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Financing the Healthcare System: A Study of Mechanisms and Their Impact on the Quality of Medical Services

Financiación del sistema sanitario: Un estudio de los mecanismos y su impacto en la calidad de los servicios médicos

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ABSTRACT

Introduction: this study examines how healthcare funding affects service quality in Ukraine. It focuses on spending patterns and patient satisfaction in a conflict-affected and limited-resources setting. The study's goal is to give us useful information about how to make smart financial investments in healthcare to improve results.
Method: several kinds of tools were used in the study. It was possible to find out about patient satisfaction by surveying 200 patients and interviewing them in a semi-structured way. Spending on health care from 2019 to 2020 was examined in a descriptive study. To get a statistical sense of the patient's satisfaction, we utilized model testing as we looked at how expenditure affected the data.
Results: costs for health care rose from €9,76 billion in 2019 to €18,94 billion in 2029. Cost was strongly related to both the quality of the meeting (B =0,45, p<0,01) and the cleanliness of the venue (B =0,28, p<0,05). Long wait times, particularly in rural locations, and area-specific differences are, however, persistent problems.
Conclusions: putting together financial and patient-centred results is a new idea in the scientific world. It gives us a good way to judge how much money we spend on healthcare. The level of healthcare in Ukraine and other similar places can be raised by making smart financial investments, better resource sharing, integrating technology, and fair distribution.

Keywords: Big Data Processing; Predictive Analytics; Business Intelligence; Process Automation; Digital Transformation.

RESUMEN

Introducción: este estudio analiza el impacto de la financiación en la calidad de los servicios de sanidad en Ucrania, centrándose en los patrones de gasto y la satisfacción de los pacientes en un entorno marcado

por el conflicto y recursos limitados. El objetivo es proporcionar información útil para realizar inversiones financieras inteligentes en sanidad y mejorar los resultados.

Método: se emplearon diversas herramientas para recopilar datos. Se encuestó a 200 pacientes y se realizaron entrevistas semiestructuradas para evaluar su satisfacción. Además, se llevó a cabo un análisis descriptivo de los gastos en asistencia sanitaria entre 2019 y 2020. Para interpretar estadísticamente la relación entre gasto y satisfacción, se aplicaron pruebas de modelos para analizar el efecto del gasto en los datos recopilados.

Resultados: los costos de asistencia sanitaria aumentaron de 9 760 millones de euros en 2019 a 18 940 millones de euros en 2020. El gasto mostró una correlación significativa con la calidad de la atención (B = 0,45, p < 0,01) y la limpieza (B = 0,28, p < 0,05). No obstante, persisten problemas como largos tiempos de espera, especialmente en zonas rurales, y desigualdades regionales en la prestación de servicios.

Conclusiones: la combinación de resultados económicos y centrados en el paciente aporta una perspectiva innovadora. Este enfoque permite evaluar eficazmente el impacto de las inversiones en sanidad. En Ucrania, mejoras en la asignación de recursos, integración tecnológica y distribución equitativa podrían elevar significativamente la calidad de la asistencia sanitaria.

Palabras clave: Procesamiento de Big Data; Análisis Predictivo; Inteligencia Empresarial; Automatización de Procesos; Transformación Digital.

INTRODUCTION

Over the past decade, Ukraine has undergone transformative healthcare reforms to address systemic inefficiencies and inequities in access and quality of care.[1] Historically, the Ukrainian healthcare system faced significant challenges, including fragmented financing, high out-of-pocket expenditures, inadequate infrastructure, and stark disparities in service provision between urban and rural areas.[2,3] In response, several reforms were implemented, the most important being the start of the Program of Medical Guarantees (PMG) in 2017.[4] These changes centralized healthcare spending under a single-payer system, the National Health Service of Ukraine (NHSU), and changed what citizens could expect from their healthcare. Other programs, like the Affordable Drugs Program (AMP), tried to make it easier for more people to get the drugs they needed.[6,7] Adding digital health tools was meant to make things run smoothly and hold people accountable.

Even with all of these efforts, the level of health care is still not the same for everyone. In rural areas, it is still hard to get good care because there are not enough tools and workers.[7,8] However, city facilities have issues with being too busy and service quality everywhere. There is still a big question about how these changes will work in the long term. Public health spending will only slowly rise from €9,76 billion in 2019 to €18,94 billion expected in 2029, but it is already under a lot of pressure to keep up with rising needs and demands.[9] Changes in how healthcare is paid for in Ukraine have been the subject of numerous studies examining how they affect access and fairness.[10,11,12] Different funds have been combined, and out-of-pocket costs have decreased. Before the changes, these costs comprised almost half of all health spending. In the same way, studies of PMG have shown that it can improve delivery service and lower the cost of care.[13,14] However, it is still unclear how well these reforms work to improve the level of service. Most of the studies that have been done so far focus on numbers, like participation rates and spending levels, rather than qualitative factors, like the satisfaction of patients. Verbivska et al.[15] found that improving regulatory policies to encourage creative business growth boosts Ukraine's regional competitiveness and economic security. The correlation between healthcare expenses and quality of care has been the subject of extensive study from academic institutions across the globe.[16,17] There is evidence from middle-income countries that more public spending on health can improve the level of care as long as the money is spent wisely and is closely observed. However, problems like bad management, differences between regions, and insufficient investment in infrastructure often undo these wins. These findings highlight the need to increase funding and ensure its effective utilization to enhance patient outcomes and conditions.[18] Compared to GII-leading countries, foreign direct investment uniquely affects innovation in Ukraine.[19] Telnova et al.[20] suggest that the government should offer tax breaks, back innovations, and lower risks to encourage the growth of high-tech businesses in medical care and bring in venture capital. This study is important because it answers a key policy question: How do healthcare financing mechanisms in Ukraine impact the quality of medical services? The results are especially useful for policymakers and other people involved in Ukraine's current healthcare reforms because they show how to fix problems and make things fairer and more efficient. The study also adds to the global discussion about how to pay for health care by showing the challenges and opportunities middle-income countries face when creating long-lasting health systems. This study wants to give a full picture of the connection between healthcare spending and the quality of care by combining a descriptive analysis of healthcare costs with a patient satisfaction poll. The results will suggest how to best use Ukraine's resources and improve healthcare service.

METHOD

This study relies heavily on financial data and patient satisfaction questionnaires to examine the correlation between healthcare spending and quality of care. The financial data gives a number-based picture of the money spent on healthcare. At the same time, the patient satisfaction survey tells us how patients feel about the quality of healthcare services. Together, these data sources give a complete picture of how healthcare costs affect both the availability and quality of care, which means they work well together to meet the study goals.

Study Design

A mix of quantitative financial data analysis and qualitative patient satisfaction surveys were used in this study to look at how healthcare funding in Ukraine affects the level of care. The financial data gives a complete picture of how much money is spent on healthcare services and how it is distributed. It gives us an economic background to understand the inputs into the system. To find patterns and track changes in the distribution of resources, metrics like total healthcare spending, healthcare expenditure as a percentage of GDP, and specific allocations for medical goods and services.

In addition, a patient satisfaction survey was done to get people's personal opinions on the level of care they received in the healthcare system. From the point of view of patients, the study looks at how healthcare financing works in the real world by looking at things like ease of access, quality of consultations, wait times, and cleanliness of facilities. By taking this method, the study does not just look at the spending that goes into it; it also looks at the real-life experiences of people who use healthcare, giving a human-centred assessment of service quality.

By connecting the survey results and financial data, regression analysis looks at how changes in healthcare spending affect certain parts of service quality. It is possible to examine how economic investments affect healthcare services in many ways. The independent variables are financial data, and the dependent are patient satisfaction scores. This dynamic method mixes systemic trends with real-life experiences to give useful information for improving Ukraine's healthcare system by allocating resources more wisely and providing higher-quality services.

