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RESEARCH ARTICLE

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Physical Therapy Cross-Sectional Study on the Effect of Covid-19 on Health-Related Quality of Life in Adults

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ABSTRACT

Background: Coronavirus infection (COVID-19) has triggered unparalleled worldwide health and economic calamity.

Purpose: To investigate the effects of COVID-19 on the quality of life (QoL) in the general Saudi population and assess the influence of perceived social support.

Design: Cross-sectional research was carried out on a sample of Saudi Arabian individuals.

Participants: Three-hundred-forty-seven adults voluntarily participated in and completed the survey. **Methods:** This cross-sectional study used a nameless online survey.

Outcome measures: QoL was measured using the Short-Form 36-item Survey (SF-36). The SF-36 comprises 36 measures that assess subjective mental, social, and physical health.

Data analysis: Two multiple regression analyses were performed on all 35 variables and one response. **Result:** Most respondents are neutral about the effect of the COVID-19 infection on their overall health. Regarding their feelings, the average respondent has been nervous, energized, depressed, calm, faithful, sad, frustrated, tired and has had a physiological problem during the 4-weeks infection period. **Conclusion:** We detected a statistically significant correlation between the COVID-19 score and the QoL score. These results demonstrate how significantly COVID-19 has impacted the QoL domains.

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INTRODUCTION

Several pandemics have afflicted human civilization, causing social upheavals and affecting various areas of people's well-being (Madhav et al, 2017). The World Health Organization (WHO) recently declared Coronavirus Disease 2019 (COVID-19) a pandemic (Director-General, WHO , 2020). COVID-19 is a highly infectious disease caused by the recently identified severe acute respiratory illness coronavirus 2 (SARS-CoV-2) (Chen, et al. 2019)

The WHO and United Nations (UN) have urged nations to use a variety of preventative measures, including stringent hygiene habits, social distancing, and psychological health assistance, to minimize the spread of COVID-19 and improve public health (World Health Organization, 2020). As of August 5, 2020, worldwide illnesses and fatalities had risen to almost 453 million (World Health Organization, 2020). The KSA was

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one of the first countries to adopt urgent preventive measures, including lockdowns, curfews, travel restrictions, and religious gathering prohibitions (Algaissi, etal 2020, Banjar and Alqeel 2020). The country's preventative measures and limitations are viewed as efficient ways of containing the disease, even though they create tension and worry among certain sectors of the population (McCloskey, et al. 2020).

Furthermore, the imposed limitations harm people's physical health, psychological, emotional, and social well-being, as well as their QoL (McCloskey, et al. 2020). Physical, psychological, and social health are all factors in an individual's well-being Pressman, et al 2018). As a result, the multidimensional character of QoL encompasses an individual's impression of numerous facets of his or her well-being that extend beyond physical health (Felce and Perry 2015), making it a critical variable to analyze in the face of global calamities like the COVID-19 pandemic. An individual's capacity to cope with the new living conditions created by this innovative pandemic is one powerful aspect that may affect people's QoL during this period.

The epidemic's impacts on society, the economy in general, and QoL are major problems among people in Saudi Arabia because the main objective of Saudi Arabia's Vision 2030 is to achieve sustainable economic development. The Saudi economy suffered in 2020 due to COVID-19, just like other economies worldwide. Rising unemployment, declining income, decreased savings, dramatic rises in living expenses, increasing crime, and worse living standards for significant portions of the population are only a few of the immediate socioeconomic effects (United Nations,2021). The economy's shrinkage is one of COVID-19's most evident repercussions. For instance, Saudi Arabia's gross domestic product (GDP) fell by 1.0% and 7.0% in the first and second quarters of 2020, respectively.

The commercial and public sectors both experienced negative growth rates of 10.1% and 3.5%, respectively, while the unemployment rate rose to 15.4%. These patterns persisted for the rest of the year due to a slowdown in important industries, and in 2020, the GDP was projected to decrease by 5.4% (World Bank Poverty, 2021).

