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The perspectives of healthcare professionals regarding interprofessional collaboration among three tertiary hospitals in the Tshwane district, Gauteng

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ABSTRACT

Healthcare professionals' perspectives on interprofessional collaboration differ, although structured organisational environments and professional relationships remain essential for quality healthcare. We aimed to determine healthcare professionals' perspectives regarding interprofessional collaboration in tertiary hospitals in Gauteng, South Africa. Healthcare professionals older than 18 participated in this cross-sectional survey, conducted in Tshwane district. Snowball sampling recruited registered healthcare professionals who worked more than a week at the participating hospitals. A Google link with a consent form and questionnaire was shared with departmental heads to share with their co-workers; 77 people completed the questionnaires. All ethical principles were followed. Statistical Package for Social Science version-27 analysed data. A five-point Likert scale determined perspectives of healthcare professionals' level of collaboration. A signed-rank test determined the significant difference between hospitals' personal and organisational factors. The participants perceived personal relationships among healthcare professionals as better than the organisational environment in interprofessional collaboration. The organisational environment requires improvement for better collaboration.

1. Introduction

Interprofessional collaboration includes several healthcare professionals who interact with each other to provide quality healthcare and communicate effectively with patients, caregivers, communities, and families.[1] Interprofessional collaboration is a valuable tool for establishing healthy relationships between professionals in the healthcare environment.[2] The healthcare professionals include nurses, medical doctors, occupational therapists, speech therapists, dieticians, audiologists, physiotherapists, and others, each with individual perspectives on interprofessional collaboration.[3] Each healthcare profession has a different scope of practice, which involves a research-based approach and applying specific professional skills.[4] Furthermore, interprofessional collaboration bridges the divide between different professions,[5] is thought to improve communication between healthcare professionals, an essential factor for holistic care.[6] The understanding of interprofessional collaboration and the quality of interprofessional education influence the rate of successful collaboration implementation in clinical practice.[3]

The success of interprofessional collaboration depends on the collaborative competencies of individual healthcare professionals and their ability to communicate with one another.[7] The collaborative competencies include negotiating with other healthcare professionals, joint decision-making, considering the views of other individuals and promoting innovative healthcare.[8] Additional competencies in the healthcare setting include ethical values, professional knowledge, leadership, implementing healthcare strategies and assessing needs.[9] Management and communication skills may strengthen teamwork when resources from other departments are required.[10] Effective interprofessional collaboration is demonstrated if leadership roles are rotated among members with various expertise by following the patient context.[11] Emphasis is placed on the importance of structured interprofessional rounds as a guide to enhance shared decision-making, communication, and quality of care.[12]

Interprofessional collaboration is often misinterpreted as the referral of a patient to another professional without any interaction between the

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professionals.[13] Perspectives on interprofessional collaboration differ among healthcare professionals, but collaboration remains a strong predictor of the quality of patient-centred care.[14] Through effective communication, shared responsibilities and accountable decision-making, interprofessional collaboration generates a positive outcome regarding the patient's holistic health.[2] Interprofessional collaboration has been found to show a decline in the length of inpatient hospital stays and medical charges.[3] Furthermore, if patients have easy access to an interprofessional team and the team is open to patient interaction, patients may be confident to ask questions and prevent unnecessary consultation sessions.[15] In contrast, poor collaboration negatively affects patient care.[16] Several studies demonstrated barriers to collaboration, such as lack of time, training, and poor communication.[17–19] Other barriers to successful collaboration include breach of confidentiality and insufficient funding.[20]

Research has provided evidence highlighting the importance of interprofessional collaboration within the healthcare system.[21] Interprofessional collaboration includes several healthcare workers from different professions interacting with each other and patients to ensure quality healthcare.[19] Interprofessional collaboration entails all healthcare professionals working together according to their roles in unbiased obligations and liabilities.[22] In addition, interprofessional collaboration has been recommended and proven as a tool to improve healthcare outcomes.[19] However, even with the great emphasis that institutions place on the importance of interprofessional collaboration between healthcare workers in South Africa, there still needs to be more implementation into clinical practice[3] The perspectives of healthcare professionals about interprofessional collaboration tend to differ, affecting healthcare professionals' attitudes and may lead to poor teamwork competencies and implementation in clinical practice, as interprofessional collaboration strongly depends on communication between healthcare professionals.[7] Although interprofessional collaboration is a concept that has been introduced previously in clinical settings, available studies were done in primary and secondary healthcare settings. However, studies done in tertiary hospitals are scarce; hence, we aim to establish the perceptions, the extent of interprofessional collaboration, information sharing and leadership, and the level of trust among healthcare professionals in tertiary hospitals. Tertiary hospitals are not only associated with specialised care services but are the foundation for future healthcare practitioners who are groomed to provide future quality healthcare. As tertiary hospitals receive patients for different specialised care, healthcare professionals need to collaborate in order to provide the best care to patients.[23]

2. Materials and methods

2.1. Research design

This study was a non-experimental descriptive quantitative cross-sectional research design.[24]

2.2. Research setting

The study was conducted at three tertiary hospitals in the Tshwane District in Gauteng, South Africa. The hospitals consisted of 1652, 859, and 832 beds, respectively.

2.3. Sample

The population of our study included all healthcare professionals aged 18 years and above who are registered with the Health Professions Council of South Africa (HPCSA), South African Council of Social Service Profession (SACSSP), or South African Nursing Council (SANC). The snowball sampling method was chosen because the Protection of Personal Information Act restricted direct access to the healthcare professionals' contact details.[24,25] These healthcare professionals included medical doctors, nurses, physiotherapists, occupational therapists, dieticians and nutritionists, speech therapists, audiologists, social workers, radiographers, and psychologists. Individuals with less than one week of working experience were excluded from the study, as these healthcare professionals needed adequate collaboration exposure within the specific tertiary hospitals. A minimum sample size required for the statistical tests to have at least 80 % statistical power was calculated using G*Power software and equalled 531, considering a minimum of 177 is needed for each hospital for pairwise comparison. However, a total sample size of n = 77 (100 %) was obtained due to poor online response rate. We piloted the study at a selected primary hospital using 10 % of the calculated sample size to determine the time it required to complete the questionnaire and to assess whether the study's aims and objectives would be met. The pilot study lasted for four weeks and participants took between 15 and 20 min to complete the questionnaire. No major concerns were noted during this phase, and the questionnaire was deemed clear and consistent with the study's aims and objectives. Since no significant changes were necessary, the instrument and procedures were kept as initially planned. The findings from the pilot study were not included in the main research.