Data Sources

The information for this study was obtained from two main sources:

- The finance details are extracted from government records, papers on national healthcare reform, and secondary studies of how Ukraine's healthcare spending has changed over time.
- 200 patients were randomly selected to take part in a survey about their level of satisfaction with different parts of their healthcare. The people in this group were chosen based on their most recent experiences with the hospital system, ensuring that there were many people from different places, ages, and genders.

The complicated relationship between healthcare expenditures and service quality can be better understood by using primary data sources like patient satisfaction surveys. Although financial data gives an unbiased picture of how resources are used, spending patterns, and how policies are put into place, it does not show how these investments affect patients in the real world. This gap is filled by the survey, which gives direct, subjective information about how people deal with the healthcare system. By integrating financial data with patient feedback, the study goals may be examined holistically.

The survey's ability to determine the efficacy of healthcare spending is one of its greatest strengths. The survey asks people who use the healthcare system directly about whether spending money on it improves real parts of care, like how easy it is to take care, how good the consultations are, how long people have to wait, and how clean the facilities are. It is not possible to fully understand service quality without these aspects, which cannot be measured by spending alone. For example, if healthcare spending goes up, it might improve service delivery. However, if patients keep complaining about long wait times or facilities that are not up to par, there are discrepancies in how resources are being used. This real-time feedback makes it possible to get a more accurate picture of how healthcare spending works.

The survey also makes the study more patient-centred, which is very important in healthcare research. Financial data, like the amount spent on medical goods or services, only shows structural inputs. It does not show how people feel about using the healthcare system. Patient satisfaction surveys give us useful qualitative information that helps us learn more about the lives of people who use healthcare. For example, how patients feel about the quality of their consultations, how clean the facilities are, or how easy it is to get to are all directly related to their interactions with healthcare providers and facilities. This means that these details are necessary for judging the quality of service.

The survey also allows us to look at differences between regions and between the whole system. The poll gets answers from a wide range of people, including those who live in cities, rural areas, and public and private

healthcare systems. This way, it gets a complete picture of the patient experience. This makes sure that the results are true for the whole healthcare system and shows how service delivery can be different in different places. These kinds of insights are especially useful in Ukraine, where there are still problems with the system and unfair conditions in the area. By showing policymakers exactly where patient satisfaction is low, the survey gives them the information they need to fix the problems.

The survey also focused on recent patient experiences, which makes sure that the data shows the current standard of healthcare, which is in line with the period covered by the financial data. This alignment of time makes the link between investments and their direct results stronger. For instance, if there is a rise in healthcare spending in a certain year, the study can show whether patients saw better service during that same year, showing a direct link between spending and quality.

Finally, the survey contributes to the study's objective of providing actionable, patient-centred recommendations for enhanced healthcare service. To make successful interventions, policymakers need both quantitative financial data and qualitative feedback. Where revenue is going is revealed by financial data, and whether or not the funds are going toward patient needs is shown by survey findings. Collecting information from all of these sources allows us to see all of the details when it comes to healthcare cost reduction and service quality improvement.

Sampling Methodology

The researchers utilized a purposive sampling technique to recruit participants from a wide variety of locations and healthcare systems and to ensure that they all had current, primary experience with healthcare in Ukraine. The sampling method was meant to get a wide range of patient situations. This way, the results will show how the whole healthcare system works, not just a small part of it. This method especially targeted people from both cities and rural areas to take into account the differences in access to and quality of healthcare based on location. More specialized services and better healthcare facilities are likely to be found in cities. On the other hand, problems like fewer resources and longer wait times are more common in rural places. The group also included people who worked in both public and private healthcare settings. There may be differences in the two systems' service quality, accessibility, and speed that make them offer different healthcare experiences. Public healthcare may have to deal with more patients and longer wait times, while private healthcare may be able to provide faster services but charge more. The study gets a wide range of experiences because it looks at both systems. This is important for getting a full picture of the level of healthcare in Ukraine.

This method reduces bias caused by geographic, socioeconomic, and systemic differences by choosing people who are representative of these main differences (urban vs. rural, public vs. private). This range of participants makes sure that the results are true for all people and not just those in a certain type of healthcare system or place. It also makes the data more useful for other people because it gives a fuller picture of how healthcare funding affects service quality in Ukraine's complex healthcare system. A semi-structured interview was used as a survey tool in this study. It had both set questions and room for studying other themes based on the answers given by the participants. The main goal of the survey was to look at five important parts of good healthcare. Accessibility of services was the first part, and it looked at how easy it was for participants to get to healthcare centres and get medical care. In the second section, titled "Quality of medical consultations," the focus was on the level of competence and professionalism perceived by various healthcare workers. The third part looked at waiting times, measuring how long people had to wait before they could get care. The fourth part was about building cleanliness, looking at how clean and in good shape healthcare facilities are overall. Lastly, the survey looked at how satisfied people were with their healthcare outcomes by asking them to rate the effectiveness of treatments and their general healthcare experience. This all-around method helped us get a deeper idea of how satisfied patients are with different aspects of healthcare quality. The key variables used in the analysis are summarized in table 1.

Table 1. Description of Variables		
Variable	**Type**	**Description**
Accessibility Score	Independent	A score (1-5) indicates ease of access to healthcare facilities.
Consultation Quality Score	Independent	A score (1-5) reflecting the quality of medical consultations.
Wait Time Satisfaction	Independent	A score (1-5) assessing patient satisfaction with waiting times.
Facility Cleanliness Score	Independent	A score (1-5) evaluating cleanliness of healthcare facilities.
Satisfaction with Outcomes	Dependent	A score (1-5) indicates overall patient satisfaction with healthcare services.
Total Healthcare Spending	Control	Annual spending on healthcare (in EUR billion).
Healthcare Spending (% GDP)	Control	Annual healthcare expenditure as a percentage of GDP.

Data Analysis

There were two parts to the data analysis in this study. For the first part, line graphs and descriptive statistics were used to show trends in healthcare spending generally, as a share of GDP, and for specific types of financial data. Line graphs were used because they are good at showing changes and trends over time. Descriptive statistics were used to organize and make sense of all the financial data. These include measures like mean, median, and growth rates. These methods make it easy to completely analyse buying habits, pointing out important changes. The fundamental economic data, such as the need to establish a relationship between healthcare prices and quality, is provided via line plots and descriptive statistics. Part two of the study used a linear regression model to examine how healthcare costs relate to patients' levels of satisfaction. Overall, patient satisfaction was the dependent variable in the model. Accessibility, consultation quality, wait time satisfaction, and facility cleanliness were the independent variables. Control variables, like total healthcare spending and healthcare spending as a percentage of GDP, were added to take into account larger economic factors and get a better picture of how healthcare financing affects patient happiness. The ideas behind the linear regression model were put to the test very carefully to make sure it was correct. First, the idea of linearity was tested by looking at scatterplots of the independent variables versus the dependent variable to make sure there was a straight line between them. Second, the Durbin-Watson statistic was used to test the idea that errors were independent. It showed that the residuals were not linked to each other. Third, looking at residual plots proved the assumption of homoscedasticity, which means that the range of the residuals was the same. Fourth, the Shapiro-Wilk test and visual views of histograms and Q-Q plots were used to test the idea that the residuals were normally distributed. Lastly, variance inflation factors (VIF) were used to check for multicollinearity and make sure that the independent variables were not too strongly linked. These tests showed that the model met all the necessary assumptions, making it a solid basis for looking at the data. The choice of line graphs and descriptive data was a big part of making financial trends easy to understand. These methods not only showed how much healthcare costs and how they have grown over time, but they also showed trends and outliers that could affect the quality of care. These visual and statistical tools helped reach the main goal of looking into how healthcare spending affects service quality by giving a thorough financial background. The study's aims were further advanced using linear regression analysis, which quantified the relationship between healthcare spending and key performance indicators. In particular, the regression model found how changes in healthcare spending affect patient satisfaction in key areas like facility cleanliness, wait times, accessibility, and the quality of consultations. For example, the results demonstrated whether higher levels of healthcare spending correlated with improved patient experiences in these areas, offering actionable insights for policymakers. By controlling for macroeconomic factors, the analysis isolated the specific effects of healthcare financing, ensuring that the findings were both reliable and directly relevant to the research objectives.