This study investigates the effects of COVID-19 on QoL in the general Saudi population, as well as to assess the influence of perceived social support. We hypothesized that COVID-19's effects are linked to anxiety and/or depressed symptoms, which might explain QoL, but that perceived social support could reduce this effect.

METHODS

Adherence to Ethical Guidelines

The Institutional Review Board of Umm Alqura University in Makkah, Saudi Arabia, assessed the study and gave it ethical approval. At the start of the survey, there was a study description and the lead investigator's email address. A permission question was added to confirm that respondents agreed to participate in the study. Approval No. (HAPO-02-K-012-2022-04-1103).

Population and Study Design

This cross-sectional survey was conducted in the KSA between January and March 2022. The research invitation text and link were delivered to adults in the KSA aged 18 and above via different channels (Twitter and WhatsApp). An unbiased sample estimator technique was used to evaluate the sample size, which was done using a suitable statistical program (Minitab). The study's inclusion criteria, which included being > 18 years old, residing in Saudi Arabia, and having recovered from COVID-19 for at least a month, were listed in the survey when participation was solicited. Participants under 18 and those who did not recover for more than a month were excluded from the study since these factors could skew the results and needed to be handled differently using other questionnaires.

Instruments and Measures for Research

The study approach was primarily quantitative, including a questionnaire given online using Survey Monkey. The questionnaire link was disseminated across Saudi Arabia and via social media channels. Individuals who did not have access to a social media site were recruited over the phone. Everyone who took the poll was invited to tell their loved ones and friends about it. Two self-reported questionnaires and a section on the respondents' sociodemographic and general health data were included in the survey to assess participants' impressions of their QoL during the COVID-19 infection. The questionnaires' specifics are shown below. This project starts by designing the questions based on the quality of life approach for this project-designed questionnaire. Afterward, we collected responses from COVID-19-recovered patients in Saudi Arabia.

A multiple regression analysis was conducted on all variables. The first multiple regression analysis was performed to qualify significant factors. The questions address the influence of those factors. The second regression analysis was to formulate an LP equation that estimates the level of health condition of the COVID-19-recovered patient. A linear equation aimed to describe the response change from the change in the significant variables. In general, the respondents' average responses regarding the health condition after recovery are satisfied, with a score of 4.2 out of 5. Compared with the past year, most respondents are neutral about the effect of COVID-19 infection on their overall health and have no chronic effect.

Thus, there is no difference between last year and the current year. Questions 3–12 ask about the effect of recovery from COVID-19 on the normal habits of the infected persons. Thus, the scores show that the respondents' normal habits have an above-average score for climbing stairs for several floors and walking more than 1.5 km. Questions 13–19 ask about the performance in the 4 weeks infection period. Thus the average population answered that there was no measurable effect on physical performance. For questions 20–22, the average population score strongly affects social life and feeling of pain. Questions 23–31 ask about feelings; thus, the average respondents have been nervous, energized, depressed, calm, faithful, sad, frustrated, tired and had a physiological problem during the 4 weeks infection period. Questions 32–36 ask about being infected due to others having a neutral effect. The research methodology is shown in Figure 1.

Sampling

Using the Raosoft sample size calculator (Raosoft, Inc., Seattle, WA, USA), the necessary sample size was determined

with a confidence interval of 99%, a response rate of 75%, and a margin of error of 5%. The sample size was 1000 respondents. The participants were chosen using a two-stage sampling strategy: first, a random sample of participants from various districts was taken, and then individuals from those districts were randomly chosen. Three hundred ninety-eight individuals returned the questionnaire during the initial sampling phase. Data gaps led to the exclusion of 51 respondents. Finally, this survey had 347 respondents (Figure 2).

Health and sociodemographic characteristics

Eleven questions were asked on sociodemographic and general health data. The survey asked about participants' perceived economic situation, age, gender, marital status (married and single), educational background (high school, undergraduate, and graduate degrees), and educational level (low, medium, and high input). Additional inquiries were made regarding physical health issues (absence of health problems, presence of health problems).

