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Perception of pandemic and students' quality of life in the initial stage of pandemic – a quantitative and qualitative perspective

Abstract: The pandemic prompted young people to develop different strategies for coping with stress. Disruption of societal reality and the need to adapt to new situation affected people's well-being significantly. The research was conducted between 15 and 30 June 2020 on a group of 151 students. The following tools were used: Ryff's Psychological Well-Being Scales in the Polish adaptation and the authors' own tool for measuring coping with a pandemic situation and its perception. In addition to quantitative analysis, qualitative analysis was used. Well-being was found to be related to the perception of pandemic, the sense of coping with pandemic, the sense of support, and the sense of control. Within these relationships the gender differences were found. Social support turned out to be the most significant correlate of well-being in both men and women. Qualitative analyses identified three sub-models for each gender. The criterion that allowed us to select different groups of cases was subjects' perception of the pandemic influence on their lives. The hypothesis: "Perception of the pandemic as a meaningful situation is related to psychological well-being" was confirmed only in the female group. The hypothesis: "Sense of better coping, feeling more supported, feeling more accepted, and feeling more in control are positively associated with psychological well-being" was confirmed (except for acceptance). Qualitative analyses showed that women were more involved in building social support network and experienced a stronger loss of control over the crisis. Men manifested greater autonomy and resourcefulness in emergency situation.

Keywords: *well-being, coping in pandemic, social support*

INTRODUCTION

The Covid-19 pandemic has caused tremendous disruption in all spheres of human life (Zhu & Liu, 2020). It has increased the prevalence of post-traumatic stress disorder (Liu et al., 2020), anxiety (Cao et al., 2020), depression (Zhou et al., 2020), feelings of loneliness and contributed to poor quality of life and sleep for many people (Kaparounaki et al., 2020). The anxiety people suffered seems to be especially relevant to the beginning stage of the pandemic when there were no vaccines available, social isolation and distancing were the most severe and the closure of educational institutions and

workplaces was unprecedented. That is why it is worth emphasizing that the collection of data took place in this particular, early period of the pandemic, between June 15 and June 30, 2020.¹

Students appear to be a group that is particularly vulnerable to the consequences caused by the COVID-19 pandemic, which is caused by many factors, including the developmental stage of life that young people are in. The stage of emerging adulthood is a time when difficulties, such as increased psychoactive substance use or reduced educational attainments, may surface, affecting psychological or social well-being (Arnett et al., 2014). The closure of schools and the shift to remote online learning have

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¹ We would like to thank anonymous reviewer for bringing our attention to the fact that the perception of pandemic, in the course of time, was a subject of high variability.

contributed to the isolation of young people from their peers (Sun et al., 2020). Students have been forced to abandon their lives and daily routines and to change their living conditions and location. The return to the family home, the abandonment of previous social relationships, and the need to adapt to online learning resulted in increased stress levels and difficulties in activities of daily living (Schiff et al., 2021). Studies conducted at two universities in China in the early stages of the pandemic found elevated levels of anxiety in students by 15.4% (Wang & Zhao, 2020) and 24.9% (Gao et al., 2020). The emergence of the pandemic caused depression and stress in Spanish (Odriozola-González et al., 2020), French (Wathel et al., 2020), Colombian (Pedrozo-Pupo et al., 2020) and Brazilian (Araújo et al., 2020) students. US students reported worry and anxiety about their health and that of their loved ones, difficulty concentrating attention, sleep problems, reduced social contact and increased concerns about academic performance (Son et al., 2020). The COVID-19 pandemic has reduced the quality of life and lifestyle of many young people.

The notion useful in capturing dramatic changes that appeared in people's lives is the interdisciplinary concept of quality of life. Quality of life is an interdisciplinary concept and it is defined in manifold ways. The WHO Quality of Life Group defines quality of life as an individual's perception of their life position in the context of their culture and the value systems of the society in which they live, compared to their goals, expectations, standards, and concerns (WHO Quality of Life Group, 1995, p. 1405). It is a broad concept that includes references to physical, mental, social, and personal health (WHO, 2014). Quality of life should be determined by subjective and objective indicators. Especially subjective factors aim to show psychological and individual aspects (Huebner et al., 2005).

The concept of quality of life has many synonymous terms in the literature, including "health", "life satisfaction", and "happiness". In the late 20th century, quality of life, well-being and happiness became important areas of research for psychologists. There are two main conceptions of happiness in the literature: hedonic and eudaimonic. The hedonic conception of happiness was conceptualized in the model of subjective well-being, that consists of three building blocks – the presence of positive emotions, the lack of negative emotions and the satisfaction with life (Diener, 1984). Ryff and Keyes (1995) on the other hand, proposed the eudaimonic model for capturing happiness (referred to in the literature as psychological well-being or positive functioning). It consists of six dimensions: life purpose, personal development, environmental functioning, autonomy, positive self-esteem, and social contacts.

Pandemic-related stress and coping strategies

No matter which approach to understanding well-being we decide to rely on, there is no doubt that the COVID-19 pandemic - via increased uncertainty, economic loss, confusion, stigma, closure of schools, colleges, and workplaces - affected the mental health of individuals and the perceived quality of their lives. COVID-19 pandemic

affected the mental health of individuals contributing to increased uncertainty, economic loss, confusion, stigma, closure of schools, colleges, and workplaces. Many people have experienced stress, insomnia, frustration, irritability, that all can possibly contribute to depression, anxiety disorders and post-traumatic stress disorder (Sheroun, et al., 2020).

A pandemic is perceived by many people as a powerful stressor that threatens their assets and possessions. The resulting fears, tension, and uncertainty of tomorrow have contributed significantly to the deterioration of psychological functioning. Therefore it is crucial to promote and enhance quality of life in crisis (Wolanin, 2013). Instead of taking action to overcome obstacles (task strategy), the development of an evasive, defensive attitude (passivity strategy) has become increasingly common (Markiewicz, 2019). The way a person functions in a stressful situation depends not only on the personality predispositions and the level of stress, but also on the cognitive assessment. The level of stress a person experiences depends on time, environment, and other people (Moos & Swindle, 1990).