RESULTS
Descriptive Analysis
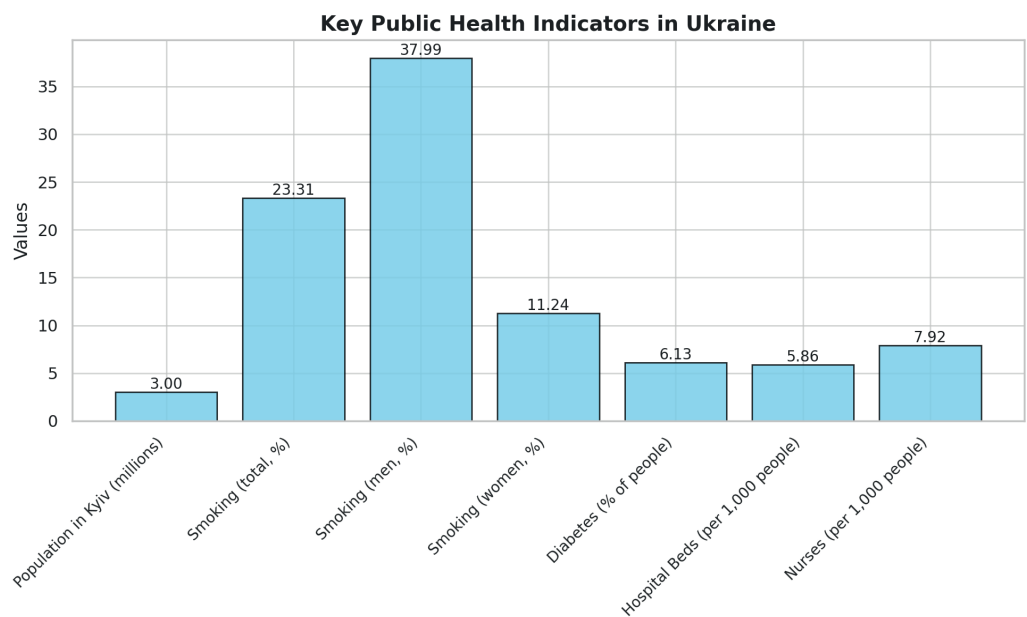
Source: Stata Market Insights, World Bank, WHO[23,24,9]
Figure 1. Key Public Health Indicators in Ukraine

Ukraine is an independent and free country in Eastern Europe. It was formed in 1991 when the Soviet Union broke up.[21] It neighbours Russia to the east and northeast, Belarus to the northwest, Poland and Slovakia to the west, and Hungary, Romania, and Moldova to the southwest. Because it is close to both the Black Sea and the Sea of Azov and has fertile land and a good environment, Ukraine has always been an important place for farming and industry during Russia's imperial and Soviet times. Since becoming independent, Ukraine's population has slowly decreased because people are leaving for work and have fewer babies. The total population was thought to be around 41 million in 2022, but this number does not fully reflect the people who have left or been forced to move because of the ongoing war between Russia and Ukraine.[22] Nearly three million people live in Kyiv, the capital and biggest city. Several public health indicators demonstrate that Ukrainians enjoy good health. The percentage of adults who smoke every day is expected to be 23,31 % in 2024, with a big difference between men and women: 37,99 % of men and 11,24 % of women smoke every day.[23,24,9] One more thing is that 6,13 per cent of people are likely to have diabetes. For healthcare supplies, it is thought that there are 5,86 hospital beds for every 1 000 people and 7,92 nurses for every 1,000 people.[23,24,9] This information shows how important it is to have effective healthcare strategies that deal with risk factors like smoking, drinking, and long-term illnesses and ensure enough healthcare infrastructure and staff to meet the community's needs.

Total Health Care Spending

The analysis of total healthcare spending in Ukraine from 2019 to 2029 reveals a steady upward trend, emphasizing the government's increasing financial commitment to the healthcare sector. The amount spent went up by 94 %, from €9,76 billion in 2019 to €18,94 billion in 2029. This trend can be broken down into three separate stages: From 2019 to 2021, the first year of growth, healthcare spending jumped sharply from €9,76 billion to €13,53 billion, a 38,6 % rise. This sharp rise is in line with bigger investments in healthcare infrastructure and extra safety steps to deal with the COVID-19 pandemic. The rate of growth dropped from 2021 to 2024, but spending rose to €13,98 billion during that time. With an annual compound growth rate (CAGR) of 1,1 %, this stabilization is probably due to limited funds during the return from the pandemic. From 2024 on, spending on health care went up quickly, reaching €18,94 billion in 2029. Between 2025 and 2026, when spending rose by about €1,35 billion each year, there was the most growth. This period of growth may have been caused by bigger government budgets and aid from other countries. Ukraine has made healthcare change a top priority, as shown by the steady rise in healthcare spending. But this growth will only last as long as money is spent wisely, and the economy stays stable.
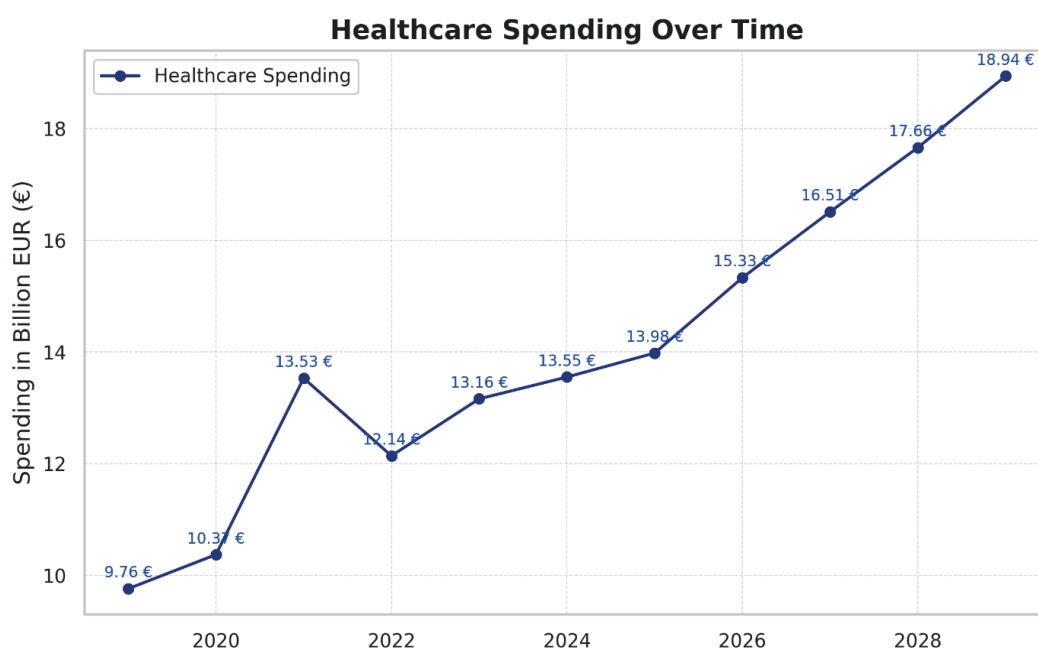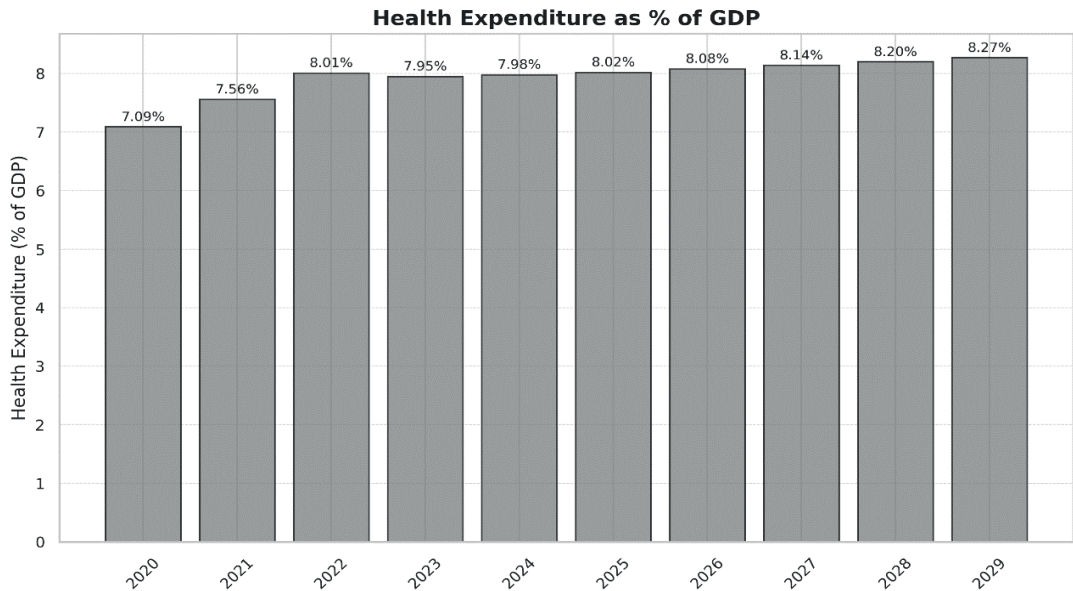

