
Impact of the COVID-19 Pandemic Crisis on the Health Care System in Less Developed Regions of Poland

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Abstract:

Purpose: The aim of the study was to develop a model for assessing the satisfaction of patients of GP practice with access to health services in the Lubelskie Voivodeship, in terms of eliminating inequalities in the quality of these services and developing a scenario for the revitalization of the health care system in relation to the inhabitants of the underdeveloped region in the period after the cessation of pandemic.

Design/Methodology/Approach: The research method included developing a research tool in the form of a survey questionnaire, validating the tool, conducting Phase I and II of the survey, and evaluating the performance of the outpatient specialty care subsystem. The analysis of the research results was directed at developing the assumptions of a model for restoring functionality and increasing resilience of the healthcare system.

Findings: It was found that the level of patient satisfaction with the functioning of the health care system during a pandemic, both in the form of medical tele-consultation and in the form of direct contact with personnel in a health care facility, depends on the age and the level of education. There were no differences in terms of sex and place of residence (town, village). It was also found that the very limited availability of advanced diagnostic methods, showing an unfavorable trend in the period preceding the outbreak of the pandemic, deteriorated further and poses a critical threat to the functioning of the health care system for patients with chronic diseases (oncological, neurodegenerative etc.).

Practical Implications: The results of the research will be used to construct a model for the reconstruction and revitalization of the health care system in the Lubelskie Voivodeship after the pandemic.

Originality/Value: The study presents results of the current research. The development of the research results will be continued in order to construct a comprehensive model.

Keywords: Health care system, COVID-19, less developed regions.

JEL codes: I15, M54, Q54, R11, P46, P48.

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1. Introduction

Recently, one of the critical challenges for management science, as well as management practice, has become not only the management of predictable change, but most of all the management of disasters and crises caused by external factors of global nature. On March 11, 2020, The World Health Organization (WHO) announced a global pandemic caused by the new coronavirus (COVID-19) (Cucinotta and Vanelli, 2020). This pandemic has caused an unprecedented global health crisis with severe socio-economic consequences and human suffering, especially for people with chronic diseases (Mantovani, Beatrice, and Dalbeni, 2020; Ricotta *et al.*, 2021). And although experts estimate that the crisis could have been avoided (MacKenzie, 2020), it should be considered a "black swan" of our times (Taleb, 2007; Bhartiya, 2020). The pandemic has caused predictable changes, it has also caused unpredictable changes, and the current pandemic crisis will inevitably change the world as we know it. The crisis has forced changes in the behavior of those who rule countries, run enterprises, but also ordinary people - workers, consumers and patients. The Polish health care system also had to quickly adapt to the situation resulting from the need to maintain isolation.

In this article, we described early social reactions - a group of patients who can determine the scenario of changes in the functioning of a healthcare system on the example in a less developed region of Poland which is a Lublin Voivodeship. The paper presents the results of a research project conducted on a randomized group of 1,000 patients in the Lubelskie Voivodeship at the turn of 2020/2021. The conducted study assesses the level of patient satisfaction with the functioning of the health care system during a pandemic, with a projection for the time of restoring health care functions, both in terms of primary care as well as the special marker of specialist care, i.e. oncological care.

2. Symptoms of Healthcare System Dysfunction in the Lubelskie Voivodeship

Satisfaction is a function of the similarity between patients' perceptions of ideal care and their observations of actual care (Bojar and Czarnocki, 2012; Czarnocki *et al.*, 2016; Zawisza, Galas, and Tobiasz-Adamczyk, 2020). Patient satisfaction, on the other hand, is the degree to which their conscious expectations addressed to the healthcare system are met, both in healthcare facilities and outside them. characteristics, including the effectiveness of care and the level of their understanding and empathy. Understanding patients, carers and families from their perspective is an opportunity to reflect the standards and behavior of a provider (empathy, courtesy and respect), improve health care services and patient well-being (Zawisza, Galas, and Tobiasz-Adamczyk, 2020).

In most low to moderate resource countries (including Poland), health systems suffer from severe funding shortages, outdated health infrastructure, limited human and technical resources, low capital and quality, and are poorly prepared to meet the challenges of today's COVID-19 pandemic or similar threats that will arise in the future (OECD 2020).