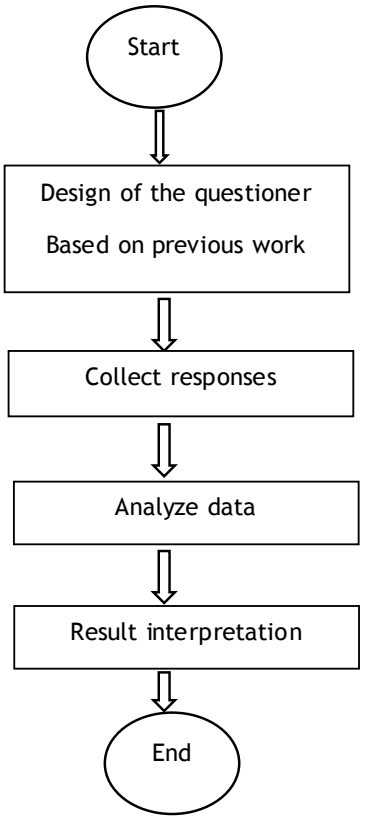

Fig. 1: Research Methodology

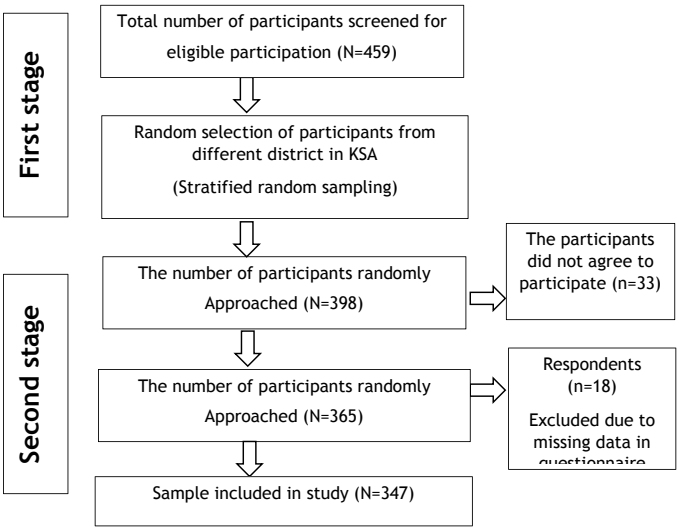

Fig. 2: Flow diagram of sample selection

Health-related quality of life

The Short-Form 36-item Survey (SF-36) comprises 36 measures that assess subjective mental, social, and physical health and are divided into eight aspects. Each scale's score is computed by summing the elements marked with a cross. Before that, the values are converted to a scale ranging from zero (poor QoL) to 100 (highest QoL) (Morfeld and Bullinger, 2008). The SF-36 may be used for group and individual assessments [Morfeld,etal 2011).

RESULTS

The respondent population was filtered to include only those who had completed all the questions. The sample population has 286 males and 61 females. The 18-24-year-old category had 95 respondents, the 25-34-year-old category had 153 respondents, the 35-44-year-old category had 82 respondents, the 45-54-year-old category had 15 respondents, and the > 54-year-old category had two respondents.

For marital status, 174 respondents were single, 162 were married, seven were divorced, and eight were widows. For the job title, nine respondents were freelancers, 73 were students, 48 were unemployed, six were retired, and 211 were employed. The demographical data of the respondents is shown in Table 1. Thirty-sex variables have been allocated for

Table 1: Demographical Data of the respondents (N = 347)

Variables		*Frequency (n)*	*Overall*
Gender	Male	286	347
	Female	61	
Age	18-24	95	347
	25-34	153	
	35-44	82	
	45-54	15	
	More than 54	2	
Academic Qualification	High School	65	347
	Bachelor	239	
	Master	37	
	Secondary school	5	
	Others	1	
Material Status	Single	174	347
	Married	162	
	Divorced	7	
	Widow	8	
Job Level	Freelancer	9	347
	Student	73	
	Unemployed	48	
	Retired	6	
	Employed	211	

36 questions. Shows the variables and the average scores for the variables as well as the minimum and the maximum-scaled score.