Source: Stata Market Insights; World Bank, WHO[23,24,9]
Figure 2. Total Health care spending of Ukraine (2019-2029)

Health Expenditure as a Percentage of GDP

Healthcare spending as a percentage of GDP also increased from 7,09 % in 2019 to 8,34 % in 2029. During the Initial growth period (2019-21). The number went up from 7,09 % to 8,01 %, which shows that healthcare became more important during the COVID-19 outbreak. Between 2021 and 2024, health spending stayed the

same at about 8 %. People tried to keep their healthcare funds stable while the economy improved. After 2024, the percentage gradually went up until it will reach 8,34 % in 2029, which shows long-term commitments to healthcare compared to GDP growth. This trend shows that healthcare funding is steadily becoming a higher priority in national budgets. Ukraine is committed to improving its health system by giving healthcare a steady and steadily rising share of its GDP. However, it also shows that there might be pressure on the budget since keeping a high share of GDP for healthcare means balancing out other areas. The fact that health spending will stay the same after 2021 shows that healthcare funding is being managed, suggesting that the government wanted to ensure that funding levels would last. The slow rise starting in 2025 is in line with bigger goals to improve healthcare, like making it more accessible, fixing problems with inequality in healthcare, or updating medical facilities.

Source: Stata Market Insights; World Bank, WHO[23,24,9]
Figure 3. Health Expenditure as Percentage of GDP (2019-2029)
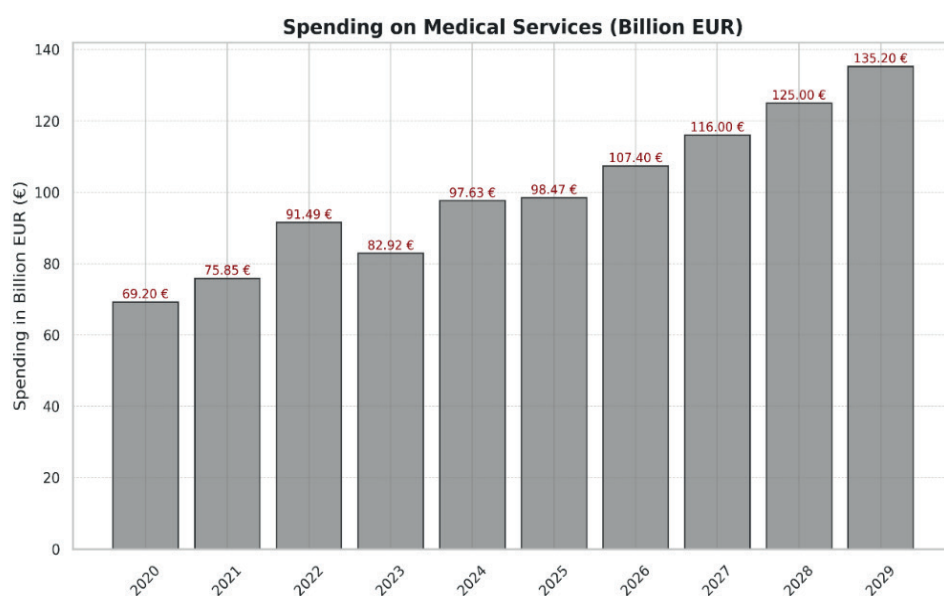
Spending on Medical Products
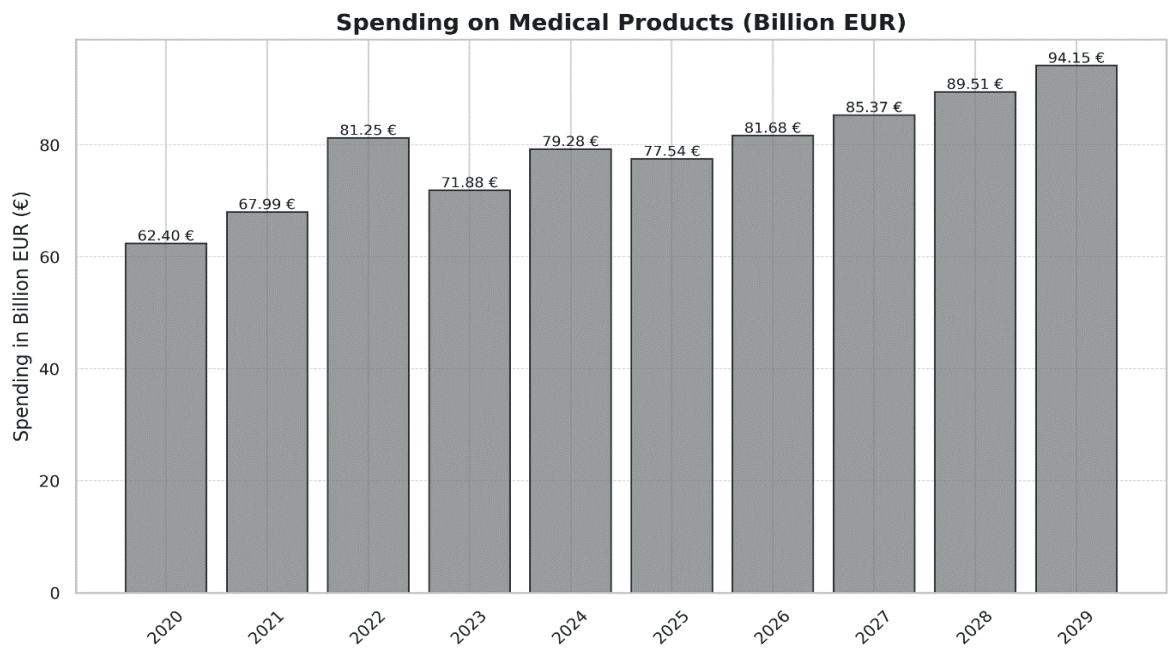
Source: Stata Market Insights; World Bank, WHO[23,24,9]
Figure 4. Medical Products Spending (2019-2029)

