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Pharmacist-Doctor Collaboration Gaps & Diabetes Patient Quality of Life: Case study at Hospital X in Magelang

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ABSTRACT

Introduction: According to data gathered from the Medical Records Unit of Hospital (RS) X in Magelang City for the year 2022, diabetes was the most prevalent condition, with a total of 2,866 recorded cases. To enhance treatment outcomes for patients, particularly those with chronic diseases, it is essential for physicians and pharmacists to collaborate effectively. Effective communication and collaboration among healthcare professionals, including physicians and pharmacists, are crucial to ensure seamless service delivery. This study aims to examine the gaps in collaboration among healthcare professionals—particularly between pharmacists and physicians—by exploring the current implementation of collaboration, identifying the challenges faced, and recommending strategies to optimize pharmacist-physician collaboration. Strengthening this collaboration may contribute to improving the quality of life of patients with diabetes.

Methods: This study employs a qualitative approach, utilizing data collection methods such as interviews and focus group discussions, structured into seven distinct stages. The participants in this study include medical professionals, pharmacists, members of the pharmacy and therapeutics committees, hospital management personnel, and patients. Data analysis was conducted using explicitation techniques with the aid of the NVivo 12 software application, resulting in the identification of four key themes.

Results: Through a qualitative approach, four main themes were identified. The first theme is the role of the Pharmacy and Therapeutics Committee, where the committee is responsible for drug selection, monitoring expired medications, compiling and distributing the hospital formulary, and providing appropriate therapy recommendations. The second theme is collaboration implementation, which is carried out through regular meetings, patient education, confirmation of drug availability and usage instructions, as well as coordination among healthcare professionals. The third theme is efforts to enhance collaboration, which include formulary updates, evaluation of drug needs, education for patients and medical personnel, and strengthening of standard operating procedures (SOPs) and interprofessional communication. The fourth theme is collaboration barriers, which include limitations in human resources, delayed communication, suboptimal evaluation of pharmaceutical personnel, and collaboration that is not yet fully integrated.

Conclusion: The partnership between doctors and pharmacists at Hospital X in Magelang City in providing care for diabetes mellitus patients is in place but requires further optimization. To strengthen collaboration, the hospital can implement a structured interprofessional framework, including formal communication channels, cross-professional training, supportive internal policies, and active involvement of hospital management. These efforts are expected to enhance team effectiveness and improve the overall quality of patient care.

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INTRODUCTION

With a prevalence of 11.3% of diabetes cases in Southeast Asia in 2020, Indonesia ranks third (1). Based on data from the Medical Records Unit of Hospital X in Magelang City in 2022, diabetes ranked first with 2,866 cases. The incidence of diabetes continues to rise due to various factors. One of them is the non-compliance of diabetes patients during treatment, which results in poor blood sugar control, a higher risk of complications, and a worse quality of life for the diabetes patients themselves. Several factors cause non-compliance among diabetes patients in healthcare; including insufficient education from healthcare professionals, lack of understanding about diabetes and its medications, and lack of family support (2). Pharmacists can help diabetes mellitus patients achieve their treatment goals in various ways, such as counseling, providing informational brochures, and reminding patients to take their medication (3). Medical professionals, especially doctors and pharmacists, must work together to improve the quality of life for patients, particularly diabetes patients. This is necessary to achieve rational treatment, reduce unwanted drug side effects, and improve patient compliance and satisfaction in healthcare. This is supported by research conducted by Ariyani and Anggrowati (2017) which found that better communication among healthcare workers in hospitals leads to improved cooperation and implementation of patient safety, which can reduce risks to patient safety (4). Based on the research by Siregar et al (2024), it is revealed that from the perspective of doctors and nurses, efforts are needed to prepare the team by involving pharmacists to enhance the role of pharmacists in the clinical pharmacy aspect (5). The interprofessional collaboration model has proven to have a significant impact on improving the quality of healthcare services. This collaboration not only involves doctors and pharmacists but can also include directors (6,7).

However, studies have shown that interprofessional collaboration among healthcare workers in Indonesia still faces several challenges and has not been optimally implemented (8). The research shows that traditional cooperation and interprofessional collaboration still occur in Indonesia, with doctors acting as leaders and pharmacists acting as implementers. Thus, doctors' experience in collaborating with pharmacists is still limited, creating challenges for doctors (9). To maximize patient treatment outcomes, especially for patients suffering from long-term illnesses, it is crucial that doctors and pharmacists work together. Doctors and pharmacists must communicate and interact with each other to ensure continuity of care (9). Research by Awalom et al (2013), states that 88% of doctors at Asmara Hospital in Eritrea accept the professionalism of pharmacists; 60% of doctors do not agree that pharmacists can help their patients, but 96% of doctors agree that pharmacists should recommend patient therapy. To gain trust between doctors and pharmacists, both professions must collaborate, especially in selecting treatments for diabetes patients (10).

Nonetheless, the execution of cooperation between physicians and pharmacists in various studies remains perceived as somewhat ineffective. This is supported by the studies carried out by Pristianty et al (2022), it was stated that the collaboration between doctors and pharmacists for diabetes mellitus patients at Airlangga University Hospital Surabaya is ineffective from the pharmacist's perspective (11). Another study conducted by Viani et al (2021) mentioned that healthcare workers view intraprofessional collaboration as a positive aspect. Pharmaceutical technical staff and pharmacists believe that intraprofessional collaboration practices are still dominant in the field of leadership. In the realm of collaborative challenges within teams, nurses perceive that their autonomy is constrained, and existing leadership continues to impede their endeavors to meet healthcare service objectives. Within the realm of leadership, it is observed that pharmacists recognize the continued prevalence of a single health profession in the execution of interprofessional collaboration. The study employed a questionnaire as a "diagnostic tool" to pinpoint the strengths and weaknesses of the team (12). Based on research conducted by Kuman and Rahajeng (2016) was stated that the quality of life of outpatient hypertensive patients at RSUD Dr. H. Moch can be significantly improved by implementing collaborative interventions between nutritionists, pharmacists, and patients. There are several factors that influence the implementation of collaboration among professionals, such as communication, different educational backgrounds, and understanding of each other's roles (13). However, there are still some obstacles in the implementation of collaboration, such as lack of communication, different educational backgrounds, and limited understanding of each other's roles, as well as limited understanding of the roles of each profession (4). Collaboration between doctors and pharmacists is crucial in improving the quality of life for patients, especially those with diabetes mellitus. This is evidenced by research conducted by Kuman and Rahajeng (2016) which states that a collaborative care system influences the reduction in blood glucose levels in patients with type 2 diabetes mellitus (13). The background of the medical profession or specialist doctors often lacks understanding of each other's roles and