2.4. Instrument and variables

The questionnaire used to conduct the study was obtained from a survey of interprofessional collaboration conducted in Basque.[26] A formal request for permission to utilise the instrument was sent to the original creator, but no reply was obtained even after subsequent attempts. Since the questionnaire was publicly available through Research Commons, and consistent with standard academic procedures for resources in the public domain, the tool was employed with complete citation and recognition of the original author. The questionnaire consists of 10 questions, which use the Likert scale ranging from 1 to 5, giving the questionnaire a total score of 50. The closer the score is to 50, the better the results, indicating good interprofessional collaboration. The designer of the questionnaire conducted an exploratory factor analysis (EFA) using the ten items. The designer of the questionnaire found two factors, which they called "Inter," which represents the personal relationships dimension (four items: shared goals, patient-centred approach, mutual knowledge and trust), and "Organiz," which represents the organisational setting dimension (six items: strategic guidelines, shared leadership, support for innovation, forums for meeting, protocolisation and information systems). Following the EFA, the author established the internal consistency of the factors using Cronbach's alpha and found the values to equal 0.813 and 0.825 for the "Inter" and "Organiz" factors, respectively, with Cronbach's alpha values above 0.6 being acceptable.[27] Finally, a confirmatory factor analysis (CFA) was conducted, confirming that the ten items' underlying factor structure consisted of these two factors. Thus, Nuño-Solinís et al.[26] established that the two factors, personal relationships between professionals ("Inter") and the organisational environment ("Organiz"), underlie the broader concept of interprofessional collaboration.

As the study by Nuño-Solinís et al.[26] was conducted in a specific institution (Osakidetza-Basque Health Service), in a particular unique community of Basque Country, in the current study, as opposed to simply conducting a CFA to confirm that the underlying two-factor structure of the instrument holds within a South African setting, an EFA, Cronbach's alpha and a CFA were conducted. The reason for starting with an EFA in this study is that the South African setting in which the current study was conducted differs dramatically from that of the Basque country, meaning that the underlying factor structure could differ. In our research, EFA, CFA, reliability, and validity tests all confirmed the two-factor structure found by Nuño-Solinís et al.[26] to hold within a South African setting with the same items loading onto each factor.

2.5. Participant recruitment and data collection

The researchers visited each hospital to explain the aim and objectives of the study to the heads of departments. Contact details of the heads of departments were requested to share the Google link to forward it to the staff members working within their departments. The Google link comprised an information sheet, consent form, demographic information, and a questionnaire assessing interprofessional collaboration among healthcare professionals. Eight weeks were given for healthcare professionals to complete the questionnaire, with a weekly reminder sent to the heads of departments to remind the staff about the study. The responses of the Google link appeared to the researchers.

2.6. Data analysis

Data received via Google link were exported to Microsoft Excel and were analysed by a statistician using the Statistical Package for Social Science version 27. A descriptive analysis was conducted for the demographic data. An EFA and CFA were performed to explore and confirm the underlying factor structure of the questionnaire. The Likert scale items were used to determine the level of collaboration and trust among healthcare professionals and their attitudes about each other's values, specific competencies, and focus on patient care. Likert scales quantitatively measure opinions, attitudes, and beliefs, rating them on a five-point scale.[28] For continuous data, such as "organisational environment" and "personal relationships", created by averaging over the items loaded onto them, normality was assessed through the Kolmogorov-Smirnov test. Since the p-value of one of the factors (personal relationships) is less than 0.05 (p-value = 0.002), normality has not been established, and the nonparametric Spearman correlation coefficient and the nonparametric Wilcoxon signed-rank tests were used.

2.7. Ethical considerations

The University of Pretoria Ethics and Research Committee (REC no: 660/2022), the National Health Research Database (GP_202211_071), and the chief executive officers from the three tertiary hospitals approved the study. An informed consent form was embedded in the questionnaire link and completed by the participants. The informed consent form emphasised that participation in the study was completely voluntary. An anonymous Google link to the questionnaire ensured the participants' anonymity. The study also adhered to the declaration of Helsinki regarding the participants' rights to make informed decisions.

3. Results

Seventy-eight participants consented to participate and only one was excluded as the participant was not registered with any statutory bodies of healthcare professionals to meet the inclusion criteria, which left us with n = 77 sample size.

There are more female participants (n = 62, 80.5 %) who completed the survey than those of their counterparts (n = 15, 19.5 %) (Table 1), and the majority of the participants were nurses (n = 19, 24.7 %). The distribution of participants between the three hospitals is similar.

A questionnaire employing a five-point Likert scale was used to determine participants' perspectives regarding the determined variables. The distinct classifications or categories of the Likert-scale are shown in Appendix 1, as they are different for each variable. On this scale, one is ranked as the worst and five the best.

In the "organisational environment" factor (Table 2), 40.3 % of the participants agreed that leadership is shared in some areas, and 31.2 % of participants agreed that there are many mechanisms in place to share information with other healthcare professionals. In the "personal relationships" factor, more than half of the participants (53.2 %) agreed that there is a moderate level of trust between healthcare professionals.

The nonparametric signed-rank test was used to test for statistical significance difference between the "organisational environment" and the "personal relationships" factors.

There was a statistically significant difference between the "organisational environment" and "personal relationship" factors (p-value = 0.001) with the mean and the median of the "personal relationships" factor being significantly higher (Table 3).

Table 1
Demographic characteristics of the participants (n = 77).

