SILESIAN UNIVERSITY OF TECHNOLOGY PUBLISHING HOUSE

SCIENTIFIC PAPERS OF SILESIAN UNIVERSITY OF TECHNOLOGY 2025
ORGANISATION AND MANAGEMENT SERIES NO. 231

ECONOMETRIC MODELLING OF MEDICAL INFORMATION IN PATIENT-CENTRED CARE

Iwona CZERSKA

Wroclaw University of Economics and Business, Wroclaw; iwona.czerska@ue.wroc.pl,
ORCID: 0000-0002-9680-6695

Purpose: To develop an econometric medical information model based on the author's theoretical model in patient-centred care. The study analyses the determinants of medical information's quality, availability, and perception in patient care.

Design/methodology/approach: A literature review and econometric modelling were used. In the first step, the key independent variables affecting the quality and accessibility of medical information were identified: the sources of information, the form of communication, the empathy of medical staff and the level of information asymmetry. An attempt was made to develop an econometric model to quantify the relationship between these factors and the dependent variable, medical information.

Findings: The quality and accessibility of medical information are determined primarily by the empathy of medical staff, the form in which information is communicated and the level of information asymmetry, indicating the need to improve communication competence, use understandable forms of communication and increase the availability of reliable educational materials.

Research limitations/implications: The CAWI survey had limitations due to non-random sampling, which makes it impossible to generalise the results to the whole population, and the econometric modelling only considered selected factors. Additionally, dimensionality reduction by PCA may have led to the loss of information, the models tested had a low R^2, and the lack of validation on independent datasets makes it impossible to assess their long-term relevance.

Practical implications: The findings suggest the need to optimise communication strategies in health care by improving forms of communication, training staff in empathy and using digital technologies to reduce information asymmetry.

Social implications: Improved availability and quality of medical information strengthens patient autonomy, increases patient involvement in the treatment process and contributes to an improved doctor-patient relationship.

Originality/value: The study represents a novel attempt to analyse medical information in patient-centred care quantitatively. Combining a theoretical model with econometric modelling can accurately identify the factors shaping the quality and perception of information in the treatment process.

Keywords: econometric modelling, patient, medical information, patient-centred care.

Category of the paper: Research paper.

http://dx.doi.org/10.29119/1641-3466.2025.231.5

1. Introduction

Modern healthcare is increasingly patient-centred, shaping a patient-centred care model. In this context, the quality and accessibility of medical information, which plays a crucial role in the patient's diagnostic, therapeutic and decision-making process, is becoming a key element. Appropriate management of medical information not only strengthens patient autonomy and involvement in the treatment process but also contributes to improving the doctor-patient relationship and the effectiveness of treatment.

Despite numerous studies on the role of information in the health care system, there has been a lack of a comprehensive econometric model to quantitatively analyse the determinants of medical information's quality, availability and perception. Existing approaches focus mainly on qualitative aspects, neglecting the possibility of precisely identifying the relationships between variables. In response to this challenge, this thesis attempts to develop an econometric model of medical information in patient-centred care based on the author's theoretical model. In particular, the analysis focuses on identifying and quantifying the impact of key factors such as the empathy of medical staff, information delivery, the availability of educational materials and the level of information asymmetry.

The study refers to the author’s original conceptual framework, previously published in the multi-author monograph Horizons of Information 6 (Czerska, 2024), which integrates relational and informational determinants of patient-centred care into a structured model. The work also offers an empirical attempt to operationalise soft variables—such as empathy or asymmetry—into quantifiable predictors in econometric modelling.

To achieve the stated aim, the following research questions were formulated:

1. How do factors such as the empathy of medical staff, the form of information delivery and the availability of educational materials affect the quality and accessibility of medical information in patient-centred care?
2. Is, and to what extent, the level of information asymmetry in the health care system determined by the way the doctor and patient communicate?

The significance of this study lies in its interdisciplinary approach, combining the conceptual achievements of patient-centred care theory with statistical modelling tools. The attempt to build and test an econometric model fills a methodological gap in health communication and supports the development of evidence-based solutions for public healthcare institutions.

The structure of the paper is as follows: the next section presents a literature review on medical information and patient-centred care. The Methods section outlines the research design, CAWI procedure, data reduction (PCA), and modelling approach. The Results section provides an overview of model performance, followed by the Discussion, which interprets the findings. The paper concludes with implications for practice, limitations, and future research directions.

