Global, WHO Regional Quality of Life in People during Covid-19 Pandemic: A Systematic Review and Meta-Analysis

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Abstract

Background: Strict adherence to safety precautions and, most importantly, social distancing and isolation of people infected with the Coronavirus disease-19 (COVID-19) virus have considerably affected the daily life activities of individuals and overshadowed their routine lifestyle. We conducted a systematic review to provide evidence-based information for clinicians, health policymakers, and social workers in developing useful interventions to effectively mitigate the adverse impacts of the pandemic on people's life and health condition.

Methods: In this systematic review and meta-analysis, studies assessing quality of life (QOL) among the population during the COVID-19 pandemic were searched in four main databases and Google Scholar from the onset of the epidemic to May 2021 with Mesh terms of quality of life and Covid-19.

Results: We included 23058 people who participated in 33 studies; the total quality of life score was estimated at 59.45 (95% CI, 56.33-62.58). Based on the analysis, for each year added to participants' age, their quality of life score was reduced by -0.3%. Furthermore, a significant association between gender and QOL was affirmed, indicating a more favorable condition among men. The highest score of QOL was reported in AMRO at 66.77 (95% CI, 60.55-73) and WPRO at 64.79 (95% CI, 59.30-70.28), respectively, while SEARO with 47.95 (95% CI, 47.67-48.23) got the lowest score.

Conclusion: Our review robustly recommends the necessity for community health promotion programs to be implemented in vulnerable community segments and adds corresponding knowledge to the existing literature about the status of quality of life in people with different socio-demographic characteristics living in different regions worldwide.

Introduction

In December 2019, the COVID-19) outbreak was first reported in Hubei Province, Wuhan City, China. Acute Respiratory Syndrome of Corona 2 (SARS-CoV-2) and its associated disease, COVID-19, has created a global public health emergency and the greatest challenge for humankind since World War II.[1] In addition to the COVID-19 common physical symptoms, psychological disorders have also been reported. Moreover, this pandemic has had devastating effects on people's quality of life (QOL) due to its adverse consequences on people's physical health, social well-being, and mental functioning.[2] Wiederhold (2020) found that amid the Covid-19 pandemic, individuals might experience severe mental problems such as fear, isolation, tediousness, and annoyance as a result of extensive restrictions imposed by governments, particularly quarantine, social distancing, and closure of public places.[3]

Such limitations affected individuals' mental health adversely and raised widespread concerns and growing anxiety over exposure to the COVID-19 virus in the workplace and other public places, particularly among healthcare providers, the old, and people with underlying health conditions.[4] A study conducted by Mucci et al. revealed a significant decline in health-related quality of life among people infected by severe acute respiratory syndrome, especially in physical health, social functioning, and psychological domains.[5] Strict observance of hygienic rules and safety precautions and, most importantly, social distancing and isolation of infected people have considerably affected the individuals' daily life activities and overshadowed their routine lifestyle. It is thought that QOL includes life satisfaction, social functioning, daily life activities, and physical health status. Due to the economic, social, emotional, and psychological burden of COVID-19, most aspects of life were negatively affected, leading to diminished health-related quality of life (HRQoL).[6]

Due to the issue's importance, particularly during infectious disease outbreaks, QOL has become an increasingly important subject in clinical research, care interventions, patient management, and health resource allocation. World Health Organization (WHO) defined HRQoL as an individual's understanding of his/her health status.[7] As a multidimensional concept, it includes a variety of physical, psychological, emotional, social, and environmental factors.[7, 8] HRQoL has also been mentioned as a significant clinical outcome in most literature focusing on its important role in predicting morbidity, hospitalization, and mortality.[9, 10]

Despite the issue's importance, most of the present studies have focused on the associations of COVID-19 with psychological disorders such as depression, anxiety, and fear.[11, 12] To cover the research gap, we conducted a systematic review of the existing literature in different continents and the regions of WHO to examine the effect of COVID-19 on people's HRQoL to provide evidence-based information for clinicians, health policymakers, and social workers in developing useful interventions to effectively mitigate adverse impacts of the pandemic on people's life and health condition.