Regression Analysis

First, to identify significant variables, we conducted a multiple regression analysis on all the variables. Factors with a p-value ≤ 0.05 were considered significant (x1, x6, x13, and x35) (Tables 2 and 3).

Table 2: Minitab Output for the first regression analysis

Term	*Coefficients*	*P-Value*
Constant	1.777	0.002*
x1	0.2333	0.000*
x2	0.1276	0.070**
x3	-0.0538	0.548**
x4	0.0209	0.833**
x5	-0.0723	0.402**
x6	0.232	0.028*
x7	-0.0434	0.628**
x8	-0.0037	0.968**
x9	0.129	0.245**
x10	0.0389	0.696**
x11	-0.1377	0.154**
x12	0.094	0.479**
x13	-0.287	0.030*
x14	0.080	0.515**
x15	0.012	0.921**
x16	0.095	0.450**
x17	-0.079	0.526**
x18	-0.011	0.932**
x19	0.0839	0.089**
x20	0.0605	0.177**
x21	0.0020	0.975**
x22	-0.0160	0.811**
x23	0.0656	0.289**
x24	-0.0669	0.296**
x25	-0.0301	0.681**
x26	-0.0417	0.525**
x27	0.0715	0.282**
x28	0.1474	0.018**
x29	-0.0264	0.719**
x30	-0.0641	0.296**
x31	-0.0193	0.633**
x32	-0.0444	0.225**
x33	0.0579	0.129**
x34	-0.0344	0.407**
x35	0.1654	0.000*

Significant (*) and non-significant (**)

Model Summary

S	*R-sq*	*R-sq (adj)*	*R-sq (pred)*
0.728414	40.57%	34.48%	25.62%

S: standard deviation, R-sq: coefficient of determination, R-sq (adj): adjusted R-squared & R-sq (pred): The predicted R-squared

The second multiple regression analysis was performed using Minitab software. All factors positively affect the response unless the accomplishment of planned work (Table 4).

The following equation may estimate the response:

Y = 2.255 + 0.2802 x1 + 0.1825 x6 - 0.3052 x13 + 0.2614 x35

An attempt to optimize the response was made using Minitab statistical software. Thus, the response is satisfactory when the answer is that the last year's health condition is similar to the current year; that the assessed person may climb the stairs for one floor; that while infected, the work accomplished was low; and that the assessed person is satisfied with their health (Table 5).

Table 3: Significant factors

Variable	*Average Score*	*Maximum Score*	*Minimum Score*
Y	4.2037037	5	1
x1	3.04232804	5	1
x6	2.63227513	3	1
x13	1.3042328	2	1
x35	3.87830688	5	1

Table 4: The Second Regression Analysis Results

Coefficients

Term	*Coefficients*	*P-Value*
Constant	2.255	0.000
x1	0.2802	0.000
x6	0.1825	0.002
x13	-0.3052	0.001
x35	0.2614	0.000

Model Summary

S	*R-sq*	*R-sq(adj)*	*R-sq(pred)*
0.738281	33.41%	32.70%	31.29%

S: standard deviation, R-sq: coefficient of determination, R-sq (adj): adjusted R-squared & R-sq (pred): The predicted R-squared

Table 5: Optimized Setting

Response Optimization: y

Parameters

Response	*Goal*	*Lower*	*Target*	*Upper*	*Weight*	*Importance*
Y	Maximum	1	5		1	1

Solution

Solution	*x1*	*x6*	*x13*	*x35*	*y Fit*	*Composite Desirability*
1	5	3	1	5	5.20536	1

y Fit: response estimate

Multiple Response Prediction

Variable	*Setting*
x1	5
x6	3
x13	1
x35	5

Response	*Fit*	*SE Fit*	*95% CI*	*95% PI*
Y	5.2054	0.0929	(5.0226, 5.3881)	(3.7422, 6.6685)

SE: Sum of error, CI: Confidence interval & PI: Predict interval

This study discusses the factors influencing the satisfaction of COVID-19-recovered persons on their present health conditions. A questionnaire answered by 459 respondents on the factors affecting the level of satisfaction has been filtered to 347 completed answers. The categorical scores have been converted to quantitative scores. The response is satisfactory when the answer is that the last year's health condition is similar to the running year, that the assessed person may climb the stairs for one floor; that while infection had affected the work accomplished was lowered; and that the assessed person is satisfied with his health.