2. Literature review

Patient-centred care emphasises a partnership between patients and healthcare professionals, focusing on patient preferences, values and holistic well-being rather than solely on diseases or medical interventions. This type of care involves joint management of health conditions by patients and healthcare providers, promoting shared goal-setting and decision-making. (Bauman et al., 2003; Delaney, 2018; Lewin et al., 2001). Patient-centred care implements a holistic approach, considering the patient as a whole person, integrating the patient's beliefs, values and social contexts into care rather than focusing solely on medical conditions (Delaney, 2018; John et al., 2020; Lewin et al., 2001). In engaging and empowering patients, they are encouraged to actively participate in their care, which can lead to better adherence to treatment plans and improved health outcomes (Bauman et al., 2003; McMillan et al., 2013). In addition, patient-centred care is associated with higher patient satisfaction and perceived quality of care because it aligns healthcare delivery with patients' expectations and needs (Delaney, 2018; McMillan et al., 2013). Finally, the pillars of patient-centred care are communication and relationship building, as effective communication and a strong therapeutic alliance between patients and healthcare providers promote trust and understanding (Kitson et al., 2013; Mead, Bower, 2000).

In patient-centred care, it is important to point out its benefits and challenges. Firstly, such care can lead to reduced morbidity, improved quality of life and better management of chronic diseases such as diabetes and asthma (Bauman et al., 2003; John et al., 2020). It also increases patient satisfaction and can improve clinical outcomes (John et al., 2020; Okeny et al., 2024). Regarding challenges, there are some concerns about the potential conflict between patient-centred care and evidence-based care, as they are sometimes seen as mutually exclusive (Delaney, 2018). In addition, implementing patient-centred care requires a commitment from health systems and may involve training providers to adopt this approach (Lewin et al., 2001; McMillan et al., 2013).

In summary, patient-centred care is a comprehensive approach that prioritises the patient's role in their healthcare journey, aiming to improve satisfaction and outcomes by tailoring care to individual needs and preferences. While it offers numerous benefits, its successful implementation requires systemic support and may face challenges in balancing it with traditional evidence-based practices.

The quality and accessibility of medical information in patient-centred care are significantly influenced by the medical staff's empathy, information delivery, and availability of educational materials. Empathy and effective communication on the part of healthcare professionals increase patient satisfaction and engagement, which is crucial for patient-centred care. Patients' perceptions of the trustworthiness and reliability of healthcare professionals influence their willingness to participate in clinical communication, especially among older people (Gaffney, Hamiduzzaman, 2022; Okeny et al., 2024). Patient-centred care is facilitated by healthcare practices that include optimal communication and family involvement (Jardien-Baboo et al., 2021).

Regarding information delivery, electronic health records empower patients by informing them about their health and engaging them in their care. However, there are mixed results regarding their impact on the patient-doctor relationship (Benjamins et al., 2020, 2021). Online access to medical records improves patient satisfaction, self-care and communication with physicians, although it may increase the burden on healthcare professionals (Mold et al., 2015).

In the context of the availability of educational materials, educational factors, including staff and patient education, are essential to promote patient-centred care. Providing relevant and understandable healthcare information is crucial for patient participation, especially for older patients (Gaffney, Hamiduzzaman, 2022; Jardien-Baboo et al., 2021). Furthermore, patient-centred e-health systems that support value co-creation through patient empowerment and shared understanding can improve the perceived quality of healthcare (Yan et al., 2022).

In summary, empathy on the part of medical staff, adequate information provision and accessible educational materials are key to improving the quality and accessibility of medical information in patient-centred care. These factors improve patient satisfaction, engagement and empowerment, leading to better health outcomes. Addressing these elements can help to overcome barriers related to socioeconomic status and disparities in access.

How doctors and patients communicate significantly influences the level of information asymmetry in the healthcare system. Effective communication can reduce information asymmetry and improve trust and collaboration in healthcare relationships. Effective communication goes beyond simply sharing information and includes sharing interpretive schemas and values, which can increase the co-creation of healthcare services and reduce information asymmetry (Barile et al., 2014).