In stressful, crisis situations, a person manifests a specific style of coping with stress that is a manifestation of "sets of coping strategies or ways, some of which are activated in the process of coping with a specific stressful confrontation" (Heszen-Niejodek, 1996, p. 19). Coping plays an important role in the relationship between personal resources and well-being (Krok & Zarzycka, 2020; Wolanin, 2020). Students around the world have tried to cope with stress by seeking support from others, choosing positive or negative coping strategies (Son et al., 2020). Research conducted in 2020 on a sample of 517 students found that during the COVID-19 pandemic, Polish students most often used the coping strategies of acceptance, planning and seeking emotional support (Babicka-Wirkus et al., 2021).

Personal resources (social support, control) for better coping

Researchers investigate which factors contribute to better coping with COVID-19 Ongoing research focus on: self-efficacy, perception of the COVID-19 threat, prosocial behaviors occurring in a pandemic situation, and perceived social stigma. Perceived social support has been recognized as another protective factor of well-being (Hefner & Eisenberg, 2009) and may be particularly important during the COVID-19 pandemic due to increased social isolation. Four factors that may contribute to better coping with COVID-19 are frequently examined in ongoing research, and these predictors include: self-efficacy, perception of the COVID-19 threat, prosocial behaviors occurring in a pandemic situation, and perceived social stigma. Prosocial and altruistic behaviors contribute to better well-being in individuals who support others (Curry et al., 2018). Moreover, self-efficacy in a pandemic situation may become an important predictor of mental health by increasing confidence in one's ability to prevent COVID-19 and increasing one's sense of control over the situation

(Person et al., 2004). Perceived social support and control over the environment have been recognized as another protective factors of well-being (Hefner & Eisenberg, 2009) and may be particularly important during the COVID-19.

Coping with stress in a threatening situation involves how a person perceives the threat and how they interpret it (Bartone et al., 1989). When making assessments of a person's well-being, it is important to consider a person's overall sense of quality of life, the circumstances, and the actions taken to achieve satisfaction (Zawiślak, 2011). According to Campbell and Gilles (2001), support plays an important role in coping with difficult situations. It facilitates better access to resources and acts as a buffer against stressful events. Lack of support and low self-esteem can significantly contribute to lower levels of overall well-being (Arslan et al., 2009). On the other hand, research by Curry et al. (2018) found that prosocial and altruistic behaviors contribute to better well-being in individuals who support others.

Control is associated with a sense of autonomy and the ability to influence certain aspects of one's life. In a threatening situation, commitment plays an important role, providing a sense of meaning and purpose and determines how to approach the problem (Kobasa, 1979). Treating a difficult situation as a challenge can contribute to well-being by discovering opportunities for growth. When valued resources are threatened, the acquisition of social-emotional skills such as self-regulation, self-control, and goal-directed behaviors are important. These psychological assets predict better functioning for academic youth (Ronen & Seeman, 2007). Planning one's actions and actively implementing them increase adaptation to a difficult situation and foster constructive coping strategies. Planned, purposeful organization of time, and development of new interests allow one to better survive difficult times. Self-control enables better coping with emotional challenges and difficult situations (Farley & Kim-Spoon, 2017).

Pandemic impacts students' well-being

In the rapidly changing landscape following the onset of COVID-19, social distancing and isolation at home are common guidelines issued by governments and other authorities. Following the recommendations, most people are dramatically changing their daily routines, limiting activities and interactions that affect well-being (Brooks et al., 2020; Lima et al., 2020). Research have shown (Hanson & Jones, 2015; MacKerron & Mourato, 2013) that being outdoors and engaging in hobbies positively increase positive affect. Studies conducted in previous viral outbreaks (e.g., SARS, H1N1), have shown their negative effects on human psychological functioning (Brooks et al., 2020). Students as a whole are no exception as to the pervasive changes influencing well-being are concerned. Their daily routine has changed even more profoundly due to the closure the educational institutions all over the world.

Research show that socioeconomic status, family stress related to COVID-19, perceived social support, and self-efficacy were somewhat correlated with each other.

Prosocial behavior and media consumption were significantly correlated with depression and anxiety. Female students reported higher levels of anxiety, which is consistent with existing evidence indicating that women feel more anxious and are more likely to have anxiety disorders (McLean & Anderson, 2009). From online surveys conducted in Poland on March 15-17, 2020 ($N = 511$) and March 29-31, 2020 ($N = 110$), among 18-35 year-old-subjects, loneliness was the most salient problem reported in the surveys. People experiencing loneliness have a strong fear of social isolation, relationships and decreased psychological or financial well-being. Forced isolation was experienced to the greatest extent by those with few friends.

The coronavirus pandemic has affected education systems around the world, practically leading to the closure of schools, universities, and colleges. Social isolation has contributed to increased levels of anxiety, including episodic paroxysmal anxiety and depression (Qiu et al., 2020). On the one hand, the pandemic revealed educational opportunities, but on the other hand, it revealed deficits in students' social and emotional interactions. Students need to acquire self-discipline and active learning skills whereas lecturers need further professional development. Challenges also include creating comprehensive quality assurance systems for online teaching and learning. Pandemic has revealed that quality is not only about achieving learning outcomes, but also about social and emotional development (Zhu & Liu, 2020). A study conducted by Sun and colleagues (2020) on Chinese university students ($N = 1912$) between March 20 and April 10, 2020, about two months after the official announcement of the COVID-19 outbreak in China, found that most students perceived stress related to family finances. In terms of mental health difficulties, most participants (67.05%) reported COVID-19-related post-traumatic stress symptoms in the clinical range (mild or higher). Depressive symptoms were clinically elevated in 46.55% and anxiety symptoms in 34.73% of participants. About one-fifth of the subjects (19.56%) reported suicidal thoughts in the past two weeks (rare to frequent). Most clinical symptoms were mild. Increase in symptoms severity occurred for post-traumatic stress (17.67%), depression (15.58%), and anxiety (9.62%).

