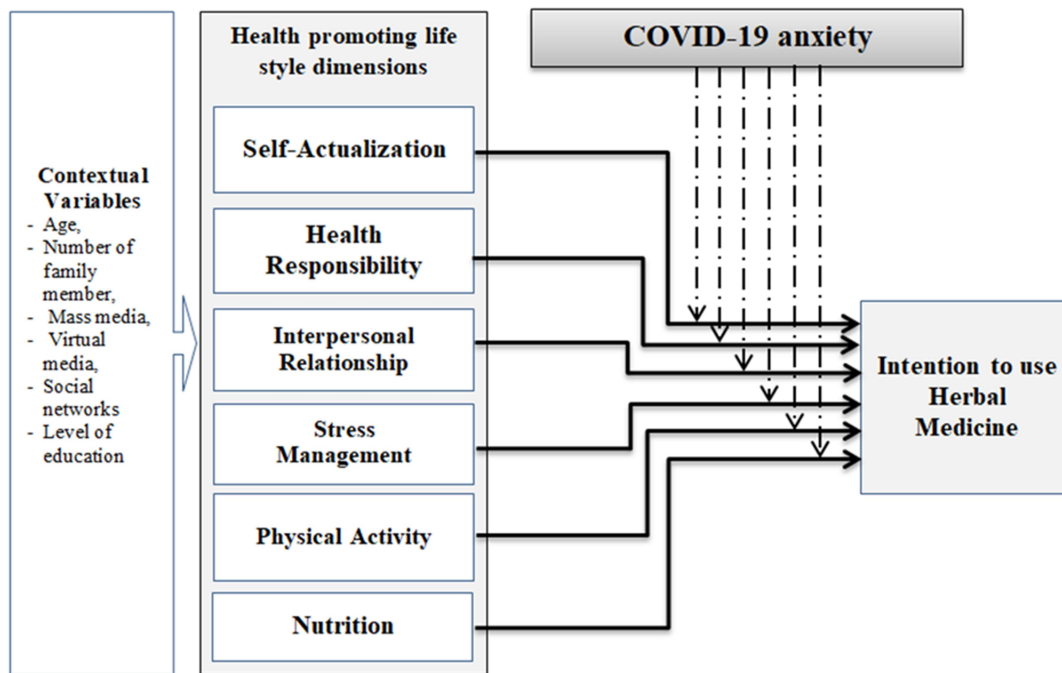The present research was an applied research using a cross-section survey.

Figure 1. Theoretical research framework.

Population and Sampling

The study population consisted of rural women and girls aged 15 years and older living in rural areas of Zanjan Province. Sampling was performed using the multi-stage sampling method, which is suitable where the population is vast and researching every individual is impossible. This province has eight counties. In the first stage of the sampling, the two counties of Zanjan and Tarom were randomly selected. Out of the total population of 346,283 people living in rural areas of the province, 43,559 women lived in rural areas of Zanjan County and 17,991 in Tarom County. Therefore, in the second stage of sampling, the villages were proportionally and randomly selected from Zanjan and Tarom Counties. Four villages from Zanjan (Yamchi, Nikpi, Yingijeh, Qarabolago) and two villages from Tarom (Harunabad and Hezar Roud) were selected. Respondents were selected in the third stage of this study; 71% of respondents were from the four selected villages of Zanjan County,

and 29% were from the two selected villages of Tarom. The number of samples was calculated as 272 respondents using Cochran's formula.

Research Instruments

Data were collected using a questionnaire, the face and content validity of which was confirmed by the subject matter experts. The reliability of the scales was assessed based on the data of a pilot test and confirmed using Cronbach's alpha as reported in the measurement model testing section. The questionnaire included demographic information consisting of age, level of education, marital status, number of family members, mass media usage (including radio and television), virtual media usage, social network communications, and Covid-19 infection. Among the three remaining sections, the first one comprised questions regarding the intention to use herbal medicine and measured using a 5-point Likert scale from very low (1) to very high (5). The intention to use herbal medicine was studied in terms of preference

and plan to use to prevent and/or treat Covid-19, and even suggested its use to others using seven items based on the reviewed literature (Hilal and Hilal, 2017; Oladeji, 2016).

The second section consisted of questions scored on a 5-point Likert scale that evaluated a health-promoting lifestyle. The health-promoting lifestyle was evaluated by adopting a native instrument (that considered cultural sensitivities and clarity of the questions) which was developed by (Mohammadi Zeidi *et al.*, 2012). The questions examined the following six dimensions:

1) Self-actualization is having a sense of purposefulness, seeking personal advancement, and experiencing self-awareness and satisfaction; measured by 10 items.