COVID-19 is an acute respiratory infection that emerged in late 2019. Flu-like symptoms such as fever, cough, difficulty breathing, fatigue, and muscle pain. The World Health Organization (WHO) announced in March 2020 that it intends to minimize the spread of COVID-19 in the community by practicing social distancing, frequent hand washing, and reducing the population density in healthcare facilities as a means of preventing COVID-19 (WHO, 2020). This minimization of risk has forced in many countries the acceleration of work on the development and implementation of a system enabling the visit combined with patient diagnostics and planning further treatment with the use of IT tools (telemedicine).

In Poland, on the occasion of their creation, electronic prescriptions, online drug guides, and the Internet Patient Account were also developed throughout the country. It should be emphasized that these changes in the way medical services are provided, resulting from the introduction of IT solutions, did not solve all the problems a primary and hospital health systems have faced critical challenges related to the increasing number of noncommunicable diseases increasing the global burden of disease, which can lead to healthcare inefficiencies both in the immediate and post-pandemic period. In addition, COVID-19 disease is one of the lethal burdens that affect 99% of chronic disease patients with pre-existing medical conditions (heart disease, hypertension, diabetes, old age, and kidney disease (Hussain *et al.*, 2020).

As in the case of any mass infection, also in the conditions of the COVID-19 pandemic, the decisive factor for the further development of the situation, and in the macro sphere of potential restitution of the health care system, access to effective, reliable and reliable in terms of EBM (Evidence-based Medicine) imaging diagnostics, i.e., imaging CT, MRI, and RTG and MG (Lutchmansingh *et al.*, 2020; Ricotta *et al.*, 2021). The same procedures are required as the initial and diagnostic phase in the case of many other diseases, including those related to civilization. A special dimension of effective and immediately available diagnostic procedures relates to oncological treatment (Potter *et al.*, 2020).

Susceptible healthcare systems and limited availability of a primary care physician can exacerbate the effects of an epidemic and limit the possibilities for adequate supervision and control. Assessing the extent to which patients are satisfied with health services is of clinical importance as satisfied patients are more likely to comply with treatment. On the other hand, COVID-19 results in reduced adherence to procedures and treatment, increased dissatisfaction with treatment, and treatment

discontinuation - continuation of treatment. The outcome of unmet patient needs can be problematic as it causes distrust in the healthcare system and healthcare providers.

Epidemic threats can be managed through telemedicine, which is essential for infection control and social distancing. (Monaghesh and Hajizadeh, 2020) However, this is true for countries and regions with sufficient and significant resources. In addition, while telemedicine also increases the population coverage of healthcare, it does not provide a solution for most diagnostic procedures, and particularly all medical imaging diagnostics procedures (Almathami, Win and Vlahu-Gjorgievska, 2020).

3. Material and Methods

Patient satisfaction survey allows to determine the level of quality of services provided by a family doctor. Even though, in satisfaction surveys we use various tools, including surveys assessing the level of patient satisfaction, it seemed necessary to construct our own tool adapted to the needs of the Eastern Poland region. In the opinion of the society, there is a belief that the level of provided healthcare services in the region is low. Collecting data on patient satisfaction with family physician services seems reasonable because it reduces the risk of difficulty in negotiating the amount of contracted medical services. By conducting its own surveys, a family physician practice is able to identify and address potential problems related to patient satisfaction with its services. When shaping and implementing new functional forms of medical care and organizational solutions in this area, it is important to have a reliable tool with known psychometric properties that can be used in routine assessment.

The prospective goal of the study was to develop a model for assessing the satisfaction of patients of GP practice with access to health services in the Lubelskie Voivodeship, in terms of eliminating inequalities in the quality of these services and developing a scenario for the revitalization of the health care system in relation to the inhabitants of the underdeveloped region, i.e., Lubelskie Voivodeship in the period after the cessation of pandemic. A team of researchers from the Faculty of Management of the Lublin University of Technology in cooperation of Institute of Rural Medicine in Lublin and Lublin Association of Family Physicians conducts research in groups of primary care physicians and patients in objective and subjective assessments of basic health care in the Lubelskie Region.

The first phase of research was carried out in 2010-2011, this is short after the introduction of essential changes in the functioning of basic healthcare. The second phase was scheduled for 2020-2021. The implementation of the second phase was carried out during the intensive combat with a proliferation of Covid-19. Thanks to this convergence, we obtained an exceptional opportunity to capture early changes in the assessment of the functioning of the basic healthcare system resulting from the

course of Covid-19 pandemic both from the perspective of a physician and the patient. The results presented in this study are the effect of research carried out on a representative test of thousands of patients.

