

Health Anxiety Among the Normal Population and Healthcare Professionals in a Highly Disadvantaged Region During Three Waves of COVID-19

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Abstract

Health anxiety manifests in fearing for our health when we recognize factors endangering it. The COVID-19 pandemic has occurred as such a factor in which millions of people have become infected and lost their relatives. The pandemic initiated by an unknown pathogen has occurred as an obviously health-influencing and -threatening phenomenon. The presence of health anxiety related to COVID-19 is considered to be an adaptive reaction, since it strengthens health behaviour (following epidemiological rules, health-protecting behaviour), but its long-lasting, increased level has created problems by influencing more fields of human life in a negative way and inhibiting people seriously in their everyday activities. Our research goal is the assessment of health anxiety among the population of a highly disadvantaged region in North-east Hungary during three waves of the pandemic. We will deal with the health anxiety of healthcare professionals working in this region separately, and we will examine how much the anxiety of people working with seriously ill patients differs from the normal population's anxiety. This study presents the partial results of the complex mental health image research of the region's adult population. In this unit of the research, we used the shortened version of the WHO Well-being questionnaire and the Short Health Anxiety Inventory. In the online data recording, 550 persons completed the questionnaire on average. It is not representative, but it reflects the attitude of the region's population well.

Keywords: health, anxiety, population, healthcare, professionals, disadvantaged region, COVID-19

I. Introduction

The mental effects of the long-lasting pandemic, uncertainty, the lack of communication and isolation occur among the population not just on short term, but we have to count with their long-term consequences as well.

In our study, we present the partial results of a great and complex research the subject of which is the examination of mental health of a highly disadvantaged Hungarian region's population in the different waves of the pandemic. In our research, besides health anxiety, we examined perceived stress, the level of aggression, well-being and hope measured among the population (Rucska & Lakatos, 2021a; Rucska & Lakatos, 2021b; Rucska et. al., 2021).

Our research goals included the assessment of the population's health anxiety, especially the exploration of the anxiety of healthcare professionals working in patient care, since they have been exposed to the risk of the infection since the outbreak of the pandemic, and they can see the progression of the disease and its consequences from close. Beyond general orientation, we were also curious whether any differences can be experienced in the examined region in the level of healthcare professionals' and the population's health anxiety, and how it changed in the different waves of the pandemic.

II. Literature review

In the last two years, several studies have dealt with the direct and indirect effects of the COVID-19 pandemic on healthcare professionals' mental status (Luo et al., 2020; Pappa et al., 2020; Shanafelt et al., 2020). The wide range of studies is indicated by the fact that numerous meta-analysis can be found by now which provide a comprehensive image about the research performed in this topic.

In their literature review and meta-analysis, during reviewing the studies examining the level of anxiety, depression, acute stress, trauma-related and sleeping disorder related to mental health experienced among healthcare professionals, Marvaldi et al. described the more frequent occurrence and worsening of psychiatric symptoms compared to the past (Marvaldi et al., 2021).

Recently, during summarizing the studies performed among healthcare professionals, Dragioti et al. has concluded that the COVID-19 pandemic has influenced the workers' mental health in a negative way; more specifically, they found the symptoms of anxiety, depression and sleeping disorder more frequent. It can also be seen from the examined data that while the examined nurses were primarily affected by the symptoms of anxiety and depression, physicians reported mostly about acute stress and post-traumatic symptoms (Dragioti et al., 2022).