responsibilities, which creates a power hierarchy within a collaborative team (14). In addition, this research also addresses common barriers identified in previous studies that affect the collaborative relationship between doctors and pharmacists, such as lack of identity, good relationships, knowledge, positive attitudes, and communication. Therefore, efforts to build trust and narrow the communication gap are critical in achieving effective collaborative practice among healthcare professionals. Pharmacists and doctors must have the ability to work together, understand the shared moral responsibilities they have, recognize the implications of their personal behavior on their professional relationships, and focus on their scope of practice without crossing boundaries. Through positive behaviors such as politeness, communication, adaptation, and mutual respect in their respective roles, pharmacists and doctors can enhance their relationships and practice collaboratively (15).

This study provides a contextual analysis of pharmacist-doctor collaboration gaps in diabetes care at a secondary hospital in Indonesia, an area rarely explored in previous research. By focusing on real-world barriers and linking collaboration directly to patient quality of life, the study offers practical, locally relevant insights and recommendations to strengthen interprofessional practices in managing chronic diseases like diabetes. Hospital X in Magelang was strategically selected as the research site due to several contextual and practical considerations relevant to the study's objectives. According to the Medical Records Unit data from 2022, diabetes ranked as the most prevalent condition in the hospital, with 2,866 recorded cases. This high burden of diabetes cases makes Hospital X a representative setting for examining the management of chronic diseases, particularly the role of interprofessional collaboration. Hospital X is a secondary-level referral hospital that plays a key role in providing healthcare services to the Magelang region and its surrounding areas. As a referral center, effective collaboration among healthcare professionals—especially between physicians and pharmacists—is essential to ensure optimal outcomes in the management of chronic conditions such as diabetes. This hospital was chosen to explore interprofessional collaboration practices in a non-tertiary, non-academic hospital context, which has been underrepresented in existing studies. Based on the background that has been described, this study aims to examine the gap in collaboration between health professionals, especially between pharmacists and doctors, by exploring the implementation of collaboration, challenges faced, and recommended strategies to optimize pharmacist-doctor collaboration, which can contribute to improving the quality of life of diabetes patients.

METHOD

Research Instruments

Based on a literature review of previous research, limited research data was found on the effectiveness of collaboration between pharmacists and clinical doctors. Based on that background, the researcher wants to delve deeper into the collaboration between doctors and pharmacists in providing healthcare services to diabetes mellitus patients at Hospital X in Magelang City. In this study, a research design using qualitative methods is employed, which represents a novel methodological approach introduced by the researcher to complement previous studies that utilized questionnaires with a survey design. Qualitative research focuses on a profound understanding of phenomena or problems by exploring the meanings contained in more subjective data, such as narratives or in-depth interviews. This approach emphasizes context and individual experiences, allowing researchers to understand feelings, perceptions, and views that might not be captured through numerical measurements (16). Research in the social field often uses in-depth interviews or focus group discussions (FGDs) to delve deeper into the views and experiences of subjects. These methods allow researchers to obtain rich and contextual data, which is essential in understanding the complexity of social issues (17). The researchers employed qualitative method strategies, focusing on an in-depth exploration of participants' experiences and perspectives. They conducted participatory observations of the services offered by doctors and pharmacists to diabetes patients, aiming to gain a direct understanding of the phenomenon (18).

The qualitative approach was chosen for this study because it allows for an in-depth exploration of the complex and contextual dynamics of collaboration between doctors and pharmacists. This method enables researchers to understand the experiences, perceptions, and challenges faced by healthcare professionals in providing services to diabetes patients—insights that cannot be fully captured through quantitative data alone. Additionally, this approach is relevant as it offers a holistic understanding within the specific context of Hospital X in Magelang and complements previous studies that primarily used survey methods. Therefore, the findings are expected to provide practical insights to improve collaboration and the quality of healthcare services for patients.

This research has obtained Ethical Clearance from the Health Research Ethics Committee (KEPK) of Universitas Muhammadiyah Magelang with No.0111/KEPK.FIKES/II.3.AU/F/2023. The research instrument used in this study is an interview guide with informants including patients, doctors, pharmacists, hospital management, and the pharmacy and therapy committee. Prior to the data collection phase, the researcher presents their identity, clarifies the research's purpose and objectives, and reviews key aspects of the Informed Consent in accordance with the WHO-CIOMS 2016 guidelines. The researcher will subsequently inquire about the informant's readiness to participate as an informant in this study. Upon the informant's agreement, we will proceed to request that they complete and sign a consent form to participate in the research. The researcher guarantees the informants that their identities will solely be utilized for research purposes and will remain confidential, not being revealed to the public or any other parties.

METHOD

This research uses a qualitative research design. The research design is carried out through 7 (seven) core stages, starting from the desk review stage, need assessment, development of research instruments, data collection through interviews, data triangulation, verbatim transcription, and data analysis as follows:

Desk Review

At this stage, the collection and analysis of information related to the topic or title being addressed are conducted by extracting relevant scientific journals.

Need Assessment

Need assessment is the stage of identifying and exploring the issues raised in the research, specifically how the collaboration between doctors and pharmacists at Hospital X in Magelang City is. The need assessment process greatly assists researchers in designing relevant and effective solutions to be implemented.