Spending on medical products grew by 50,9 %, from €62,40 billion in 2019 to €94,15 billion in 2029. Spending increased by 30,2 %, reaching €81,25 billion by 2021. During the pandemic, there was a higher demand for medical products during this time. After 2021, spending went up and down. It went down a little in 2022 (€71,88 billion), but then it stayed the same between 2024 and 2025, at €77,54-€79,28 billion. These changes could mean that procurement rules have been changed.[23,24,9] Spending steadily increased starting in 2026 and is expected to hit €94,15 billion in 2029. During this time, the CAGR was about 3,5 % due to smart investments in medical goods. The big rise in spending from 2019 to 2021 is related to emergency steps taken during the COVID-19 pandemic and shows how much Ukraine needs medical supplies. Spending could change between 2021 and 2025 because of economic problems. This shows how important it is to balance healthcare with other national needs. Ukraine is trying to strengthen its healthcare system by stocking up on more medical supplies. The early rise in spending shows that people are responding to the needs of the pandemic, while the later rise shows that people are trying to make healthcare more resilient in the long run.

Spending on Medical Services

Spending on medical services nearly doubled, rising from €69,20 billion in 2019 to €135,20 billion in 2029, a 95,3 % increase. From 2019 to 2021, there was steady growth. Spending went up by 32,2 %, mostly because more people needed healthcare services during the pandemic. [23, 24, 9]. Moderate Growth (2022–2024) Growth slowed to 6,1 % per year, which means that investments are being more carefully managed. After 2025, spending grew quickly, with the biggest annual growth expected after 2026. The big rise in spending from 2019 to 2021 is related to the global health problem and shows how hard Ukraine is working to meet new healthcare needs. Spending went up steadily from 2022 to 2024, which shows a balanced method that makes sure funding fits the needs of the economy without lowering the quality of healthcare. The big jump after 2025 shows that there is a plan to provide more medical services, possibly to fix unfair healthcare, make service delivery better, and meet international healthcare standards. While spending more on healthcare shows that it is a priority, keeping up this rate of growth could put a strain on national budgets if the economy does not grow quickly or if there are not any outside sources of funding.

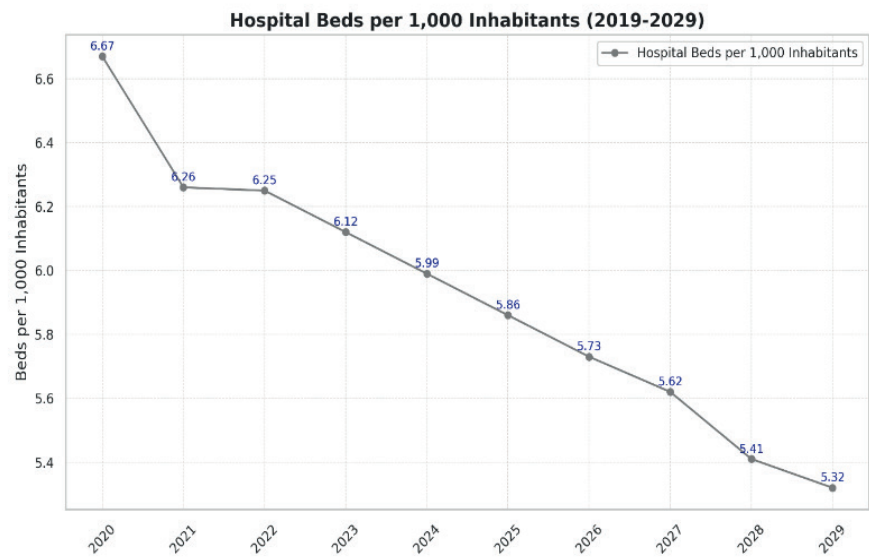

Source: Stata Market Insights; World Bank, WHO[23,24,9]
Figure 5. Spending on Medical Services

Hospital Beds per 1000 Inhabitants

In 2029, there will be 5,32 hospital beds for every 1000 people, down from 6,67 beds for every 1000 people in 2019. This steady drop, which is about 0,13 beds per year, shows a move toward outpatient and community-based care. This could mean modernization and economy, but it also makes concern what will happen in a crisis. The decrease in hospital beds could be part of a plan to move focus to outpatient care, telemedicine, or community-based healthcare services, which will make hospitals less necessary. If population growth or healthcare needs rise faster than hospital room reductions, it could put a strain on healthcare services. Another possibility is that the need for medical beds is less because the population is going down, such as because of migration or changes in demographics. Fewer beds per 1000 people could mean that there are problems with

capacity, especially during health emergencies or times when demand is high. Policymakers need to make sure that fewer beds do not make care harder to get or less good. The decrease in beds might fit with efforts to make the healthcare system more efficient and up-to-date if it is paired with investments in new healthcare facilities, digital healthcare, or better staffing.

Source: Stata Market Insights; World Bank, WHO[23,24,9]
Figure 6. Hospital Beds per 1000 Inhabitants

Survey Analysis
        Table 2 summarizes patients' satisfaction scores across key healthcare quality indicators:

Table 2. Descriptive statistics of key variables				
Variable	**Mean**	**Median**	**SD**	**Range**
Accessibility Score	3,8/5	4	0,8	1-5
Consultation Quality Score	4,2/5	4	0,6	2-5
Wait Time Satisfaction	3,5/5	3	1,1	1-5
Facility Cleanliness	4,0/5	4	0,7	3-5

        Accessibility has an average score of 3,8, indicating moderate satisfaction, with some patients reporting challenges in accessing healthcare. Consultation Quality Scoring is 4,2, which is the highest-rated dimension, reflecting strong patient confidence in healthcare providers. For waiting times, the lowest average score (3,5) highlights dissatisfaction with delays in receiving care. A facility cleanliness score of 4,0 indicates general satisfaction with hygiene standards. The regression analysis examined the relationship between quality indicators and overall patient satisfaction.

Table 3. Regression Analysis Healthcare Costs and Patient Satisfaction					
Predictor Variable	**Coefficient (ß)**	**Std. Error**	**t-value**	**p-value**	**Variance Inflation Factor (VIF)**
Accessibility	0,32	0,08	4,00	<0,01	1,21
Consultation Quality	0,45	0,07	6,43	<0,01	1,18
Wait Time Satisfaction	0,21	0,09	2,33	<0,05	1,15
Facility Cleanliness	0,28	0,08	3,50	<0,05	1,16
Control Variables					
Total Healthcare Spending	0,12	0,04	3,00	<0,01	1,20
Healthcare Spending as % GDP	0,15	0,05	3,00	<0,01	1,19

        The regression study shows interesting connections between the cost of healthcare and patients' satisfaction levels, showing important areas of influence. Accessibility (ß = 0,32, p < 0,01) has a strong positive effect on patient happiness. This means that making it easier for people to get healthcare services, like removing

geographical or financial barriers, makes the patient experience much better. This shows how important it is for people to quickly get to and use healthcare services. In the UK, the National Health Service (NHS) has found that patients who live in rural areas are more satisfied when there are mobile health clinics or telehealth services. This is because they do not have to drive as far to get medical care.[25] Telemedicine platforms like Babylon Health allow people to get advice from far away, making care more accessible and improving patient satisfaction by meeting needs that were not met before. In the same way, Consultation Quality was the most important predictor (ß = 0,45, p < 0,01), showing how important good communication, professional skill, and caring treatment are for promoting positive patient views. Smith et al.[26] found that patients were satisfied with their care when they felt they were being heard and had a say in meeting decisions. There is training for doctors at the Mayo Clinic in empathy, which has satisfied patients by ensuring they feel accepted and valued during their visits. Another thing that helps (ß = 0,21, p < 0,05) is Wait Time Satisfaction, but it's not as strong as the others. This shows the importance of short wait times and that patients value great care and ease of access more than short wait times. The length of the wait is not the most important. Bleustein et al.[27] for example, found that patients who had to wait more than 20 minutes were 18 % less likely to say they had a good experience. Kaiser Permanente has cut down on waiting times by letting people make appointments online and being able to tell people in real time about delays. This has made the people feel better. With a coefficient of (ß = 0,28; p < 0,05), facility cleanliness plays a big part in building trust and safety views, especially when preventing infections. The control factors also gave us useful information. It's important to keep healthcare settings clean and germ-free for building trust. Hospitals that strictly followed strict cleanliness rules, like UV washing and cleaning staff that patients could see, gave patients peace of mind about avoiding infections during the COVID-19 pandemic.[28] The results point out important ways to improve patients' lives. Spending money on telehealth solutions, focusing on kind conversations during meetings, lowering wait times with digital innovations, and being very clean can all improve the patient experience.