In the last two years, the examination of anxiety related to health has become more emphasized besides the above-mentioned correlations, since the pandemic has

caused general increase in the level of health anxiety. It is important to note that anxiety related to health is actually the most natural reaction and it can be considered to be an adaptive process on an optimal level, because it helps self-care, and it makes people motivated to take the necessary health-protecting steps and stop or avoid health-damaging behaviour. So, it can be said that feeling fear when perceiving health-endangering factors or becoming anxious because of the imagined negative outcome is natural and this spurs us to action (Kosic et al., 2020; Salkovskis, 1996). If we can protect our health by this, anxiety will decrease. But if the effort fails due to either external conditions or the lack of internal coping capacity, anxiety will become permanent and the person gets to such a chronic stress condition which can obviously cause the deterioration of life quality and mental well-being (Köteles et al., 2011). We have to count with negative consequences, such as the increase of the affected person's distress level, difficulty of performing usual actions, depression and low quality of life (Asmundson & Taylor, 2020; Heinen et al., 2021; Saurer et al., 2020; Tyrer, 2020).

Different literature data can be found in association with the comparison of the level of health anxiety in case of healthcare workers and normal people during the pandemic. While higher anxiety level was measured among healthcare workers in certain studies (Mohd et al., 2021; Mokhtari et al., 2020), Luo et al. reported in their meta-analysis that the study results reviewed and summarized by them indicated the same possibility of anxiety and depression among healthcare workers and the normal population (Luo et al., 2020).

The factors influencing healthcare workers' health anxiety include for example personal and family members' safety, meeting basic needs, the availability of the protective gear for inhibiting the infection, testing opportunity, information, and the available social support (Shanafelt et al., 2020).

Finally, examining individual characteristics and working conditions, a correlation occurred between the number of years a healthcare worker had spent in the job, the type of the medical institute and health anxiety in such a way that the more experienced healthcare professionals working in state care showed lower health anxiety than their younger colleagues or those who worked in private care (Saedi et al., 2022). Further results draw the attention to the influence of individual characteristics (i.e., state and trait anxiety, stress tolerance) and working conditions (i.e., social support) (Shayganfard et al., 2021).

The aim of this current study is to provide new data completing our previous research data about the health anxiety and well-being of a Hungarian region's adult population.

III. Methods

1. Participants

The first data recording of the cross-sectional online survey on the population's mental status was performed between the end of November and the beginning of December 2020, the second was performed in March 2021, and the third data recording was done also in the late autumn-early winter period. Only people over the age of 18 were involved in the online survey research. Participants received information about the aim of the study before filling the questionnaire.

The questionnaire was filled by 528 persons at the time of the first data recording of our research. The second data recording was performed when the third wave of the pandemic occurred in Hungary in March 2021: in this period, 515 persons filled the questionnaire, and 590 persons were involved in the third data recording process.

2. Measures

This study presents the partial results of the complex mental health image research of the region's adult population. The measuring tool includes both the background variables (gender, age, education level) and labour market status, relationship status or the size of the residential settlement. We had questions about subjective health status and religiousness as well. There were further questions about COVID-19 infection and any involvement in association with it.

In this unit of the research, we used the shortened version of the WHO Well-being questionnaire (Susánszky et al., 2006) and the Short Health Anxiety Inventory (Salkovskis et al., 2002; Köteles et al., 2011). While subjective well-being focuses on the frequency of positive emotions and the satisfaction with life, the 18-item scale of the Short Health Anxiety Inventory assesses health anxiety independently from physical health condition. The questionnaire focuses on concerns related to health status, attention to somatic processes and the consequences of a potential disease. The variables include disease belief, susceptibility to a disease, fear and nervousness about the disease, body awareness, fears related to death, and attitudes in connection with other people's and own health. The questionnaire has two sub-scales: one examines the perceived possibility of becoming ill, while the other measures the perceived consequence of the disease (Perczel-Forintos et al., 2018).

In the study, we attach special importance to healthcare workers' health anxiety and well-being.

The online data recording was performed in Wave II, III and IV of the pandemic, and it is not representative because of the convenience sampling procedure, but it reflects the attitude of the region's population well. The changes of health anxiety during the second and third waves of the pandemic were published earlier in the study

“Changing of Health Anxiety in Disadvantaged Population during the Pandemic” (Rucska & Lakatos, 2021b).