Development of Research Instruments

The researcher conducts the process of developing research instruments using methods such as interview guides to facilitate data collection. This interview guide was developed based on the need assessment that had been conducted, referring to several journals or literature studies.

Data Collection Through Interviews

The researcher conducted data collection through observation and interviews carried out at the Hospital in 4 meetings. Before conducting the interview process, the researcher needs to establish inclusion criteria for informants to ensure the validity of the interview data obtained. The inclusion criteria for patient informants are diabetes mellitus patients who have undergone treatment at the hospital for 6 months or more. The inclusion criteria for healthcare informants, such as internal medicine specialists, pharmacists, the pharmacy and therapy committee team, and the hospital management team, is that they have worked at the hospital for at least 2 years in a division relevant to the research topic. The exclusion criteria for patient informants are patients who do not have diabetes or diabetic patients who have not received treatment for at least 6 months. The exclusion criteria for healthcare informants are specialist doctors, pharmacists, pharmacy and therapy committees, and hospital management teams who have worked for less than 2 years in divisions relevant to the topic. Additionally, the exclusion criteria for informants are those who are unwilling to provide information or unwilling to be interviewed. The determination of the six informants in this study was based not only on the principle of data saturation, but also on the representation of key informants, as well as their willingness to participate and fulfillment of inclusion criteria. Data saturation was reached when the information obtained from the informants no longer yielded new or relevant themes related to the research focus. In addition, the six selected informants represented essential perspectives in the context of healthcare collaboration between doctors and pharmacists, including clinical, managerial, and patient (diabetes) viewpoints. The selection also considered each informant’s willingness to participate and their eligibility based on the inclusion criteria, namely having direct and relevant experience with the topic. Therefore, the involvement of six informants was considered sufficient to provide a comprehensive and in-depth understanding aligned with the objectives of the study.

Data Triangulation

Data triangulation at this stage is carried out by comparing and combining information from various different sources to test or validate a result. This can help ensure the accuracy of information obtained from multiple perspectives. The researcher obtained secondary documents from the Pharmacy and Therapy Committee Team in the form of minutes and attendance lists of the committee's regular meetings. Based on that data, a comparison of the results from various data sources and other methods was conducted.

Focus Group Discussion

The Focus Group Discussion (FGD) serves as a systematic method for gathering data, emphasizing the importance of the process involved. We carry out focus group discussions with the objective of directly addressing issues or achieving consensus. FGD seeks to investigate and gather diverse insights regarding a specific issue or topic, which is likely to be interpreted in various ways with differing explanations. The focus group discussion included five participants: one member of the pharmacy and therapy committee, two pharmacists from the hospital pharmacy installation, one specialist in internal medicine who manages diabetes patients, and representatives from the hospital management team. The FGD was carried out to facilitate data triangulation, aiming to evaluate the validity of the earlier interviews conducted with each informant prior to data analysis.

Verbatim Transcript

A verbatim transcript is the process of listening to the recorded interview results and writing down the words verbatim. Authors CDB and EL conducted the verbatim transcription process based on the interview data with the informants.

Data Analysis

Data analysis in this qualitative research method refers to the technique of data explication. The content-based explication technique is written with coding that is organized into a single theme (the process of deconstructing or presenting the respondent's implicit expressions) with the help of NVIVO12 software. The identification of themes and their substance originated from the analysis of verbatim interview transcripts and focus group discussions conducted with each informant. These data were systematically coded using NVIVO 12 software to facilitate the organization of information into relevant categories. The coding process followed an inductive approach, where researchers examined recurring and meaningful narratives to identify patterns, concepts, and key issues. Themes emerged through the consolidation of nodes (codes) that shared similar meanings or were conceptually related, and were further developed into broader themes that accurately represented the field findings. At this stage, a team of five individuals—EL, CDB, AY, YNZ, and BRA—collaboratively reviewed and discussed the emerging themes. They engaged in in-depth discussions to ensure consistency in interpretation and to enhance the reliability of the data analysis outcomes. The visual outputs generated from NVIVO 12, such as thematic diagrams and matrix queries, were subsequently reconstructed in Microsoft Word to improve the clarity and readability of the visuals for the audience.

RESULTS

This research aims to review the implementation of collaboration between pharmacists and doctors in providing rational medication therapy for diabetes patients by exploring efforts to improve the quality of life of diabetes patients at Hospital X in Magelang City. The researcher conducted interviews in 4 (four) sessions using data collection tools, namely the researcher themselves, with the aid of a recorder, field notes, and an interview guide. The next process is verbatim transcription. After that, the researcher reads the verbatim transcript repeatedly to create categories that can be included in subthemes and generate the main theme. This research obtained 4 (four) themes, namely the role of the pharmacy and therapy committee, collaboration implementation, efforts to enhance collaboration, and collaboration barriers.

The Role of the Pharmacy and Therapy Committee

Based on the results obtained in Figure 1, it shows that the role of the pharmacy and therapy committee at Hospital X in Magelang City includes drug selection, anticipating expired drugs, facilitator for old and new drug

requests, providing and distributing formularies, addressing prescribing discrepancies with the formulary, formulation of hospital formulary and advisor on the appropriateness of therapy.