Methods

Registration and Reporting

We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)[13] and registered this systematic review with PROSPERO (CRD) 42021237355.

Databases and Search Terms

A comprehensive search of electronic databases, including EMBASE, Google Scholar, Scopus, PubMed, and Web of Science, was done from the onset of the Covid-19 pandemic to May 2021. The search terms included (((("life quality"[Title/Abstract] OR "health related quality of life"[Title/Abstract]) OR "health related quality of life"[Title/Abstract]) OR "HRQOL"[Title/Abstract]) AND (Covid-19[Title/Abstract] OR Covid 19[Title/Abstract] OR COVID-19 Virus Disease [Title/Abstract] OR COVID 19 Virus Disease [Title/Abstract] OR COVID-19 Virus Diseases [Title/Abstract] OR COVID-19 Virus Infection [Title/Abstract] OR COVID 19 Virus Infection [Title/Abstract] OR COVID-19 Virus Infections [Title/Abstract] OR 2019-nCoV Infection [Title/Abstract] OR 2019 nCoV Infection [Title/Abstract] OR 2019-nCoV Infections [Title/Abstract] OR Coronavirus Disease-19 [Title/Abstract] OR Coronavirus Disease 19 [Title/Abstract] OR 2019 Novel Coronavirus Disease [Title/Abstract] OR 2019 Novel Coronavirus Infection [Title/Abstract] OR 2019-nCoV Disease [Title/Abstract] OR 2019 nCoV Disease [Title/Abstract] OR 2019-nCoV Diseases [Title/Abstract] OR COVID19 [Title/Abstract] OR Coronavirus Disease 2019 [Title/Abstract] OR SARS Coronavirus 2 Infection [Title/Abstract] OR SARS-CoV-2 Infection [Title/Abstract] OR SARS CoV 2 Infection [Title/Abstract] OR SARS-CoV-2 Infections [Title/Abstract] OR COVID-19 Pandemic [Title/Abstract] OR COVID 19 Pandemic [Title/Abstract] OR COVID-19 Pandemics [Title/Abstract])). In the first step of searching databases, 849 records were identified. After removing duplicates, 511 articles remained for full-text review. To provide an up-to-date estimate of the quality of life and its determinants among people with and without COVID-19, we included studies containing quantitative data on related measures for further consideration. The reference lists of included articles and conference abstracts were also screened to ensure any relevant data were added to the review process.

Inclusion Criteria

Studies were included if they reported quantitative estimates of health-related quality of life and its associated factors among the worldwide population, published in English from the beginning of the Covid-19 pandemic to May 2021, recognized as descriptive, prospective, cross-sectional, case-series and cohort studies, and used SF-36 OR WHOQOL-BREF questionnaires to assess HRQoL among the population.

Exclusion Criteria

The research did not include review papers, brief reports, letter to the editor, expert opinions, editorials, book chapters, commentaries, case-control, thesis, and randomized controlled trials. Furthermore, articles in languages other than English or those published before the announcement of the first confirmed cases in the COVID-19 outbreak or after May 2021 were excluded. Studies were also excluded if they evaluated medication approaches, clinical interventions, and the effects of medical treatment approaches.

Selection Process

The entire search yielded 849 records through electronic database searching. After removing duplicates, 511 articles remained; of which 149 were published in PubMed, 213 in SCOPUS, 55 in Web of Science, and 94 were retrieved from EMBASE. After screening titles/abstracts, 143 records remained for full-text review. In the final step given inclusion/exclusion criteria, 33 articles were included (Figure 1).