IV. Results

Demographics

The average age of the 528 persons participating in *the first phase of the research* (in Wave II of the pandemic) was 39.4 ± 13.1 years. 44.7% of the respondents lived in cities, 28.8% in towns and 26.1% lived in villages. The respondents having higher educational level were overrepresented (59.3%). The majority of the respondents worked regularly (62.1%), studied (15.3%) and the rate of women parenting infants was also higher (11.5%).

In this wave, 16.7% of the respondents have been over a COVID-19 infection. Mostly with mild (50.4%) or medium strength (47.8%) symptoms. 22.7% of those living in one household had at least one infected family member, and 77.3% had more than one infected family members.

At *the second data recording* (in Wave III), 515 persons filled the questionnaire, and their average age was 34.7 ± 13.05 years (range: 18-75 years).

49.6% of the respondents lived in cities, 24.6% in towns and 25.8% lived in villages. Most of the respondents had higher education level again (53%). 60.9% of the respondents work regularly and 22.5% of them are students. At the time of answering, the number of people having been infected by COVID-19 increased (23.5%) and the severity level of the symptoms also changed. The rate of people experiencing mild symptoms decreased (45.1%), and the rate of medium strength symptoms increased minimally (52.6%).

The infection of people living in the same household also increased (37.1%) and 62.9% had more than one infected family members. At the time of answering, 45.8% of the sample had already received at least one vaccine. Finally, only 5.5% of the respondents had asked for mental support from a professional in the recent period, most of them, 94.5% had not asked for this kind of help. At the same time, 38.2% of the respondents answered that if they had the chance, they would ask for mental help (Rucska & Lakatos, 2021b).

590 persons participated in *the third data recording* (Wave IV), and their average age was 35.4 ± 13.4 years. The youngest respondent was 18, while the oldest was 85 years old. 21.4% of the sample was healthcare worker. 48.1% of the respondents lived in cities, 29.1% in towns and 22.8% lived in villages. Most of the respondents had higher education level (44.5%). Most of the respondents worked regularly (66.5%) or studied (21.4%).

The rate of people having been infected by COVID-19 increased (32.5%): 40.7% of them had mild symptoms and 52.3% of them suffered from medium strength symptoms. The rate of people having mild symptoms showed gradual decrease.

Health anxiety

In case of health anxiety, minimal difference could be detected between the three data recording processes (Table 1). Decreasing health anxiety could be detected at Wave III with minimally higher dispersion compared to Wave II, while the pandemic raged more intensively in Wave III, and the restrictions were stronger than in the previous wave. Although, some increase could be experienced in Wave IV compared to the earlier values, the dispersion of which was also higher.

	Wave II (Mean)	Wave III (Mean)	Wave IV (Mean)
Health anxiety	33.84	33.43	34.18
SD	7.32	7.62	8.8

Table 1. Health anxiety

No significant difference could be detected in Wave II and III in case of genders ($p > 0.15$) (Table 2), but men’s health anxiety level was higher than women’s in case of data measured in Wave II. This rate turns in Wave III, as the health anxiety values of women participating in the sample were higher than men’s values (Rucska & Lakatos, 2021). These rates increased in Wave IV: the health anxiety level of women became significantly higher ($p < 0.0001$). In this period, the health anxiety of the elder age group was significantly stronger ($p < 0.007$). The level of healthcare professionals was minimally higher than the average (34.4 ± 8.1).

gender	Wave II Health anxiety (Mean)	Wave III Health anxiety (Mean)	Wave IV Health anxiety (Mean)
mal Mean	34.9583	32.7361	32.3299
fem Mean	33.6163	33.5463	35.0909

Table 2. Anxiety level in terms of genders

If health anxiety is examined in terms of the residence (Table 3), it can be observed that significant difference ($p < 0.037$) could be experienced in health anxiety in Wave IV, and regarding the settlement types, a tendency-level increase can be experienced mainly in cities. The level of health anxiety during Wave IV of the pandemic is the most significant in people living in cities ($p > 0.07$).