In turn, the quality of patient-physician interaction, which is influenced by communication, significantly affects trust. Online health information and doctor guidance can improve patient-physician interaction and trust, thereby reducing information asymmetry (Peng et al., 2019). In addition, patients who actively seek information and second opinions can put pressure on doctors, encouraging them to do better and reducing information asymmetry (Rochaix, 1989).

Information asymmetry can lead to conflict and aggression in the doctor-patient relationship. Better communication and information sharing can alleviate these problems by increasing trust and reducing misunderstandings (Xu, He, 2019). Reducing information asymmetry through better communication can lead to more efficient healthcare delivery and potentially lower costs, as it better aligns treatment recommendations with patients' needs and expectations (Blomqvist, 1991; Mascarenhas et al., 2013).

Different strategies to reduce information asymmetry can be distinguished. Firstly, education and public awareness. Indeed, educating the public about common diseases, relevant medical regulations, and general health awareness can help reduce information asymmetry and prevent conflicts. This can be achieved through public health campaigns and educational programmes. Secondly, systemic change. This involves establishing systems for information exposure, patient rights and independent evaluations of health services, which could further reduce information asymmetry.

In summary, how doctors and patients communicate plays a key role in determining the level of information asymmetry in healthcare. Effective communication that includes sharing interpretations and values and systemic changes to improve information transparency can significantly reduce information asymmetry, increase trust and improve healthcare outcomes.

3. Methods

This paper attempts to build an econometric model of medical information in patient-centred care based on the author's theoretical model of medical information in patient-centred care. The aforementioned theoretical model is described in detail in the article "Medical information as a key resource in patient-centred care". “Medical information as a key resource for patient-centred care” was published in a multi-author monograph by the Jagiellonian University and the Jagiellonian Library in Krakow. “Horizons of Information 6” in 2024. (Czerska, 2024) (Figure 1).