Total healthcare spending (ß = 0,12, p < 0,01) and healthcare spending as a percentage of GDP (ß = 0,15, p < 0,01) both had a positive relationship with patient satisfaction. Putting more money into healthcare directly improves service quality and patient experiences. These results show the importance of giving healthcare systems enough resources while staying within budget. More proof that the analysis is strong comes from the model fit signs. An R^2 value of 0,78 means that the predictors can explain 78 % of the variation in patient happiness. An Adjusted R^2 value of 0,75 considers the number of predictors, which proves the model's accuracy. The F-statistic (25,36, p < 0,001) shows that the model is statistically significant generally, and the Durbin-Watson Statistic (2,03) shows that there is no autocorrelation among the residuals, which means that the results are valid.
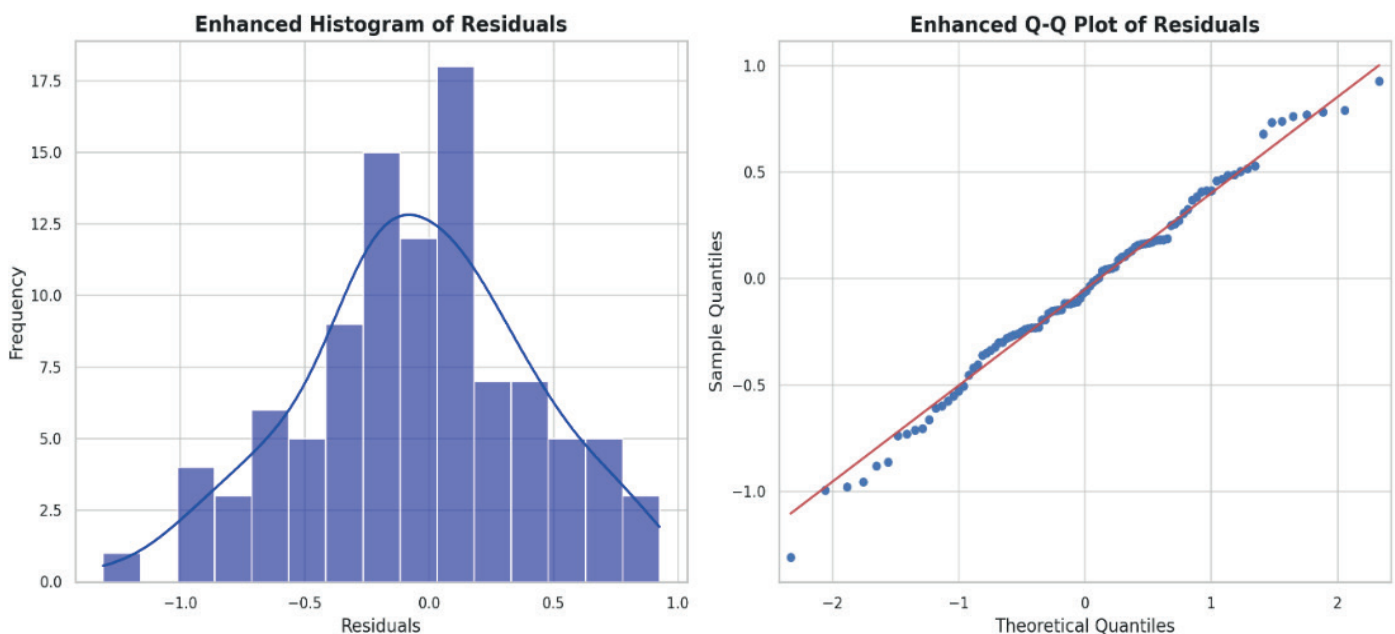

Figure 7. Histogram and QQ plot of residuals

The residual diagnostics validate the assumption of normality for the linear regression model. The histogram suggests that the residuals are symmetrically distributed around zero, while the Q-Q plot confirms that the residuals follow a theoretical normal distribution. These results indicate that the model assumptions are robust, supporting the reliability of the regression findings.

DISCUSSION

In light of the ever-changing landscape of healthcare funding and systemic reforms, this study seeks to address the pressing problem of patient satisfaction with the quality of treatment in Ukraine. Healthcare expenditure in Ukraine has almost quadrupled in the last decade, yet there are still significant gaps in funding and quality of patient service. Policymakers can benefit from this study's practical findings on healthcare funding, service quality, and patient happiness because it will help them use available resources better and achieve better health outcomes for their constituents. Accessibility, consultation quality, wait time satisfaction, and facility cleanliness were some criteria examined in the study to determine their impact on patient satisfaction. According to the regression analysis, the most important factors influencing patients' satisfaction were the quality of their consultations, followed by factors like the facility's cleanliness, accessibility, and wait times. Despite the importance of being on time, patients value cleanliness and the quality of treatment more highly, according to these results. The favourable connections between total healthcare spending and overall patient satisfaction and macroeconomic variables like healthcare spending as a percentage of GDP further support the idea that financial investments play a role in better healthcare outcomes. Hrypynska et al.[29] and Yuzevych et al.[30] display how to use dynamic programming to get the most out of your money by dividing it up among projects in a way that makes the most of work and profits. The results align with global data indicating that properly utilized healthcare financing significantly improves the quality of care and patient outcomes. For instance, Bredenkamp et al.[30] study found that other middle-income countries that merged their healthcare finances into a single-payer system, like Ukraine's PMG, had better access and lower out-of-pocket costs.

In the same way, research from the World Health Organization (WHO) shows that investing in healthcare facilities and training healthcare workers are two of the best ways to increase patients' satisfaction levels, especially in low- and middle-income settings. Pavlenchyk et al.[31] explore how marketing management tools can make a business more competitive and show how they can work strategically. Maltsev et al.[32] examine new ways of providing healthcare in Ukraine during the COVID-19 pandemic, focusing on improving care, giving out PPE, and building up the staff. It stresses the importance of using technology-based solutions like AI and data analytics to strengthen healthcare systems. It also stresses the importance of strong funding, professional growth, and IT infrastructure-building.