2) Health responsibility, often understood as attitude toward carrying out and behaviors performed to care for oneself; measured by 8 questions.

3) Interpersonal relationships and supports, reflecting the individual's position in establishing and maintaining relationships that provide social support and intimacy; examined in 8 items.

4) Stress management, identifying sources of stress and taking actions that help manage stress; investigated by 4 items.

5) Physical activity related to having a regular schedule for exercise; measured by 3 items.

6) Nutrition, associated with healthy eating habits such as daily consumption of vegetables and fruits and avoiding excessive consumption of sugar; assessed by 6 items.

The third section was Corona anxiety, which refers to a feeling of worry, nervousness, or unease about Corona that has an uncertain outcome. This was measured by physical (9 items) and psychological (9 items) dimensions. Each item of the scale was rated with a 4-point type response, the point descriptors being never (0), sometimes (1), most of the time (2), and always (3). This scale was developed in the early days of the Covid-19 pandemic by Iranian researchers (Alipour *et al.*, 2020) based on the characteristics of Iranian society. This instrument was also used in later studies, and its reliability has been confirmed (Alizadehfard and Saffarinia, 2020).

Data Collection

Data were collected in March and May of 2020. First, the purpose of the study was explained to the target community and verbal informed consent to participate was obtained. The Covid-19 pandemic was one of the limitations in data collection. To overcome this limitation, and considering the percentage of illiteracy in rural communities, the study questionnaire was completed through telephone interviews with illiterate people and self-completion for literate people. However, many of the rural women and girls had no contact number registered with the provincial or county authorities. Therefore, the villagers' homes were visited in person by the researcher and, while observing social distance, the two data collection approaches, i.e. telephone interview and self-completion questionnaire, were explained. Based on the residents' preferences, respondents either received a questionnaire to complete or gave their contact numbers for a telephone interview.

Data Analysis

Data were analyzed using SPSS24 and AMOS24 software and described using percentages and means. As the data showed a normal distribution based on the skewness (-.836 to .143) and kurtosis (-0.867 to 0.368) criteria within the range of ±1 according to Schumacker and Lomax (2004), the inferential statistics used in this study were the correlation test, Confirmatory Factor Analysis (CFA), structural model test, and multi-group moderating test.

RESULTS

A total of 272 rural women and girls participated in this study of which 65 were

singles and 178 persons were married. Respondents' mean age was 36, with a range of 15 to 83 years. The participants' education levels varied i.e. 15.1% were illiterate, near half (46.4%) were literate and had under high school diploma degree, 22.7% were high school graduates, and 15.8% had university education.

To investigate the correlation of contextual variables that had normal distribution and their measurement scale were interval and ratio, with health-promoting lifestyle, the Pearson correlation was used. The conducted correlation test for the level of education with an ordinal measurement scale was Spearman's rho. The results in Table 1 demonstrated that correlated variables with a health-promoting lifestyle included mass media (r= 0.511), social networks (r= 0.225), and level of education (0.343), while we could not find a significant correlation between age, the number of family members, and virtual media with health-promoting lifestyle.

The results in Table 2 demonstrate that from 272 rural women, 128 were infected by covid-19. An independent-samples t-test conducted to test the difference in dimensions of health-promoting lifestyle between infected and non-infected rural women. As depicted in Table 2, there was a significant difference in self-actualization, t (270)= 2.041, P= 0.042 so that the Mean score of infected women (M= 2.99) for self-actualization was slightly higher than the mean for non-infected women. Further, there was a significant difference in health responsibility, t (270)= 2.035, P= 0.043, in which infected women (M= 2.99) showed a higher health responsibility than non-infected women. The results fail to support the conclusion that covid-19 infection could provide differences in term of interpersonal relationships, stress management, physical activity, and nutrition.

Measurement Model Testing

The Confirmatory Factor Analysis (CFA) result indicated a relative good fit between the data and the proposed model (Table 3).

The CFI, IFI, and TLI with values more than 0.90 and the RMSEA (0.047), which was less than the recommended value of .08, significantly showed satisfactory model fit (Hair *et al.*, 2010; Ho, 2006). The results of assessed convergent validity showed that all the items standardized factor loading in the CFA model, except for eight items, exceed the recommended value of 0.5 (Table 3). Moreover, the Average Variance Extracted (AVE) and Composite Reliability (CR) values for the entire constructs exceeded the minimum criterion of 0.5 and 0.7 respectively, ensuring satisfactory internal consistency among measured items (Table 3). Discriminant validity among the constructs was supported since the AVE value for each construct was higher than those of Maximum Shared Variance (MSV) and Average Shared Variance (ASV) in the measurement model (Table 4).

