ORIGINAL ARTICLE

sciendo

10.2478/AMB-2024-0040

SELF-PERCEIVED HEALTH AND LIFE SATISFACTION DURING COVID-19 PANDEMIC

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Abstract. The aim *of the study was to assess both self-perceived health and life satisfaction during one of COVID-19 pandemic peaks and to reveal their correlates among the study characteristics.* ***Materials and methods.*** *An online survey was conducted at the end of 2020 among 930 participants recruited via Facebook.* ***Results.*** *A quarter of the participants (26.2%) rated their own health as very good, 47.1% – as good, for 22.8% it was satisfactory, 2.9% claimed it as bad and 0.9% as very bad. Life satisfaction was measured by a 10-point scale ranging from 1 "very unsatisfied" to 10 – "very satisfied". The median level of satisfaction was 6 (IQR 3-8). With the decrease of self-perceived health a significant drop of life satisfaction was observed (Kendall's tau = 0.172, p < 0.001). No significant difference was noticed in both self-perceived health and life satisfaction between patients who had suffered from COVID-19 and those who had not (p > 0.05). Self-perceived health was positively correlated with self-perceived living standard (Kendall's tau = 0.118, p < 0.001) and negative with age (Kendall's tau = -0.112, p < 0.001). Females' health was significantly worse (p=0.006) and also single, divorced and widowed reported significantly worse health compared to married/in a steady relationship (p = 0.019). Life satisfaction was positively correlated with net monthly income (Kendall's tau = 0.199, p < 0.001), self-perceived living standard (Kendall's tau = 0.246, p < 0.001) and education (Kendall's tau = 0.101, p < 0.001). Married or in a steady relationship reported significantly higher life satisfaction than single, divorced and widowed (p = 0.001).* ***Conclusion.*** *Better economic status and living with spouse or having a steady partner (instead of being single, divorced or widowed) helps individuals to maintain better health and subjective well-being during pandemics.*

Key words: *pandemic, COVID-19, coronavirus, SARS-CoV-2, health, public health, self-perceived health, well-being, health-related quality of life, life satisfaction*

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Received: *18 October 2023* ***Accepted:*** *30 January 2024*

INTRODUCTION

COVID-19 caused a dramatic change in all areas of life. Very high excess mortality and a decrease in life expectancy was recorded in Bulgaria alongside the impact on the economic well-being of the population [1-4].

Lockdowns, isolation, the probability of being infected with new disease and possibility to die, the staggering increase in the number of confirmed deaths

and difficult access to medical professionals led to increased levels of depression and anxiety. Recent studies have provided evidence of the impact of COVID-19 pandemic on mental and physical health of the individuals as well as their well-being [5-8]. Self-perceived health is part of the health-related quality of life concept. Life satisfaction assesses the subjective well-being of the individuals [9-10].

Recent research in other European countries showed that fear of COVID-19 was negatively related to health-related hardiness and life satisfaction [11-12]. Moreover, the long consequences of COVID-19 amongst COVID-19 survivors should also be taken into account when evaluating patients' quality of life [13].

The aim of the study was to assess both self-perceived health and life satisfaction in Bulgaria during one of the COVID-19 pandemic peaks (the end of 2020) and to reveal their correlates among the study characteristics.

MATERIALS AND METHODS

An online survey was conducted at the end of 2020. We recruited 930 participants aged 16 years or older via targeted advertisements on Facebook. Demographics, economic status, as well as self-perceived health and self-rated life satisfaction were recorded. Male-to-female ratio of the respondents was 1:1.65 and the median age was 39 years (IQR 29-48).

Statistical methods

The results are shown as the numbers and proportions; median (Me) with interquartile range (IQR; both 25th and 75th percentile) were calculated for ordinal as well as numerical variables. Median values between two groups were compared by Mann-Whitney U test. Pearson chi square test (Fisher's exact test if applicable) was used to check the relationship between categorical variables. Kendall's tau correlation coefficient was calculated to test the relationship between ordinal variables and between ordinal and numerical ones. Results were considered as significant when $p < 0.05$. IBM SPSS v. 22 was used for statistical data processing.