DISCUSSION

COVID-19's fast and unprecedented development has had devastating impacts on all sectors of the economy and the lives of individuals worldwide. Psychological health specialists have cautioned about the effect of the pandemic on physical and psychological health, social connections, and environmental health due to unanticipated events, financial recessions, and lockdowns (Dubey, et al 2020). There are likely negative consequences on psychological well-being, as well as high rates of stress, anxiety, and depression in the general population (Rajkumar, 2020 and Ho, et al 2020). In these conditions, it is critical to look into measures that might minimize the COVID-19 pandemic's detrimental effects on overall QoL. Even though QoL has been researched in the past (Brooks, et al 2020), there is limited literature on pandemics and QoL predictions.

This study aimed to evaluate QoL in adults and investigate gender-based changes in QoL during COVID-19. The outcomes of this study were important in terms of QoL, although several limitations should be addressed. Non-probability sampling does not ensure that the sample represents the KSA. A probability survey should be used in a future study. Only those above the age of 18 were included in the research. Future studies might examine the link between COVID-19 and QoL in children and adolescents. Because of the wide age range and convenience sample approach used in the study, the study's findings cannot be generalized. Furthermore, because the cross-sectional research design does not establish the causal link between exposure and result, a longitudinal study design must capture the cause-and-effect relationship. Because of the abrupt nature of the COVID-19 pandemic, longitudinal research to assess the impact of COVID-19 on QoL was not possible.

Well-being, coping strategies, and community integration are just a few of the key characteristics associated with QoL. These parameters should be studied in connection to QoL in future studies. A bigger sample size would be advantageous to generalize our findings. The lack of data on the participants' individual experiences during the COVID-19 pandemic (e.g., how strictly they observed quarantine laws, whether they went to work or not) precludes any examination of the impact of the participants' experiences during the COVID-19 pandemic.

Concerns regarding health-related QoL have risen due to the current COVID-19 outbreak. Various situations can influence an individual's assessment of QoL. The majority of the extant literature believes that conditions such as handicaps, health-related concerns, sickness, or living with someone who is dying harm overall QoL evaluations. Most everyday activities were halted or limited in scope during recent COVID-19 lockdowns. This supported the hypothesis that QoL will be adversely impaired by the COVID-19 pandemic (Brooks, et al 2020). This study found that the participants (n = 347) reported a reasonably decent QoL during the COVID-19 pandemic after additional analysis. The findings of this study corroborate those of a previous study (Algahtani, et al 2021), which found that the COVID-19 pandemic had a substantial impact on many elements of QoL in the KSA.

Furthermore, the impact of gender inequalities on QoL is a growing concern in the Kingdom of Saudi Arabia. Indeed, the current study found that gender differences impacted QoL, and gender was one of the characteristics that predicted the overall QoL score in this study. As a result, the data revealed no significant differences in QoL levels between men and women. This suggests that existing gender disparities in society can impact health to some extent (Mobaraki and Soderfeldt 2010). Even though numerous policies have been implemented at the government level to improve women's QoL, complete implementation is required to achieve progressive change. During the epidemic, the KSA used the same preventative steps for both men and women. Another factor that should not be overlooked is that during the epidemic, women were saddled with more home chores without additional assistance. This became increasingly difficult for professional women when combined with office activities that had to be done from home and the requirements of family members that had to be balanced. Ultimately, this condition may cause tension. Future research should look at the relationship between QoL and other characteristics, particularly in women.

Furthermore, comparing married women with children, married women without children, and single women may show the causes of minor physical issues and their influence on QoL. However, because this was not the study's primary focus, more research is needed to investigate these aspects.