Data Extraction

Two reviewers independently assessed the full texts and relevant data, including the author/ authors' name, publication date, research setting, study design, reported score of HRQoL among people with and without COVID-19, and a summary of study findings in terms of quality of life determinants through a data extraction form. (Appendix a)

Assessment Tools

In this study, we included the articles that used SF-36 OR WHOQOL-BREF questionnaires. SF-36 is an easily administered self-reporting quality-of-life questionnaire for evaluating the popular general population's perception regarding their health status. Questionnaire items are scored from 0 (worst health) to 100 (best health) and used to estimate
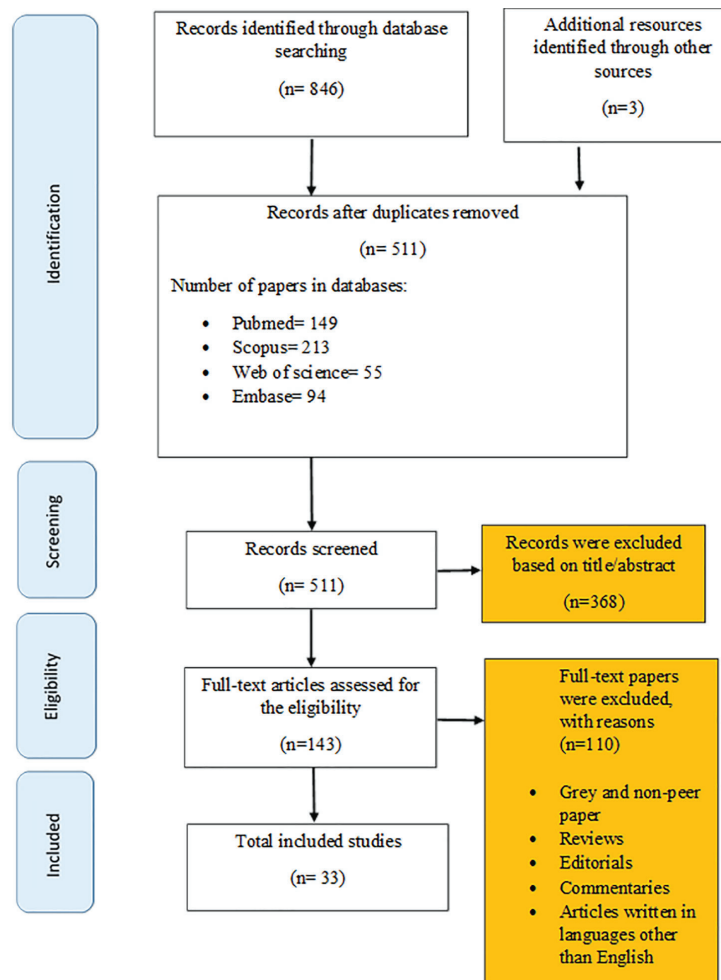

Figure 1: Flow diagram of our review process (PRISMA).

eight subscales, including physical wellbeing, role physical, body pain, general health, strength, social functioning, role emotional, and mental health.[14] Higher scores designate better health conditions, while the lower ones represent more disability. World Health Organization Quality of Life Instrument (WHOQOL-BREF) has 26 questions assessing the quality of life based on an individual's culture, values, personal goals, and concerns. The method of scoring in this questionnaire is the same as SF-36; higher scores show higher quality of life in a spectrum from 0 to 100.[15]

Quality Assessment Tool

To assess the quality of included articles, two independent reviewers used Newcastle-Ottawa Scale (NOS) with a star scoring system in which studies were judged on three main standpoints: selection of study groups, the comparability of study groups, and the ascertainment of either the exposure or outcome for case-control or cohort studies with a range of 0-9 scoring allocated to each study. Any disagreement was resolved through a consensus discussion with a third investigator. Studies with a score of ≥6 were considered high quality, and those with a score of <4 were mentioned as low-quality articles.[16]

Statistical Analysis

We used the random-effects model and validated our study results using sensitivity analysis. The statistical heterogeneity was assessed using the I^2 statistics. In case of heterogeneity in data collection tools, study setting, and different age and gender groups, subgroup analysis was performed. Furthermore, the Egger test was used to measure publication bias, and data were analyzed by Comprehensive Meta-Analysis (CMA) software.