There are numerous studies on students' quality of life and related variables, including personality, health, and environment (Makinen & Pychyl, 2001; Ng, 2005). When studying students' quality of life, it is important to consider the level of stress, depression, and anxiety an individual experiences. These components significantly affect experienced well-being. Coping with stress is an important component of quality of life indicating mental and physical health, and affecting well-being in the long run (Ben-Zur, 2009). Well-being can be developed and promoted by many variables (Wolanin, 2016). Research show a positive relationship between psychological well-being and physical activity. Students engaged in physical activity experienced greater satisfaction with life (Maher et al., 2014). Elements that significantly reduce quality of life include

depression, poor interactions, and low self-esteem, which contribute to poorer academic performance (Arslan et al., 2009).

METHOD

Aim of the study and hypotheses

The purpose of the research conducted was to show the impact of the pandemic on students' quality of life.

Thus we put forward the following hypotheses:

1. The perception of the pandemic as a significant situation, that affects the lives of the respondents, is related to psychological well-being.
2. The sense of better coping, experiencing greater support, greater acceptance and the sense of control are positively associated with psychological well-being.

Participants and procedure

Procedure

The project was approved in its entirety by the Ethical Committee of the Institute of Psychology of the John Paul II Catholic University of Lublin Paul II Catholic University in Lublin (no. KEBN_22/2020). The participants were recruited into the study via e-mail invitations and were asked to complete the survey on a personal device (e.g., computer, phone) in a private space. Data were collected between 15 June and 30 June 2020, approximately three months after the official announcement of the COVID-19 outbreak in Poland.

Participants

The study included 151 students of two Polish universities (in Lublin and in Rzeszów). The subjects were aged between 19 and 50 years ($M = 21.77$; $SD = 4.26$). 110 women and 41 men were examined.

Measures

The study used a questionnaire that included items assessing demographic information (e.g., age, gender, region).

Another tool was the Psychological Well-Being Scales (Ryff, 1989, 2014), in Polish adaptation (Karaś & Cieciuch, 2017). The questionnaire consists of 84 items. The respondent gives answers on a 6-point Likert scale, where 1 means "I strongly disagree" and 6 means "I strongly agree". The reliability of the scale made using Cronbach's alpha for the 84 test items ranges from $\alpha = 0.79$ (for autonomy) to $\alpha = 0.89$ (for life goals).

In addition to the standardized instrument, we used 6-questions scale arranged specially for the study (The Pandemic Perception Scale):

- 1) I can handle a pandemic situation very well.
- 2) I have sufficient support from other people in a pandemic situation.
- 3) I accept the situation I am currently in.
- 4) I feel that I have the situation I am in under control.
- 5) The pandemic has had a major impact on my life.
- 6) The pandemic has turned my life upside down.

Participants responded to the questions using a 7-point Likert scale by selecting responses ranging from "I strongly agree" to "I strongly disagree".

Data analyses

In the first step we analyzed data quantitatively. In the second stage qualitative analysis was deployed - the Strategy of Process Transformation Reconstruction (PTR) by E. Rzechowska. It is a complex analysis of empirical data that allows to undertake research when there is insufficient knowledge about a given phenomenon and when it is difficult to fully conceptualize the research problem (Rzechowska, 2014). Data analysis is performed on two levels: at the level of individual cases and at the level of a set of cases (Rzechowska, 2010). Level I - analysis of individual cases leads to the emergence of important characteristics reflecting the individual life paths of the subjects. Level II - analysis of a set of cases, which aims to identify a set of cases with similar characteristics. The procedure is based on the analysis of a decision tree generated by Quinlan's algorithm C4.5 (Rzechowska, 2014; Rzechowska & Dacka, 2016). Quinlan's algorithm is one of the symbolic classification methods of data mining methods. Data mining allows discovering new, unknown, useful patterns in databases (Fayyad et al., 1996).

RESULTS

Table 1 presents descriptive data for the Psychological Well-Being Scales and for The Pandemic Perception Scale separately for men and women and comparison of means for these two groups. Supplementary material 1 and 2 present more detailed information on the descriptive data.

The first step of the analyses was Pearson's R correlation analysis (see Table 2 and Table 3).

H1: The perception of the pandemic as a meaningful situation, that affects the lives of respondents, is related to psychological well-being.

In women, personal growth was positively associated with feeling that the situation has impacted the lives of the respondents ($r = .24$). The global well-being score correlated positively with the belief that the pandemic has had an impact on life ($r = .19$).

In men, the associations of well-being with pandemic perception were found to be insignificant.

H2. 2. Sense of better coping, a sense of greater support, greater acceptance, and greater sense of control are positively associated with psychological well-being.

In the female group, autonomy was not associated with a sense of support, acceptance of the current situation, or a sense of control over the situation. Mastery of the environment was positively associated with a sense of coping ($r = .24$), sense of support ($r = .28$), and a sense of control over the situation ($r = .27$). Life purpose was positively associated with a sense of support ($r = .20$) and a sense of control ($r = .21$). Self-acceptance was associated with a sense of support ($r = .24$). The global well-being score correlated positively with the sense of support ($r = .30$). The results in the female group

Table 1. Means and standard deviations for the variables

The Pandemic Perception Scale	<i>M</i> women	<i>M</i> men	<i>SD</i> women	<i>SD</i> men	<i>t</i>	<i>df</i>	<i>p</i>	<i>M</i> women – <i>M</i> men	<i>CI</i> -95%	<i>CI</i> +95%	Cohen's <i>d</i>
1/ I can handle a pandemic situation very well.	4.95	5.42	1.32	1.66	-1.77	149	.08	-.46	-.97	.05	.31
2/ I have sufficient support from other people in a pandemic situation.	5.45	5.27	1.28	1.47	0.73	149	.47	.17	-.30	.65	
3/ I accept the situation I am currently in.	4.54	5.15	1.68	1.90	-1.91	149	.06	-.60	-1.24	.02	.34
4/ I feel that I have the situation I am in under control.	4.26	4.76	1.60	1.77	-1.64	149	.10	-.49	-1.08	.10	.30
5/ The pandemic has had a major impact on my life.	4.77	4.54	1.57	1.80	.79	149	.43	.23	-.35	.82	
6/ The pandemic has turned my life upside down.	3.37	2.81	1.89	2.04	1.61	149	.11	.56	-.13	1.26	
Ryff's Psychological Well-Being Scales											
Autonomy	4.10	4.29	.82	.84	-1.26	149	.21	.14	-.11	.40	
Environmental Mastery	4.07	3.92	.70	.79	1.11	149	.27	.08	-.14	.32	
Personal Growth	4.53	4.44	.63	.68	.76	149	.45	.42	.12	.72	
Positive Relations with Others	4.49	4.06	.85	.81	2.77	149	.01	.31	.01	.60	.52
Purpose in Life	4.42	4.11	.77	.96	2.06	149	.04	.32	.008	.63	.36
Self-acceptance	3.93	3.61	.80	1.05	2.03	149	.04	1.10	-.24	2.45	.34
Total	25.53	24.43	3.58	4.10	1.62	149	.11	-.46	-.97	.05	.29