The results of correlation estimates among constructs in CFA indicated that all of the correlation estimates were significantly different from zero at the 0.001 level (Table 4).

Structural Model Testing

The estimated structural model based on the set of statistical goodness of fit indices provided a satisfactory fit to data (Figure 2). According to the hypothesized structural model, exogenous variables explained 68% of intention to use herbal medicine. Moreover, the result demonstrated that self-actualization (β= 0.183, CR= 2.960, P= 0.003), health responsibility (β= 0.346, CR = 4.722, P= 0.000), stress management (β= 0.113, CR = 2.070, P= 0.038), and nutrition (β= 0.278, CR= 3.499, P= 0.000) had a positive significant impact on respondent's intention to use herbal medicine (Figure 1). However, the interpersonal relationship (β= 0.044, CR= 0.634, P= 0.526) and physical activity effect on intention to use herbal medicine of respondents were not statistically significant (β= 0.021, CR= 0.4280, P= 0.668) (Figure 2).

Table 1. The correlation results of health-promoting lifestyle.

Variable	*r*
Age	-0.056
The number of family members	0.102
Mass media (Radio and TV)	0.511**
Virtual media	-0.036
Social Networks	0.225**
Level of education	0.343**

Correlation significance: ** P< 0.01.

Table 2. The results of the comparison health-promoting lifestyle dimensions based on COVID-19 infection.

Health Promoting Lifestyle dimensions	COVID-19 Infection	N	Mean	t	df	Sig
Self-Actualization	Yes	128	2.99	2.041	270	0.042
	No	144	2.79			
Health Responsibility	Yes	128	3.38	2.035	270	0.043
	No	144	3.19			
Interpersonal Relationship	Yes	128	3.19	0.256	270	0.798
	No	144	3.17			
Stress Management	Yes	128	3.49	1.204	270	0.229
	No	144	3.37			
Physical Activity	Yes	128	2.33	-0.773	270	0.440
	No	144	2.24			
Nutrition	Yes	128	2.79	0.917	270	0.360
	No	144	2.87			

Moderator Effects of COVID-19 Anxiety

To investigate the COVID-19 anxiety moderator effect via a Multi-group modeling test, first, we implemented separate but identical path models for the low (Figure 3-A) and high (Figure 3-B) COVID-19 anxiety samples. Then, we set up an invariant model (in which the relation path for respondents with low or high COVID-19 anxiety hypothesized to share the same regression weights) and a variant model (in which the relation path for respondents with low or high COVID-19 anxiety hypothesized to have different regression weights) that can be directly compared as to their model-fit. Lastly, the Critical Ratio criterion was used to assess the differences in the regression weights (Ho, 2006).

The results showed that the baseline comparison fit indices (Including: IFI, TLI, and CFI) for variant models yielded better values in comparison with the invariant model (Table 5). The result of nested model comparisons specified that the Chi-square difference value for the two models was 197.531, with 97 degrees of freedom. This value is significant at the .05 level (P= 0.000 then P< 0.05) (Table 5). Thus, hypothesized structural model for women with low or high COVID-19 anxiety does not share the same regression weights.

The hypothesized model based on moderator effects of COVID-19 anxiety explained 66% of the variance of intention to use herbal medicine for respondents with low COVID-19 anxiety (Figure 3.1), which is less than the explained variance for respondents with higher COVID-19 anxiety (70%) (Figure 3.2), as well as slightly higher than the explained variance for the main hypothesized structural model (62%) (Figure 2).

Table 3. First-order CFA result (Standardized factor loading).