Results

Total Prevalence

Results were obtained based on the items of

Figure 2: The forest plot of QoL in Covid-19 patients.

PRISMA. Among 23058 people who participated in 33 studies, the total quality of life score in people during the COVID-19 pandemic was 59.45 (95% CI, 56.33-62.58) out of 100 (Figure 2).

Meta-analysis Based on Assessment Tools

The score of quality of life in participants surveyed by SF-36 was 57.81 (95% CI, 52.68-62.94), while the score in people whose QOL was measured by WHOQOL-BREF was estimated to be 62.32 (95% CI, 58.17-66.46). Reviewing each of the items of these two questionnaires revealed that the highest score of quality of life was relatively reported for physical functioning with 62.54 (95% CI, 57.20-67.88) in SF-36 and general health with 61.93 (95% CI, 54.57-69.30) in WHOQOL-BREF questionnaire (Table 1).

Meta-analysis Based on Physical/Mental Aspects of Quality of Life

Based on the results, the quality of life was reported separately for physical and psychological dimensions. The related scores were estimated at 59.54 (95% CI, 48.18-70.90) and 51.59 (95% CI, 42.05-61.12), respectively (Figure 3).

Meta-regression Based on Gender

According to the analysis, the quality of life score in men was 69.09 (95% CI, 58.13-72.06); in women, it was estimated at 61.08 (95% CI, 55.46-66.69). Findings also affirmed a significant association between gender and quality of life, indicating a more favorable QOL for males (Figure 4).

Meta-regression Based on Age

Study results showed a statistically significant relationship between age and people's quality of life. Based on the analysis, for each year added to participants' age, their quality of life score was reduced by -0.3% (Figure 5).

Meta-analysis Based on WHO Regions/Continents

According to study findings, AMR and WPR regions had the highest QOL score of 66.77 (95% CI, 60.55-73) and 64.79 (95% CI, 59.30-70.28) respectively, while SEAR with 47.95 (95% CI, 47.67-48.23) got the lowest score. Comparing different continents, results revealed that the United States of America, with 66.77 (95% CI, 60.55-73), had the highest score of QOL, while Africa got the lowest score, 51.23 (95% CI, 47.55-5491) (Table 2).

Meta-analysis Based on Various People Strata

Analysis of quality of life in different strata of society revealed that patients had the lowest score, among which cancer patients with a score of 41.40 (95% CI, 39.50-43.30) and COVID-19 patients with
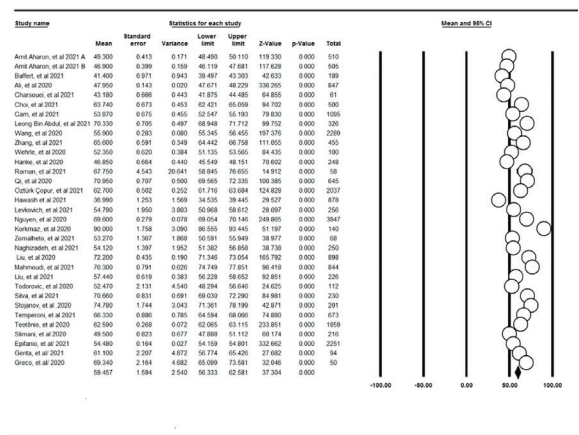
Table 1: A meta-analysis based on Quality of Life Assessment Tools