RESULTS

A quarter of all participants (26.2%) rated their own health as very good (coded as 2), nearly half (47.1%) – as good (1), for 22.8% it was satisfactory (0), 2.9% claimed it as bad (-1) and 0.9% – as very bad (coded as -2). The median level of health was 1 (IQR 0-2).

Life satisfaction was measured by a 10-point scale ranging from 1, equal to "very unsatisfied" to 10, equal to "very satisfied". Nearly one out of four respondents (26.2%) rated their satisfaction between 1 and 3, almost half of all respondents (45.4%) claimed values between 4 and 7 and the rest 28.4% pointed satisfaction between 8 and 10. The median level of life satisfaction was 6 (IQR 3-8).

We tested the relationship between self-perceived health and life satisfaction during the COVID-19 pandemic. The results showed a connection between them: the better health the respondents claimed, the higher was their life satisfaction; with the decrease of self-perceived health a significant drop of life satisfaction was observed: Kendall's tau = 0.172, $p < 0.001$, Fig. 1.

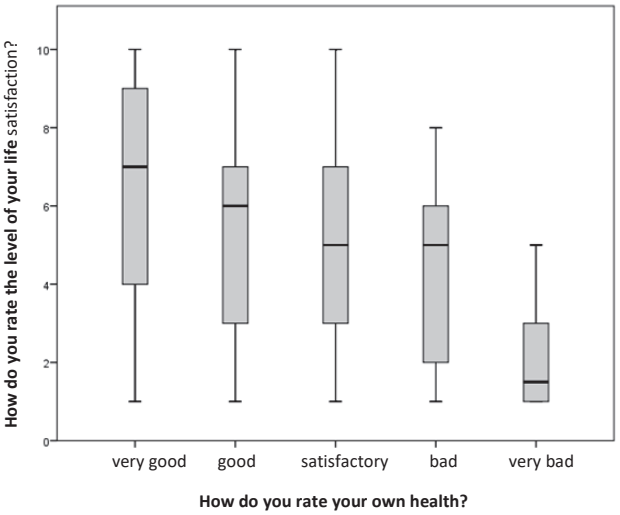

Fig. 1. Life satisfaction levels by different self-perceived health status

We hypothesized that those who had suffered from COVID-19 probably would have worse both self-rated health and life satisfaction compared to the others reporting "no" or "don't know" (DK). The analyses did not prove these hypotheses, both $p > 0.05$ ($p = 0.272$; $p = 0.134$, respectively). Despite of this there was an obvious difference in IQR of self-rated health of both groups but equal medians. In addition we observed a slightly lower median of life satisfaction calculated for participants who have recovered from COVID-19 (Fig. 2).

We checked the relationship between self-perceived health and demographic/economic status variables, Table 1. There was a positive correlation between self-perceived health and self-perceived living standard (Kendall's tau = 0.118, $p < 0.001$). Those who claimed a better living standard also reported better health. Females' health was significantly worse ($p = 0.006$). Respondents who were married or in a steady relationship had better level of self-perceived health compared to single, divorced and widowed ($p = 0.019$). A negative correlation between the age and health was