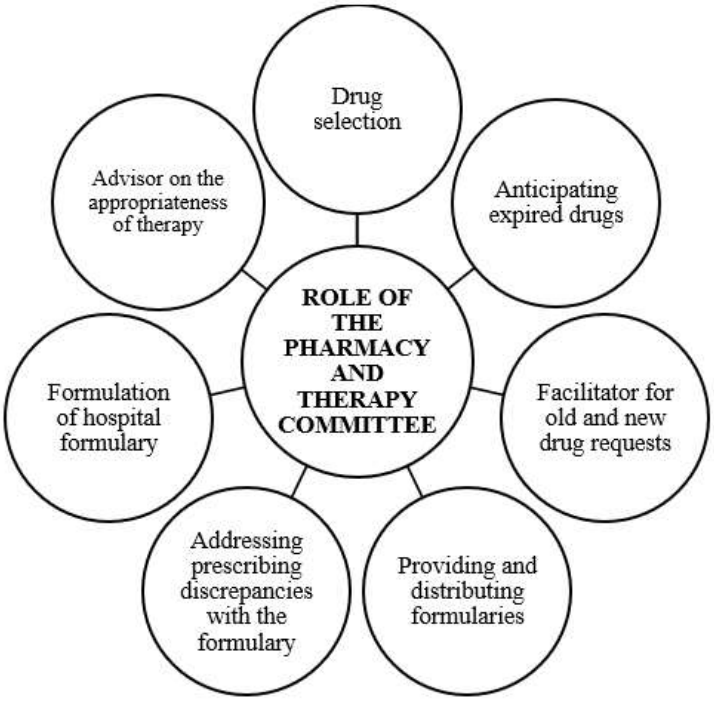

Figure 1. The Role of the Pharmacy and Therapy

The Pharmacy and Therapeutics Committee is tasked with the selection of medications, as highlighted by the informant's statement: *"We engage in the selection of diabetes mellitus medications that will be available at the hospital, taking into account both benefits and cost-effectiveness"* (Pharmacy and Therapeutics Committee, Hospital X). Furthermore, the Pharmacy and Therapy Committee indicated their involvement in monitoring expired medications, as highlighted by the informant's remark: "*We consistently remind internal medicine specialists about diabetes mellitus-specific medications that are approaching or have exceeded their expiration date"* (Pharmacy and Therapy Committee, Hospital X). The Pharmacy and Therapeutics Committee clarified their role as facilitators for requests concerning both established and novel medications, as highlighted by the informant's statement: *"One of our duties is to be a competent facilitator for the internal medicine doctor's requests regarding diabetes mellitus medications"* (Pharmacy and Therapeutics Committee, Hospital X).

The Pharmacy and Therapeutics Committee holds the responsibility of compiling, providing, and distributing the hospital formulary, as evidenced by the informant's statement*: "We compile, provide, and disseminate the hospital formulary book to doctors and pharmacists."* Furthermore, to uphold the guideline of utilizing the hospital formulary for prescription writing, the Pharmacy and Therapeutics Committee examines drug prescriptions that deviate from the established formulary. The informant's statement supports this: *"If there are any drugs that do not match the formulary, we will advise the doctor to write or recommend drugs that are in accordance with the formulary"* (Pharmacy and Therapeutics Committee, Hospital X). The Pharmacy and Therapeutics Committee functions as an advisory body regarding the suitability of therapy to prevent drug interactions or discrepancies in treatment, as highlighted by the informant's statement: *"We also provide advice on the appropriateness of the therapy given by the doctor to the patient"* (Pharmacy and Therapeutics Committee, Hospital X). The Pharmacy and Therapeutics Committee at Hospital X in Magelang City adheres to the guidelines established by the Decree of the Minister of Health of the Republic of Indonesia Number HK.01.07/MENKES/200/2020 regarding its primary responsibilities, roles, and functions. The tasks encompass formulating policies regarding drug utilization in healthcare settings, assessing and choosing medications for inclusion in the hospital formulary, establishing therapeutic standards, pinpointing issues related to drug use, taking action to enhance rational medication practices, overseeing the

management of adverse drug reactions, coordinating the handling of medication errors, and sharing information pertinent to drug use policies within hospitals (19).

Collaboration Implementation

Based on the results obtained in Figure 2, it shows that collaboration implementation at Hospital X in Magelang City includes pharmacy and therapy committee coordination meeting once every six months, drug substitution, provision of information and education by doctors, nurses and pharmacists, selection of new drugs in the pharmacy and therapeutics committee forum, confirm the avaibility of drinking rules and side effects pf drugs, coordination of the patient's diet with the dietitian, confirmation of prescription clarity and confirmation of patient's condition.