indicated a relationship between variables such as sense of support, sense of control, sense of coping and some dimensions of well-being. The obtained results supported the hypothesis.

In the male group, autonomy was positively associated with a sense of coping ($r = .40$). Mastery of the environment was associated with a sense of coping ($r = .37$), sense of support ($r = .36$), and sense of control ($r = .44$). Personal growth correlated positively with a sense of coping ($r = .41$), sense of support ($r = .44$), and a sense of control ($r = .43$). Positive relationships with others correlated positively with the sense of support ($r = .44$). Life purpose was positively related to sense of coping ($r = .38$), sense of support ($r = .31$), and a sense of control ($r = .33$). Self-acceptance was positively associated with a sense of coping ($r = .40$), sense of support ($r = .41$), and a sense of control ($r = .46$). The global well-being score correlated positively with a sense of coping ($r = .42$),

sense of support ($r = .42$), and a sense of control ($r = .42$). In men, results showed an association between higher sense of coping, sense of support, sense of control and dimensions of psychological well-being. The results provided support for the hypothesis.

Regression analyses were additionally performed, separately for each dimension of well-being, as well as the global score (dependent variables). Predictors in this analysis were: sense of coping with the pandemic, sense of support, acceptance of the situation, sense of control, assessment of the impact of the pandemic on the subjects' lives, and gender.

The results of regression analysis for autonomy were found to be statistically insignificant.

For well-being in the form of mastery over the environment, the regression coefficients showed that the significant predictors included sense of support ($b = .13$, $\beta = .24$, $p < .01$) and a sense of control ($b = .10$, $\beta = .23$,

Table 2 Correlations between scales from the Pandemic Perception Scale and the Psychological Well-Being Scales in women

Psychological Well-Being Scales	Pandemic Perception Scale					
	S1	S2	S3	S4	S5	S6
Autonomy	.07	.15	.01	.08	.05	.06
Environmental Mastery	.24*	.28*	.09	.27*	.15	.07
Personal Growth	-.01	.17	.04	.03	.24*	.18
Positive Relations with Others	.07	.36*	.04	-.02	.19	.12
Purpose in Life	.15	.20*	.13	.21*	.16	-.01
Self-acceptance	.13	.24*	.15	.18	.13	.01
Total	.14	.30*	.10	.16	.19*	.09

Note. S1 - Coping with pandemic, S2 - Support in pandemic, S3 - Acceptance of situation, S4 - Control over situation, S5 - Influence of Pandemic, S6 - Significant changes

* $p < .05$

Table 3 Correlations between scales from the Pandemic Perception Scale and the Psychological Well-Being Scales in men

Psychological Well-Being Scales	Pandemic Perception Scale					
	S1	S2	S3	S4	S5	S6
Autonomy	.40*	.05	.23	.24	-.11	-.10
Environmental Mastery	.37*	.36*	.08	.44*	-.23	-.18
Personal Growth	.41*	.44*	.22	.43*	-.19	-.17
Positive Relations with Others	.05	.44*	.14	.10	-.03	.04
Purpose in Life	.38*	.31*	.12	.33*	-.13	-.07
Self-acceptance	.40*	.41*	.04	.46*	-.10	-.07
Total	.42*	.42*	.17	.42*	-.16	-.11

Note. S1 - Coping with pandemic, S2 - Support in pandemic, S3 - Acceptance of situation, S4 - Control over situation, S5 - Influence of Pandemic, S6 - Significant changes

* $p < .05$

$p < .01$). The standardized beta coefficients indicated that the higher sense of support and a sense of control, the higher well-being in the dimension of mastery over the environment. The model was a good fit to the data ($F(2,148) = 12.439, p < .00001$) and explained 13% of the variance of the dependent variable (R^2).

For personal growth the sense of support was found to be among the significant predictors ($b = .12, \beta = .26, p < .01$). The standardized coefficient beta indicated that the higher sense of support the higher the well-being in the personal development dimension. The model was a good fit to the data ($F(1,149) = 10.466, p < .00150$) and explained 6% of the variance of the dependent variable.

Significant predictors for the positive relationships with others included feeling supported ($b = .24, \beta = .38, p < .001$) and gender ($b = -.38, \beta = -.20, p < .001$). The standardized beta coefficients indicated that the higher sense of support the higher well-being in the dimension of positive relationships with others. This data also showed that the sense of greater well-being was found in women. The model was a good fit to the data ($F(2,148) = 17.420, p < .0001$) and explained 18% of the variance of the dependent variable.

Gender was found to be among the significant predictors of well-being in the life purpose dimension ($b = -.31, \beta = -.17, p < .001$). The standardized coefficient

beta indicated that higher well-being in the life purpose dimension was found in women. The model was a good fit to the data ($F(1,149) = 4.2507, p < .04097$) and explained 2% of the variance of the dependent variable.

For self-acceptance dimension significant predictors included the sense of support ($b = .16, \beta = .23, p < .01$), sense of control ($b = .11, \beta = .20, p < .05$) and gender ($b = -.35, \beta = -.18, p < .05$). The standardized beta coefficients indicated that the higher sense of support and the sense of greater control the higher well-being in the self-acceptance dimension. Moreover higher sense of well-being was found in women. The model was a good fit to the data ($F(3,147) = 8.6108, p < .00003$) and explained 13% of the variance of the dependent variable.