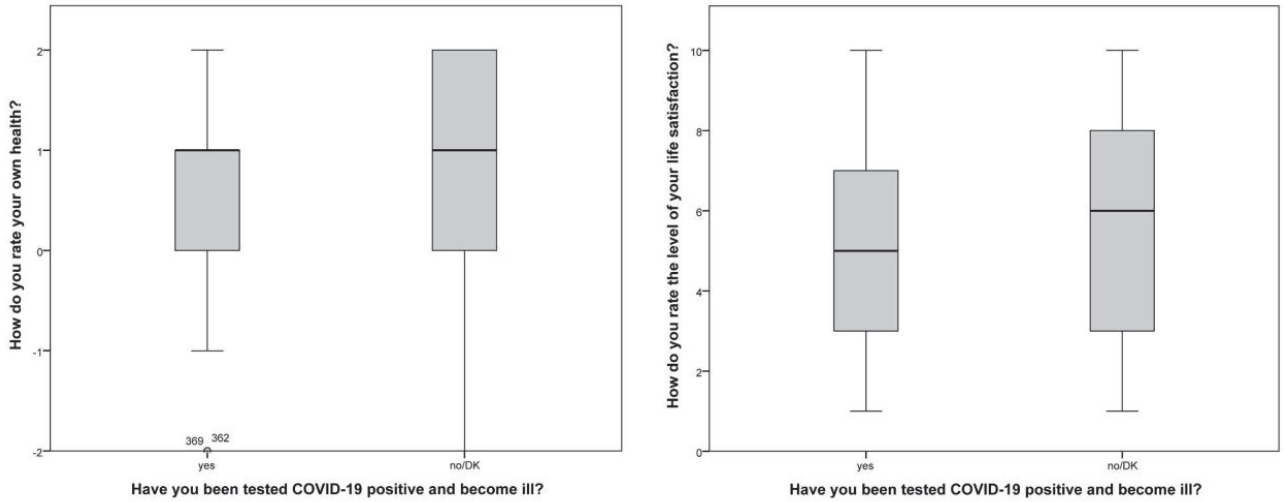

Fig. 2. Self-perceived health and life satisfaction levels of participants who have recovered from COVID-19 vs. the rest of the sample

Table 1. Correlates of self-perceived health

		very bad		bad		satisfactory		good		very good		Kendal's tau	p
		n	%	n	%	n	%	n	%	n	%		
Net monthly income	≥ 500 BGN*	2	1,7	4	3,4	33	28,2	50	42,7	28	23,9	0.057	ns (0.117)
	501-1000 BGN	1	0,5	4	1,9	47	22,6	107	51,4	49	23,6		
	1001-1500 BGN	1	0,5	6	2,9	51	24,3	100	47,6	52	24,8		
	1501-2000 BGN	0	0,0	3	3,5	17	19,8	45	52,3	21	24,4		
	2001-2500 BGN	0	0,0	1	2,6	11	28,9	20	52,6	6	15,8		
	2501-3000 BGN	0	0,0	3	8,3	4	11,1	13	36,1	16	44,4		
	3001 + BGN.	0	0,0	1	1,4	18	26,1	26	37,7	24	34,8		
Self-perceived living standard	Much below the average	3	2,1	4	2,9	35	25,0	59	42,1	39	27,9	0,118	p < 0,001
	Slightly below the average	0	0,0	11	5,6	54	27,6	93	47,4	38	19,4		
	At the average	2	0,5	8	2,2	86	23,3	191	51,8	82	22,2		
	Slightly above the average	1	0,5	4	2,1	33	17,2	81	42,2	73	38,0		
	Much above the average	0	0,0	0	0,0	4	12,1	14	42,4	15	45,5		
Gender	Male, Me, 1 IQR 1-2	3	0,9	10	2,9	69	19,7	155	44,3	113	32,3	Mann-Whitney U test	0,006
	Female, Me, 1 IQR 0-1	3	0,5	17	2,9	142	24,6	283	49,0	133	23,0		
Education	High school	1	0,5	11	5,6	35	17,9	89	45,6	59	30,3	0.020	ns (0.548)
	College	0	0,0	3	4,5	17	25,4	32	47,8	15	22,4		
	Master's or bachelor's degree	4	0,6	12	1,8	157	24,1	311	47,7	168	25,8		
Family status	Not in a relationship/divorced/ widowed, Me 1, IQR 1-2	4	1,0	15	3,8	73	18,5	182	46,1	121	30,6	Mann-Whitney U test	0,019
	Married/in a relationship, Me 1, IQR 0-1	2	0,4	12	2,2	139	26,0	256	47,9	126	23,6		
Residence	Rural	0	0,0	0	0,0	12	27,3	17	38,6	15	34,1	0.010	ns (0.757)
	Town	1	0,7	7	5,2	36	26,9	57	42,5	33	24,6		
	City	3	0,8	10	2,7	75	20,5	180	49,2	98	26,8		
	The capital	2	0,5	10	2,6	89	23,1	184	47,7	101	26,2		
Age	Me; IQR (25th-75th percentile)	48	27-51	37	28-45	42	33-52	39	30-48	35	25-45	0,112	<0,001