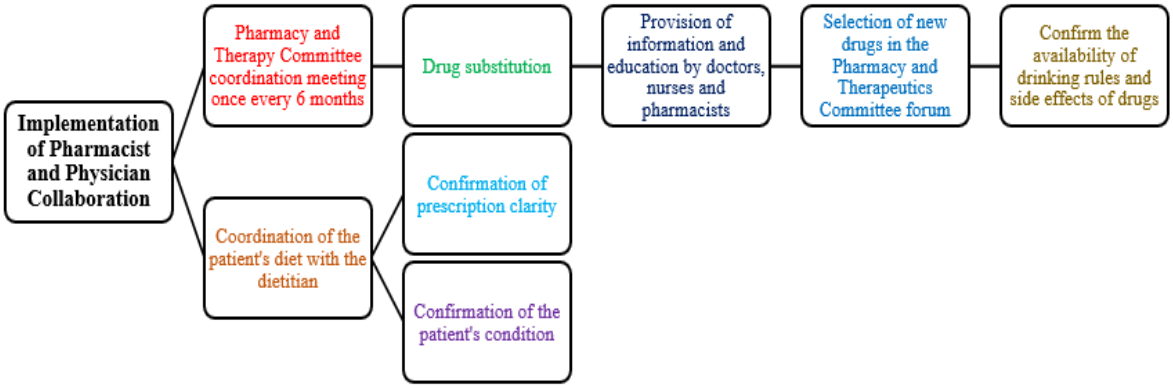

Figure 2. Collaboration Implementation

The collaboration between doctors and pharmacists at Hospital X in Magelang City is primarily facilitated by the Pharmacy and Therapeutics Committee, which conducts coordination meetings every six months. According to the informant, *"The Pharmacy and Therapeutics Committee meetings, as a form of collaboration among healthcare professionals, are usually held every six months, but recently because of new medication requests, they are held every four months"* (Pharmacy and Therapeutics Committee, Hospital X Magelang City). The informant indicated that drug substitution represents a collaborative effort between physicians and pharmacists. Specifically, they noted, *"For BPJS prescriptions, cooperation is essential; if a medication is unavailable in the pharmacy, the pharmacist will inquire about possible alternatives."* (Physician, Medical Facility X). Collaboration is facilitated through the dissemination of information and educational resources offered by medical professionals, including doctors, pharmacists, and nurses. *"I suggest that the initial action should be to take the medication and come back here for guidance on the proper use of insulin and the recommended dosage."* (Doctor, Hospital X). The medication dosage is typically explained by the nurse in this setting. *"I have already undergone therapy from the physician, who will clarify the application and dosage prescribed."* Upon arrival at the pharmacy, the pharmacist will reiterate the information regarding the usage and dosage provided" (Patient, Hospital X). Additionally, the process of choosing new medications for diabetes mellitus by the Pharmacy and Therapeutics Committee exemplifies a collaborative approach, as noted by the informant: *"The collaboration involved in the selection or request for new medications, particularly those for diabetes mellitus, aligns with the established procedures between the Pharmacy and Therapeutics Committee and the physicians"* (Pharmacy and Therapeutics Committee, Hospital X).

A different approach to collaboration that has been established at Hospital X in Magelang City involves communication, including the confirmation and coordination among doctors, pharmacists, and other healthcare professionals. This encompasses verifying medication availability, dosage instructions, and potential side effects. *"We acknowledge the arrangement of medications that are currently out of stock or may not be accessible in this location."* (Pharmacist 1, Hospital X), *"The collaboration typically entails pharmacists verifying with physicians about the availability of medications and the guidelines for medication administration." "Intervention prior to the selection of medication is not performed, and the responsibility for medication selection in this hospital rests entirely with the attending physician."* (Pharmacist 2, Hospital X), "*The collaboration involves confirming the availability of*

prescribed medications for the patient" (Doctor, Hospital X), and *"The pharmacy department typically verifies if there are alternative medications or potential side effects"* (Management Team, Hospital X).

Moreover, the collaboration extends beyond the interaction between doctors and pharmacists; it encompasses other healthcare professionals, including nutritionists, to ensure the coordination of patient diets, as highlighted by the informant's remark: *"Regarding the patient's diet, I consult and discuss with the nutritionist"* (Doctor, Hospital X). A different type of validation pertains to the clarity of prescriptions, typically addressed by the pharmacist in cases of illegible prescriptions. *"In instances of unclear prescriptions, it is essential to seek confirmation as well."* In cases where a patient has expressed a concern and has previously communicated this to the physician, yet the physician has overlooked documenting the treatment or medication, we will reconfirm with the physician to ensure effective collaboration moving forward. *"We confirm through phone calls, WhatsApp, or occasionally by meeting directly with the doctor"* (Pharmacist 1, Hospital X). The pharmacist communicated with the doctor to confirm the patient's condition, as noted by the informant: *"So, when we find that a special medication is given to a certain patient, we usually confirm it with the doctor because he understands the condition of each patient"* (Pharmacist 1, Hospital X).

The implementation of collaboration between doctors and pharmacists is known as Interprofessional Collaboration (IPC). This concept involves the interaction or relationship among two or more healthcare professionals who work together to exchange information, with the goal of making joint decisions and identifying the optimal moments for collaboration in ensuring patient safety and delivering quality care to patients (4). The collaboration that has been implemented aligns, which indicate that IPC involves collaboration and communication among healthcare professionals in a coordinated approach to decision-making regarding health issues. This ensures that the care provided is both reliable and sustainable, allowing for optimal patient care while minimizing adverse effects on patients' health (20).

Efforts to Enhance Collaboration

Based on the results obtained in Figure 3, it shows that efforts to enhance collaboration to improve the quality of life for patients with diabetes mellitus at Hospital X in Magelang City includes periodic formulary updates, monitoring and evaluation of pharmacists and doctors, application of non-pharmacologic therapy, evaluation of diabetes mellitus drug requirements, SOP for patient education, estimated planning and procurement for the next periode, personal approach to patients, providing doctor and pharmacist education, SOP for confirmation mechanisms with doctors, confirm the presence of the patient's companion, appropriateness of diabetes mellitus prescription with formulary and update reference of diabetes mellitus drug development.

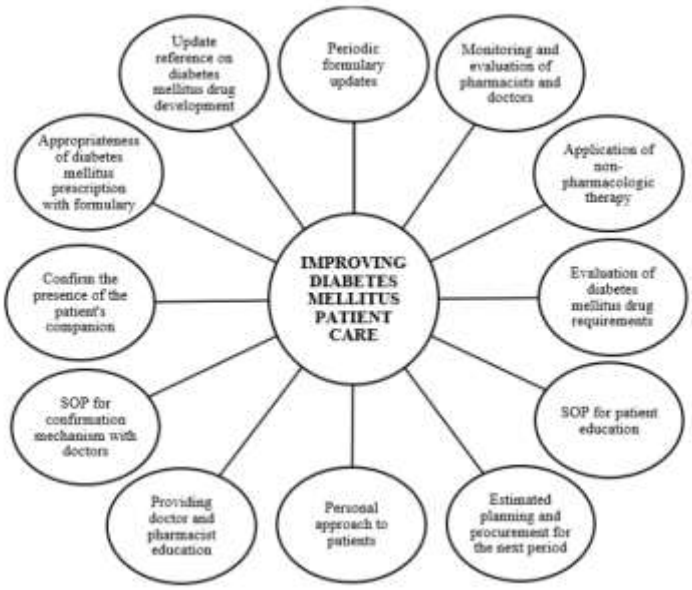

Figure 3. Efforts to Enhance Collaboration

Initiatives aimed at improving collaboration between physicians and pharmacists at Hospital X in Magelang City encompass, among other things, the participation of doctors in health promotion, as noted by the informant. *"Although my team is not directly involved, we have successfully implemented diabetes management in this setting."* This discussion provides a clear explanation of diabetes, including its recognition, associated risk factors, and management strategies related to exercise, diet, and therapy. *"It seems that a significant barrier for patients is their limited comprehension of insulin usage, as they often equate it with severe diabetes. This is why we consistently highlight this aspect in our educational efforts."* (Physician, Medical Facility X). Subsequently, the initiatives undertaken to verify the existence of a patient companion are highlighted by the informant's statement: "*We typically investigate with the patient if their medication adherence is accurate and consistent, whether there is someone at home to remind the patient, and additionally, it is essential to examine the non-pharmacological aspects as well. Subsequently, we can collect data from the patient and then offer educational insight*s." (Pharmacist 2, Hospital X).

