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Research paper

Modeling the Effect of Coronavirus Outbreak on Public Health and Community Well-Being

Ehsan Asadollahi[1], Malihe Sadat Aghaei shahri[2], Mahdi Esfahani[3], Reza Heydari[4], Homeyra Shojaei[5]

1. Faculty member of Sanabad Golbahar University, Golbahar, Iran
2. Department of physical education and sport science, faculty of Alzahra, khorasan razavi branch, technical and vocational University (tvu), Mashhad, Iran
3. Sports Centre, Imam Reza International University, Iran
4. PhD candidate Sport management, Faculty of Sports Sciences, Ferdowsi University of Mashhad, Mashhad, Iran
5. PhD in Sports Management, Urmia University, Urmia, Iran

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Abstract

Today, the world is facing a very serious crisis caused by the coronavirus (COVID-19) outbreak and domestic quarantine. The domestic quarantine caused by the COVID-19 outbreak has various effects on the physical and psychological dimensions of society. The aim of this study was to model the effect of the COVID-19 outbreak on public health and community well-being. In this applied descriptive-exploratory study, the data were collected in the field. The statistical population included an unlimited number of all sports directors, sports teachers and professors, sports coaches, sports producers, sports service providers, sports referees, athletes, sports equipment sellers and sports media activists in Iran as well as 600 subjects of this population answered the questionnaire with 18 items. The face validity was confirmed by 12 experts. In order to evaluate the reliability of internal consistency and its stability, Cronbach's alpha index was used in a pilot study (including 30 people) so that the alpha value for the whole questionnaire was 0.898. In order to analyze the research data, descriptive statistical methods were first applied. Then, the structure of the general factors was determined in the inferential statistical methods part of the exploratory factor analysis. Finally, the path analysis was modeled by structural

1. Email: asadollahiehsan92@gmail.com
2. Email: fa.malihe@yahoo.com
3. Email: mahdisfh@gmail.com
4. Email: reza.hdr1994@gmail.com

equation modeling and according to the results of the exploratory model. All statistical analyses were conducted using SPSS 24 and Amos statistical software. The results of factor analysis showed that public health and community well-being were influenced by COVID-19 (p-value=0.001).

Keywords: Pandemic, COVID – 19, Public Health, Community Well-Being, Domestic Quarantine

Introduction

Analyzing community well-being and its threatening factors is the basis for public health. Public health refers to the science and art of disease prevention, prolonging life, and promoting human health through organized efforts and the conscious choice of society, organizations, public and private, communities, and individuals (WHO, 2020). Today, the world is facing a much more serious crisis than the previous ones. Coronavirus (COVID-19) epidemics continue to spread (Craven, Liu, Mysore, & Wilson, 2020; Asadollahi, Nazari Torshizi, Heydari & Abrishami, 2021). On January 30, 2020, the World Health Organization announced the emergence of a new coronavirus and declared a public health emergency. On February 11, 2020, the World Health Organization named the COVID-19. This contagious disease has been the largest outbreak since the severe outbreak of SARS Acute Respiratory Syndrome in 2003, and with the potential for severe respiratory disease, it has rapidly affected the health of governments and public health systems. The lifestyle of millions of people has changed significantly and a global process is underway. The virus, as an emerging infectious disease, includes symptoms such as fever, cough, and shortness of breath. Due to the lack of a definitive vaccine, non-pharmacological interventions such as home quarantine are still the only way to prevent the disease, which significantly affects the daily habits of the body, mental condition, social and economic status (WHO, 2020).

The COVID-19, like sports, is ubiquitous. That is why it has caused a deep crisis in sports in all its dimensions. But the more important similarity between COVID-19 and sport is that the universe is both tied to human health; however, one of them (COVID-19) is a health pest and the other (exercise) can be a cause of human health (Fazeli, 2020). The closure of sports centers was one of the negative consequences of the spread of the COVID-19 in the world. Centers were built for health and entertainment, but with the spread of the virus, locks were suddenly knocked on the doors of small and large stadiums. Sports clubs that served to