Variables	Frequency (n)	Percentage (%)
Sex		
Male	15	19.5
Female	62	80.5
Profession		
Doctor	13	16.9
Nurse	19	24.7
Occupational Therapist	11	14.3
Dietitian and Nutritionist	2	2.6
Audiologist	2	2.6
Radiographer	5	6.5
Psychologist	5	6.5
Physiotherapist	14	18.2
Speech Therapist	3	3.9
Social Worker	3	3.9
Working experience (in years)		
Less than 5	24	31.2
Between 5 and 10 years	26	33.8
More than 10 years	27	35.1
Hospital of employment		
Hospital A	24	31.5
Hospital B	28	36.4
Hospital C	25	32.5

4. Discussion

This study aimed to determine healthcare professionals' perspectives regarding interprofessional collaboration among three tertiary hospitals in the Tshwane district, South Africa. A sample size of n = 77 participants was obtained. The low response rate is attributed to the fact that people being less likely to complete online surveys if they do not know the researchers personally.[29] Moreover, healthcare professionals often face a high volume of survey requests, resulting in survey fatigue that tends to impact specific professional groups, particularly junior staff.[30] In addition, despite the questionnaire consisting of just ten items, each item was structured using a Likert scale that included five response choices with relatively lengthy wording. This format could have led to lower participation rates, as surveys that are seen as time-intensive or mentally challenging, even if they do not have many items, are recognised to deter completions.[31] Most participants were female (n = 62; 80.5 %), and the nurses responded the most (n = 19; 37 %). Literature supports that women are more likely to participate in community work and volunteer in research studies than males.[32] In addition to the increased number of nurses participating, most healthcare professionals in the African World Health Organisation regions are nurses.[33]

In this study, the different variables influencing interprofessional collaboration among healthcare professionals are highlighted in two key factors: "organisational environment" and "personal relationships" factors. It is crucial to highlight that these results are preliminary and are derived from a small group of 77 participants. Therefore, they should not be viewed as representative of all healthcare professionals within the district or the wider South African context. Instead, the insights provide a valuable, contextual perspective on how both personal and organizational factors could affect interprofessional collaboration. By considering the findings as exploratory, the study offers an initial comprehension of interprofessional collaboration in these hospitals, while recognizing the necessity for additional research with larger and more diverse samples to confirm and enhance these observations.

Table 2
Perspectives of interprofessional collaboration n (%).

Factors	Variables	1	2	3	4	5
Organisational Environment	**Support for innovation**	6 (7.8)	29 (37.7)	18 (23.4)	19 (24.7)	5 (6.5)
	Shared leadership	3 (3.9)	20 (26.0)	31 (40.3)	18 (23.4)	5 (6.5)
	Protocolisation	7 (9.1)	18 (23.4)	20 (26.0)	27 (35.1)	5 (6.5)
	Forums for meetings	2 (2.6)	26 (33.8)	16 (20.8)	23 (29.9)	8 (10.4)
	Information systems	3 (3.9)	18 (23.4)	24 (31.2)	24 (31.2)	8 (10.4)
	Strategic guidelines	8 (10.4)	19 (24.7)	17 (22.1)	26 (33.8)	7 (9.1)
Personal Relationships	**Shared goals**	8 (10.4)	13 (16.9)	19 (24.7)	26 (33.8)	11 (14.3)
	Patient-centred approach	3 (3.9)	12 (15.6)	22 (28.6)	25 (32.5)	15 (19.5)
	Mutual Knowledge	5 (6.5)	11 (14.3)	22 (28.6)	27 (35.1)	12 (15.6)
	Trust	2 (2.6)	8 (10.4)	41 (53.2)	21 (27.3)	5 (6.5)

Table 3
Differences between organisational environment and personal relationships factors.

	Factor 1: Organisational environment factor	Factor 2: Personal relationships factor
Signed rank test statistic (p-value)	−3.176 (0.001)	
Mean (M)	3.056	3.341
Median (Mdn)	3.000	3.500
Std. Deviation (SD)	0.821	0.844
Minimum	1.500	1.000
Maximum	5.000	5.000
Range	3.500	4.000
Interquartile Range (IQR)	1.167	1.250

4.1. Organisational environment factor

An organisational environment is composed of internal and external variables that influence how an organisation operates.[34] It includes the principles on which an organisation is based, providing stability and distinguishing from others.[34] In this study, variables influencing the organisational environment include support for innovation, shared leadership, protocol development, forums for meetings, information systems and strategic guidelines.

Nearly half of the participants (45.5 %) reported no to little support for innovation in tertiary hospitals. Numerous challenges are experienced in healthcare innovation, including a limited budget, rising healthcare demand, and improved patient expectations[35] that may contribute to poor innovation. A lack of resources and knowledge within an organisation is often present and limits the ability to implement innovative strategies.[36] Limited understanding of factors contributing to innovation prohibits effective implementation.[37] This accounts for nearly half of the participants reporting a need for more support for innovation in their work environment. Nearly half of the respondents (40.3 %) reported that leadership is shared among healthcare professionals in certain areas. This is consistent with a study that compared large, diverse interprofessional teams to smaller, more homogeneous ones in geriatric and palliative care, which found that smaller, less diverse teams had a greater perception of shared leadership[38] Nevertheless, other research points out that factors such as team identification, professional culture, and organisational environment also affect shared leadership, not just team size or diversity.[39,40] In the context of South Africa, similar patterns have been noted, where shared leadership is acknowledged, yet its practical execution differs across various environments due to professional divisions and institutional backing.[41,42]

More than a third of the participants (35.1 %) reported a considerable number of protocolisation mechanisms in place in tertiary hospitals. Ebben et al.[43] noted that a gap between protocols and clinical practice frequently exists, which can result in patients not receiving optimal healthcare. The author further stated that the medical function and condition in which a guideline recommendation can be categorised could influence how healthcare professionals adhere to protocol guidelines in agreeing on patient treatment.[43] Most participants agreed that many mechanisms are in place, but there is still room for improvement in the successful use of systematic processes in agreement-making. Less than half of the participants (40.3 %) agreed that a sufficient number of interprofessional forum meetings are in place, highlighting a significant gap in the implementation of these meetings and indicating room for improvement. In this study, the meetings referred specifically to interprofessional team meetings rather than departmental meetings. Such forums support team learning, facilitate shared goal setting, and contribute to more effective team functioning. If not clearly distinguished, this lack of specificity could represent a limitation in interpreting the findings regarding interprofessional collaboration.[44]

Common challenges experienced in the healthcare setting include a need for more accountability, structure and decision-making,[45] which can hinder the implementation of meeting forums. A lack of dedicated time for meetings negatively impacts the implementation of structured meetings.[46] The participants were divided regarding information systems, with approximately one quarter of participants (27.3 %) reporting that no to little relevant information is available from other healthcare professionals. Most participants (41.6 %) reported that many relevant information systems were in place in the clinical settings. A study on implementing Health Technology Assessment found that effective health information systems were in place in South African governmental clinical settings due to sufficient financial resources and the availability and sharing of health data.[47] A study done in twelve African countries stated that there are difficulties in obtaining reliable health information in developing countries, leading to decreased health results and an inability to meet the population's needs.[48] Barriers to effective health information systems in South Africa, India and China were identified by MacQuilkan et al.[49] as a lack of expertise, poor health data infrastructure, a rise in non-communicable diseases, healthcare costs, and fragmented healthcare systems. These barriers correspond with the study's results, which showed that a significant number of participants recognised deficiencies in information systems in the clinical environment, though 41 % stated that these systems were satisfactory. This varied perception underscores the differences in accessibility or effectiveness of information systems among various teams or departments.