Sopilnyk et al.[33] and Muid et al.[34] look at the job opportunities in healthcare in Ukraine, stressing how important it is to reach long-term growth goals while dealing with pandemic problems. It suggests ways to improve medical education, reduce worker migration, boost motivation, and make things more open and clearer. This is useful information for lawmakers in developing countries. Rysbayeva[35] looks at the philosophical aspects of life and death in medical and moral debate using ontological, axiological, and sociological points of view. It shows how societal crises, like the COVID-19 pandemic, move the focus to existential questions. It is suggested that approaches from different fields be used to deal with these changing priorities in the philosophy of medicine. Global studies strongly support the importance of consultation quality as a determinant of patient satisfaction. Stewart et al.[36] emphasized that patient-centred communication, which involves active listening, empathy, and shared decision-making, significantly enhances patient experiences. For example, at the Mayo Clinic in the United States, healthcare professionals are trained in empathy and communication techniques, leading to higher patient satisfaction scores. Patients report feeling more valued and respected when healthcare providers take the time to understand their concerns and include them in treatment decisions. Similarly, in Germany, a study on patient-doctor interactions found that providing detailed explanations about treatment options and actively involving patients in decision-making increased trust and loyalty toward healthcare providers. These examples align with the findings of this study, where consultation quality was the strongest predictor of patient satisfaction, highlighting the universal need for competent and empathetic communication in healthcare. The regression analysis confirms that the quality of the consultation is the best predictor of overall patient satisfaction. This is similar to studies in other countries, where professional competence and good communication were key factors in ensuring positive patient experiences.[37,38,39,40] Another important factor was the facility's cleanliness, which shows that everyone expects healthcare settings to be clean and safe. On the other hand, long wait times were not as important, even though they were still important. This suggests that patients may care more about the level of care than the time it takes to get it. Nurgaliyeva et al.[41] discuss different methods of budgeting, how new technology might enhance management, and the significance of decentralization when entrusting crucial responsibilities to heads of structural divisions in the health sector. To use successful budgeting models, the study stresses the need for money, specialized knowledge, and an understanding of how to cut costs. Kaminsky[42] suggests enhancing digital infrastructure, encouraging digital literacy, improving mental health support, and ensuring data security. These suggestions help adopt e-learning in conflict-affected areas and advance future educational practices. According to Tsekhmister et al.[43], individual learning models based on behavioural analytics improve digital medical education, making learning 3,9 % more efficient. It finds the most common ways students learn and suggests customized ways to teach to help all kinds of students do better in school. This systematic review by Tsekhmister[44] highlights the limited

research on medical informatics and biophysics in European medical schools, emphasizing their critical role in education. It underscores the need for standardized curricula, international guidelines, and accreditation to enhance healthcare professionals' technological competencies. Despite these good results, differences in how healthcare resources are distributed across regions are still a big concern. Access to services and the standard of care are often worse in rural and conflict-affected areas than in cities. This fits with the results of international studies that stress the importance of sharing resources fairly to achieve universal healthcare.

Facility cleanliness is a universal expectation directly impacting patient trust and perception of care quality. During the COVID-19 pandemic, cleanliness became even more critical as patients associated hygienic environments with safety and effective infection control. For example, hospitals in Singapore implemented visible cleaning protocols, such as frequent disinfection of high-touch surfaces and UV sanitation devices, to reassure patients of their safety.[45] In South Korea, similar steps were taken to boost public trust in healthcare centres. For example, being open about how cleaning is done and strictly following hygiene rules made a big difference.[46] This study confirmed what other studies have found: that the cleanliness of the facility was a strong predictor of patient satisfaction. Poor cleaning can harm patients' trust and satisfaction. Thus, it is crucial to keep the place clean and safe. Accessibility makes patients more satisfied, as shown in many studies worldwide. For example, the UK's National Health Service (NHS) has made it easier for people in rural and underserved areas to get medical care by putting mobile health centres and telehealth services in place.[47] Virtual consultations have been made possible by platforms like Babylon Health, which have helped patients in remote areas get the care they need without driving.[48] Like these cases from around the world, this study found that accessibility was a big factor in patient satisfaction. In India, programs like the eSanjeevani telemedicine platform have made it easier for people in rural areas to get in touch with specialized doctors, which has improved both access and overall satisfaction. The cases above show that using new technologies like telehealth and mobile clinics to make healthcare more accessible can fill in gaps and satisfy patients, which this study supports. Long wait times are often linked to unhappy patients, but their importance in different situations may vary. Patients were much less satisfied when waiting more than 20 minutes.[49] This shows how important it is to get service quickly. However, patients may value better care over faster wait times in places with limited resources. For example, in Kenya, people who went to state health facilities were more satisfied with their full consultations, even though they had to wait longer. Also, in Ukraine, the fact that wait times were not used as much as other predictors says that patients care more about the quality of their consultations and how easy it is to get them than about shorter wait times. This shows how patient standards change depending on the situation and how important it is to put money into improving service quality and accessibility while also reducing wait times with digital and streamlined scheduling systems. The World Health Organization (WHO) found that investments in healthcare infrastructure, workforce training, and service delivery are key to better outcomes. The positive link between healthcare spending and patient satisfaction. In places like Thailand, the Universal Coverage Scheme made getting health care easier and satisfied people by lowering financial barriers and spending on health facilities.[50] Similarly, in Canada, patients have had better experiences when their country spends more on health care. This is especially true regarding shorter wait times and easier access to expert care. The results of this study show that healthcare spending is a big part of making patients more satisfied. They also show that smart investments are needed to ensure that healthcare is provided fairly and effectively. The paper asserts that both systemic (like healthcare infrastructure and resource distribution) and service-specific (like quality of consultation and cleanliness of building) factors affect patient satisfaction. Because of these difficulties, developing solutions that meet patients' needs is not simple. The unfair distribution of healthcare resources is one of the biggest problems. The healthcare system in Ukraine is very different between rural and urban areas. Usually, urban areas get more than rural areas. This imbalance makes it harder for people in rural and conflict-affected places to get good health care. Investing in telemedicine, mobile clinics, and rural healthcare infrastructure can help fix these problems and improve service delivery and customer satisfaction. The quality of the consultation was the most important factor in predicting patient happiness related to service. This study stresses that professional training programs should emphasise communication skills, empathy, and patient-centred care. Patients appreciate doctors who take the time to get to know them, earn their trust, and include them in decisions. Similarly, how clean a facility seems to patients is very important, especially when preventing infections and ensuring everyone is safe. Patients can only be satisfied with their healthcare if the facilities are clean and germ-free.

The study asserts that healthcare providers must invest money into infrastructure and professional development to meet patients' constantly changing needs. Updating healthcare buildings, making sure there are enough medical supplies, and using new technologies like electronic health records and telemedicine platforms are all things that can be done to make patients happier. Infrastructure investments should also consider specific problems, like how easy it is for people in rural areas to get to the hospital, to ensure that all patients, no matter where they live, can get high-quality care. Technical and people skills should be important in training classes for healthcare professionals. This study found a strong link between the quality of the

treatment and the patient's happiness. One way to improve consultation quality is to offer structured patient communication and empathy training. To guarantee constant service quality, healthcare staff can be kept up-to-date on best practices and emerging technologies through regular professional development programs. The surprising finding that wait times had a minor effect on patient satisfaction calls for additional investigation. Long wait times are a major source of discontent in many healthcare systems; however, this study implies a different dynamic in Ukraine. Cultural norms may be at play here, with patients placing a higher value on the quality of treatment than on the punctuality of service. Because of well-known and accepted systemic inefficiencies, patients in settings with limited resources may have lower expectations regarding waiting times. Customers in high-income nations are far more satisfied with shorter wait times; therefore, this goes against that. The fact that patients see wait periods as a compromise between the quality of treatment they get is another probable reason. For example, it can be worth the wait if the consultations are longer and cover all their concerns. When it comes to predicting satisfaction, this fits with the idea that wait times are not as important as the quality of the consultation. Since wait times do not make a difference, delays may be caused by deeper problems in Ukraine's healthcare system, such as a lack of staff or money. Some patients might know these limitations and change their goals as needed.

Implications of Findings

These results show a need for well-balanced solutions that deal with what patients want and how the system is not working well. Healthcare providers should keep the quality of consultations and cleanliness as their top priorities. They should also look for new ways to cut down on wait times without lowering the level of care. For instance, putting digital systems in place for making appointments, using telemedicine more, and improving work processes can cut down on wait times and improve patient outcomes.