The informant indicated that doctors and pharmacists also conduct monitoring and evaluation of the patient's condition. *"Typically assessed on a monthly basis during evaluations conducted at check-ups. For patients with diabetes enrolled in BPJS, the recommended frequency for monitoring is monthly. However, if I identify a patient with elevated blood sugar levels and a high HbA1c at the outset, I typically advise weekly monitoring."* (Doctor, Hospital X). Following the examination, healthcare professionals consistently offer educational guidance to patients. As noted by the informant: *"The doctor always emphasizes that during the consultation about the disease, when patients later collect their medication from the pharmacist, they will receive an explanation regarding its use."* (Patient, Hospital X). The informant further disclosed that they adopt a personalized approach with patients to investigate their conditions and offer insights into non-pharmacological methods. *"We typically ask patients about the accuracy and consistency of their medication intake, whether they have someone at home to remind them, and we also need to investigate the non-pharmacological factors. Following this, we can collect information from the patient and then offer education."* (Pharmacist 2, Hospital X).

Subsequently, the initiatives undertaken to enhance collaboration encompass facilitating access to communication. *"Typically, communication occurs via WhatsApp or occasionally through direct meetings with the doctor. Meeting in person is often more convenient, as it allows for a clearer understanding of the doctor's intentions"* (Pharmacist 2, Hospital X). The informants indicated that they collaboratively assess the planning and procurement for the forthcoming period, stating, *"For instance, we evaluate whether the medicines are slow-moving or fast-moving; for the slow-moving ones, we will classify them as items to be considered for ordering in the upcoming month."* (Pharmacy and Therapeutics Committee, Hospital X). Furthermore, it was disclosed that the assessment of medication requirements for diabetes mellitus is consistently performed every 6 months: *"An evaluation of the necessity for diabetes mellitus medications is typically performed every 6 months or biannually"* (Pharmacy and Therapy Committee, Hospital X). Subsequently, the execution of strategies aimed at improving collaboration entails the provision of standard operating procedures concerning patient education, mechanisms for confirming information with physicians, consistent updates on advancements related to diabetes mellitus medications, and the modification of prescribed medications in alignment with the hospital formulary.

Prior studies indicate that the relationship initiated by the doctor plays a crucial role in shaping collaboration. The trust placed in doctors is another element that affects collaboration. The establishment of this relationship is shaped by the physician's confidence in the pharmacist's capability to deliver medication services to patients and their dedication to working together. Therefore, this study indicates that demonstrating the competence of pharmacists is crucial for maximizing doctors' trust. It is essential for pharmacists to deliver clinical recommendations that enhance patient health outcomes. Pharmacists are required to showcase their knowledge and skills to establish credibility with physicians, thereby fostering collaboration (11).

Collaboration Barriers

Based on the results obtained in Figure 4, it shows that barriers to collaboration among healthcare workers in providing services to diabetes mellitus patients at Hospital X in Magelang City includes monitoring and evaluation of pharmaceutical personnel isn’t optimal, human resource limitations, delay in communication response, unavailability and unfamiliarity with SOPs involving health worker collaboration, doctor and pharmacist collaborations partial and adjustment of doctor visit schedule.

Figure 4. Collaboration Barriers

Several challenges in the execution of collaboration highlighted by the informants include the constraints of human resources, which impact the coordination of doctors' visiting schedules for inpatients. *"However, the implementation of this initiative is currently not feasible due to constraints in human resources and the timing, as we are unable to establish the doctor's visit schedule at this hospital. Nonetheless, there are certainly plans for future support of healthcare services.*" (Pharmacy and Therapy Committee, Hospital X). Furthermore, the informant highlighted the lag in communication when pharmacists seek to verify medications or prescriptions with physicians: *"Our hope here is that the doctors can be more cooperative, because not all doctors are cooperative when confirmed"* (Pharmacist 1, Hospital X). Additionally, in terms of regulations, there are still healthcare professionals who do not understand the availability of SOPs related to collaboration. *"Regarding the SOPs, they appear to be accessible already, but for further clarification, it may be beneficial to consult with the nurses or pharmacists."* (Physician, Hospital X).

Furthermore, the informant disclosed that collaboration remains partially in effect, particularly concerning inpatient visits. *"To my knowledge, the doctors typically manage the visits independently. Typically, the pharmacist's visits take place just before the patient is discharged, at which point the explanation regarding medication usage is given"*. (Patient, Hospital X). The challenges that arise are also shaped by the inadequate monitoring and evaluation of pharmaceutical personnel regarding patients. *"In the context of pharmacy, it is evident that monitoring and follow-up have not been conducted or implemented to date."* (Pharmacist 1, Hospital X). The challenges faced at Hospital X in Magelang City were similarly observed in earlier studies. Based on research conducted by (13) was stated that the quality of life of outpatient hypertensive patients at RSUD Dr. H. Moch can be significantly improved by implementing collaborative interventions between nutritionists, pharmacists, and patients. There are several factors that influence the implementation of collaboration among professionals, such as communication, different educational backgrounds, and understanding of each other's roles. However, there are still some obstacles in the implementation of collaboration, such as lack of communication, different educational backgrounds, and limited understanding of each other's roles, as well as limited understanding of the roles of each profession (4). Another study conducted by (12) mentioned that healthcare workers view intraprofessional collaboration as a positive aspect.

Pharmaceutical technical staff and pharmacists believe that intraprofessional collaboration practices are still dominant in the field of leadership.