Existing strategic guidelines promoting a considerable amount of explicit collaborative work between levels of care; however, almost half (n = 33; 42.9 %) of participants reported a few to a lack of strategic guidelines in the clinical setting. An American study investigating advanced care identified that role confusion among interprofessional team members is one of the most significant barriers to practical strategic guidelines and is possibly emboldened by the lack of clarity in professional discipline expectations.[50] A lack of compliance with recognised practices for interprofessional collaboration leads to confusion about the responsibilities and skills of healthcare providers. This confusion may cause communication failures and result in tasks being executed incompletely or redundantly among team members. It leads to duplication and contributes to the need for interprofessional

cooperation.[51] This is concurred by a study conducted in Canada, which identified organisational barriers such as the lack of guideline implementation in primary care services as one of the leading setbacks for interprofessional collaboration.[52] The latter further states that the lack of an integrated communication system fails to provide resources and tools, such as a clear trajectory of services for good patient outcomes, contributing to role confusion among healthcare professionals.[52] Therefore, in a South African context, better communication and adequate strategic programs in governmental hospitals could contribute to the improved perspectives of health professionals to guidelines promoting health collaboration.

4.2. Personal relationship factor

Personal relationship refers to the connections between healthcare professionals that influence their quality of collaboration.[53] Variables that form this factor consist of shared goals, the patient-centred approach, mutual knowledge, and trust between healthcare professionals. Almost half of the participants (48.1 %) agreed that a considerable number of consensual shared goals within the healthcare environment exist. An American study emphasised the importance of shared goals within an interprofessional team to ensure safer and quality healthcare.[54] However, limited time among healthcare professionals is one of the main constraints to shared decision-making and goals.[55] In South African public hospitals, healthcare professionals must care for many patients, resulting in patient overload.[56] Patient overload leads to limited interaction time between healthcare professionals and may be a leading cause of limited shared goals.

Almost a third of the participants (28.3 %) reflected that during interactions between healthcare professionals, the interests and preferences of patients are considered *some of the time*, indicating a lack of a patient-centred approach between the healthcare professionals. Different healthcare professions may have different understandings regarding patient-centred care.[57] Patient-centred collaborations between healthcare professionals are essential to form team-based goals to provide better quality and focused patient care.[58] This patient-centred approach during interprofessional discussions can finally lead to patient satisfaction and increased physical and social well-being.[59]

Approximately half of the participants in the study agreed that there is good to excellent knowledge among healthcare professionals about each other's values and specific competencies within their clinical environment. A study conducted in Ethiopia emphasised the importance of shared knowledge and expertise between healthcare professionals to ensure quality healthcare.[60] Furthermore, the study reported that limited resources among healthcare professionals are one of the primary reasons leading to a lack of shared knowledge and expertise between healthcare professionals.[60] South African public hospitals face the challenge of limited resources, such as the lack of equipment, storage and communication platforms.[61]

More than half of the participants acknowledged a moderate level of trust among healthcare professionals. Trust between healthcare professionals is an integral aspect of successful interprofessional collaboration.[62] Trust and performance of interprofessional groups have been found to be closely related, and increased levels of trust and effective team performance often come from years of previous experience.[63] Only a third of the participants in our study have more than ten years of working experience. Trust between healthcare professionals increases with more years of working experience.[63]

A statistically significant difference was found between the organisational environment and personal relationships factors, indicating that personal relationships between healthcare professionals are better than the organisational environment when considering collaboration. The organisational environment determines how healthcare professionals assign roles and responsibilities to achieve the hospital's goals.[64] It explains how information should flow and is, therefore, essential to assist in the collaboration between healthcare professionals.[64] A lack of time and organisational skills has been identified as significant limitations to an organised healthcare system.[17] As mentioned earlier, public hospitals in South Africa face the challenge of patient overload, leading to limited time for healthcare professionals to interact.[56] This, in turn, explains the need for more implementation of an organisational environment within tertiary hospitals. Both personal relationships among healthcare professionals and the organisational environment play a crucial role in facilitating effective interprofessional collaboration.[26] Therefore, a lack of an organisational environment within the healthcare setting will lead to diminished interprofessional collaboration.[17]

The results of this study can be better comprehended in relation to recognised interprofessional education and collaborative practice (IPECP) competency frameworks. The World Health Organisation (2010) and the Interprofessional Education Collaborative (2016) highlight key areas including values and ethics, clarification of roles, interprofessional communication, and teamwork with a focus on collaborative leadership. In our research, barriers such as insufficient communication among professions, ambiguity regarding role limitations, and staff reluctance to address managerial hindrances reflect deficits in these competencies. For instance, the hesitation of certain participants to address managerial matters may underscore difficulties within the competency area of collaborative leadership, which anticipates open discussions and shared decision-making. Likewise, heavy workloads and time limitations restricted chances for role clarification and interprofessional communication, which are essential for effective collaborative practice. These findings indicate that incorporating IPECP competencies more clearly into training, organisational culture, and hospital policies could improve interprofessional collaboration in tertiary hospitals within the Tshwane district.

4.3. Strengths and limitations

Relevant information on what variables contribute to good interprofessional collaboration in tertiary hospitals, such as shared goals, shared leadership, trust, and support for innovation amongst healthcare professionals, were identified. This study also identified which of these variables need to be implemented in the studied hospitals and thus identifies areas with room for improvement in the healthcare system. Furthermore, the study population is quite broad as it includes most healthcare professionals who worked in the chosen tertiary hospitals; thus, there is a good representation of the selected population and their collaboration. This study also contributed to filling the gap in research regarding information about interprofessional collaboration in tertiary hospitals in Gauteng.