Constructs	Measurement items	Standardized lodging* factor (t-value)	Validity and reliability statistics	Cronbach's Alpha
Self-Actualization (SA)	SA1	0.753(fixed)	AVE= 0.606 CR= 0.904	0.884
	SA2	Dropped		
	SA3	0.617 (10.272)		
	SA4	0.784 (13.423)		
	SA5	0.865 (15.046)		
	SA6	0.855 (14.836)		
	SA7	0.841 (14.564)		
	SA8	0.815 (14.041)		
	SA9	0.662 (11.098)		
	SA10	Dropped		
Health Responsibility (HR)	HR1	0.640 (fixed)	AVE= 0.650 CR= 0.917	0.804
	HR2	0.820 (11.419)		
	HR3	0.729 (10.418)		
	HR4	Dropped		
	HR5	0.866(11.888)		
	HR6	0.890 (12.126)		
	HR7	Dropped		
	HR8	0.862 (11.856)		
Interpersonal Relationship (IR)	IR1	0.725 (fixed)	AVE= 0.574 CR= 0.889	0.887
	IR2	0.596 (9.480)		
	IR3	0.817(13.069)		
	IR4	0.831 (13.306)		
	IR5	Dropped		
	IR6	0.829 (13.273)		
	IR7	0.720 (11.494)		
	IR8	Dropped		
Stress Management (SM)	SM1	0.844 (fixed)	AVE= 0.642 CR= 0.877 Cronbach's Alpha=	0.875
	SM2	0.858 (16.413)		
	SM3	0.752 (13.834)		
	SM4	0.745(13.639)		
Physical Activity (PA)	PA1	0.766 (fixed)	AVE= 0.596 CR= 0.815	0.884
	PA2	0.679 (10.488)		
	PA3	0.861 (11.712)		
Nutrition (N)	N1	0.657 (fixed)	AVE= 0.607 CR= 0.884	0.880
	N2	0.702 (10.206)		
	N3	0.835 (11.756)		
	N4	0.849 (11.900)		
	N5	0.832 (11.720)		
	N6	Dropped		
Intention to use Herbal Medicine (IHM)	IHM1	0.723 (fixed)	AVE= 0.703 CR= 0.934	0.929
	IHM2	0.865 (14.311)		
	IHM3	0.906 (15.088)		
	IHM4	0.907 (15.052)		
	IHM5	0.879 (14.554)		
	IHM6	Dropped		
	IHM7	0.725 (11.892)		

Fit indices of First- order CFA:
[χ^2 (644) = 1025.734, p = 0.000; χ^2/df=1.593; GFI = 0.836; CFI = 0.948; IFI = 0.949; TLI = 0.943; RMSEA = 0.047]

* All factor loading is significantly different from zero at the 0.001 level.

Table 4. Summary of measurement model including correlation, MSV, and ASV statistics.

Constructs	Mean	MSV	ASV	Correlation						
				SA	HR	IR	SM	PA	N	IHM
· Self-Actualization (SA)	2.9	0.42	0.32	1						
· Health Responsibility (HR)	3.3	0.56	0.37	0.61***	1					
· Interpersonal Relationship (IR)	3.2	0.48	0.34	0.63***	0.58***	1				
· Stress Management (SM)	3.4	0.32	0.24	0.45***	0.49***	0.57***	1			
· Physical Activity (PA)	2.2	0.17	0.14	0.40***	0.38***	0.32***	0.32***	1		
· Nutrition (N)	2.8	0.53	0.38	0.60***	0.71***	0.69***	0.52***	0.41***	1	
· Intention to use Herbal Medicine (IHM)	3.3	0.56	0.39	0.65***	0.75***	0.62***	0.54**	0.39***	0.73***	1