educate or train athletes have closed or semi-closed. This has caused problems for people's health and well-being (Cohen, Robinson & Flint, 2020). One of the indirect effects of the corona outbreak, apart from the economic impact of closing sports clubs and even outdoor camps, parks and sports grounds, is the reduction in public mobility, which is certainly a consequence of overweight and obesity, and in the coming months, because of this increase in inactivity and obesity, the increase in cardiovascular disease and diabetes and abnormalities of the erectile structure and so on cannot be expected to be far away. Heyadri et al (2021) in their research have stated that one of the effects of the outbreak of COVID-19 in society is its destructive effects on public health and well-being of society. Ravalli & Musumi (2020) stated that quarantine and staying at home lead to immobility and these negative effects may be even greater than those of COVID-19. Moreover, Hammami et al. (2020) have mentioned that COVID-19 has changed the general form of sports and with the formation of home quarantine, the home is the most important environment for sports activities; therefore, sports organizations are obliged to provide solutions for the development of sports at home. In addition, Shirvani & Rostamkhani (2020)) studied the exercise during COVID-19 outbreaks and concluded that 1. People should reasonably limit strenuous exercise at this time because according to the open window hypothesis, these activities may increase the susceptibility to infection; 2. Healthy and asymptomatic people by following health instructions can continue moderate-intensity exercise and benefit from the strengthening of the resulting immune system; 3. People with mild symptoms of upper respiratory illness (such as runny nose, sinus congestion, sore throat) can engage in light exercise with consideration; and 4. People with more widespread and suspected symptoms of Covid-19 (such as fever, dry cough, severe sore throat, body aches, shortness of breath and general fatigue) should refrain from exercising until they are fully recovered.

One of the most important debates related to COVID-19 and sports is that the COVID-19 crisis has led to the suspension of many sports activities in the world, with significant economic consequences. The consequences of this crisis for professional athletes and sports heroes are also discussed from various psychological and professional aspects. However, the relationship between COVID-19 with exercise, public health and community well-being is not mentioned. There is also no mention of the consequences of widespread sports activities in the world on the public health of the society and the responsibility of sports institutions in the instability of this issue. Considering the above and the need to address public health during quarantine (according to death statistics,

abnormalities due to mobility, mental health, development of inactive lifestyle and so on), the aim of the present study was to investigate the effects of the COVID-19 outbreak on public health and community well-being.

Methodology

In this applied descriptive-exploratory cross-sectional study, the data were collected in the field. The statistical population included an unlimited number of all sports directors, sports teachers and professors, sports coaches, sports producers, sports service providers, sports referees, athletes, sports equipment sellers and sports media activists in Iran as well as 600 persons selected using purposive sampling method were considered as a sample. The questionnaire was distributed online. They responded to the 18-item researcher-made questionnaire on the effect of the COVID-19 outbreak on public health and community well-being (on a Likert scale). The face and content validity of the research instrument was confirmed by the opinion of 12 professional professors of the university. To assess the reliability of internal consistency and stability of the questionnaire, Cronbach's alpha index was used in a pilot study (in which 30 people participated), which gave a value of 0.898 for the whole questionnaire. In order to analyze the research data, descriptive statistical methods were first applied. Then, the structure of the general factors was determined in the inferential statistical methods part of the exploratory factor analysis. Moreover, the Kolmogorov-Smirnov test was used to evaluate the normality of data distribution. Finally, the path analysis was modeled by structural equation modeling and according to the results of the exploratory model. All statistical analyses were conducted using SPSS 24 and Amos statistical software.

Findings

Description of the demographic information of the sample under study suggested that the respondents were mostly in the age group of 36 to 40 years with 40.8% (245 people) and in the field of activity of the teacher with 32.8% (197 people). In addition, most of the respondents were at the master's level with 40.3% (242 people) and the highest frequency of gender was related to men with 52.5% (315 people). Besides, the results of Table 1 showed that the average impact of COVID-19 on public health and community health is higher than average, with 3.09 of the maximum score of 5 and the median score of 3.

Before the exploratory factor analysis test, the sampling adequacy was measured using Kaiser–Meyer–Olkin (KMO) and Bartlett tests (Table 1):

Table 1. KMO and Bartlett test results

Kaiser-Meyer-Olkin, Measuring Sampling Adequacy		**0.960**
Bartlett's Test of Sphericity	Approx. Chi-Square	40754.880
	df	1485
	Sig.	0.001

The KMO index value for the items related to the effects of COVID-19 on public health and community well-being was 0.960, which is a very good value for the good fit of the factor model. The value of Bartlett's test was 4075.880, indicating the use of this method for the data.