Sense of support was found to be among the significant predictors of the scale of overall psychological well-being ($b = .97, \beta = .34, p < .001$). The standardized coefficient beta indicated that the higher sense of support the higher well-being in general. The model was a good fit to the data ($F(1,149) = 20.074, p < .00001$) and explained 11% of the variance of the dependent variable.

Qualitative analyses

Data analysis in the Strategy of Process Transformation Reconstruction proceeds through two levels. Each level consists of three stages (Rzechowska, 2014; Rzechowska & Dacka, 2016 modified version).

Level I: Single Case Analysis

At Level I, each subject was described with a set of items and categories that were important for reconstructing the individual's well-being, considering some of its components including: autonomy, mastery over the environment, personal growth, positive relationships with others, life purpose, self-acceptance, and attitude towards the pandemic situation. Data transformation at this level involved three steps:

1. Initial data analysis. Preliminary analysis of the results obtained from each subject was aimed at selecting from the tools applied (their items) categories of description relevant to reconstruct the characteristics of the respondents, including quality of life and references to the situation of the pandemic.
2. Selection of the characteristics describing the subject. As a result of the content analyses of items the characteristics were extracted to describe each subject.
3. Recording of individual characteristics in the database. The record created this way was a kind of basic report describing the characteristics of each respondent.

Level II: analysis of a set of cases

At Level II, the analysis was directed at separating groups of subjects with common characteristics. Analysis of a decision tree provided the basis for the selection of variants. A detailed analysis of the internal structure of each variant and their interrelationships became the basis for separating more general structures (sub-models) that accurately reflected the transformation of students' quality of life. Subsequently, the analysis between the sub-models provided a basis for building a hypothetical model of the transformation of students' quality of life in a pandemic situation. The Level II analysis consists of three stages:

1) Database and selecting a set of cases with common characteristics.

Selection of a set of cases with common characteristics is done using Quinlan's C4.5 algorithm (Quinlan, 1993).

A researcher prepares a database (in this case: 151 individuals characterized using 92 attributes reflecting personal characteristics - quality of life and attitudes toward the pandemic). The software poses and verifies the hypotheses, given the classification criterion chosen by the researcher, e. g. *Pandemic has had a major impact on my life x Gender*.

2) Decision tree and the reconstruction of partial models of the phenomenon.

The analysis of the obtained decision tree and the partial models of the phenomenon (variants, submodels) selected on its basis, reflecting the transformation of the quality of life of students in a pandemic situation. The fragment of the dendrogram reflecting the basis for reconstructing the exemplary variant (Variant F₁) in the group of women included in the Submodel F₃ is shown in Figure 1.

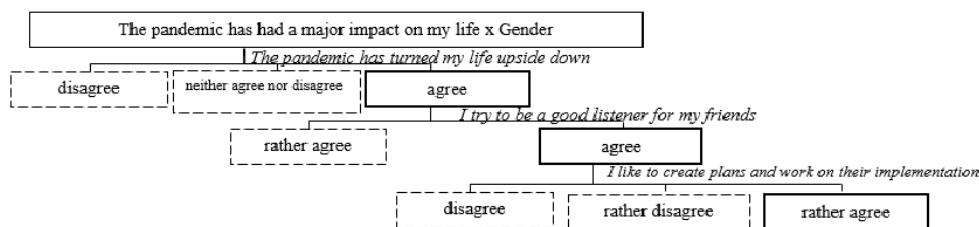
3) Constructing a hypothetical model of the phenomenon transformation.

The detailed analysis of the internal structure of each variant is the starting point for the construction of more general structures (sub-models), which reflect the specificity of the analyzed phenomenon in a more general way (Kulik et al, 2021). Analysis of connections between sub-models provided a basis for building a hypothetical model of the transformation of students' quality of life in a pandemic situation.

4) Securing the value of the study.

At a first pass, reliability was secured by the elaboration of results by independent competent judges. At the second level of the analysis, the reliability of the research was assessed by the error that burdens the decision tree (here: 13.2%; with acceptable 25%) and internal consistency (the consistency of each partial transformation of well-being and the consistency of the organization of the model as a whole). The results were considered reliable.

As a result of the dendrogram analyses, men and women were characterized, showing differences in quality of life transformations and attitudes towards the pandemic



Note. The fragment of the decision tree presented above is a basis for the reconstruction of a variant (being a part of a sub-model, in this case F₃ – “Women recognizing the impact of the pandemic on their own lives”). The starting point is a classification criterion chosen by a researcher (in this case “The pandemic has had a major impact on my life x Gender”). The categories present in this sample decision reflect: *The pandemic has turned my life upside down* (“I agree”); *I try to be a good listener for my friends* (“I agree”); *I like to create plans and work on their implementation* (“I rather agree”). The data determined by the structure of the decision tree has been supplemented with information from a demographic survey. The emerging set of characteristics has become a basis for reconstructing changes in the quality of students’ life in a pandemic situation.

Figure 7: Mediation effect of logical thinking

situation (those perceiving or not perceiving the impact of the pandemic on their lives and those indifferent to the situation).

Sub-model M1. Men not perceiving the impact of the pandemic on their lives

Sixteen men in the age range 19 to 28 ($M = 21.75$) formed the sub-model. The respondents studied "Internal security", "Civil engineering", "Psychology" and "Management". They lived mostly in rural areas.

Perception of the pandemic

Male respondents deal well with the pandemic situation. They accept and control the situation they are currently in.

Elements of well-being:

Autonomy. On the one hand, men try to be independent by, among other things, expressing their own opinions and making decisions on their own. On the other hand, they are still dependent on their environment, as they tend to submit to people with strong opinions. There is a strong need to gain acceptance from others.

Environmental mastery. Representatives of this sub-model experience a sense of responsibility for their own actions and decisions. They try to carry out the duties entrusted to them. Sometimes they are overwhelmed by an excess of activity. Men appreciate the opportunity to gain experience. Thanks to this, they can learn about themselves and verify their knowledge about the world.

Personal development. They are committed to acquiring new qualifications, skills, and experience to learn more about themselves. They benefit from effective schemata that enable them to cope well with everyday tasks. They feel stronger and wiser now.