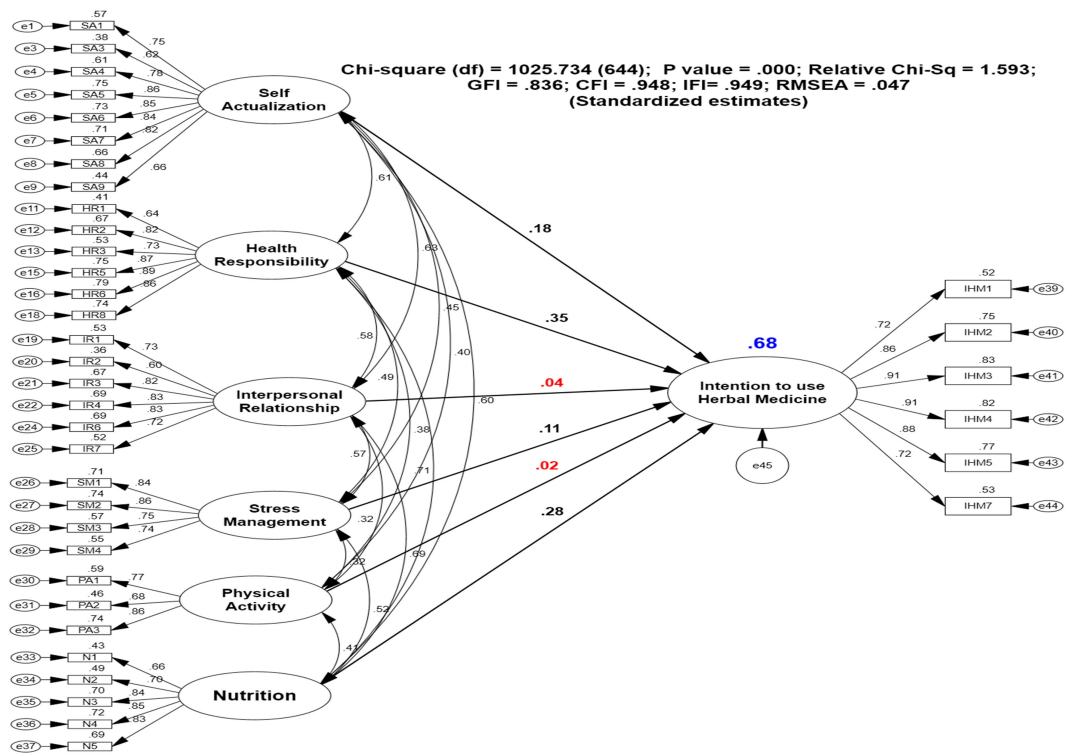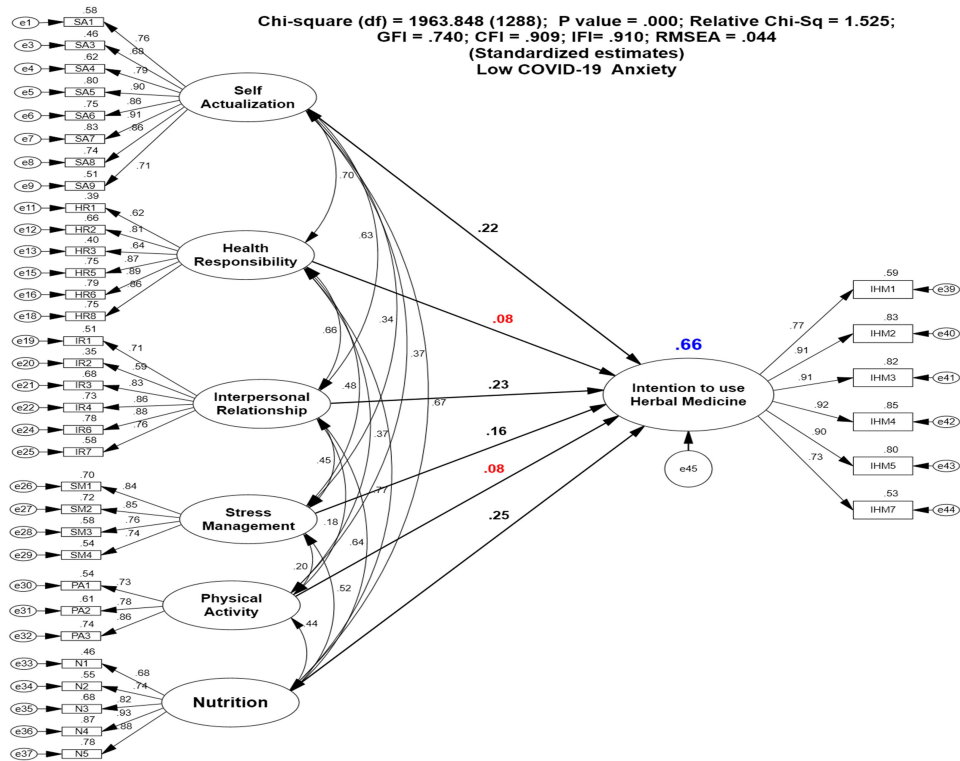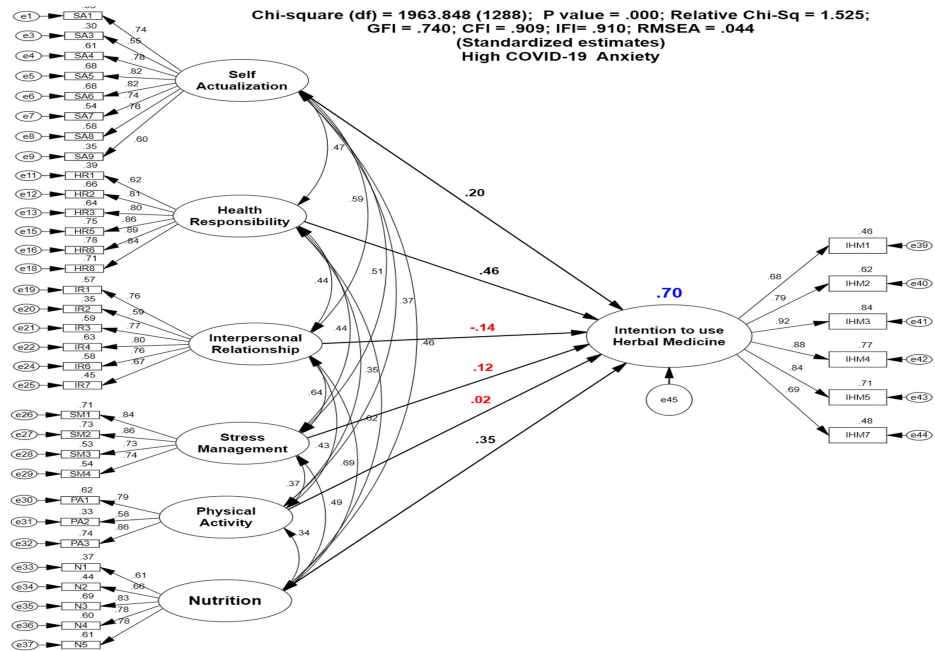**Figure 2.** Significance testing results of the main structural model path coefficient (all paths were significant: P< 0.05, with the exception of two paths including IR and PA to IHM that were non-significant).