Residence	Wave II	Wave III	Wave IV
	Health anxiety (Mean)	Health anxiety (Mean)	Health anxiety (Mean)
city	33.9550	32.8500	35.151
town	33.7857	33.3254	34.058
village	34.2803	33.9848	33.544

Table 3. Anxiety level in terms of residence

In Wave II, significant difference can be detected in case of education level ($p < 0.005$): health anxiety of people with lower education level is stronger than in case of respondents with higher education level (Rucska & Lakatos, 2021b). This type of difference cannot be observed in the other waves of the pandemic.

In data measured in Wave III, health anxiety was significantly higher in families ($p < 0.017$) where one/more family members had been infected by COVID-19 (Rucska & Lakatos, 2021b). This phenomenon could not be detected in data of Wave II; however, it has come to the fore in the closer family environment ($p < 0.016$) and wider socio-cultural environment that health anxiety is stronger in case of infections occurring with more severe symptoms ($p < 0.008$).

Examining the sub-dimensions of health anxiety, the following changes can be observed (Table 4):

	Wave II (Mean)	Wave III (Mean)	Wave IV (Mean)
Perceived possibility of becoming ill	26.1970	25.8754	26.3831
Perceived consequence of becoming ill	7.6434	7.5573	7.8000

Table 4. Sub-scales of health anxiety

Examining the perceived possibility of becoming ill, decrease can be experienced in Wave III compared to Wave II, while a not significant increase ($p > 0.9$) exceeding Wave II can be observed in Wave IV. In Wave II and III, the values of the health anxiety sub-scale are higher in people with subjectively satisfactory and bad health status, which are the strongest in Wave IV in comparison with the previous ones (Rucska & Lakatos, 2021b) (Table 5).

<i>What do you think about your general health status?</i>	Perceived possibility of becoming ill Wave II (Mean)	Perceived possibility of becoming ill Wave III (Mean)	Perceived possibility of becoming ill Wave IV (Mean)
<i>Very bad</i>	25.5000	42.0000	43.6000
<i>Satisfactory</i>	28.4903	28.2843	28.0948

Table 5. Health anxiety sub-scale, and the bad and satisfactory subjective health status

In all the examined waves, subjective health status is determining in the values of both the perceived possibility of becoming ill ($r_2=-0.41$; $r_3=-0.44$; $r_4=-0.41$) and its consequence ($r_2=-0.26$; $r_3=-0.25$; $r_4=-0.31$), so the values of the sub-scale are higher in case of people with worse subjective health status.

In terms of residence, it can be observed that the values of the sub-scales tend to be the highest in the villages ($p>0.18$) in both pandemic waves (Table 6).

	Wave II		Wave III		Wave IV	
	Perceived possibility of becoming ill	Perceived consequence of becoming ill	Perceived possibility of becoming ill	Perceived consequence of becoming ill	Perceived possibility of becoming ill	Perceived consequence of becoming ill
city	26.2900	7.4000	25.4350	7.4050	27.1459	8.0222
town	26.2566	7.6711	25.8095	7.5159	26.3158	7.7427
village	26.6014	7.7609	26.4318	7.5530	25.8881	7.6567

Table 6. The values of the health anxiety sub-scale in terms of residence

The values of the sub-scales decreased in Wave III, but it could be observed that they were higher in people living in villages, and the rate of decrease was lower (Rucska & Lakatos, 2021). In Wave IV, health anxiety can be experienced mainly in people living in cities (perceived possibility of becoming ill: $p<0.05$), while the level of this is the lowest in the residents of villages.

In terms of genders, significant difference can be found in the sub-scales of perceived possibility of becoming ill in Wave II and IV ($p_2<0.028$; $p_4<0.00001$), but the values of the sub-scale occur more markedly in women in all the three waves (Table 7).