The questionnaires were collected with the participation of volunteers in phase 1 of the study, while in the final phase involving a cohort of 1000 respondents, cooperation with *Biostat Sp. z o.o.* was used. The research was carried out in GP clinics in the poviats of the Lubelskie Voivodeship and using the CAWI method. The research method included the following stages:

1. An original, developed research tool in the form of a questionnaire.
2. Tool validation procedure (Bojar, 2013).
3. Conducting 1-phase and 2-phase questionnaires.

In terms of the evaluation and statistical analysis of the research results, the tool in the form of the Statistica 13.3 StatSoft Inc package was used, using the descriptive dynamics and multiple regression modules (the results of the regression model are not presented in this study). The characteristics of the study group to the phase 2 studies using the CAWI method are presented in Table 1.

Table 1. Study group characteristics

		N	Mean	Min - Max	SD
Gender	Female	522 (52.2%)	-	-	-
	Male	478 (47.8%)	-	-	-
Age	-	1000 (100%)	48.9	19 - 89	17.71
Age groups	1 < 30 yrs.	175 (17.5%)	-	-	-
	2 31-45 yrs.	282 (28.2%)	-	-	-
	3 46-60 yrs.	235 (23.5%)	-	-	-
	4 > 60 yrs.	308 (30.8%)	-	-	-
Education level	Primary school	116 (11.6%)	-	-	-
	Vocational school	331 (33.1%)	-	-	-
	Secondary school	319 (31.9%)	-	-	-
	Higher	234 (23.4%)	-	-	-
Residence	City	588 (58.8%)	-	-	-
	Village (rural area)	412 (41.2%)	-	-	-

Source: Developed by the authors based on their research.

4. Results

Table 2 shows the level of satisfaction of patients of the Lubelskie Voivodeship with the availability and quality of healthcare during the COVID-19 pandemic in the form of e-consultation (medical teleconsultation) in relation to age groups. The analysis of data summarized in Table 2 shows that the lowest level of satisfaction with health care in the form of tele-consultation was demonstrated by patients in the 2nd, 3rd and 4th age group - in total 100% extremely negative (-3); - 86.4% of very negative (-2) and 84.8% negative (-1) ratings in total. Negative assessments in relation to teleporting as a form of telemedicine consultation in the period of a

pandemic accounted for 60.5%, while positive assessments accounted for 30.4% of respondents' responses.

Table 2. *Patients' satisfaction in e-consultation (telemedicine consultation) process according to the age range level*

	E-consultation satisfaction level	Age range 1	Age range 2	Age range 3	Age range 4	Row totals
Count	-3	0	11	6	5	22
Column percent		0.00%	7.86%	7.59%	4.67%	
Row percent		0.00%	50.00%	27.27%	22.73%	
Count	-2	16	31	33	38	118
Column percent		27.59%	22.14%	41.77%	35.51%	
Row percent		13.56%	26.27%	27.97%	32.20%	
Count	-1	16	50	10	29	105
Column percent		27.59%	35.71%	12.66%	27.10%	
Row percent		15.24%	47.62%	9.52%	27.62%	
Count	0	5	13	2	12	32
Column percent		8.62%	9.29%	2.53%	11.21%	
Row percent		15.63%	40.63%	6.25%	37.50%	
Count	1	12	15	16	14	57
Column percent		20.69%	10.71%	20.25%	13.08%	
Row percent		21.05%	26.32%	28.07%	24.56%	
Count	2	4	9	9	9	31
Column percent		6.90%	6.43%	11.39%	8.41%	
Row percent		12.90%	29.03%	29.03%	29.03%	
Count	3	5	11	3	0	19
Column percent		8.62%	7.86%	3.80%	0.00%	
Row percent		26.32%	57.89%	15.79%	0.00%	
Count	All groups	58	140	79	107	384

Source: *Developed by the authors based on their research.*

Table 3 shows the level of satisfaction of the patients of the Lubelskie Voivodeship with the availability and quality of healthcare during the COVID-19 pandemic in the form of direct contact with a primary care physician.