The pairwise comparison Critical Ratios (CR) has been conducted for investigating the differences between parameters. As shown in Table 6, the two path comprising; health responsibility (CR= 2.40> ±1.96) and interpersonal relationship (CR= -2.56 > ±1.96) to intention to use herbal medicine path pairwise comparisons for low and high COVID-19 anxiety were significant. The other path pairwise comparisons including; self-actualization (CR= -0.28 < ±1.96); stress management (CR= -0.62 < ±1.96); physical activity (CR= -0.73 < ±1.96); and physical activity (CR= 0.59 < ±1.96) to intention to use herbal medicine were non-

(A)

(B)

Figure 3. COVID-19 anxiety moderation structural model significance testing results: (A) Low and, (B) High COVID-19 Anxiety.

Table 5. Summary of fit indices and nested model comparisons for low or high COVID-19 anxiety group variant and group invariant.[a]

Model	CMIN (χ^2)	DF	P	CMIN/DF	IFI	TLI	CFI	RMSEA
Group variant	1963.848	1288	0.000	1.525	0.910	0.901	0.909	0.040
Group invariant	2161.379	1385	0.000	1.561	0.896	0.894	0.896	0.042

Nested model comparisons
Assuming model group variant to be correct:
χ^2 difference (2161.379 – 1963.848 = 197.531); df (1385-1288 = 97); P (.000).

[a] CMIN: Chi-square, DF=Degrees of Freedom, P= p value, CIMIN/DF= Relative Chi-square, IFI= Incremental Fit Indices, TLI= Tucker-Lewis Index, CFI=Comparative Fit Index, RMSEA= Root Mean Square Error of Approximation.

Table 6. The result of hypothesized path model for low or high COVID-19 anxiety (Group variant model).

Locus of control (Moderator)	Hypothesized path	Estimate	SE	Standardized regression weights	CR	P	Hypothesis supported	Path labels
Low COVID-19 anxiety	SA → IHM	0.254	0.111	0.224	2.291	0.022	Yes	Low1
	HR→ IHM	0.112	0.153	0.084	0.732	0.464	No	Low2
	IR → IHM	0.296	0.128	0.227	2.318	0.020	Yes	Low3
	SM → IHM	0.177	0.084	0.164	2.120	0.034	Yes	Low4
	PA→ IHM	0.094	0.085	0.083	1.114	0.265	No	Low5
	N→ IHM	0.361	0.174	0.248	2.078	0.038	Yes	Low6
High COVID-19 anxiety	SA → IHM	0.214	0.086	0.200	2.486	0.013	Yes	High1
	HR→ IHM	0.604	0.135	0.456	4.458	0.000	Yes	High2
	IR → IHM	-0.151	0.119	-0.144	-1.264	0.206	No	High3
	SM → IHM	0.109	0.073	0.124	1.496	0.135	No	High4
	PA→ IHM	0.017	0.063	0.019	0.277	0.782	No	High5
	N→ IHM	0.502	0.164	0.351	3.056	0.002	Yes	High6

Critical Ratios for differences between path coefficients for low or high COVID-19 anxiety (Group variant model)

Variable	Path labels	Pairwise parameter comparisons (Variant model)					
		High1	High2	High3	High4	High5	High6
SA	Low1	-0.28					
HR	Low2		2.40				
IR	Low3			-2.56			
SM	Low4				-0.62		
PA	Low5					-0.73	
N	Low6						0.59

significant (Table 6). Thus, these results confirmed the COVID-19 anxiety moderate effects on the path relation between health responsibility and interpersonal relationships with intention to use herbal medicine. Thus, these results confirmed the COVID-19 anxiety moderate effects on the path relation between health responsibility and

interpersonal relationships with intention to use herbal medicine.