Groups	Effect size and 95% confidence interval					Test of null (2-Tail)	
	Point estimate	Standard error	Variance	Lower limit	Upper limit	Z value	P value
Mixed effects analysis							
SF-36	57.81	2.62	6.85	52.68	62.94	22.08	0.00
WHOQOL-BREF	62.32	2.11	4.47	58.18	66.47	29.48	0.00
SF-36 Items							
Physical functioning	62.54	2.73	7.43	57.20	67.88	22.95	0.00
Social functioning	47.61	1.70	2.88	44.29	50.94	28.08	0.00
Role–physical	51.28	3.21	10.30	44.99	57.57	15.98	0.00
Role–emotional	48.50	2.71	7.34	43.19	53.81	17.91	0.00
Mental health	51.12	1.85	3.43	47.49	54.75	27.59	0.00
Vitality	51.17	2.45	6.00	46.37	55.97	20.89	0.00
Bodily pain	61.75	2.44	5.95	56.97	66.53	25.32	0.00
General health	61.72	2.56	6.56	56.70	66.75	24.10	0.00
Physical Component Summary	60.35	5.55	30.78	49.48	71.23	10.88	0.00
Mental Component Summary	49.02	2.99	8.94	43.16	54.88	16.39	0.00
WHOQOL-BREF							
Self-perception	56.57	5.27	27.74	46.24	66.89	10.74	0.00
Environmental	58.46	14.29	204.17	30.45	86.46	4.09	0.00
Social relations	53.23	4.53	20.50	44.35	62.10	11.75	0.00
Psychological	50.77	4.76	22.64	41.44	60.09	10.67	0.00
Physical health	52.49	3.99	15.91	44.68	60.31	13.16	0.00
General health	61.93	3.76	14.13	54.57	69.30	16.48	0.00

Z scores (Z value): the number of standard deviations a score or a value (x) is away from the mean; P-value: the probability under the assumption of no effect or no difference (null hypothesis), of obtaining a result equal to or more extreme than what was actually observed.; SF-36 (The 36-Item Short Form Survey); WHOQOL-BREF (The World Health Organization Quality of Life Brief Version)
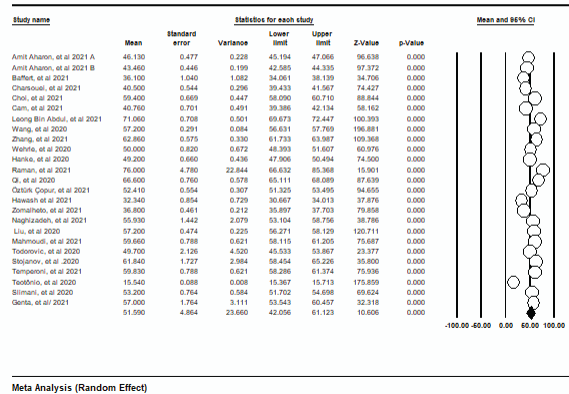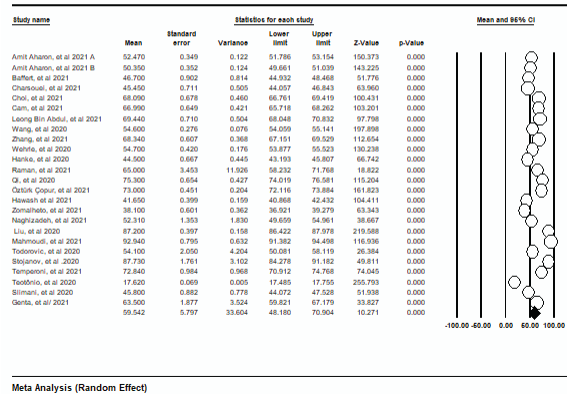
Figure 3: Meta-regression based on Physical/Mental Quality of Life

53.20 (95% CI, 45.14) -61.25) were in the worst condition. On the other hand, the highest score was related to health workers, with 70.73 (95% CI, 58.16-83.30) (Table 3).

Discussion

Overview

Our study is the first to examine the quality of life of the worldwide population by different segments in integrated SLR in the Covid-19 pandemic. To better describe the quality of life using SF-36 and WHOQOL-BREF tools, we investigated the preliminary studies,

interviewed experts, and designed a qualitative spectrum that includes three parts 0-40 (Poor), 41-70 (Moderate) and 71-100 (Good) to determine the quality of life in this pandemic. Moreover, Both tools have an identical scoring system.