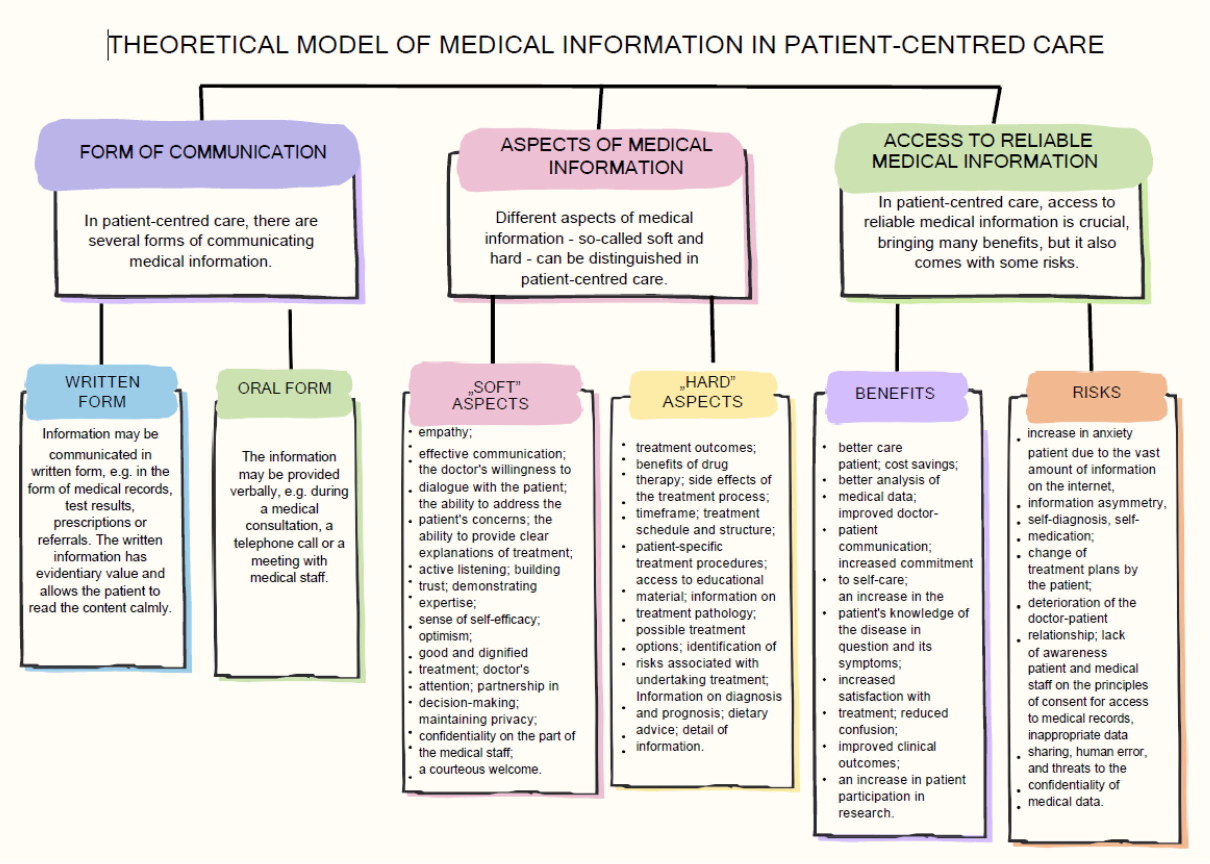

Figure 1. Theoretical model of medical information in patient-centred care.

Source: (Czerska, 2024).

The explanatory variable in the econometric model is "Quality and accessibility of medical information" based on the following responses: very low (no access to reliable information) - 1; low (difficult access, unclear information) - 2; medium (partial accessibility, need to search for information by oneself) - 3; high (suitable educational materials, availability of consultations) - 4; very high (complete transparency, high quality of information) - 5; no opinion - 0. On the other hand, as explanatory variables, it was planned to take into the model, firstly, synthetic variables, which would be formed as arithmetic averages of the assigned scores for the answers: very low - 1; low - 2; medium - 3; high - 4; very high - 5; I have no opinion - 0, for the following variables:

- Assessing the reliability of different sources of medical information in public health care: general practitioner, nurse, NHF website, information brochures and leaflets, medical telephone helplines, information obtained from the pharmacist, websites of hospitals and clinics, e-registration and patient portals (e.g. Internet Patient Account), social media (e.g. Facebook, LinkedIn, Twitter), online health forums, educational programmes on TV and radio, mobile health monitoring apps, medical articles and research, patient organisations, WHO (World Health Organisation) recommendations. New synthetic independent variable "Credibility of medical information sources".

- Assessment of the reliability of different forms of medical information transmission in public healthcare: verbal information from a doctor, verbal information from a nurse, written recommendations after a visit, websites of medical facilities, patient portal (e.g. Internet Patient Account), SMS appointment reminders, telephone medical consultations, information brochures and leaflets, mobile health management apps, video medical consultations. New synthetic independent variable "Credibility of forms of medical information communication".
- Assessment of different aspects of empathy of medical staff: ability to listen to the patient, showing understanding and support, giving sufficient attention to the patient, patience when talking to the patient, politeness and respect when interacting with the patient, and giving clear and understandable explanations. The new synthetic independent variable is "Empathy of medical staff".

Secondly, the variable "Level of information asymmetry", denoting the difference in access to information between doctor and patient, was planned to be taken into the model: very low asymmetry (complete transparency of information to the patient) - 5; low asymmetry (patient has access to most information) - 4; medium asymmetry (some information difficult to obtain) - 3; high asymmetry (relevant information is not made available to the patient) - 2; very high asymmetry (patient has minimal knowledge, complete domination by the doctor) - 1; no opinion - 0.

The article combines "Results" and "Discussion", which allows the results of the medical information modelling in patient-centred care to be presented and verified, and its implications are discussed in the same section. This arrangement made the article more concise and focused by allowing the results of the econometric modelling to be directly linked to the research questions.

4. Results

In February-March 2025, the self-administered survey was conducted using CAWI (Computer-Assisted Web Interviewing). A baseline survey followed the pilot. The survey sample consisted of 247 respondents. The sample selection was non-random. Firstly, voluntary selection was used, and a link to the survey was posted on Facebook and LinkedIn. Secondly, purposive selection - students and employees of Wrocław University of Economics and Business were invited to participate in the study. Thirdly, snowball selection - the study participants shared the link with their friends and family, who then shared it with others.

The study aimed to identify key factors influencing the quality and accessibility of medical information in public healthcare. The analysis focused on assessing the reliability of different sources of information, forms of medical information delivery, the level of empathy of medical staff, and information asymmetry between patients and medical staff.