We had limited access to the contact details of the heads of departments; either the number written on the telephone directory or the office changed. Due to the head of the departments' busy schedules in managerial meetings and planning, it was not easy to organise a suitable time to set an appointment to explain the study's aims. Even though our study followed a snowball sampling method where any healthcare professional could share the link with other professionals working at the same hospital, the majority were unwilling to share the questionnaire with others as they did not want to violate the ethical principles that may lead them to disciplinary hearings. The research faced limitations due to a relatively low response rate, a typical issue in survey studies conducted with healthcare professionals, which can be attributed to heavy clinical workloads, shortages of staff, and time constraints. Moreover, some participants hesitated to discuss managerial barriers to interprofessional collaboration out of concern for possible consequences and job security. These contextual factors may have led to a reduced number of responses; nevertheless, the data gathered still offer valuable insights into the challenges and opportunities for enhancing interprofessional collaboration in tertiary hospital environments.

5. Conclusion

The core of healthcare services is delivered through interprofessional collaboration, influencing patient outcomes. There needs to be interprofessional collaboration across South Africa's tiers of healthcare, particularly the primary and secondary tiers. In the tertiary sector tier, no supporting literature on interprofessional collaboration existed. Therefore, this cross-sectional study highlighted two key factors that could influence the concept's framework in the tertiary sector: the organisational environment and personal relationships factors. Health professionals are guided by statutory bodies and the regulations of their health practices in terms of their job descriptions. However, they are also driven by the knowledge and experience they receive from one another. These delicate balances the personal and organisational groundwork required to facilitate interprofessional collaboration. However, the study found that personal relationships among professionals were of a more significant benefit than the organisational environment, indicating that the gap lies within the organisational dimension. Therefore, the need for the ability of the organisational dimension to uphold its responsibilities compels professionals to rely more on the knowledge and experience gained from their personal relationships. The effects of this one-sided relationship between personal relationships and organisational environments thus lead to a lack of complete interprofessional collaboration since they are both required collectively for a smooth operational system targeting positive patient outcomes. Therefore, further efforts are needed to restore the balance to improve South African healthcare settings.

5.1. Recommendations

- Healthcare organisations ought to prioritise the implementation of structured policies and frameworks that foster interprofessional collaboration. This involves creating effective communication channels, scheduling regular interprofessional meetings, and securing leadership backing to eliminate organisational barriers.
- Programs for continuous professional development that emphasise interprofessional education (IPE) and teamwork skills should be enacted. These initiatives will help healthcare professionals gain a clear understanding of their roles and acquire the necessary skills for effective collaborative practice.
- Management ought to look into redistributing workloads and establishing support systems for staff that allow healthcare professionals the time and opportunity for collaboration without impacting service delivery.
- Although this research offers valuable quantitative findings, further qualitative studies are suggested to delve into the nuanced perspectives of healthcare professionals. Conducting interviews or focus groups may yield richer insights into lived experiences, contextual factors, and underlying barriers to interprofessional collaboration that numerical data may fail to capture.
- The results should guide both local and national health policies to integrate interprofessional collaboration into healthcare delivery models, ensuring lasting enhancements in patient outcomes and overall system efficiency.

CRediT authorship contribution statement

Nontembiso Magida: Conceptualization, Methodology, Project administration, Software, Supervision, Writing – original draft, Writing – review & editing. **Kirsten Hellberg:** Investigation, Methodology, Resources, Visualization, Writing – original draft. **Charmari Kotze:** Data curation, Investigation, Methodology, Software, Validation, Writing – original draft. **Kgopotso Mathume:** Data curation, Investigation, Methodology, Resources, Writing – original draft, Writing – review & editing. **Thuto Molapo:** Data curation, Methodology, Resources, Software, Writing – original draft. **Lara Moolman:** Investigation, Methodology, Software, Visualization, Writing – original draft. **Bianke Schoeman:** Data curation, Investigation, Project administration, Writing – original draft, Writing – review & editing. **Marien Alet Graham:** Data curation, Formal analysis, Methodology, Validation, Visualization, Writing – review & editing.

Informed consent statement

Informed consent was obtained from all participants involved in this study.

Disclaimer

The views expressed in the study are the author's own and not an official position of the institutions documented.

Institutional review board statement

The study was approved by the Research Ethics Committee of the Faculty of Health Sciences at the University of Pretoria (REC no: 660/2022) and conducted according to the guidelines of the Declaration of Helsinki.

Declaration of generative AI in scientific writing

We hereby confirm that Artificial Intelligence (AI) is not responsible for this research output and that no AI assistance, including but not limited to ChatGPT and Bing AI, was used during this study.

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Conflict of interest statement

All authors declare no competing interests. This study was conducted independently, and no external funding influenced the design, execution, or reporting of the finding.

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Appendix 1. Questions to assess interprofessional collaboration within a tertiary hospital

Please rate the current situation in the hospital that you are currently working in with regard to other healthcare professionals on a scale of 1–5.