Positive relationships with others. Men are perceived as tender and loving people. They engage in conversations with relatives and friends. Respondents sometimes experience a sense of loneliness when they face a great deal of difficulty.

Life purpose. The men are satisfied with their accomplishments and experience purpose and meaningfulness in their lives. They currently focus on the present because planning for the future makes them anxious.

Self-acceptance. Respondents experience satisfaction with their track record until now. However, paradoxically, they currently do not think positively about themselves despite having some accomplishments.

Sub-model summary: Personal development and sense of responsibility as a basis for quality of life.

Sub-model M2. Men indifferent to the impact of the pandemic on their own lives

The sub-model consists of five men between the ages of 19 and 24 ($M = 21.00$). The respondents studied mainly "Internal security", a few studied "Psychology". They resided mainly in rural areas.

Perception of the pandemic

Respondents cope well with the pandemic situation. They experience sufficient support from others and a sense of control over the current situation.

Elements of well-being:

Autonomy. Men feel independent in opinions and actions (not giving in to peer pressure, holding their own opinion in controversial situations). Sometimes they change decisions when they do not meet with the approval of people close to them. When evaluating themselves, the respondents take into account their system of values and worldview.

Environmental mastery. Men feel responsible for their lives, including the tasks they fulfil. Sometimes they experience stress, especially when they are not able to complete all planned activities. Respondents enjoy managing their finances effectively.

Personal development. Respondents value the acquisition of life experience. It allows them to expand their knowledge about themselves and the world. Men are able to change their habits when the situation demands it.

Positive relationships with others. Respondents try to be good listeners in the relationships they form with others. They value friends and the social network they build, but they experience a sense of loneliness in difficult situations.

Life purpose. Men experience satisfaction with their lives and accomplishments to date. They are currently focused on the present because of the concerns about the future.

Self-acceptance. Respondents do not accept themselves as they are. They feel inferior when they compare their track record with others. They are aware of their mistakes. However, looking back upon their lives, they would not want to change anything.

Sub-model summary: Independence of opinions and actions as a basis of the quality of life.

Sub-model M3. Men noticing the impact of the pandemic on their own lives

The sub-model was formed by twenty men ranging in age from 19 to 31 ($M = 22.25$). The respondents studied mainly "Internal security", less frequently "Psychology" and "Management". They lived mostly in rural areas.

Perception of the pandemic

Men are trying to cope with the pandemic. They experience support in the present situation.

Elements of well-being:

Autonomy. Subjects attempt to be independent by not succumbing to peer pressure, expressing their own opinions and views. Self-satisfaction is more important for men than acceptance from the environment. Sometimes, however, that they succumb to the influence of the environment.

Environmental mastery. Respondents are responsible for their own actions. They blame themselves if they do not succeed in everything they have planned. They feel busy, but they experience satisfaction because of being able to cope with their responsibilities effectively.

Personal development. Representatives of this sub-model like to try new things in their lives. They value gaining experience through which they can learn something

about themselves and the world. They recognize that they have become different people over the years. For them, life is a process of constant learning, change, and growth.

Positive relationships with others. Men are engaged in conversations with family and friends. In their conversations, they strive to be good and supportive listeners. In relationships with friends, they have a sense of being outside observers.

Life purpose. Respondents experience satisfaction with their accomplishments. They are focused on the present because the future fills them with anxiety. They feel proud of their lives and of who they are.

Self-acceptance. Men are satisfied with their lives and accomplishments. They are aware of past mistakes, but in retrospect, they see that everything in their lives has worked out well.

Sub-model summary: Satisfaction, purposefulness of one's own life as a basis of satisfaction with life.

The overview of the sub-models for males is presented in Table 4.

Sub-model F₁. Women not perceiving the impact of the pandemic on their lives

Thirty women ranging in age from 19 to 27 (*M* = 21.60) formed this sub-model. The respondents studied “Psychology”, “Internal security”, “Romance philology” and “Management”. They mainly resided in the villages, few in the cities.

Perception of the pandemic

Women cope well with the pandemic. They receive support from others. They accept the current situation and experience a sense of control over it.

Elements of well-being:

Autonomy. Respondents try to be independent by forming their own opinions, beliefs, making decisions, even in spite of the lack of acceptance from the environment. Sometimes in order not to stand out they try to fit in with the views of the environment. Women are satisfied with themselves and their beliefs about themselves.

Environmental mastery. They feel responsible for everything that happens in their lives. Everyday duties are not difficult for them. Women are good at managing their finances. Sometimes they get stressed in situations when they are not able to do everything they have planned.

Personal development. Respondents value gaining experiences in their lives that allow them to verify their knowledge about themselves and the world. They like to try new things, however, in most situations they deploy proven ways of getting things done. They feel that as they grow older they become better, wiser people.

Positive relationships with others. Women are perceived by those around them as loving and affectionate. However, they find it difficult to maintain close relationships with other people. They are eager to engage in conversations with relatives and friends. They strive to be supportive and to be good listeners.

Life purpose. Respondents are satisfied with their lives. They try to think about the future. They have a sense of purpose and meaning in their lives. They perceive the purposefulness of daily activities.

Self-acceptance. The women experience satisfaction with the history of their lives to date. They try to think positively about themselves. They accept themselves just the way they are.

Sub-model summary: Independence and meaningfulness of life as a basis for the quality of life.

Sub-model F₂. Women indifferent to the impact of the pandemic on their lives

Women forming this sub-model studied “Internal security”, “Psychology” and “Management”. They lived mainly in rural areas, few in urban areas.

Perception of the pandemic

Women cope well with the pandemic situation. They receive support from others and experience a sense of control over the situation.