The first step in building an econometric medical information model was to check collinearity for potential synthetic variables. The results are as follows. For the synthetic variable "Credibility of medical information sources", the mean VIF = 19.42, which indicates very high collinearity. The result indicates that the components of this variable are highly correlated, which may lead to instability in the model. For the second synthetic variable, "Credibility of forms of medical information transmission", the mean VIF = 25.23, indicating extreme collinearity. Such a high level of correlation within the component variables implies the need to reduce collinearity. The highest collinearity among all synthetic variables concerns the variable "Empathy of medical staff", for which the mean VIF = 28.96. This variable, in its current form, could cause serious problems in the regression model

Due to VIF values > 10 indicating strong collinearity and VIF values > 25 indicating critical collinearity, an attempt was made to apply PCA analysis to create one optimised synthetic variable for each group. The results of the PCA analysis allowed the synthetic variables to be optimised as follows:

- For the synthetic variable "Credibility of medical information sources (PCA1)", the variance = is 34.71%, meaning that one principal component retains 34.71% of the information from the original variables.
- For the synthetic variable "Credibility of forms of medical information communication (PCA1)", explained variance = 47.78%, meaning that this component retains almost half of the information, so the collinearity was successfully reduced.
- For the synthetic variable "Empathy of medical staff (PCA1)", the explained variance = is 76.33% (a very high value), meaning that PCA1 represents this variable well and effectively eliminates redundant information.

In summary, PCA effectively reduced the impact of collinearity, producing optimised synthetic variables. The best fit was obtained for "Empathy of medical staff" (76.33%), suggesting that the component captures the original information well.

In the next step, an attempt was made to build an econometric model of medical information in patient-centred care, considering the PCA synthetic variables. The analysis started with a linear regression, but it turned out that the model fit was very low, so the model was rejected. Another attempt was, therefore, made to create a non-linear medical information model. Unfortunately, the various non-linear models did not yield the expected results. In addition, several other statistical analyses and predictive models were conducted to explain the variation in the dependent variable. The results show that none of the models tested achieved a high fit (Table 1).

Table 1.
Summary of different approaches to modelling the dependent variable "Quality and accessibility of medical information" for PCA variables

Approach	R^2 on the learning set	Most significant variables ($p < 0.05$)	Interpretation
Linear regression	0,116	Credibility of forms of medical information communication, Empathy of medical staff, and Level of information asymmetry	Linear regression indicates significant variables but low fit
The power model	0,069	No significant variables	The power model does not improve the results
Exponential model	0,064	No significant variables	The exponential model does not improve the results either
Polynomial regression	0,150	No significant variables	Polynomial regression slightly improves the result but is still a poor fit
Decision tree	0,379	Lack of interpretation	The decision tree is well-matched to the learning data but may be overfitting
Random Forest	0,490	Lack of interpretation	Random Forest is a better fit, but generalisation is poor
LASSO	0,120	No significant improvement	A slight improvement over linear regression, but not useful
Ridge	0,122	No significant improvement	No significant improvement
Support Vector Regression	0,238	No significant improvement	Did not improve fit relative to a linear model
Neural network (MLP)	0,113	No improvement	A neural network gives a better match in validation, but still has a low

Source: own study.

5. Discussion

Table 1 shows the results of the predictive model analysis, considering only the PCA synthetic variables "Credibility of medical information sources (PCA1)", "Credibility of forms of medical information communication (PCA1)", "Empathy of medical staff (PCA1)" and the variable "Level of information asymmetry". Linear regression, non-linear models (power, exponential, polynomial), decision trees, regularised regression (LASSO, Ridge), Support Vector Regression (SVR) and neural network (MLP) were tested. The best fit was achieved by linear regression on the PCA variables, in which "Credibility of forms of medical information communication (PCA1)", "Empathy of medical staff (PCA1)", and "Level of information asymmetry" were statistically significant. However, the R^2 was still low (~0.12), meaning that the model explains only a tiny part of the variation in the dependent variable. The power and exponential models did not improve the results, and the polynomial regression produced minimal improvement but still had a low fit.

Tree models (Decision Tree and Random Forest) fit the learning set well (R^2 up to 0.49) but tended to overfit and have poor generalisation. Regularised regression (LASSO, Ridge) and SVR did not significantly improve. The neural network had a slightly better fit in validation, but it was still low, indicating the difficulty in capturing significant relationships in the data.