In this section, the exploratory factor analysis tests are reviewed (Table 2):

Table 2- Exploratory factor analysis of the effects of COVID-19 on public health and community well-being

Variable	Dimensions	Factor loads
Public health and community well-being	Effect on general mobility of society	0.60
	Effect on organizational sports of employees in departments and institutions	0.41
	Obesity and overweight people	0.85
	Outbreak of erectile dysfunction	0.83
	Outbreak of cardiovascular disease or diabetes	0.88
	Outbreak of neurological and mental illnesses	0.88

The results of table 3 represent that the effect of COVID-19 on public health and community well-being can be divided into 6 factors. It must also be noted that 69.45% of the data variance in the above model can be explained.

To confirm the structure of the questionnaire and explain the factor load of the effect of COVID-19 on public health and community well-being, the first-order factor analysis was performed by using the maximum likelihood method (Figure 1):

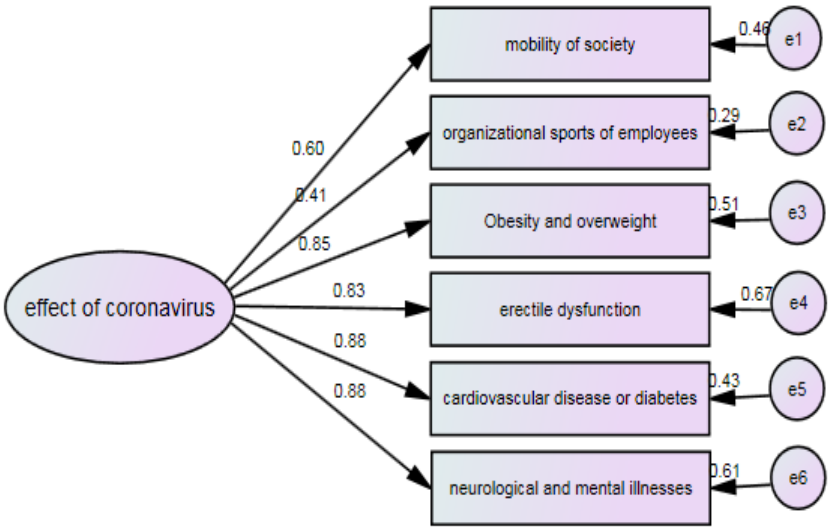

Figure 1- Model of public health and community well-being in sport influenced by COVID-19 in standard mode

The desirability indices demonstrated that the research model had a good fit (Table 3).

Table 3- Indicators of model fit

Index	RMSEA	CFI	AGFI	GFI	CMIN/DF	P	DF	CMIN
Standard value	<0.08	>0.9	>0.9	>0.9	Between 1-5	<0.05		
The obtained value	0.071	0.993	0.949	0.983	4.014	0.001	9	36.122

Table 4 shows that the outbreak of COVID-19 affected public health and community well-being.

Table 4- Factor loads in standard and non-standard models and significant values of model relationships

Relationships			Standard factor loading	Non-Standard Factor Loading	P	C.R.
Indirect Effects of Virus	→	Public health and community well-being	0.971	0.931	0.001	23.192

According to the research results, it could be said that from the perspective of the respondents, the COVID-19 outbreak has played a role in the public health and community well-being.

The convergence and differential validity assessment of the model is given in table 5.

Table 5- Conditions for establishing structural reliability and validity

Variable	CR	AVE	MSV	ASV
Effects of COVID-19 on public health and community well-being	0.803	0.506	0.354	0.196

According to the calculated numbers for the indicators, it was observed that 4 convergent validity conditions were confirmed. It was found that the average variance extracted (AEV) value was greater than the maximum shared variance (MSV) and average shared variance (ASV) values, and the differential validity of the model was confirmed, too.