*1 BGN = 1.95583 EUR (fixed rate since 1st of July 1997)

observed (Kendall's tau = -0.112, p < 0.001), the levels of self-perceived health significantly decreased with aging. The statistical tests didn't prove a significant difference in self-perceived health by residence and education (p > 0.05). Net monthly income was not related to self-perceived health (p > 0.05).

We also assessed the relationship between life satisfaction and demographic/economic status variables, Table 2. Net monthly income was positively correlated with life satisfaction (Kendall's tau = 0.199, p < 0.001), self-perceived living standard (Kendall's tau = 0.246, p < 0.001) and education (Kendall's tau =

Table 2. Correlates of life satisfaction

Life satisfaction by:		**Median**	**IQR**		**Kendal's tau**	**p**
Net monthly income	≥ 500 BGN	4,0	2,0	7,0	0,199	< 0,001
	501-1000 BGN	5,0	3,0	7,0		
	1001-1500 BGN	6,0	4,0	8,0		
	1501-2000 BGN	6,0	5,0	8,0		
	2001-2500 BGN	6,0	5,0	8,0		
	2501-3000 BGN	7,5	5,5	9,5		
	3001 + BGN.	7,0	5,0	9,0		
Self-perceived living standard	Much below the average	3,0	1,0	7,0	0,246	< 0,001
	Slightly below the average	5,0	3,0	7,0		
	At the average	6,0	4,0	7,0		
	Slightly above the average	7,0	5,0	8,0		
	Much above the average	8,0	6,0	10,0		
Gender	Male	6,0	3,0	8,0	Mann-Whitney U test	ns (0.221)
	Female	6,0	4,0	8,0		
Education	High school	5,0	3,0	7,0	0,101	< 0,001
	College	5,0	3,0	7,0		
	Bachelor's or master's degree	6,0	4,0	8,0		
Family status	Not in a relationship/divorced/widowed	5,0	3,0	7,0	Mann-Whitney U test	0,001
	Married/in a relationship	6,0	4,0	8,0		
Residence	Rural	6,5	4,0	8,0	0.044	ns (0.181)
	Town	5,0	3,0	7,0		
	City	5,5	3,0	8,0		
	The capital	6,0	4,0	8,0		
Median age by levels of satisfaction	1	41	28	53	0.022	ns (0.500)
	2	35	27	46		
	3	36	26	51		
	4	39	29	50		
	5	41	32	50		
	6	37	26	45		
	7	36	27	43		
	8	40	31	47		
	9	43	35	48		
	10	42	34	52		

0.101, p < 0.001). Significantly higher life satisfaction was claimed by those who had higher income, higher self-perceived living standard and were better educated which is especially valid for those who studied in a university. Respondents who were married or in a steady relationship also reported significantly higher life satisfaction than single, divorced and widowed (p = 0.001). The statistical tests didn't prove a difference in life satisfaction by gender and residence (p > 0.05). The age was not related to self-perceived life satisfaction (p > 0.05).

DISCUSSION

Our results showed that nearly half of the participants rated their own health as good and another quarter as very good (a total of 73.3%). The median level of satisfaction was 6 (IQR 3-8) and there was a positive correlation between self-perceived health and life satisfaction. We were not able to prove any significant differences in life satisfaction and self-perceived health between those who had suffered from COVID-19 and those who didn't suffer or were not aware. This could be explained by the relatively low number of respondents who reported that they had suffered from COVID-19 (81; 8.7%). Self-perceived health was positively correlated with self-perceived living standard and negatively related with age. Females and the group of single, divorced and widowed claimed significantly worse health compared to males and resp. the group of married or in a steady relationship. Life satisfaction was positively correlated with net monthly income, self-perceived living standard and education. Single, divorced and widowed reported significantly lower life satisfaction.