1.SHARED GOALS. The existence of explicit shared goals facilitates collaboration and coordination between healthcare professionals.	1 Lack of shared goals	2 Few shared goals	3 Some shared goals	4 A considerable number of shared goals	5 All aspects of care are covered by shared and consensual goals
2.PATIENT-CENTRED APPROACH. Explicitly giving priority to the interests and preferences of patients in the interaction between healthcare professionals favours collaboration and coordination between professionals working in the tertiary hospital.	1 In the interaction between healthcare professionals, the interests and preferences of patients are not taken into account	2 In the interaction between healthcare professionals, the interests and preferences of patients are taken into account on a few occasions	3 In the interaction between healthcare professionals, the interests and preferences of patients are sometimes taken into account	4 In the interaction between healthcare professionals, the interests and preferences of patients are often taken into account	5 In the interaction between healthcare professionals, the interests and preferences of patients are always taken into account
3.MUTUAL KNOWLEDGE. Knowledge between healthcare professionals of each other's values, specific competences and focus with respect to care, as well as of the environment in which healthcare professionals work, has an impact on the development of team spirit and collaborative work. Knowing colleagues personally is also helpful.	1 Lack of knowledge of the other healthcare professionals	2 Little knowledge of the other healthcare professionals	3 Moderate knowledge of other healthcare professionals	4 Good knowledge of other healthcare professionals	5 Excellent knowledge of other healthcare professionals
4.TRUST. Mutual trust makes interprofessional collaboration possible, reduces uncertainty and contributes to the formation of networks of multidisciplinary professionals focused on the needs of patients.	1 Lack of trust	2 Low level of trust	3 Moderate level of trust	4 High level of trust	5 Very high level of trust
5.STRATEGIC GUIDELINES. The existence of guidelines, issued by the corresponding Departmental Authority, that promotes collaborative work between professionals of different departments, influences on the coordination and collaboration between professionals of the hospital.	1 Lack of guidelines related to collaboration between levels of care.	2 Few guidelines related to collaboration between levels of care.	3 Some guidelines related to collaboration between levels of care.	4 A considerable number of guidelines related to collaboration between levels of care.	5 Explicit guidelines and strategies promote collaboration in all areas.
6.SHARED LEADERSHIP. Shared leadership between managers and healthcare professionals at the departmental level allow for the development of collaboration between healthcare professionals.	1 No shared leadership	2 Leadership is shared in a few areas	3 Leadership is shared in some areas	4 Leadership is shared in a considerable number of areas	5 Leadership is extensively shared and promotes collaboration in all areas
7. SUPPORT FOR INNOVATION. Collaboration requires changes in clinical practice and the distribution of responsibilities from each department. Such changes require innovation that may or may not be supported by your department.	1 No support for innovation.	2 Little support for innovation.	3 Some support for innovation.	4 A considerable level of support for innovation.	5 Strong support for innovation.
8. FORUMS FOR MEETING. For professionals of different departments to collaborate, they need forums, channels of communication and activities that enable them to come into contact with one another, discuss shared issues and establish links and agreements.	1 Professionals are isolated and there are no forums for meetings.	2 Few forums for meetings.	3 Some forums for meetings.	4 A considerable number of forums for meetings.	5 Many forums for meetings.
9. PROTOCOLISATION. The preparation and establishment of protocols clarify and makes it possible to negotiate how to share the responsibilities of each professional. Indeed, there are many mechanisms to formalise agreements and understandings between professionals within the different departments: care pathways, information systems, agreements between departments or units, etc., as well as protocols.	1 Lack of mechanisms in place.	2 Few mechanisms are in place.	3 Some mechanisms are in place.	4 A considerable number of mechanisms are in place.	5 A systematic process is in place for establishing agreements.

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(*continued*)

10. INFORMATION SYSTEMS. The effective exchange of high-quality information about patient care between healthcare professionals is an element that facilitates collaboration and makes it possible to provide better care to patients.	1 Relevant information from other healthcare professionals is not available	2 Little relevant information from other healthcare professionals is available	3 Some relevant information from other healthcare professionals is available	4 A considerable amount of relevant information from other healthcare professionals is available	5 All the relevant information from other healthcare professionals is available