DISCUSSION

The Role of the Pharmacy and Therapy Committee

According to the hospital organization's guidelines, the Pharmacy and Therapeutics Committee/Team is one of the existing hospital teams. This team performs specific functions in the hospital in accordance with technological advancements and scientific knowledge to improve patient care and safety (19)**.** The role of the Pharmacy and Therapeutics Committee (PTC) at Hospital X in Magelang City is in accordance with the Pharmaceutical Service Standards in hospitals. Hospital X in Magelang City already has a Pharmacy and Therapeutics Committee, however, the collaboration between doctors and pharmacists at Hospital X in Magelang City is still not optimal, as evidenced by the absence of standard operating procedures for collaboration among healthcare workers for patient monitoring, such as inpatient visits to determine therapy together in order to improve therapy outcomes. Patient monitoring is carried out through the Integrated Patient Progress Notes and Integrated Data.

Based on the results of the interview survey, the role of the Pharmacy and Therapeutics Committee (PTC) in hospitals, as shown in Figure 1.1, includes reviewing the use of medications to avoid inaccuracies in medication use that could pose risk factors and making efforts to improve the quality-of-service management to patients. Legislation has regulated the duties of the Pharmacy and Therapeutics Committee in accordance with the Pharmacy Service Standards in Hospitals. This includes evaluating and selecting medications to be included in the Hospital Formulary and providing recommendations to the director regarding drug use policies in the hospital, thereby ensuring that the PTC is implemented correctly in the hospital (19).

During collaboration with doctors and other healthcare professionals, Pharmacy and Therapeutics Committee can provide recommendations for the medications to be given to patients, ensuring that they receive more optimal therapeutic efficacy. Pharmacy and Therapeutics Committee also plays a role in the selection and planning of medications in this study. Pharmacy and Therapeutics Committee participates in the selection of diabetes mellitus medications by considering their benefits and cost-effectiveness, checking the availability of medications, and conducting an analysis of item and quantity planning estimates with the aim of providing medications with the appropriate type, quantity, and quality safety. Pharmacy and Therapeutics Committee contributes by providing input related to the suitability of therapy with the formulary and addressing medication adherence issues in patients (21). In Hospital X City of Magelang, therapy for diabetes mellitus patients is already in accordance with the hospital formulary. To improve adherence to the Hospital Formulary, the hospital must establish policies regarding the addition or removal of medications in the Hospital Formulary, considering indications for use, effectiveness, risks, and costs. Guidelines for the Compilation of Hospital Formularies, No HK.01.07/MENKES/200/2020, state that hospitals must have policies that are easy to understand and use by all healthcare personnel when doctors write prescriptions in the formulary (19).

The role of the Pharmacy and Therapeutics Committee in this study also serves as a facilitator if there are requests for old or new medications and to assess the suitability of the therapy. Compiling the hospital formulary is also part of the Pharmacy and Therapeutics Committee 's role in providing the necessary medications to meet the needs of diabetes mellitus patients. In addition to compiling the formulary, the Pharmacy and Therapeutics Committee also provides and distributes the formulary book in the hospital, including to prescribing doctors. Hospitals are required to implement the use of medications according to the formulary to ensure the stability of medication availability. Based on this, to maintain the quality of doctors' compliance in writing prescriptions according to the formulary, it is necessary to conduct an evaluation of the hospital formulary compliance, which can be done by calculating the conformity of drug usage and availability. If there is non-compliance by doctors in prescribing according to the formulary, it can lead to many expired drugs, material losses, and a decline in patient service due to poor drug management (19). It is necessary to provide rewards to doctors who are committed to adhering to the formulary in the form of incentives and sanctions to doctors who do not comply with the formulary (21). In addition, it is necessary to have an electronic formulary list in the Outpatient Installation connected to the Pharmacy Installation, and it is important to enhance the socialization of the formulary through regular meetings between management and doctors.

Collaboration Implementation

The form of collaborative implementation carried out in each hospital may vary, but the collaboration has the same goal of improving the quality of performance among healthcare workers and enhancing the quality of life and patient satisfaction. The form of collaboration between doctors and pharmacists at Hospital X is outlined in Figure 1.2. The implementation of collaboration among healthcare workers, especially pharmacists and doctors, can prevent undesirable events and improve the quality of healthcare services and patient safety. One form of implementation is holding coordination meetings of the Pharmacy and Therapeutics Committee every six months to discuss revisions to the hospital formulary.

The implementation of the collaboration that took place is also supported by the statement made by the hospital, "*...Here, the selection of therapy usually depends on the doctor, whether it is a general practitioner or an internal medicine specialist* (Management Team, Hospital X)". For the pharmacy, they usually confirm if there are any drugs of the same type or if there are other side effects. In previous research, the CPPT form was used as an effective tool for communicating about the implementation of interprofessional collaboration. In this form, all findings and opinions of healthcare professionals such as doctors, nurses, midwives, pharmacists, nutritionists, dietitians, clinical psychologists, physical therapists, medical technicians/anesthesia technicians, and others are collected and consolidated to fill out the care plan (22). The findings of the medical history and the actions taken for the patient are documented in writing or recorded with the aim of facilitating the monitoring of the patient's health history and decision-making.

If pharmacists and doctors have good and effective collaboration, it will also lead to good communication, resulting in improved patient care. The collaboration that occurs among healthcare professionals can be referred to as interprofessional collaboration. The interprofessional team consists of pharmacists, doctors, nurses, nutritionists, and other healthcare professionals. When the intercollaboration team has been formed, open communication between doctors and pharmacists is necessary. In current healthcare services, communication within an interprofessional team can be considered very important because it can expand the population of healthcare services, especially in providing care within healthcare services (23). Interprofessional communication is a factor that influences the improvement of patient safety, because through effective interprofessional communication, it will prevent the healthcare team from misunderstandings that can lead to medical errors (24). Effective communication can integrate safe and effective care for patients and other healthcare workers (25). Situation Background Assessment Recommendations (SBAR) is an example of effective communication that can be implemented because it is a technique for conveying important information that requires immediate attention and action to ensure patient safety. The involved group is committed to understanding each other's professional roles and valuing each other as individuals, which results in effective communication (25).