Table 4. Men’s sub-models overview

Men	Sub-model summary	Pandemic perception	Resources	Shortcomings	Temporal perspective
Not perceiving the impact of the pandemic on their lives	Personal development and sense of responsibility as a basis for quality of life	- acceptance - control - tested patterns	- responsibility for own decisions, actions - personal development	- dependence on the opinion of others - need for acceptance	- present
Indifferent to the impact of the pandemic on their lives	Independence of opinions and actions as a basis of quality of life	- support from others - control - flexibility	- independence of opinions, actions	- lack of purpose, sense of life - lack of self-acceptance	present
Perceiving the impact of a pandemic on their own life	Satisfaction, purposefulness of one's own life as a basis of satisfaction with life	- support from others - loss of control	- satisfaction with the implementation of daily tasks, relationships	- apparent purposefulness - planned activity	- present

Elements of well-being:

Autonomy. Respondents manifest dependence on others by becoming similar in their behavior and thinking to those around them. They are concerned about opinions about themselves. Women have difficulty expressing their own views on controversial issues. They often change decisions if they do not gain approval from family or friends.

Environmental mastery. They are in control of their surroundings. Respondents are responsible for what happens in their lives. They admit that they cope quite well with numerous daily challenges. The women are convinced that they have managed to arrange their lives in an appropriate way and have chosen the right style of living for themselves.

Personal development. Women are willing to try new solutions and activities in their lives. They value gaining experience because it allows them to expand their knowledge about themselves and about the world. Women notice the shift in their own views over the years.

Positive relationships with others. Respondents are perceived by those around them as loving and affectionate. They tend to engage in conversations with relatives and friends. Listening to others and providing support is important to them. They value mutual trust in the relationships with others. In difficult situations, they have many people ready to listen and support them.

Life purpose. The women are satisfied with what they have accomplished in the past and what they hope to do in the future. They are currently concerned about the present because the future makes them anxious.

Self-acceptance. Women try to think of themselves positively. They accept their life and do not want to change anything in it. They have experienced some difficulties in the past, but in retrospect, they acknowledge that things have worked out well.

Sub-model summary: Responsibility for one's own life, satisfaction with relationships with others as a basis of the quality of life.

Sub-model F₃. Women recognizing the impact of the pandemic on their own lives

Sixty-four women in the age range of 19 to 64 ($M = 22.39$) formed this sub-model. The respondents studied "Editing", "Internal security", "Psychology", "Romance philology" and "Management". Some of them not only studied but also worked. The women were both from urban and from rural areas.

Perception of the pandemic

Respondents try to cope with the pandemic situation. They experience support from others. They do not accept the situation they are in and do not feel in control of the events they experience. They feel that the pandemic has had a major impact on their lives.

Elements of well-being:

Autonomy. Women tend to align their own views, opinions with those of others. They have difficulty in expressing their own views on controversial issues. They are concerned about how other people judge their choices.

They sometimes change their decisions, especially when their relatives or friends disapprove of them.

Environmental mastery. Women feel responsible for what goes on in their lives. Sometimes they experience a sense of being overwhelmed by the responsibilities of everyday life. They feel that they do not fit in with the people and groups around them.

Personal growth. They are the kind of people who like to try new things in life. However, they often tend to fall back into old, established patterns of behaviour. Women perceive life as a process of continuous learning, change and development.

Positive relationships with others. Women are perceived by others as affectionate and loving. However, they experience loneliness when in the company of others. They admit that it is difficult for them to maintain positive relationships with other people. They sometimes feel as if they are outside observers rather than participants in friendly relationships.

Life purpose. Respondents are focused on the present because they associate the future with problems. They state that they experience a sense of meaning and purpose in life. However, most of their other statements contradict this opinion. The bottom line is that this group fail to perceive meaningfulness and purpose in their own lives.

Self-acceptance. Women feel that many people they know have received more from life than they have. Respondents are disappointed in their accomplishments in many areas of their lives. When they compare themselves to friends or acquaintances, they have a sense of being inferior to others.

Sub-model summary: Dissatisfaction with themselves, own achievements, own life until now.

The comparison of the sub-models for females is presented in Table 5.

DISCUSSION

The perception of pandemic turns out to be slightly relevant to students' quality of life. In females, the influence of pandemic correlates with personal growth – one of the dimensions of quality of life. Influence of pandemic also correlates with global well-being in women. In general, the fact that hypothesis 1 is to some degree confirmed (in female group) is somewhat understandable, as the pandemic is too important factor - which has impacted the functioning of entire societies - to be indifferent to well-being one experiences.

What has been mentioned in the paragraph above, and needs to be stressed here, is that the pandemic increases the quality of life in women, especially in the dimension of personal growth. This interesting effect occurs in an unexpected and paradoxical way - by the increase of women's volume of responsibilities. Women seem to play more social roles outside of the workplace, being for instance more involved in caring for offspring or younger siblings (Łukasik et al., 2014). They are also more involved in social activities such as volunteering (Body et al., 2017). The effect of the increased well-being due to

Table 5. Women's sub-models summary

Women	Sub-model summary	Pandemic perception	Resources	Shortcomings	Temporal perspective
Not perceiving the impact of the pandemic on their lives	Independence and meaningfulness of life as a basis for quality of life	- acceptance - control - support - proven patterns	- independence of opinions, decisions - purpose, meaning of life	- difficulty in maintaining relationships	- future
Indifferent to the impact of the pandemic on their lives	Responsibility for one's own life, satisfaction with relationships with others as a basis of quality of life	- support from others - control	- responsibility for own decisions, actions - involvement in relations with others	- dependence on others' opinions - unstable self-evaluation	- present
Perceiving the impact of a pandemic on their own life	Dissatisfaction with themselves, own achievements, own life until now	- lack of acceptance of the situation - lack of control - difficulties in carrying out activities		- dependence on evaluations of the surroundings -feeling of loneliness - lack of purpose, sense of life - apparent sense of responsibility for one's actions	- present

the pandemic is “paradoxical and unexpected” because, according to common sense, the shift in lifestyle and increased number of responsibilities should rather decrease well-being. We believe that this counter-intuitive effect could have occurred because the increase of women's responsibilities acted as a developmental stimulus. Ryff (1989) defines personal growth as the ability to improve oneself, the feeling that actions lead to increased competence, self-realization and openness to experience. This is the way new challenges - stimulating development and forcing effective coping with environmental demands - translate into the feeling of greater self-actualization. As to the gender differences in this regard, a study conducted by Herberger (2016) on students' stress levels sheds some light on this. According to Herberger women are characterized by higher conscientiousness and commitment to responsibilities. They also show higher reflexivity towards their own experiences. Women are also more aware of their own resources in a difficult situation.