In summary, the inclusion of the PCA synthetic variables did not improve the quality of the modelling. The most significant predictors are “Credibility of forms of medical information communication”, “Empathy of medical staff”, and “Level of information asymmetry”, but their impact on the quality and accessibility of medical information is limited. The low R^2 in all the models tested suggests that other factors not included in the analysis influence the variability of the dependent variable, such as the demographic characteristics of the respondents, the information policy of the medical facilities or the patients' health education level. Further research could explore new variables, analyse the interactions between predictors, and use more advanced machine-learning techniques.

These results indicate that empathy, information asymmetry, and communication credibility are statistically significant but account for only a small portion of the overall variability. This suggests that medical information perception is shaped by a more complex set of factors than initially expected. The results should be interpreted in the context of broader patient-centred care models, where factors such as health literacy, institutional trust, and individual digital competencies may play a crucial role (Delaney, 2018; Nutbeam, 2008; Yan et al., 2022). The low explanatory power of the tested models confirms that the perception of medical information is multidimensional and influenced by behavioural, systemic, and psychological determinants (Epstein, Street, 2011; McMillan et al., 2013).

This is consistent with the findings of (Epstein, Street, 2011), who emphasised that the perception of information quality is shaped by the depth of communication and trust in the patient–provider relationship. Similarly, (Nutbeam, 2008) Highlighted health literacy as a key determinant in patients' ability to interpret and act on medical information (Mead, Bower, 2000) also noted that communication and shared understanding are fundamental to patient-centredness. Kitson et al. (2013) further emphasised the role of relational continuity and empathy in improving care quality.

Compared to previous research—often qualitative or survey-based—this study contributes by proposing a quantitative, model-based approach that integrates a theoretical framework with PCA and regression techniques. It offers a novel operationalisation of soft constructs in econometric modelling.

While prior studies confirmed the importance of empathy and trust in patient-provider communication, this research attempted to validate these findings through structured quantitative modelling. For example, H. Gaffney & Hamiduzzaman (2022) showed that older patients' participation in clinical dialogue depends strongly on perceived empathy and clarity of communication. Jardien-Baboo et al. (2021) confirmed the significance of evidence-based guidelines for patient-centredness in nursing care. These observations are echoed in the present study's results, although the quantitative modelling reveals that these factors alone do not fully explain variability in perceived information quality.

The findings emphasise the need for hybrid approaches incorporating behavioural, psychological and organisational dimensions. Additionally, the weak explanatory power of the tested models raises the question of whether context-specific or longitudinal data may be more suitable for future analyses.

The study provides empirical support for the assumption that key factors—such as empathy, credible forms of communication, and perceived information asymmetry—play a statistically significant role in shaping how patients assess the quality and accessibility of medical information. However, the relatively low explanatory power of the models suggests that additional, unmeasured factors may also be important.

The novelty of the findings lies not only in the use of PCA and machine learning techniques but also in the attempt to translate intangible constructs into empirical data. The methodological triangulation enhances the robustness of the conclusions, although the lack of generalisability due to the sample structure remains a limitation. This approach reflects the recommendations of Barile et al. (2014), who argued that addressing information asymmetry in healthcare requires systemic analysis and co-creation of communication strategies with patients. Similarly, Mascarenhas et al. (2013) proposed reducing asymmetry through multi-level educational and institutional strategies.

In terms of future research plans, the author intends to extend the model by including cross-sectoral comparisons (public vs. private healthcare institutions) and test dynamic models using longitudinal data. Another direction involves incorporating health literacy scales, perceived trust, and digital engagement variables into the econometric framework.

In conclusion, this study demonstrates the challenges of modelling complex, human-centric variables such as medical information quality. It also opens new research directions, encouraging interdisciplinary methodologies and deeper investigation into how patients process, trust, and act upon the information they receive.

6. Conclusions

The conclusions presented below are directly linked to the modelling results and take into account both theoretical assumptions and practical implications for health communication systems.

The literature review showed that the quality and accessibility of medical information in patient-centred care depend mainly on the empathy of medical staff, sufficient consultation time, the form of information delivery, and access to educational resources. Econometric analysis confirmed that these factors significantly impact patients' perception of information, with the level of information asymmetry in the healthcare system playing a key role in limiting access to reliable medical data.