Table 3. *Patients' satisfaction in General Physician care in Lublin Voivodship in the pandemic period according to the age range level*

	GP care satisfaction level	Age range 1	Age range 2	Age range 3	Age range 4	Row totals
Count	0	33	54	27	52	166
Column percent		18.86%	19.15%	11.49%	16.88%	
Row percent		19.88%	32.53%	16.27%	31.33%	
Count	1	32	88	59	68	247
Column percent		18.29%	31.21%	25.11%	22.08%	
Row percent		12.96%	35.63%	23.89%	27.53%	
Count	2	93	113	120	157	483
Column percent		53.14%	40.07%	51.06%	50.97%	

Row percent		19.25%	23.40%	24.84%	32.51%	
Count	4	17	27	29	31	104
Column percent		9.71%	9.57%	12.34%	10.06%	
Row percent		16.35%	25.96%	27.88%	29.81%	
Count	All groups	175	282	235	308	1000

Source: Developed by the authors based on their research.

The analysis of the data summarized in Table 3 shows that the lowest level of satisfaction with health care in the form of direct contact with the Physician was demonstrated by patients in the 2nd and 4th age groups - a total of 63.8% of extremely negative assessments (0 - dissatisfaction); - 63.2% of negative ratings in total (1 - dissatisfied). Negative assessments in relation to the work of primary health care facilities during the pandemic accounted for 41.3%, while positive assessments accounted for 58.7% of respondents' answers.

Table 4. Patients' satisfaction in General Physician care in Lublin Voivodship in the pandemic period according to the education level

	GP care satisfaction level	Education level				Row totals
		Secondary school	University or College	Vocational school	Elementary school	
Count	0	53	46	52	15	166
Column percent		16.61%	19.66%	15.71%	12.93%	
Row percent		31.93%	27.71%	31.33%	9.04%	
Count	1	78	51	88	30	247
Column percent		24.45%	21.79%	26.59%	25.86%	
Row percent		31.58%	20.65%	35.63%	12.15%	
Count	2	163	117	152	51	483
Column percent		51.10%	50.00%	45.92%	43.97%	
Row percent		33.75%	24.22%	31.47%	10.56%	
Count	4	25	20	39	20	104
Column percent		7.84%	8.55%	11.78%	17.24%	
Row percent		24.04%	19.23%	37.50%	19.23%	
Count	All groups	319	234	331	116	1000

Source: Developed by the authors based on their research.

Table 4 shows the level of satisfaction of the patients of the Lubelskie Voivodeship with the availability and quality of healthcare during the COVID-19 pandemic in the form of direct contact with a primary care physician.

The analysis of the data summarized in Table 4 shows that the lowest level of satisfaction with health care in the form of direct contact with the Physician was demonstrated by patients in the upper levels of education (Higher, Secondary school and Vocational school) - a total of 90.9% of extremely negative assessments (0 - dissatisfaction); - 87.9% of negative ratings in total (1 - dissatisfied). Negative assessments in relation to the work of primary health care facilities during the pandemic accounted for 41.3%, while positive assessments accounted for 58.7% of respondents' answers.

Table 5. *Patients' satisfaction in medical e-consultation in Lublin Voivodship in the pandemic period according to the education level*

	e-consultation satisfaction level	Education level				Row totals
		Secondary school	University or College	Vocational school	Elementary school	
Count	-3	7	7	7	1	22
Column percent		7.14%	5.93%	5.26%	2.86%	
Row percent		31.82%	31.82%	31.82%	4.55%	
Count	-2	24	37	39	18	118
Column percent		24.49%	31.36%	29.32%	51.43%	
Row percent		20.34%	31.36%	33.05%	15.25%	
Count	-1	34	33	31	7	105
Column percent		34.69%	27.97%	23.31%	20.00%	
Row percent		32.38%	31.43%	29.52%	6.67%	
Count	0	8	6	13	5	32
Column percent		8.16%	5.08%	9.77%	14.29%	
Row percent		25.00%	18.75%	40.63%	15.63%	
Count	1	13	16	24	4	57
Column percent		13.27%	13.56%	18.05%	11.43%	
Row percent		22.81%	28.07%	42.11%	7.02%	
Count	2	6	13	12	0	31
Column percent		6.12%	11.02%	9.02%	0.00%	
Row percent		19.35%	41.94%	38.71%	0.00%	
Count	3	6	6	7	0	19
Column percent		6.12%	5.08%	5.26%	0.00%	
Row percent		31.58%	31.58%	36.84%	0.00%	
Count	All groups	98	118	133	35	384