References

1. Montano AR, Cornell PY, Gravenstein S. Barriers and facilitators to interprofessional collaborative practice for community-dwelling older adults: an integrative review. *J Clin Nurs*. 2023;32(9-10):1534–1548. https://doi.org/10.1111/jocn.15991.
2. Itzhaki M, Katz Leurer M, Warshawski S, Avrech Bar M. Preparedness of health professions students for interprofessional collaboration: a mixed method study. *Teach High Educ*. 2020:1–19. https://doi.org/10.1080/13562517.2020.1769057.
3. Ellapen TJ, Swanepoel M, Qumbu BT, Strydom GL, Paul Y. Interprofessional knowledge and perceptions of selected South African healthcare practitioners towards each other. *AJHPE*. 2018;10(3):148–152. https://doi.org/10.7196/AJHPE.2018.v10i3.951.
4. Leslie K, Moore J, Robertson C, et al. Regulating health professional scopes of practice: comparing institutional arrangements and approaches in the US, Canada, Australia and the UK. *HRH*. 2021;19(1):1–12. https://doi.org/10.1186/s12960-020-00550-3.
5. Nies MA, Lim WYA, Fanning K, Tavanier S. Importance of interprofessional healthcare for vulnerable refugee populations. *J Immigr Minor Health*. 2016;18(5):941–943. https://doi.org/10.1007/s10903-016-0424-0.
6. Karam M, Brault I, Van Durme T, Macq J. Comparing interprofessional and interorganizational collaboration in healthcare: a systematic review of the qualitative research. *Int J Nurs Stud*. 2018;79:70–83. https://doi.org/10.1016/j.ijnurstu.2017.11.002.
7. Busari JO, Moll FM, Duits AJ. Understanding the impact of interprofessional collaboration on the quality of care: a case report from a small-scale resource limited health care environment. *J Multidiscip Healthc*. 2017;10:227–234. https://doi.org/10.2147/jmdh.S140042.
8. Walton V, Hogden A, Long JC, Johnson JK, Greenfield D. How do interprofessional healthcare teams perceive the benefits and challenges of interdisciplinary ward rounds. *J Multidiscip Healthc*. 2019;12:1023–1032. https://doi.org/10.2147/jmdh.S226330.
9. Mereu A, Sotgiu A, Buja A, et al. Professional competencies in health promotion and public health: what is common and what is specific? Review of the European debate and perspectives for professional development. *Epidemiol Prev*. 2015;39(4 Suppl 1):33–38. https://hdl.handle.net/2158/1016507.
10. Chamangwana IC, Jere D, Kazembe A. Experiences of health care workers' on interprofessional collaborative practice at mzuzu central and Ntcheu district hospitals. *Malawi Med J*. 2021;33(Postgraduate Supplementary Iss):10–15. https://doi.org/10.4314/mmj.v33iS.3.
11. Varpio L, Teunissen P. Leadership in interprofessional healthcare teams: empowering knotworking with followership. *Med Teach*. 2021;43(1):32–37. https://doi.org/10.1080/0142159X.2020.1791318.
12. Kendall-Gallagher D, Reeves S, Alexanian JA, Kitto S. A nursing perspective of interprofessional work in critical care: findings from a secondary analysis. *J Crit Care*. 2017;38:20–26. https://doi.org/10.1016/j.jcrc.2016.10.007.
13. Kock L, Mlezana NB, Frantz JM. Perceptions, attitudes and understanding of health professionals of interprofessional practice at a selected community health centre. *Afr J Prim Health Care Fam Med*. 2021;13(1):e1–e6. https://doi.org/10.4102/phcfm.v13i1.2724.
14. Schot E, Tummers L, Noordegraaf M. Working on working together. A systematic review on how healthcare professionals contribute to interprofessional collaboration. *J Interprof Care*. 2020;34(3):332–342. https://doi.org/10.1080/13561820.2019.1636007.
15. Davidson AR, Kelly J, Ball L, Morgan M, Reidlinger DP. What do patients experience? Interprofessional collaborative practice for chronic conditions in primary care: an integrative review. *BMC Prim Care*. 2022;23(1):8. https://doi.org/10.1186/s12875-021-01595-6.
16. Folkman AK, Tveit B, Sverdrup S. Leadership in interprofessional collaboration in health care. *J Multidiscip Healthc*. 2019;12:97–107. https://doi.org/10.2147/jmdh.S189199.
17. Rawlinson C, Carron T, Cohidon C, et al. An overview of reviews on interprofessional collaboration in primary care: barriers and facilitators. *Int J Integrated Care*. 2021;21(2):32. https://doi.org/10.5334/ijic.5589.
18. Etherington C, Burns JK, Kitto S, et al. Barriers and enablers to effective interprofessional teamwork in the operating room: a qualitative study using the theoretical domains framework. *PLoS One*. 2021;16(4), e0249576. https://doi.org/10.1371/journal.pone.0249576.
19. Moncatar TJRT, Nakamura K, Siongco KLL, et al. Interprofessional collaboration and barriers among health and social workers caring for older adults: a Philippine case study. *HRH*. 2021;19(1):1–14. https://doi.org/10.1186/s12960-021-00568-1.
20. Supper I, Catala O, Lustman M, Chemla C, Bourgueil Y, Letrilliart L. Interprofessional collaboration in primary health care: a review of facilitators and barriers perceived by involved actors. *J Public Health*. 2015;37(4):716–727. https://doi.org/10.1093/pubmed/fdu102.
21. Morgan KH, Barroso CS, Bateman S, Dixson M, Brown KC. Patients' experiences of interprofessional collaborative practice in primary care: a scoping review of the literature. *J Patient Exp*. 2020;7(6):1466–1475. https://doi.org/10.1177/2374373520925725.
22. Asmirajanti M, Hamid AYS, Hariyati TS. Clinical care pathway strenghens interprofessional collaboration and quality of health service: a literature review. *Enferm Clin*. 2018;28:240–244.
23. Dahlke S, Hunter KF, Reshef Kalogirou M, Negrin K, Fox M, Wagg A. Perspectives about interprofessional collaboration and patient-centred care. *Can J Aging*. 2020;39(3):443–455. https://doi.org/10.1017/s0714980819000539.
24. Brink H, Van der Walt C, Van Rensburg GH. *Fundamentals of Research Methodology for Healthcare Professionals. [Internet]*. Cape Town, South Africa: Juta; 2018 [cited Access 2018 Access Date]. Available from: http://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=1647445.
25. Staunton C, Adams R, Anderson D, et al. Protection of personal information act 2013 and data protection for health research in South Africa. *IDPL*. 2020;10(2):160–179. https://doi.org/10.1093/idpl/ipz024.
26. Nuño-Solinís R, Zabalegui IB, Arce RS, Rodríguez LSM, Polanco NT. Development of a questionnaire to assess interprofessional collaboration between two different care levels. *IJIC*. 2013;13, e015. https://doi.org/10.5334/ijic.984.
27. Daud KAM, Khidzir NZ, Ismail AR, Abdullah FA. Validity and reliability of instrument to measure social media skills among small and medium entrepreneurs at pengkalan datu river. *IJDS*. 2018;7(3):1026–1037. https://doi.org/10.2139/ijds.2018.v7n3-15.
28. Taherdoost H. What is the best response scale for survey and questionnaire design; review of different lengths of rating scale/attitude scale/likert scale. https://hal.archives-ouvertes.fr/hal-02557308/document; 2019.
29. Saleh A, Bista K. Examining factors impacting online survey response rates in educational research: perceptions of graduate students. Online submission. *JMDE*. 2017;13(2):63–74. https://doi.org/10.56645/jmde.v13i29.487.
30. Brown RF, St John A, Hu Y, Sandhu G. Differential electronic survey response: does survey fatigue affect everyone equally? *J Surg Res*. 2024;294:191–197. https://doi.org/10.1016/j.jss.2023.09.072.
31. Ellis LA, Pomare C, Churruca K, et al. Predictors of response rates of safety culture questionnaires in healthcare: a systematic review and analysis. *BMJ Open*. 2022;12(9), e065320. https://doi.org/10.1136/bmjopen-2022-065320.
32. Otufowora A, Liu Y, Young H, et al. Sex differences in willingness to participate in research based on study risk level among a community sample of African Americans in north central Florida. *J Immigr Minority Health*. 2021;23(1):19–25. https://doi.org/10.1007/s10903-020-01015-4.
33. Ahmat A, Okoroafor SC, Kazanga I, et al. The health workforce status in the who African region: findings of a cross-sectional study. *BMJ Glob Health*. 2022;7(suppl 1), e008317. https://doi.org/10.1186/s12960-022-00735-y.
34. Michalos AC. Encyclopedia of quality of life and well-being research. https://doi.org/10.1007/978-94-007-0753-5; 2014.
35. Kelly CJ, Young AJ. Promoting innovation in healthcare. *FHJ*. 2017;4(2):121. https://doi.org/10.7861/2Ffuturehosp.4-2-121.
36. Thijssen SV, Jacobs MJ, Swart RR, Heising L, Ou CX, Roumen C. The barriers and facilitators of radical innovation implementation in secondary healthcare: a systematic review. *J Health Organisat Manag*. 2023;37(3):289–312. https://doi.org/10.1108/jhom-12-2020-0493.
37. van den Hoed MW, Backhaus R, de Vries E, Hamers JP, Daniëls R. Factors contributing to innovation readiness in health care organizations: a scoping review. *BMC Health Serv Res*. 2022;22(1):997. https://doi.org/10.1186/s12913-022-08185-x.
38. Ong YH, Koh MYH, Lim WS. Shared leadership in interprofessional teams: beyond team characteristics to team conditions. *J Interprof Care*. 2020;34(4):444–452. https://doi.org/10.1080/13561820.2019.1653834.
39. Forsyth C, Mason B. Shared leadership and group identification in healthcare: the leadership beliefs of Clinicians working in interprofessional teams. *J Interprof Care*. 2017;31(3):291–299. https://doi.org/10.1080/13561820.2017.1280005.
40. Barry ES, Teunissen P, Varpio L, Vietor R, Kiger M. Leadership and followership dynamics in interprofessional health care teams: attending physician perspectives. *Acad Med*. 2023;10:1097. https://doi.org/10.26481/dis.20241120eb.
41. Mohamed N, Peck CW, Senekal J. Perceptions of interprofessional collaborative practice in South Africa: a systematic review. *HSAG*. 2024;29(1). https://doi.org/10.4102/hsag.v29i0.2413.
42. Hlongwa P, Rispel LC. Interprofessional collaboration among health professionals in cleft lip and palate treatment and care in the public health sector of South Africa. *Hum Resour Health*. 2021;19(1):25. https://doi.org/10.1186/s12960-021-00566-3.