Our review estimated the overall quality of life score at 59.45 (95% CI, 56.33-62.58), representing a moderate level. Almost all studies in this systematic review reported a moderate level of QOL associated with the COVID-19 pandemic. For example, in a study conducted by Wang et al. among Chinese people, findings reported QOL at 55.9±13.55.[17] Similarly, the mean score of this measure was estimated at
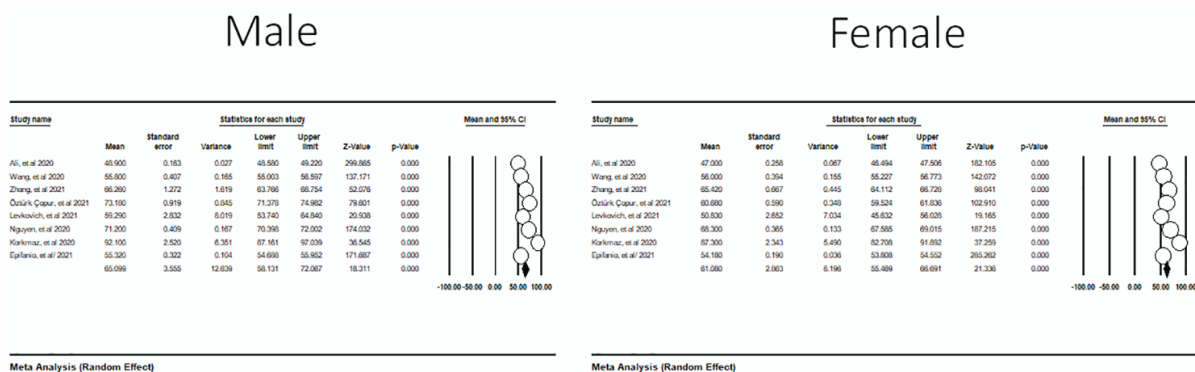
Male

Female

Meta Analysis (Random Effect)

Figure 4: Meta-regression based on Gender
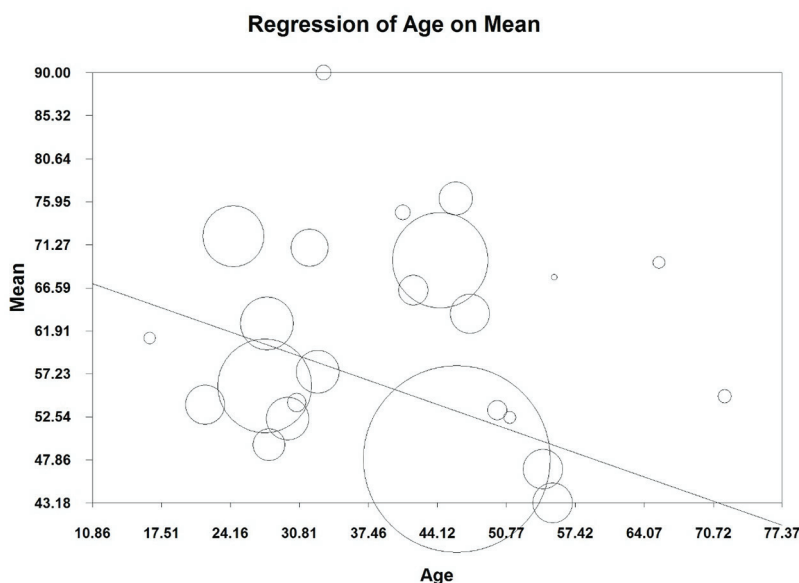
Regression of Age on Mean