Discussion and Conclusion

With the widespread of COVID-19, concerns have been raised worldwide about physical activity and exercise threatening the lives and public health of millions of people around the world (Heydari & Asadollahi, 2021a, Shirvani & Rostamkhani, 2020). Therefore, the aim of the current study was to determine and model the effect of the COVID-19 outbreak on public health and community well-being.

The first effect of COVID-19 in society is its destructive effects on public health and well-being. These effects include the effect on general mobility, obesity and overweight, the prevalence of erectile dysfunction, the prevalence of cardiovascular disease or diabetes as well as the prevalence of neurological and

mental illnesses. With the decrease in mobility in the society, day by day, the average weight of people is increasing, and society will be prone to cardiovascular diseases, erectile dysfunction, diabetes and so on. The COVID-19 has made people homeless in 165 countries around the world, and this homelessness will undoubtedly have a great impact on their physical and mental health. Inactivity and lack of exercise jeopardize not only the physical health of people in the society but also their mental health. Some studies have shown that staying at home has negative effects on fitness, heart and respiratory problems, weight gain and psychosocial problems (Meskarpour-Amiri et al, 2020). The results of the studies of Heydari et al. (2021), Shirvani and Rostamkhani (2020), Ravalli and Musumeci (2020) and Hughes (2020) confirm the results of this research. Heyadri et al. (2021) have stated that one of the effects of the COVID-19 outbreak in society is its destructive effects on public health and well-being.

Furthermore, Ravalli and Musumeci (2020) have pointed out the importance of developing sports at home and its positive effects on the people of Italy. They have stated that quarantine and staying at home make people inactive, and these negative effects may be even greater than those of COVID-19 so sports organizations must offer solutions for the development of sports at home. Additionally, Hughes (2020) examined Australian sports in the face of the COVID-19. Australia is a leader in sport; therefore, it has chosen three strategic levels to develop the sport to counteract the effects of COVID-19. At level 1, quarantine exercise is done individually while keeping distance from others in the open space; Level 2 allows individuals to gather in small groups of up to 10, as long as they are in good condition and have been free of coronavirus symptoms for 14 days. Level 3 allows full return to sports activities. Activity at level 3 requires reducing the prevalence of COVID-19. Moreover, Shirvani & Rostamkhani (2020) studied the exercise during COVID-19 outbreaks and concluded that 1. People should reasonably limit strenuous exercise at this time because according to the open window hypothesis, these activities may increase the susceptibility to infection; 2. Healthy and asymptomatic people by following health instructions can continue moderate-intensity exercise and benefit from the strengthening of the resulting immune system; 3. People with mild symptoms of upper respiratory illness (such as runny nose, sinus congestion, sore throat) can engage in light exercise with consideration; and 4. People with more widespread and suspected symptoms of Covid-19 (such as fever, dry cough, severe sore throat, body aches, shortness of breath and general fatigue) should refrain from exercising until they are fully recovered.

The relevant institutions and sports federations must maintain this momentum and desire for sport at a community level by taking the necessary measures and offering creative solutions so that we do not experience such problems in the future. In addition, the changes in active lifestyles and the way people spend their free time, as well as alternative activities instead of sports have adverse effects on the social dimension so that the Covid-19 outbreak has on society and will lead to many consequences. On the positive side, tone can take advantage of the recreational opportunities created for families by playing appropriate group sports games in the home environment. With most sporting activities and events canceled or postponed, as well as clubs and sports facilities closed and access to health services reduced to a minimum, it is imperative that the WHO recommends you stay at home and let us quarantine ourselves to protect the health of people in the community. Lack of exercise and long periods of rest at home have a great impact on the physical and mental aspects of people. Weight gain, decreased fitness level, musculoskeletal disorders, depression and confusion and so on can be the consequences of inactive quarantine. Therefore, the country's sports community has participated on various TV channels and live broadcasts, social media and personal pages by posting sports pictures and videos ranging from simple to complex movements to encourage people to play sports in domestic quarantine. Prominent athletes around the country were able to describe the dangers and consequences of this disease for individuals and their families by performing simple and exciting sports challenges without special equipment and with indoor equipment to help people stay at home. Additionally, athletes were able to share the top challenge of the day on their personal social media pages to motivate and inspire people to continue their sporting activities at home and during the quarantine period.

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