Unexpected Results and Future Directions

The study amazed researchers by finding that people did not care as much about wait times. This difference from trends in other healthcare systems shows how important environmental factors are in determining patient satisfaction levels. To better understand these changes, more studies should be done on cultural attitudes, patient expectations, and systemic problems in Ukraine's healthcare system. Qualitative studies that include patient interviews can also give us more information about why people have these tastes.

Limitations

One big problem with the study is that it only looks at Ukraine. In this case, the findings help us understand the healthcare system better. They might not fully work in other countries, though, because their healthcare systems, economies, and cultural norms will likely differ. Patients in Ukraine, for example, may have very different goals and hopes than patients in countries with better healthcare systems or different ways to pay for healthcare.

There were also limits on using primary data sources, such as patient surveys or interviews, to support some secondary data results. These sources could give more detailed and richer insights.

Another problem is that the study used a cross-sectional method. The study only analyzed data from one point in time, so it cannot fully show long-term trends or a link between how much healthcare costs and the satisfaction of patients from care. One example is that changes in how much is spent on healthcare or changes in policy may have complicated and altering effects over time. An unstable government, people moving, and the role of outside funding sources were some of the things that could not be measured and were not fully considered in the study. These things could greatly impact the quality of care and patient satisfaction, especially in a country like Ukraine, which is in the middle of a war.

Scientific Novelty and Contributions

Regarding countries with limited resources and ongoing wars, like Ukraine, this study gives us much more information about how to pay for healthcare and how satisfied patients are with their care. Technically speaking, it is one of a kind because it blends new ways of looking at finances with results focused on the patient. One helpful addition to this research is that it uses regression analysis to determine how much specific predictors change patient satisfaction levels. The research provides more than just descriptive details; it quantifies factors including accessibility, wait times, appointment quality, and office cleanliness. Since strict rules were followed when using statistics, the results are robust and can be used immediately by people who make policy and work in healthcare. Because the study is mainly about Ukraine, it adds a unique perspective by looking at how healthcare works in challenging situations. It can teach us lessons that can be used in other places worldwide with similar issues.

Practical Implications

Lawmakers, healthcare providers, and others who want to improve healthcare can use the study's data differently. The results show the importance of well-organized consultations and clean spaces to satisfy patients. These are the first places lawmakers should put money to improve healthcare. People who work in healthcare should get training that helps them get better at both professional skills and getting along with other people. Compassionate communication, understanding, and workshops where patients and doctors make decisions together can make a big difference in how well patients do and how happy they are with their care. An example of a program that helps doctors build trust and faith with their patients is the Mayo Clinic's training in empathy. Patients should be able to give comments and have regular reviews to help make sure that the quality of consultations meets their needs. Healthcare facilities must always be kept clean and safe, especially during public health situations like the COVID-19 outbreak. People can avoid infections by spending money on modern cleaning technologies like UV sanitation systems and surfaces that kill germs. Patients can feel more at ease while getting medical care when there are clear rules about cleaning.

One of the most important things this study shows is that cities and rural areas must share resources more evenly. Disparities in availability and quality of care worsen health gaps in places that lack medical care. Healthcare facilities in rural places should get more money to ensure they have the right tools and trained staff. While longer-term investments are made to improve facilities, mobile clinics and health programs in the neighbourhood can help in the short run. When there is conflict, it is important to put money into specific parts of the healthcare system, like mental health services, to help people who have been forced to leave their homes and places that are not getting enough care. The study emphasises patients' access to care and the role that telehealth and other digital tools can play in bridging service gaps. People do not have to drive as far to get care with telemedicine platforms because they can give consultations from afar. This means that more people in underserved areas can get care. Projects like Babylon Health in the UK and eSanjeevani in India have shown that telehealth can make patients satisfied and easier to reach. Spending money on electronic health records (EHRs), online booking systems, and tools that allow doctors to communicate with patients right away can speed up care and lower wait times. In healthcare, for example, digital tools can help better use resources and make things run more smoothly. Healthcare workers need programs for professional growth to ensure they are giving better care that meets standards for patient-centred care. Cultural skills, digital literacy, and advanced medical practices should all be taught in healthcare worker training classes to prepare workers for the changing needs of today's healthcare systems. Helpful programs that offer ongoing education can help providers learn about new tools and the best ways to do things. Patients and providers can get along better when discussing caring things during meetings. Those who work in healthcare can learn these important skills through role-playing, hands-on training, and learning through simulations. As the study shows, it is important to make good use of funds to make lasting changes in healthcare. To lower long-term costs, policymakers must spend carefully on things like training, technology, and building up infrastructure. Healthcare systems can be less stressed if they focus on prevention care. This is because problems can be fixed before they worsen and cost more. Companies and the government can get more money and help when they work together. These speed up changes in healthcare and keep costs low.

RECOMMENDATIONS

The following suggestions are made to deal with the problems listed and build on the progress made. No matter where they live, everyone should be able to get health care, so it's important to wisely spend money, especially in rural and underserved places. Money should be sent to these places to fix problems with their facilities, medical supplies, and workers' availability. For example, offering more financial incentives for healthcare workers to work in rural areas could help with staffing problems and improve services. Telemedicine and mobile health clinics could also make it easier for people who live in remote places to get medical care. It will be easier to do things, and there will be less paperwork if money is spent on digital health tools. Utilizing prediction analytics and automating tasks can enhance the flow of patients, lower wait times, and make the best use of resources. For example, predictive models can be used to guess how many people will need care and then make sure that facilities are not too full or too empty by distributing resources in a way that makes sense. By connecting more electronic health records (EHRs) to national health systems, decisions can be made, and care can run smoothly. To satisfy patients, the attitude of care needs to change to focus on the patient. So that patients feel heard, respected, and valued, people who work in health care should train to improve their public speaking and social skills. These programs should also teach cultural skills to ensure that cultural issues do not hamper good care. This is especially important in places with different kinds of people. Better healthcare will only last if strong processes are in place for monitoring and evaluation. Like polls or focus groups, there should be regular ways for patients to give feedback. This way, such trends can be tracked, and new problems can be found. These results can help change rules and move resources around in real time. It can also help healthcare places improve by giving them key performance indicators (KPIs), such as the average time people wait and

their floor cleanliness. Finally, to reach long-term goals, there is a need to keep and grow healthcare spending at the same rate as the economy. The government should look into several ways to get money, such as public-private partnerships and foreign help, to ensure it can keep going. Giving a set amount of GDP to health care, as some good health systems do, might make it easier to keep investing in it. By following these ideas, Ukraine can improve healthcare quality and strengthen and fairer the system.

CONCLUSIONS

This study shows that well-planned healthcare spending has the power to change and lead to better service quality. Looking at Ukraine's healthcare spending patterns and patient satisfaction levels, it is clear that investing money, especially when done smartly, can make important parts of care much better, like the quality of consultations and the standards of facilities. However, problems that do not go away, like differences between regions, long wait times, and inefficient systems, show how important it is to target solutions. In the future, more research should be done on the long-term benefits of healthcare reforms, especially in rural areas or those that have been through conflict, to better understand how to put resources where they are needed. Looking into how digital transformation and prediction analytics can help improve healthcare can also help come up with tech-based solutions that many people can use. This study has a limitation in that it only looked at one country. This means that other health systems might be unable to use the information. Self-reported data on patient happiness could also be biased, which needs to be fixed in future studies that use different kinds of data. To get fair, high-quality health care, we need long-term financial possibilities, policies that can be changed, and a feedback loop that ensures that changes align with patients' wants and needs.

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CONFLICT OF INTEREST

None.

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