43. Ebben RH, Vloet L, Verhofstad MH, Meijer S, Groot JA, van Achterberg T. Adherence to guidelines and protocols in the prehospital and emergency care setting: a systematic review. *Scand J Trauma Resuscitation Emerg Med*. 2013;21(1):1–16. https://doi.org/10.1186/1757-7241-21-9.
44. Gray R, Sanders C. A reflection on the impact of Covid-19 on primary care in the United Kingdom. *J Interprof Care*. 2020;34(5):672–678. https://doi.org/10.1080/13561820.2020.1823948.
45. Zajac S, Woods A, Tannenbaum S, Salas E, Holladay CL. Overcoming challenges to teamwork in healthcare: a team effectiveness framework and evidence-based guidance. *Front Commun*. 2021;6, 606445. https://doi.org/10.3389/fcomm.2021.606445.
46. Lamprell K, Arnolda G, Delaney G, Liauw W, Braithwaite J. The challenge of putting principles into practice: resource tensions and real-world constraints in multidisciplinary oncology team meetings. *Asia Pac J Clin Oncol*. 2019;15. https://doi.org/10.1111/ajco.13166.
47. Mueller D. Addressing the challenges of implementing a health technology assessment policy framework in South Africa. *Int J Technol Assess Health Care*. 2020:1–6. https://doi.org/10.1017/s0266462320000562.
48. Koumamba AP, Bisvigou UJ, Ngoungou EB, Diallo G. Health information systems in developing countries: case of African countries. *BMC Med Inf Decis Making*. 2021;21(1):1–10. https://doi.org/10.1186/s12911-021-01597-5.
49. MacQuilkan K, Baker P, Downey LE, et al. Strengthening health technology assessment systems in the global south: a comparative analysis of the hta journeys of China, India and South Africa. *Glob Health Action*. 2018;11(1), 1527556. https://doi.org/10.1080/16549716.2018.1527556.
50. Kwak J, Cho S, Handzo G, Hughes BP, Hasan SS, Luu A. The role and activities of board-certified chaplains in advance care planning. *AJHPM*. 2021;38(12):1495–1502. https://doi.org/10.1177/1049909121989996.
51. Fischer F, Lange K, Klose K, Greiner W, Kraemer A. Barriers and strategies in guideline implementation-a scoping review. *Healthcare (Basel)*. 2016;4(3). https://doi.org/10.3390/healthcare4030036.
52. Vachon B, Giasson G, Gaboury I, et al. Challenges and strategies for improving copd primary care services in Quebec: results of the experience of the compas+ quality improvement collaborative. *Int J Chronic Obstr Pulm Dis*. 2022:259–272. https://doi.org/10.2147/COPD.S341905.
53. Bosch B, Mansell H. Interprofessional collaboration in health care: lessons to be learned from competitive sports. *Can Pharm J*. 2015;148(4):176–179. https://doi.org/10.1177/1715163515588106.
54. Rosen MA, DiazGranados D, Dietz AS, et al. Teamwork in healthcare: key discoveries enabling safer, high-quality care. *Am Psychol*. 2018;73(4):433. https://doi.org/10.1037/amp0000298.
55. Lee PY, Cheong AT, Ghazali SS, et al. Barriers of and strategies for shared decision-making implementation in the care of metastatic breast cancer: a qualitative study among patients and healthcare professionals in an Asian country. *Health Expect*. 2022;25(6):2837–2850. https://doi.org/10.1111/hex.13590.
56. Julien A, Anthierens S, Van Rie A, et al. Health care providers' challenges to high-quality HIV care and antiretroviral treatment retention in rural South Africa. *Qual Health Res*. 2021;31(4):722–735. https://doi.org/10.1177/1049732320983270.
57. Moreau JL, Hamilton AB, Yano EM, Rubenstein LV, Stockdale SE. The impact of job role on health-care workers' definitions of patient-centered care. *J Patient Exp*. 2020;7(6):1634–1641. https://doi.org/10.1177/2374373520910335.
58. Constand MK, MacDermid JC, Dal Bello-Haas V, Law M. Scoping review of patient-centered care approaches in healthcare. *BMC Health Serv Res*. 2014;14:271. https://doi.org/10.1186/1472-6963-14-271.
59. Kuipers SJ, Cramm JM, Nieboer AP. The importance of patient-centered care and co-creation of care for satisfaction with care and physical and social well-being of patients with multi-morbidity in the primary care setting. *BMC Health Serv Res*. 2019;19(1):13. https://doi.org/10.1186/s12913-018-3818-y.
60. Asemahagn MA. Knowledge and experience sharing practices among health professionals in hospitals under the addis ababa health bureau, Ethiopia. *BMC Health Serv Res*. 2014;14:431. https://doi.org/10.1186/1472-6963-14-431.
61. Maphumulo WT, Bhengu BR. Challenges of quality improvement in the healthcare of South Africa post-apartheid: a critical review. *Curationis*. 2019;42(1):e1–e9. https://doi.org/10.4102/curationis.v42i1.1901.
62. Gregory PA, Austin Z. Trust in interprofessional collaboration: perspectives of pharmacists and physicians. *Can Pharm J*. 2016;149(4):236–245. https://doi.org/10.1177/1715163516647749.
63. Sifaki-Pistolla D, Melidoniotis E, Dey N, Chatzea V-E. How trust affects performance of interprofessional health-care teams. *J Interprof Care*. 2020;34(2):218–224. https://doi.org/10.1080/13561820.2019.1631763.
64. Winasti W, Berden H, van Merode F. Hospital organizational structure and information processing: an entropy perspective. *Entropy*. 2023;25(3). https://doi.org/10.3390/e25030420.