More research was done to see if there was a link between COVID-19 and QoL. Most respondents said their QoL was positive, with women reporting higher QoL scores. Furthermore, sociodemographic factors such as gender were important predictors of QoL. Other factors may impact QoL, such as major worries because of COVID-19's unique dynamic lifestyle changes. It is uncertain whether the dynamic of living during the COVID-19 pandemic influenced QoL levels in any way. Multisectoral methods for COVID-19 containment have been used in Saudi Arabia. The use of surveillance systems and contact tracing as critical aspects in managing the pandemic has been a tremendous endeavor by public health agencies to restrict the development of COVID-19. All aspects of public health, payers, healthcare providers, and non-health sectors (education, security, finance, industry, legislative, public works, habitat), as well as the community, collaborated to promote good health and restrict the spread of the virus (Algaissi et al 2020 ,Ebrahim and Memish, 2020). The public health system and healthcare professionals collaborated, and people with modest symptoms were required to seek medical attention and isolate themselves, which were key conditions for efficient infection control. Hospitals were outfitted, and subsidized testing was made available to all patients, including those with minor symptoms; out-of-pocket

fees were eliminated, potentially assisting in preventing future transmission (Algaissi et al 2020, Ebrahim and Memish, 2020).

In most KSA regions, the authorities adopted strategic readiness, partial lockdowns, and postponed visits to holy locations and mosques (Algaissi et al 2020, Yezli and Khan 2020). These lifestyle changes may have contributed to the reported overall health-related QoL result. Further work found that age levels explain variability in the social, environmental, and psychological aspects of QoL, whereas gender differences can predict the physical and psychological domains of QoL to some extent.

Other social elements and their complicated interplay should also be evaluated. In the current research, there were no correlations between educational level and overall QoL. In contrast, prior research (Regidor, et al.1999) found the opposite. The discrepancy between our findings and earlier findings might be attributed to discrepancies in the created measures and cultural variances between researchers. Several other major intervening factors might affect QoL. When analyzing the outcomes of this study, it is important to keep in mind the level of lockdown and the severity of the pandemic in different geographical places. As a result, it will be vital to consider personal considerations in the future (e.g., physical disability and psychological conditions, social support, and community integration). This study examined physical performance one month after infection with COVID-19. The results indicate that COVID-19 did not affect physical effort, perhaps because most subjects were young. Perhaps the outcomes would be different if the elderly and those with chronic conditions had been addressed.

Finally, the influence of COVID-19 on social life and the perception of pain was examined, and it was shown to be significant over the 4 weeks following infection. It is also suggested that additional studies be conducted, particularly on the psychological effects of COVID-19 on persons who suffer from health difficulties.

CONCLUSION

In general, the respondents' average responses regarding the health condition after recovery are satisfied, with a score of 4.2 out of 5. Compared with the past year, most respondents are neutral about the effect of COVID-19 infection on their overall health and have no chronic effect. Thus, we detected no difference between the prior year and the current year. Questions 3–12 ask about the effect of recovery from COVID-19 on the normal habits of the infected persons. Thus, the scores show that the respondents' normal habits have an above-average score for climbing stairs for several floors and walking more than 1.5 km. Questions 13–19 ask about the performance in the 4 weeks infection period. Thus, the average population answered that there is no measurable effect on physical performance. For questions 20–22, the average population score strongly affects social life and feeling of pain. Questions 23–31 ask about feelings; thus, the average respondent has been nervous, energized, depressed, calm, faithful, sad, frustrated, tired, and having a physiological problem during the 4-weeks infection period. Questions 32–36 ask about getting infected due to others having a neural effect.

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Availability of data and materials

The data sets generated and analyzed during the current study are available on request due to privacy/ethical restrictions.

Declaration of interest statement

The authors declare that they have no competing interests.

Compliance with ethical standards

All procedures performed in study were in accordance with the ethical standards of the institutional and/or national research committee

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Conflict of Interest: The authors declare that they have no conflicts of interest

Informed consent: All participants signed an informed consent form before engaging in the study.

Author contributions: All authours contribute in concept and design of the study, Acquisition of data and data analysis, critical revision of the manuscript and final approval of the version to be submitted

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