	Wave II		Wave III		Wave IV	
	Perceived possibility of becoming ill	Perceived consequence of becoming ill	Perceived possibility of becoming ill	Perceived consequence of becoming ill	Perceived possibility of becoming ill	Perceived consequence of becoming ill
male	26.0357	7.7500	25.1528	7.5833	24.7371	7.5928
female	26.2161	7.6314	25.9932	7.5530	27.1894	7.9015

Table 7. Values of the health anxiety sub-scale in terms of genders

In the perceived consequence sub-scale, men’s values are minimally higher than women’s in Wave II, which difference can also be observed in Wave III, but this turns in Wave IV and women’s values become higher than men’s, however, not significantly ($p>0.3$).

WHO Well-being

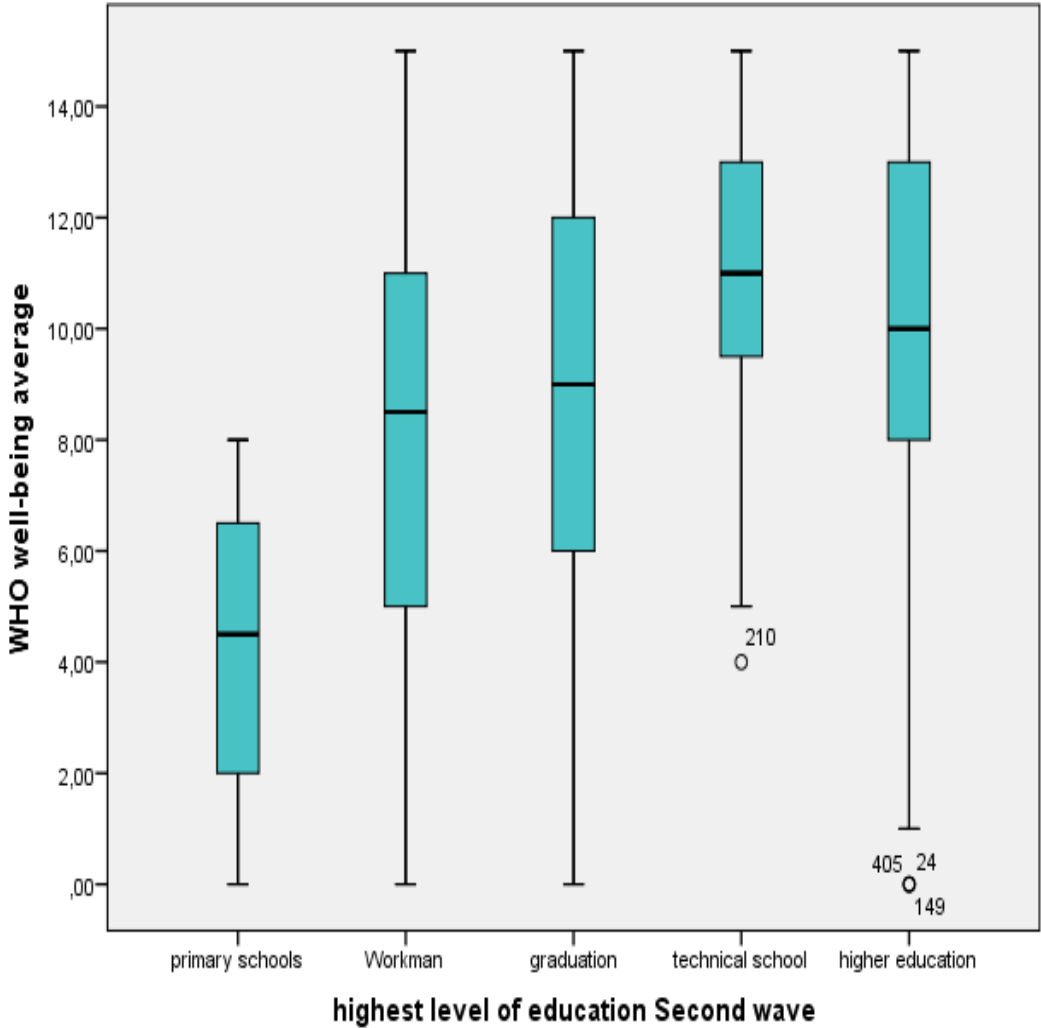
The Well-being Scale used in the research is one of the most commonly applied measuring tool which is used for the assessment of mental well-being based on self-esteem. The scores to be achieved could vary between 0 and 15 on the scale. When evaluating the results, higher scores mean more positive and favourable mental state.