The findings have important practical implications for the healthcare sector. Firstly, they point to the need to optimise the communication strategies used by healthcare professionals. Indeed, improving forms of communication, including digital technologies, can increase the transparency and accessibility of data, reducing the information asymmetry between patients and doctors. Secondly, it is also crucial to train medical staff in effective communication and empathy, which can significantly improve the quality of interactions with patients. Thirdly, from a health policy perspective, the study's results suggest a need for greater emphasis on standardising and sharing medical information. Indeed, implementing standardised e-health systems, improving access to electronic patient records and providing patients with easier access to reliable and understandable educational materials can increase their autonomy and involvement in treatment. Finally, taking measures to reduce information asymmetries can lead to better-tailored treatments for patients and, thus, higher efficiency in the healthcare system.

In summary, improving the quality and accessibility of medical information requires comprehensive measures that include changes in medical facilities' communication strategy and systemic information access reforms. The integration of an empathetic approach by staff, the digitalisation of information and the reduction of information asymmetries can contribute to better patient-centred care and increased patient satisfaction and engagement.

The article contains limitations. Firstly, the CAWI survey had limitations related to the availability and quality of data - the sampling was non-random, which makes it impossible to generalise the results to the whole population, as the results are only specific to the surveyed group. Secondly, the modelling included variables related to information reliability, staff empathy and information asymmetry but did not include other potentially relevant factors, such as patients' digital competence or cultural context. Thirdly, the collinearity problem required dimensionality reduction through PCA, which could lead to some information loss. The econometric models tested had low R^2 values, suggesting that important variables were not captured. The model was not fully validated on independent datasets, and the analysis was static, making it impossible to assess long-term changes, which limits the possibility of assessing long-term trends or causal relationships.

References

1. Barile, S., Saviano, M., Polese, F. (2014). Information Asymmetry and Co-Creation in Health Care Services. *Australasian Marketing Journal*, *22*(3), 205-217. https://doi.org/10.1016/j.ausmj.2014.08.008
2. Bauman, A.E., Fardy, H.J., Harris, P.G. (2003). Getting it right: Why bother with patient-centred care? *Medical Journal of Australia*, *179*(5), 253-256. https://doi.org/10.5694/j.1326-5377.2003.tb05532.x
3. Benjamins, J., Haveman-Nies, A., Gunnink, M., Goudkuil, A., De Vet, E. (2021). How the Use of a Patient-Accessible Health Record Contributes to Patient-Centered Care: Scoping Review. *Journal of Medical Internet Research*, *23*(1), e17655. https://doi.org/10.2196/17655
4. Benjamins, J., Haveman-Nies, A., Gunnink, M., Goudkuil, A., Vet, E. de. (2020). *How the Use of a Patient-Accessible Health Record Contributes to Patient-Centered Care: Scoping Review (Preprint)*. https://doi.org/10.2196/preprints.17655
5. Blomqvist, Å. (1991). The doctor as double agent: Information asymmetry, health insurance, and medical care. *Journal of Health Economics*, *10*(4), 411-432. https://doi.org/10.1016/0167-6296(91)90023-G
6. Czerska, I. (2024). Informacja medyczna jako kluczowy zasób opieki pacjentocentrycznej. In *Horyzonty informacji* (Vol. 6, pp. 78–87). Uniwersytet Jagielloński, Biblioteka Jagiellońska. https://doi.org/10.26106/zpj7-bm65
7. Delaney, L.J. (2018). Patient-centred care as an approach to improving health care in Australia. *Collegian*, *25*(1), 119-123. https://doi.org/10.1016/j.colegn.2017.02.005
8. Epstein, R.M., Street, R.L. (2011). The Values and Value of Patient-Centred Care. *The Annals of Family Medicine*, *9*(2), 100-103. https://doi.org/10.1370/afm.1239
9. Gaffney, H., Hamiduzzaman, M. (2022). Factors that influence older patients' participation in clinical communication within developed country hospitals and GP clinics: A systematic review of current literature. *PLoS ONE*, *17*. https://doi.org/10.1371/journal.pone.0269840
10. Gaffney, H.J., Hamiduzzaman, M. (2022). Factors that influence older patients' participation in clinical communication within developed country hospitals and GP clinics: A systematic review of current literature. *PLOS ONE*, *17*(6), e0269840. https://doi.org/10.1371/journal.pone.0269840
11. Jardien-Baboo, S., van Rooyen, D.(R.M.), Ricks, E.J., Jordan, P.J., ten Ham-Baloyi, W. (2021). Integrative literature review of evidence-based patient-centred care guidelines. *Journal of Advanced Nursing*, *77*(5), 2155-2165. https://doi.org/10.1111/jan.14716
12. John, J., Jani, H., Peters, K., Agho, K., Tannous, K.W. (2020). The Effectiveness of Patient-Centred Medical Home-Based Models of Care versus Standard Primary Care in Chronic Disease Management: A Systematic Review and Meta-Analysis of Randomised and Non-