Figure 5: Meta-regression based on Age

Table 2: A meta-analysis based on WHO Regions/Continents

Groups		Effect size and 95% confidence interval					Test of null (2-Tail)	
		Point estimate	Standard error	Variance	Lower limit	Upper limit	Z value	P value
Subgroups	Mixed effect analysis							
WHO Regions	AFR	53.27	1.37	1.87	50.59	55.95	38.98	0.00
	AMR	66.77	3.18	10.08	60.55	73.00	21.03	0.00
	EMR	52.03	7.22	52.16	37.87	66.18	7.20	0.00
	EUR	58.51	1.78	3.18	55.02	62.00	32.83	0.00
	SEAR	47.95	0.14	0.02	47.67	48.23	336.27	0.00
	WPR	64.79	2.80	7.84	59.30	70.28	23.14	0.00
Continents	Africa	51.23	1.88	3.53	47.55	54.91	27.27	0.00
	America	66.77	3.18	10.08	60.55	73.00	21.03	0.00
	Asia	60.54	2.73	7.45	55.19	65.89	22.18	0.00
	Europe	56.40	1.89	3.56	52.70	60.10	29.88	0.00

AFR: African Region; AMR: Region of the Americas; EMR: Eastern Mediterranean Region; EUR: European Region; SEAR: South-East Asian Region; WPR: Western Pacific Region

63.74±15.05 in Choi et al. study.[18] Prior studies confirmed that the COVID-19 epidemic worsened people's psychological health globally.[19] Loneliness and social isolation were among the important factors that contributed to individuals' aggravation of psychological problems. Bartels et al. found that feeling of isolation increased from 18% before the coronavirus outbreak to 67% amid the pandemic.[20] In line with these findings, Yang et al. mentioned loneliness as a key mediating factor between social isolation and cognitive abilities.[21]

A systematic review of the public health consequences of social isolation and loneliness before the pandemic verified the adverse impacts of

Table 3: A meta-analysis based on population strata

Groups	Effect size and 95% confidence interval					Test of null (2-Tail)	
	Point estimate	Standard error	Variance	Lower limit	Upper limit	Z value	P value
Mixed effects analysis							
Cancer patients	41.40	0.97	0.94	39.50	43.30	42.63	0.00
Covid-19 Patients	53.20	4.11	16.91	45.14	61.25	17.80	0.00
General population	57.23	2.08	4.31	53.17	61.30	27.58	0.00
Healthcare Workers	70.73	6.41	41.14	58.16	83.30	11.03	0.00
Other Patients	56.94	4.64	21.52	47.84	66.03	12.27	0.00
Pregnant	54.12	1.40	1.95	51.38	56.86	38.74	0.00
Students	61.88	6.37	40.52	49.40	74.36	9.72	0.00

social isolation on people's physical functioning and mental well-being.[22] Saltzman et al. found that the likelihood of a decline in individuals' quality of life has multiplied during the COVID-19 pandemic due to rigid restrictions and preventive measures imposed to control the epidemic.[23] Another study conducted among quarantined people during the SARS outbreak in 2004 also reported feelings of loneliness, depression, and psychological distress associated with limited contact with friends and reduced emotional support from family members due to quarantine and physical distance obligations. Furthermore, adherence to standard precautions and strict preventive measures such as wearing personal protective equipment, quarantining, physical distancing, and ventilation of indoor spaces prohibited them from traveling or going out with friends, which considerably worsened their emotional and mental well-being.[24]

QoL Based on Tools

According to the analysis conducted to assess the quality of life based on different measurement tools, findings revealed a higher mean score of QOL for WHOQOL-BREF [62.32 (95% CI, 58.17-66.46)] compared to SF-36 [57.81 (95% CI, 52.68-62.94)]; while both results categorized QOL in a moderate level. Similarly, in a study performed among 505 Italian people to estimate QOL through the SF-36 questionnaire, the related mean score was reported to be 46.9±8.96; while during the same year, this measure was estimated at 54.48±7.77 by WHOQOL-BREF tool.[25, 26] Therefore, there is an agreement that the results obtained from the latter instrument were relatively higher than the former.