Overall, it can be observed that well-being has changed a lot in the different periods of the pandemic: it deteriorated in Wave III, then it showed an increasing tendency again by Wave IV. This also manifests in the dispersions because the population’s well-being state has become permanent in the long-lasting pandemic situation. In the beginning, men had better mental status, however, women’s mental status exceeded men’s by Wave IV of the pandemic (Table 8).

gender	Wave II WHO Well-being (Mean)	Wave III WHO Well-being (Mean)	Wave IV WHO Well-being (Mean)
male Mean	10.0417	9.4107	9.4948
female Mean	9.5892	9.4110	9.7121
total Mean	9.6524	9.4110	9.6407
Total Std.	3.74030	3.57617	3.58923

Table 8. WHO Well-being in terms of genders

Examining the dimension of education level, it can be stated that significant differences of well-being can be detected in Wave II and III ($p_2 < 0.0003$; $p_3 < 0.005$) that do not occur in case of Wave IV ($p < 0.3$) (Figure 1). It can be observed that while school dimensions are more distinct in Wave II, this difference is less strong in Wave III.



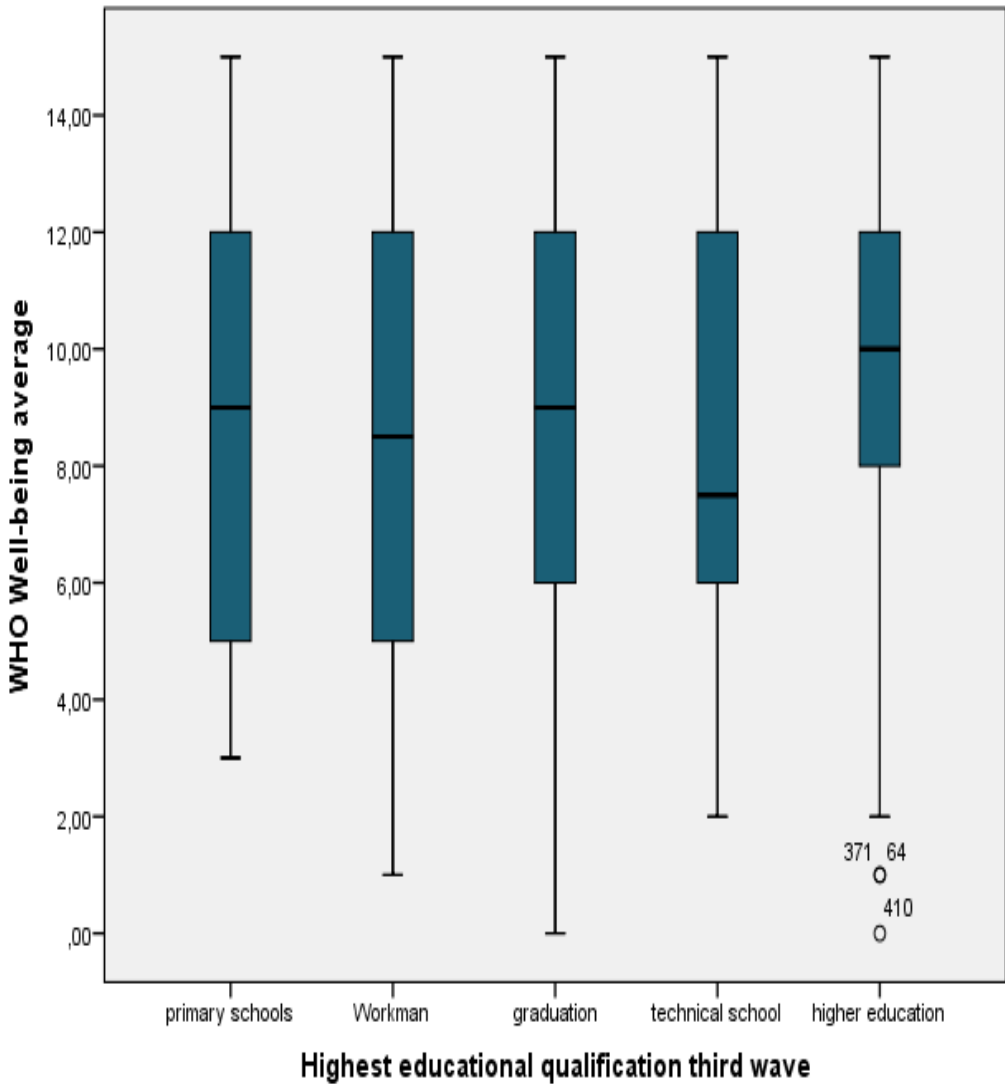


Figure 1. WHO Well-being in the dimension of education level in Wave II and III of the pandemic

In Wave IV, a significant difference could be found in case of age when examining well-being ($p < 0.006$), and the well-being index of the elder age group was significantly lower than in the younger group.

In Wave II, a medium strength negative correlation could be detected between health anxiety and well-being ($r = -0.443$; $p < 0.000$). This correlation minimally decreases in

Wave III ($r=-0.38$; $p<0.000$), then it becomes stronger again by Wave IV ($r=-0.42$; $p<0.000$).

Healthcare professionals

In the examined sample, the values of healthcare professionals show minimal deviation compared to the population’s values (Table 9).

	Wave II			Wave III			Wave IV		