DISCUSSION

Today, when an infectious disease has been able to endanger global health despite widespread medical advances, we need a new approach to building the future (Uysal and Argın, 2021). This required approach is a healthy lifestyle that influences

individuals' health protection and improvement (Hepburn *et al.*, 2021). To provide reliable health interventions, one of the important factors is working with specific groups (Pan *et al.*, 2020). The population of this study is made up of rural women as an "in-need of attention" group (Alireznejhad, 2018), whose lifestyle, in addition to affecting their health and the next generation of producers, also affects the production sector, which guarantees food security. The results of this study about the lifestyle of the rural women in a situation of Covid-19 prevalence indicate that lifestyle behaviors of rural women, except for physical activity that was at a low level, were at a moderate level of health-oriented. The results are consistent with another study that found people during the pandemic did not regularly maintain a healthy lifestyle (Uysal and Argın, 2021). Thus, to prevent unhealthy behaviors that significantly spread the epidemic (Chen *et al.*, 2019; Doraiswamy *et al.*, 2021), considering the importance of physical activity, promotion and training of a healthy lifestyle is recommended.

The present study theoretically contributes to the body of knowledge by comparison of adherence to health-promoting lifestyle dimensions based on COVID-19 infection, investigating the correlated contextual variables with health-promoting lifestyle, and testing the association between health-promoting lifestyle and intention to use medical plants by considering the moderating effect of corona anxiety on the model. The results demonstrate that, among

the study respondents, about 47% reported that they were infected by Covid-19 by the date of data collection, which showed higher self-actualization and health responsibility than non-infected women. Infection to Covid-19 likewise the study of Alzahrani *et al.* (2019) provides a situation for experiencing self-awareness and having a sense of purposefulness that could lead to caring for oneself. The ability to choose a health-oriented lifestyle is the result of multiple factors that vary according to the characteristics of the population and the environment (Hepburn *et al.*, 2021). In this study, the level of education showed efficacy in improving the level of a health-oriented lifestyle, consistent with the findings of previous studies (Ahmadi *et al.*, 2020; Alzahrani *et al.*, 2019; Hardan-Khalil, 2020; Huang *et al.*, 2021). Further, women who had broader social networks and used more mass media, such as radio and television, had healthier lifestyles, in accordance with the study of Afshar Kohan and Sharafi (2016). However, virtual media did not play a significant role as reported in the study of (Afshar Kohan and Sharafi (2016)), perhaps due to less penetration in the rural area. Therefore, paying attention to health-oriented lifestyle education in formal and media educational programs is necessary. Further, now that developmental interventions have been making lots of changes in rural women's life and rural women seem to follow the urban housewife's lifestyle (Alireznejhad, 2018) and may be exposed to cyberspace, appropriate virtual media content, as one of the powerful tackles in guiding the society, should be provided.

The results of the hypothesized structural model showed that dimensions of health-promoting lifestyle explained 68% of intention to use herbal medicine, which is used as a body system booster (Sari *et al.*, 2021) or prevention and treatment (Alyami *et al.*, 2020; Nugraha *et al.*, 2020) in the situation of COVID-19 pandemic. The drivers of intention to use herbal medicine for rural women in order of influence were

health responsibility, nutrition, self-actualization, and stress management. These results revealed that women who believed that it was their responsibility to live healthily, and infection was not related to luck, used healthy foods to strengthen their immune system, were hopeful about their future, and lived purposefully for a healthy future, tried to control their stress, and were more inclined to use herbs for prevention and even treatment during the corona pandemic. This result is in the line with the studies that found people in Corona outbreaks intended to use more herbal medicines for prevention and treatment (Alyami *et al.*, 2020; Nugraha *et al.*, 2020). However, physical activities and interpersonal relationships did not have a significant effect on the consumption of herbal medicines, probably due to the social distancing and related restrictions in the conditions of the Corona pandemic.

The finding on the moderating role of Covid-19 anxiety declared that anxiety significantly moderates the conceptual model of study, which is an extension over the health-promoting lifestyle theory. These findings are supported by the results of studies that discuss the anxiety of Covid-19 (Alizadehfard and Saffarinia, 2020) and its effects on the behavior of people (Fischhoff, 2020), and more specifically, people in societies with lower education (Kim *et al.*, 2015). More precisely, this study's results showed how Corona anxiety moderates the path relation between health responsibility and interpersonal relationships with intention to use herbal medicine. Based on the results, taking responsibility for maintaining health among more anxious women has led to a tendency to consume more herbs, while for women with low anxiety levels this relationship is not significant. Furthermore, according to the results, less anxious women get ideas about the use of herbs by communicating with friends and families, and this has led to an increase in the use of herbs for this group. While women with high anxiety avoided interpersonal communication and, therefore,

did not receive the synergistic recommendations of others for the use of medicinal plants, their interpersonal relationships could not influence the use of medicinal plants for this group. It is noteworthy that the decrease in the interpersonal relationship of rural women with high anxiety could be due to the fact that, in rural communities, where there is usually more face-to-face communication, social distancing to control COVID-19 pandemic limited this type of communication.