QoL Based on Physical and Psychological Aspects

Furthermore, our study results reported higher scores for the physical domains of QOL than psychological and emotional aspects. In a research conducted by Öztürk Çopur et al. among 2037 people in Turkey, the average quality of life in physical domains was 73±20.36, while the measure related to mental items was reported to be 52.41±24.99.[27] Also, Liu et al. found that the average score difference between these two dimensions was almost 20 points.[28] It is assumed that imposing distancing measures, death of

loved ones and family members, economic pressures, and subsequent psychological disorders contributed to decreased quality of life in different populations. The significant negative impact of mental disorders on quality of life during the COVID-19 pandemic was acknowledged in several studies suggesting that increased uncertainty and anxiety regarding the epidemic adversely affected people's well-being in various health dimensions.[29, 30]

QoL Based on Other Subgroups

Findings revealed that some population segments tended to have a lower quality of life due to their demographic characteristics, employment loss, chronic diseases, and psychological vulnerability. For instance, females and older adults were more at risk of lower QOL. Likewise, Levkovich et al. reported the average score of quality of life to be 59.29±31.02 in men, while it was estimated at 50.83±30.93 for women.[31] This increased risk has been verified in several studies depicting that females bear the greater burden of psychological disorders than men.[1, 11, 32, 33] The gender differences in psychology might be attributable to the fact that women are more genetically sensitive toward worrying situations, and their hormonal imbalances might lead to a range of anxiety and depression symptoms.[34-36] Our study also found a significant inverse relationship between age and quality of life, depicting that older adults had decreased levels of QOL due to a considerable reduction in their social contact. This finding was confirmed in several studies,[32, 37, 38] as people get older, they feel more lonely and socially isolated, resulting in a robust increase in stress and anxiety due to the lack of social and family support. Furthermore, people aged 60 years and older face a gradual decrease in their physical and mental capacities. Therefore, one of health officials' most important policy objectives is to plan for healthy aging through developing and implementing physical fitness and mental health promotion programs.

Our review also revealed that patients with cancer or coronary heart disease had a lower quality of life than others. In a study conducted by Raman et al., the reason for decreased levels of QOL in patients was a prolonged hospitalization time, reduced physical

activity, stress, fear, and depression, which all together negatively impacted their quality of life.[39] Stress of being infected by coronavirus disease and the higher fatality rate of COVID-19 among patients with chronic underlying diseases were other influencing factors affecting individuals' quality of life, as mentioned by Wehrle et al.[40] This review showed that fear of COVID-19 pandemic should be logically controlled among patients through providing them valid information about the disease, possible modes of transmission, precautions, and treatment strategies.

Limitation

There are some limitations regarding the current review. First, our findings concentrated on certain countries due to the lack of quantitative data about the prevalence of mental disorders such as anxiety and depression in some of the geographical regions. We believe researchers can work on these variables to indicate the correlations. Only studies published in English were included in the review, which might result in language bias. Also, non-uniform methods applied to evaluate the QoL in the Covid-19 pandemic might be another reason for methodological heterogeneity. Finally, we suggest that researchers investigate the QoL in countries where no studies have been done yet.

Conclusion

This study is the first systematic review and meta-analysis conducted globally to assess the quality of life in different segments of the population to provide evidence-based information for governments and policymakers to effectively satisfy people's needs to live healthy lives and provide them preventive actions to be protected against adverse psychological effects of the outbreak. Our review robustly recommends the necessity for community health promotion programs to be implemented in vulnerable community segments. It adds corresponding knowledge to existing literature about the status of QOL in people with different socio-demographic characteristics living in different regions worldwide. Furthermore, community participation and active involvement of family members and friends in disease management could considerably help vulnerable populations, particularly those with chronic diseases, to control their stressful conditions better and improve their quality of life.

Conflicts of Interest: None declared.

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