	Perceived possibility of becoming ill	Perceived consequence of illness	Health anxiety	Perceived possibility of becoming ill	Perceived consequence of illness	Health anxiety	Perceived possibility of becoming ill	Perceived consequence of illness	Health anxiety
Mean	26.813	8.178	34.991	25.620	7.753	33.373	26.535	7.842	34.377

Table 9. Health anxiety values of healthcare professionals

42% of the healthcare professionals have been over the infection and other 23% of them are uncertain about having been infected. The infection passed with mild symptoms in some of them, 68% had medium strength symptoms and 6% needed hospitalization. In case of professionals, the level of health anxiety showed significantly weak correlation ($p<0.05$; $r=0.269$) with the strength of the infection.

In Wave II and IV, the health anxiety values of healthcare professionals are higher than the population’s values, but insignificantly lower values could be detected in Wave III in comparison with the population’s values. The different sub-scale values were also higher in Wave II compared to the population, which values showed strong decrease in Wave III and almost similar level in Wave IV.

In Wave III, the values of the perceived possibility of illness sub-scale significantly differ in case of the education level of healthcare professionals ($p<0.036$) which deviation can also be detected in Wave IV, however, not so strongly ($p>0.6$). The higher the professionals’ education level, the higher the sub-scale values. In case of residence, significant difference can be found in Wave IV ($p<0.008$), and health anxiety is higher in healthcare professionals living in cities than those living in smaller settlements. Health anxiety was influenced in a significantly positive way by the occurrence of the vaccine. 37% of healthcare professionals would like to get mental support in Wave III of the pandemic, which demand has increased in Wave IV when

10.5% of the workers have already used it and further 38.1% of them would use mental help if possible.