A survey conducted before COVID-19 era (in 2018) among healthcare professionals (Shtereva et al.) collected data about self-perceived health. They also used a 5-point scale and nearly half of their respondents rated their health as good which is close to our results. Corresponding to our findings they also observed significant worsening of health with the age increase. In contrast to our results they didn't prove differences between males and females; but proved that highly educated persons claimed better health: MDs compared to nurses, a fact which we were not able to verify [14].

Szwarcwald et al. reported worsening of their respondents' health during COVID-19 pandemics but their methodology was quite different [15].

A study conducted by van de Weijer et al. compared pre-COVID and COVID self-rated health. More than a half of their respondents (58%) during COVID rated their health as good and 27.5% as excellent (corresponds to very good in our questionnaire) which is close to our results [16]. Their findings showed improvement of self-perceived health during the pandemic.

In contrast to our results Moniuszko-Malinowska et al. recorded a decrease in both self-perceived health and well-being of their respondents. Similarly to us they did not prove a difference between COVID-19 survivors and healthy population [17]. Probably life satisfaction and self-perceived health of participants who had suffered from COVID-19 vary by disease severity and treatment that was underwent [18].

EUROSTAT collects data about self-perceived health on an annual basis. They covered the same population as we did: aged 16 years or older and they also used a 5-level scale. According to their results for Bulgaria the proportion of people who claimed to have very good or good health was 67.1% in 2019, a slight drop was observed in 2020 to 66.6%, then an increase to 67.5% in 2021 and 68.1% in 2022 [19]. Our results show nearly 5% higher proportion which is not far from their findings. The difference might be due to the younger population we studied.

Peters et al. measured improvement in self-rated state of health from baseline (before COVID-19) but worsening was recorded mostly amongst those who had been tested and especially those with a positive result. They also noticed a positive relationship between self-rated health and mental health [7]. All this supports the conclusion that the effect of COVID-19 on self-perceived health remains controversial.

Karataş et al. measured life satisfaction by 5-item questionnaire. In line with our results they also didn't prove a correlation with gender and age [20].

Hamermesh reported higher life satisfaction among married and persons with higher incomes which confirms our findings [21].

EUROSTAT measures life satisfaction by using a 11-point scale [22]. Their results showed much lower average satisfaction compared to our results: 4.8 in 2013; 5.4 in 2018; 5.7 in 2021 and 5.6 in 2022. The differences to our results are probably due to the methodology: we calculated the median and they used the mean value; our scale is 10-point and theirs is 11-point. The mean life satisfaction calculated from our data is 5.6 which is not far from the one measured by EUROSTAT despite the different scales. Their results also didn't manage to prove significant differences in life satisfaction between males and females.

An article based on EUROBAROMETER results showed a decline in life satisfaction during COVID-19 era compared to the pre-pandemic period [23]. It's not possible to compare their results to ours due to the different type of question they asked. They re-

ported a decline of life satisfaction during the pandemic's peaks.

One of the limitations of our study is that we cannot compare the self-perceived health and satisfaction of life to their levels before the pandemic. However, it was not possible to address it. An option for that was to ask the respondents to compare their own health before the pandemic and during the study but that should have raised the recall bias. Another limitation is the convenience sample which skews the data in gender and age. However during a pandemic the most applicable data collection method was online. In addition the sample size of our study triples the size of a simple random sampling for the same population. This ensures the validity and reliability of our results to some extent.

CONCLUSION

Factors that affect both self-perceived health and life satisfaction during COVID-19 were self-perceived living standard and marital status. Better economic status and living with spouse or having a steady partner (instead of being single, divorced or widowed) helps individuals to maintain better health and subjective well-being.

Conflict of interest. *All authors declare no conflict of interest.*

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