Randomised Controlled Trials. *International Journal of Environmental Research and Public Health*, *17*. https://doi.org/10.3390/ijerph17186886

13. Kitson, A., Marshall, A., Bassett, K., Zeitz, K. (2013). What are the core elements of patient-centred care? A narrative review and synthesis of the literature from health policy, medicine and nursing. *Journal of Advanced Nursing*, *69*(1), 4-15. https://doi.org/10.1111/j.1365-2648.2012.06064.x
14. Lewin, S., Skea, Z., Entwistle, V.A., Zwarenstein, M., Dick, J. (2001). Interventions for providers to promote a patient-centred approach in clinical consultations. *Cochrane Database of Systematic Reviews*, *4*. https://doi.org/10.1002/14651858.CD003267
15. Mascarenhas, O.A.J., Kesavan, R., Bernacchi, M.D. (2013). On Reducing Information Asymmetry in U.S. Health Care. *Health Marketing Quarterly*, *30*(4), 379-398. https://doi.org/10.1080/07359683.2013.847338
16. McMillan, S.S., Kendall, E., Sav, A., King, M.A., Whitty, J.A., Kelly, F., Wheeler, A.J. (2013). Patient-Centered Approaches to Health Care: A Systematic Review of Randomized Controlled Trials. *Medical Care Research and Review*, *70*(6), 567-596. https://doi.org/10.1177/1077558713496318
17. Mead, N., Bower, P. (2000). Patient-centredness: A conceptual framework and review of the empirical literature. *Social Science & Medicine*, *51*(7), 1087-1110. https://doi.org/10.1016/S0277-9536(00)00098-8
18. Mold, F., Lusignan, S. de, Sheikh, A., Majeed, A., Wyatt, J.C., Quinn, T., Cavill, M., Franco, C., Chauhan, U., Blakey, H., Kataria, N., Arvanitis, T.N., Ellis, B. (2015). Patients' online access to their electronic health records and linked online services: A systematic review in primary care. *British Journal of General Practice*, *65*(632), e141-e151. https://doi.org/10.3399/bjgp15X683941
19. Nutbeam, D. (2008). The evolving concept of health literacy. *Social Science & Medicine*, *67*(12), 2072-2078. https://doi.org/10.1016/j.socscimed.2008.09.050
20. Okeny, P.K., Pittalis, C., Monaghan, C.F., Brugha, R., Gajewski, J. (2024). Dimensions of patient-centred care from the perspective of patients and healthcare workers in hospital settings in sub-Saharan Africa: A qualitative evidence synthesis. *PLOS ONE*, *19*. https://doi.org/10.1371/journal.pone.0299627
21. Peng, Y., Yin, P., Deng, Z., Wang, R. (2019). Patient–Physician Interaction and Trust in Online Health Community: The Role of Perceived Usefulness of Health Information and Services. *International Journal of Environmental Research and Public Health*, *17*. https://doi.org/10.3390/ijerph17010139
22. Rochaix, L. (1989). Information asymmetry and search in the market for physicians' services. *Journal of Health Economics*, *8*(1), 53-84. https://doi.org/10.1016/0167-6296(89)90009-X

23. Xu, Y., He, W. (2019). More Information = Less Aggression? Impact of Information Asymmetry on Chinese Patients' Aggression. *Frontiers in Public Health*, *7*. https://doi.org/10.3389/fpubh.2019.00118
24. Yan, Y.-H., Yang, C.-W., Fang, S.-C. (2022). Patient-centred e-health supports value co-creation and quality of medical care in Taiwan. *Health Information & Libraries Journal*, *39*(1), 68-78. https://doi.org/10.1111/hir.12372