The results of research on the non-significant role of physical activity, as one of the dimensions of health-promoting lifestyle, in the main and moderating model indicate its low role in the lifestyle of rural women and the need for special attention. Although for many years rural society was characterized by physical activity assorted with agricultural work, technological advances have to some extent affected the way villagers work and live, such as the fact that, today, fewer rural women bake bread or collect wood for the fire (Alizadehfard and Saffarinia, 2020). These cases make it necessary for the extension agents to work with the relevant institutions to promote suitable alternatives such as rural sports houses for women.

The practical implications of this research are in recommending purposeful educational interventions that are designed based on a deep understanding of society.

CONCLUSIONS

A comparison of health-promoting lifestyle dimensions between affected rural women by the Corona Virus and women who have not experienced the disease shows that patients have higher levels of self-actualization and health-related responsibility. The results and the large number of infected people indicate the readiness of the mental substrates to teach the dimensions of a healthy lifestyle that can flow like a fluid goal throughout the society.

A look at the results of contextual variables correlated with the health-promoting lifestyle shows that the fastest channel for teaching is the use of mass media including radio and television. Further, special planning is needed for a significant part of the rural population that is made up of elderly and illiterate people, since the observance of a health-oriented lifestyle had a positive correlation with education, and with age there were signs of correlation with a negative direction (although not significant). The use of herbs in a healthy lifestyle is approved by scientific circles, but anxiety caused by COVID-19 moderates the path of health-oriented responsibility and interpersonal relationships on increasing the use of herbal medicine. This moderating role of anxiety, especially in rural areas, where interpersonal relationships are strong and the advice of others is highly accepted, can lead to the acceptance of popular recommendations for self-medication and pose a risk. To prevent misuse of medicinal plants as a result of anxiety, it is recommended to increase the information in the rural community about the COVID-19, which is driving anxiety, and the ways to prevent and treat it. According to (Nugraha *et al.*, 2020), to address the concerns about the overuse of medicinal plants in the COVID-19 outbreak, cooperation of experts familiar with the concept of anxiety and health-promoting lifestyle and extension agents familiar with rural community characteristics can reduce health and social costs and provide a basis for a healthy human life, which is the central core of sustainable development.

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سبک زندگی ارتقاء دهنده سلامت و قصد استفاده از گیاهان دارویی در همه گیری کووید-۱۹: مطالعه موردی زنان روستایی استان زنجان

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چکیده

این مطالعه با هدف بررسی تأثیر سبک زندگی ارتقاء دهنده سلامت زنان روستایی در طول همه‌گیری کوید-۱۹ بر قصد استفاده از گیاهان دارویی و همچنین بررسی اثر تعدیل‌کننده اضطراب کرونا بر مدل انجام شده است. پژوهش حاضر یک پیمایش مقطعی است که با استفاده از پرسشنامه با روایی و پایایی تایید شده، انجام شده است. جامعه مورد مطالعه را زنان روستایی استان زنجان تشکیل دادند. نمونه گیری به روش چند مرحله ای انجام گردید و حجم نمونه با استفاده از فرمول کوکران ۲۷۲ محاسبه شد. داده ها بین ماه مارس و می ۲۰۲۰ در طول همه گیری کووید-۱۹ جمع آوری شد. نتایج نشان داد که سبک زندگی زنان روستایی در حد متوسط سلامت محور بوده است. نتایج مدل ساختاری مفروض نشان داد که ابعاد سبک زندگی ارتقاء دهنده سلامت ۶۸ درصد از تغییرات تمایل به استفاده از گیاهان دارویی را تبیین می‌کند. محرک‌های تمایل به استفاده از گیاهان دارویی برای زنان روستایی به ترتیب تأثیرگذاری، مسئولیت پذیری سلامت، تغذیه، خودشکوفایی و مدیریت استرس بوده است. یافته‌های مربوط به نقش تعدیل‌کننده اضطراب کرونا در مدل مفهومی مطالعه نشان داد که اضطراب کرونا رابطه مسیر مسئولیت پذیری سلامت و رابطه بین فردی را با قصد استفاده از گیاهان دارویی تعدیل می‌کند. این مطالعه در تبیین اینکه چگونه ابتلا به کووید-۱۹ می تواند توجه به جنبه های خاصی از سبک زندگی سالم و قصد استفاده از گیاهان دارویی را افزایش دهد، مهم است. همچنین، نتایج این مطالعه با بررسی متغیرهای زمینه‌ای مرتبط با تمایل به مصرف گیاهان دارویی می‌تواند در تبیین مداخلات آموزشی مناسب برای زنان روستایی مفید باشد.