Finally, we examined how healthcare professionals' well-being differs from the population's well-being (Table 10). While the value is the same as the population's value in Wave II and IV, the measured well-being index is significantly lower in Wave III. In Wave II, a medium strength negative correlation could be found between the health anxiety of healthcare professionals and well-being ($r=-0.36$; $p<0.000$), and this strength is under the population's average.

gender	Wave II WHO Well-being (Mean)	Wave III WHO Well-being (Mean)	Wave IV WHO Well-being (Mean)
Healthcare Professionals	9.6	8.9	9.6
SD	3.4	3.6	3.4

Table 10. Well-being of healthcare professionals

V. Discussion

Anxiety related to health can occur in all life situations when we fear our health from external, health-endangering conditions or a disease, we deal with the possibility of becoming ill and the outcome of the disease. Basically, it is a natural reaction that motivates the protection of health and the return to it, so, actually, it serves the protection of life. But, similarly to anxiety conditions becoming chronic, long-lasting health anxiety can cause the deterioration of quality of life and mental well-being. The pandemic has created such a situation worldwide that has justified the assessment of the population's health anxiety and its long-term tracking.

Our research data explained above allow us to conclude that health anxiety have occurred in waves in the last two years in the examined region: mild decrease could be detected in Wave III compared to the values measured in Wave II, while it increased again in Wave IV.

Although, the level of health anxiety did not show correlation with gender, age and socio-economic status in studies performed before the pandemic, it has brought changes in this sense as well. Results suggest that the two genders reacted in different ways in the certain waves: while health anxiety was higher in women in Wave II, it was higher in men in Wave III, and finally, the global increase in women's anxiety level measured in Wave IV occurred emphatically. At the same time, elder people and people living in cities showed significant anxiety increase in Wave IV. And finally, a

correlation could be found in terms of education level in the examined sample as well: respondents with lower education level reported about stronger health anxiety in Wave II.

Health anxiety related to diseases perceived in the environment (family or wider socio-cultural environment) has become stronger by the passing time, and this correlation is the highest in Wave IV.

In terms of mental well-being, it can also be stated that it has changed in the different waves of the pandemic: compared to Wave II, it deteriorated in Wave III, then it showed improving tendency again by Wave IV. While men had better well-being in the beginning, women's well-being has exceeded men's by Wave IV of the pandemic. In terms of age, differences could be detected in well-being in Wave IV: by this time, the well-being index of elderly people was significantly lower than in case of the younger respondents.

Examining the connection between health anxiety and well-being, it can be concluded that, however, some waving can be observed here as well, the correlation known from earlier was proven in all the three waves according to which the two conditions were inversely related to each other: the aggravation of health anxiety was accompanied by the deterioration of mental health.

Examining healthcare professionals, it could be determined that their health anxiety level was only minimally higher than the normal population's level in the examined region. Education level and residence occurred as causal factors in their case: lower education level and metropolitan environment was accompanied by higher health anxiety.

Our data also showed that, however, the occurrence of the vaccine influenced health anxiety in a positive way, healthcare professionals reported significantly lower mental well-being in Wave III than in the other two examined waves. At the same time, as time progressed, the rate of healthcare professionals asking for mental help or requiring it if possible increased.

VI. Conclusion

The study results aimed at the assessment of the population's mental state performed in Wave II, III and IV of the pandemic in the North-east Hungarian region are consistent with the international and national studies which have proved the negative effect of COVID-19 on mental health. The increase of health anxiety caused by the pandemic and the deterioration of mental well-being among both normal population and healthcare workers can be stated with great certainty among people living in the examined socio-economically disadvantaged region. In the examined region, health anxiety showed correlation with gender, age, education level and settlement type, however, it also showed reverse correlation with mental well-being. In the examined sample, the correlations between the mental phenomena have been proved rather in

case of elderly people and people living in greater settlements. Our results are essential in the success of further prevention and intervention work of helping professionals in terms of the examined region.

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