Source: *Developed by the authors based on their research.*

Table 5 shows the level of satisfaction of patients of the Lubelskie Voivodeship with the availability and quality of healthcare during the COVID-19 pandemic in the form of e-consultation (medical teleconsultation) in relation to education level groups. The analysis of data summarized in Table 5 shows that the lowest level of satisfaction with health care in the form of tele-consultation was demonstrated by patients in the upper levels of education (Higher, Secondary school and Vocational school) - in total 95.5% extremely negative (-3); - 84.7% of very negative (-2) and 93.3% negative (-1) ratings in total. Negative assessments in relation to e-consultation as a form of telemedicine consultation in the period of a pandemic accounted for 69.6%, while positive assessments accounted for 30.4% of respondents' responses.

5. Discussion and Conclusions

The SARS-COV-2 pandemic in China in late 2019 has spread worldwide. In April 2021, it reached its peak in Poland - called the 3rd wave. The pandemic has meant that almost all of us have come across the imperfection of the health care system.

This required improved management and reorganization of the GP services system cross the country affected by the pandemic. The scale of the situation and quarantine measures in many countries are unprecedented and understanding how these circumstances affect the functioning of societies in various sectors, including the area of health care, including the introduction of telemedicine tools, is of particular interest to researchers (Monaghesh and Hajizadeh, 2020). By focusing on the general population, various individual and sociodemographic factors manifest a relationship with both worse health, including mental health, during the COVID-19 pandemic (Vindegaard and Benros, 2020). The perception of uncertainty and levels of isolation (Li *et al.*, 2020) are associated with a higher risk of negative psychological reactions, which translates into lower satisfaction with the functioning of the healthcare system.

Patient satisfaction as a measure of quality of care is a valid outcome and a key component to value-based care (Ramaswamy *et al.*, 2020). The level of satisfaction and the level of risk perception induced by the unavailability of certain services were carried out in relation to four features of primary health care: availability, continuity, equality and quality of care (Maijala, Tossavainen, and Turunen, 2016; Stevenson *et al.*, 2001).

Comparing patients' experiences with meeting their expectations allows us to identify areas for improvement that are prioritized by patients. It seems that the needs of the Polish patient, especially the inhabitants of less developed regions, are satisfied with a low level of individual satisfaction. Accessibility is recognized as the most important area while showing the highest level of improvement potential perceived by patients.

However, possible changes in this area are more dependent on the financial and organizational conditions of primary health care services, and therefore depend on the decisions of political decision-makers and the senior management of the health care system. Interpersonal care is the field in which the needs of patients are in the transition period between the severity of the next wave of pandemic and the period of revitalization of health care, are being met, but subjectively at an unsatisfactory level. Strong, directly, doctor-patient relationships seem to be the leading priority in patients' expectations towards primary care, in particular for the subpopulation of people on the verge of professional activity and functioning in the society after the end of intensive professional activity.

Continuous efforts to train GPs in the field of interpersonal communication skills should be intensified to meet the increasing level of knowledge, including specialist knowledge, and the resulting expectations, especially in the group of educated people. Effective communication directly influences the therapeutic process. Reliable and understandable expressions, apart from the readiness to listen to the patient's needs, are the most valuable communication skills that every doctor should learn in everyday practice. In terms of the availability of medical imaging diagnostic

procedures, urgent and intensive measures should be taken to increase both the availability of devices and to enable their more efficient use, also by increasing the number of diagnostic procedures per device per day.

Research carried out in the Lublin Region during the prevailing Covid-19 pandemic peak confirmed that the practices of a family doctor provided patients with the necessary health care. The disease threat forced a complementary, indirect form of providing medical services. Despite its imperfections, it was accepted, and patients indicated its improvement. Including and developing this subsystem is a way to improve patient satisfaction.

Every healthcare system needs systematic improvements to improve the services provided and improve patient satisfaction with these services. This is crucial in view of the real threats of the 4th wave of the pandemic. The experience gained regarding the functioning of the health service and the opinions of patients on this subject may turn out to be very useful and valuable in the improvement of the PHC system organization in the context of methods and procedures managing during the crisis.

The research team will continue the research in subsequent phases with the aim of creating a comprehensive model of the post-pandemic reconstruction of the health care system in south-eastern Poland.

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