The pandemic has increased women's well-being not only in terms of personal growth but in general. Women's lives may have changed in such a way because - despite many unquestionable, objective drawbacks – they also may have perceived some benefits of the pandemic situation. This could be, for example, the possibility of working remotely and having better control over the family environment.

The second hypothesis is confirmed, except for acceptance. There are some gender differences as far as the relationship between the way one experiences the pandemic situation and psychological well-being is concerned. However these differences are not of immense size - correlations have the same direction (for example the sense of control), but more correlations are found in men.

Quantitative and qualitative analyses show that women have a higher quality of life in terms of positive relationships with others, life purpose or self-acceptance. Gender is also a significant predictor for the dimensions of well-being such as positive relationships with others and self-acceptance. Other studies ($N_{women} = 1700$; $N_{men} = 1700$) also indicate that women score higher than men on the scales of positive relations with others and personal growth, whereas men score higher on autonomy (Matud et al., 2019).

Overall well-being and many of its specific dimensions are Best predicted by the sense of support. The results obtained are consistent with the studies conducted by Bovier et al. (2004) and Hefner and Eisenberg (2009). Bovier et al. (2004) showed that mental health is positively associated with social support. The positive impact of social support on mental health is mediated by internal resources and stress.

Our study presents social support as an important protective factor of well-being. It turns out to be important

for such dimensions of well-being as positive relationships with others, mastery of the environment, personal growth, and self-acceptance. The sense of support also correlates with the overall well-being scale score. Support plays an important role in difficult situations; it is a buffer against stress and prevents the appearance of, for instance, post-traumatic disorders. In stressful and crisis situations people often seek and benefit from social support. The impact of support on a crisis is explained by two effects: main (direct) and buffer (indirect). The main effect of support is that support directly contributes to adaptation to a difficult situation by influencing stressors or modifies the perception of stress. The buffering effect of social support means that support has the effect of lowering tension, reducing the impact of stressors, and mitigating the effects of stress (Juczyński, 2014). The role of social support in the pandemic is currently noted by many researchers. For example, a study on the relationship between the experience of pandemic stress and acute stress disorder, involving Chinese students - among other things - proved the role of support as a mediator of this relationship (Ye et al., 2020).

Limitations

A relatively unsophisticated and non-standardized tool was used to assess the perception of a pandemic situation. However, the authors were operating under time pressure and wanted to conduct a study at the beginning of the pandemic, also not knowing how long it would last. Future researchers can focus on developing a tool to assess the perception of emergencies and crises such as epidemics and pandemics, humanitarian disasters or financial crises.

Moreover, given time and budget constraints we faced, this was not feasible to draw a random probability-based sample of the population. We rather relied on the accessibility of the respondent. Given the fact that the sample does not exactly represent the population, our findings have lower level of generalization compared to probability sampling.

The convenient sampling got us also into the specific trouble – unequal gender distribution. It turned out that 72.84% of respondents were females. This is because this ratio is a true representation of males/females in the sampled population. These are females who mostly choose to study humanities and psychology – this holds true for two institutions from which the samples were drawn. Nonetheless, this gender bias (correct for this specific naturally skewed female population) should be taken into account when making statements about general population. In order to correct for this bias we run the majority of analyses, both quantitative and qualitative, separately for males and for females. In any case, in future studies, replacing convenient sampling with the stratified sampling will remove the inconvenience and limitations related to generalizability.

Practical implications

The results of our research have some practical implications. First, social support plays a large role in

coping with stressful situations. Programmes and initiatives to build peer and specialist support should be developed. The results of the research obtained could form the basis for the development of more targeted support programmes for young people to alleviate the stress caused by the COVID-19 pandemic. They also allow us to see the resources, the potential of both young women and men in coping with crisis situations.

Future directions

In future studies on the relationship between pandemic perception and well-being, it would be worthwhile to consider a different theoretical approach than the Ryff model (1995) deployed in our study. Moreover, the assessment of stress and clinical symptoms (e.g., anxiety, depression) in relation to pandemic perception could provide interesting information. Coping strategies as a mediator of pandemic perception and sense of well-being also seem to be an interesting issue. Future research should also be conducted in other, specific, groups. This should include, on the one hand, occupational groups whose functioning has not changed significantly, for instance professional drivers or store workers. On the other hand, consideration should be given to other groups where changes were more pervasive (teachers, healthcare workers, entertainment industry workers - actors, musicians, etc.). Future research can also be conducted in clinical groups, such as cancer patients or those with chronic illnesses. Other developmental periods through the life cycle (children, adolescents, middle adulthood, and older adults) should also be considered.

Many studies, focusing on clinical symptom, cited in our article come from China¹. One should keep in mind that Far Eastern cultures are collectivist (Tropmennaars, Hampden-Turner, 2020), sounder circumstances of social isolation typical for pandemic, clinical symptoms may intensify in these cultures. It would be worth while, therefore, in case of subsequent waves of COVID-19 or other humanitarian crises, to conduct research similar to those Chinese in Western cultures (e.g. in Poland), to verify whether the severity of clinical symptoms will be of similar size

Conclusions

The COVID-19 pandemic affected significantly students' mental health of and their quality of life. The volume of clinical symptoms young people all over the world report is striking. The quantitative and qualitative analyses we conducted contribute to a deeper understanding of some determinants of students' quality of life in a pandemic situation. Quantitative analyses prove social support to be crucial for maintaining positive well-being. At the same time, the qualitative approach shows that for women, during the pandemic, it was important to feel in control over the situation. Whereas men, despite experiencing anxiety in a pandemic situation, show greater

¹ We would like to thank anonymous reviewer for bringing our attention to the issue of possible cultural differences in this regard.

savviness in the use of available resources. In the era of uncertainty it seems crucial to promote friendly (social) environment, to build social networks and to enhance people's ability to develop and strengthen their psychological capital (sense of control, self-efficacy and resilience etc.). These internal and external resources seem promising protective factors for one's quality of life.

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