An effective inter-professional relationship in health care practices is grounded in formal organizational action (26). Consequently, it falls upon the professionals to establish and uphold the relationship (27). A fruitful partnership can be fostered, particularly when doctors aim to build professional connections with pharmacists, considering the significant authority and impact that physicians hold within healthcare environments. Initiating a relationship can also occur through involvement in a shared community organization, providing an additional avenue for interaction among professionals (28). The former may be a likely explanation for the initiation of relationships being more prevalent among pharmacists compared to physicians. Pharmacists working in inpatient settings are anticipated to engage in morning discussions with physicians and participate in significant rounds with the healthcare team to impact medication choices and enhance patient outcomes. These facilitate avenues for outreach and expedite the formation of partnerships (29).

Nevertheless, the interaction between pharmacists and physicians is also influenced by systemic external factors. One such factor is hospital policy, which can either support or hinder the development of collaboration. Hospitals that have formal policies regarding interprofessional collaboration—such as the presence of standard operating procedures (SOPs), regular discussion forums, or interdisciplinary teams—tend to create a work environment that is conducive to collaboration (30). Conversely, the absence of such policies or formal structures may lead to the marginalization of the pharmacist's role in clinical decision-making.

Funding limitations also present a significant challenge. Limited budgets may restrict the recruitment of clinical pharmacists or the provision of interprofessional training, resulting in collaboration that is informal and less

integrated (31). Hospitals with constrained resources may prioritize spending on immediate patient needs, while long-term investment in collaborative efforts is often overlooked.

In addition, organizational culture and professional attitudes influence interactions. In certain hospital work cultures, strong professional hierarchies can result in physicians having dominant roles in decision-making, while pharmacists are perceived merely as technical implementers. This dynamic may hinder equal, two-way communication and diminish the pharmacist's contribution to therapy planning (32). A collaborative culture needs to be instilled early through interprofessional education so that healthcare workers develop a collective perspective in delivering care.

In the context of diabetes mellitus management, collaboration between physicians and pharmacists has been shown to positively impact patient clinical outcomes, including improved medication adherence, better blood glucose control, and reduced complications (33) Therefore, strengthening external factors such as regulatory support, institutional backing, and resource allocation is essential for optimizing the benefits of collaboration for patients.

Efforts to Enhance Collaboration

The implementation of service improvement efforts in hospitals is essential as part of the interprofessional collaboration between pharmacists and doctors to support the enhancement of services for patients, especially DM patients. The service improvement efforts for DM patients that have been carried out at Hospital X in Magelang City are listed in Figure 1.3. According to research Pristianty et al (2022), pharmacists often take the initiative to start communication with doctors (11). "…*As far as the pharmacist confirms with the doctor regarding the availability of medication and the medication regimen or his writing that might be unclear, we need to confirm as well or perhaps if there is a situation where the patient has a complaint* (Pharmacist 1, Hospital X)".

Based on research Aritonang (2017) it is mentioned that service improvement can be achieved through discussions among healthcare professionals such as pharmacists and doctors or by recording the patient's status (34). Other efforts that have been made at Hospital X in Magelang City include a personal approach to patients through education or teaching, such as providing information on the application of non-pharmacological therapy to enhance patients' knowledge and understanding. "...*I have already received therapy from the doctor, and later I will get the instructions on how to use the medication dosage. Once I get to the pharmacy, the pharmacist will explain again about the medication usage and dosage* (Patient, Hospital X). Another effort to improve patient services is the annual update of the formulary, conducted one to two times a year, which involves the addition or removal of medications and adjustments to the development of DM drug prescriptions in the hospital formulary. The evaluation of drug use aims to ensure the safe and cost-effective use of medications. The evaluation of drug use aims to ensure the safe and cost-effective use of medications. Every new drug proposed for inclusion in the evaluation form must be accompanied by important information about the therapeutic class, indications, dosage form, strength, dosage range, side effects, and toxic effects. Institutional factors, such as hospital policies, medications, and costs, must be considered when selecting a drug (34).

The initiatives aimed at fostering collaboration between physicians and pharmacists in various hospitals differ, and this is also true for M. M Dunda Hospital, which employs a unique strategy to enhance the partnership between these two professions. The director at M. M Dunda Hospital plays a key role in enhancing the collaboration between doctors and pharmacists within the institution. The role of leadership, particularly at the director level, plays a crucial and beneficial role in enhancing employee commitment to the organization. The director serves as a source of inspiration in the workplace, guiding the organization's direction and establishing its goals. A variety of interventions have been put in place to improve collaboration between doctors and pharmacists through the involvement of the director at M. M. Dunda Hospital. The director's responsibilities encompass, engaging in the issuance of a pharmacy team decision letter to facilitate collaborative visits with physicians for rational medication practices at M. M. Dunda Hospital, promoting the implementation of antibiotic use beginning in the ICU (currently, only an oral policy is in place, with no written mandate), contributing to medical committee meetings to present findings on the outcomes of medication interventions executed by the pharmacy team and focusing on monthly accountability for each medication dispensed. The responsibilities of physicians include, performing collaborative visits, engaging in discussions with the pharmacy team about patient care, participating in medical committee meetings to present findings on treatment interventions and the monitoring of side effects conducted by the pharmacy team. The responsibilities of the pharmacist include, participating in joint visits, carrying out independent visits,

engaging in discussions with the medical team regarding treatment and monitoring patient side effects, compiling intervention reports for submission to the medical committee, therapeutic pharmacy committee, and director and attending meetings with the medical committee to present the outcomes of the interventions conducted by the pharmacist team (7).

Collaboration Barriers

In general, various factors influence the difficulty of collaboration among healthcare workers. Individual factors include competence, character, and interprofessional communication. Group factors include the quantity and quality of personnel, as well as hierarchy and seniority. Organizational factors include leadership, motivation, organizational policies, supporting facilities, and health information systems that are not user-friendly. In this study, there are several barriers to collaboration between Pharmacists and Doctors that occur at Hospital X in Magelang City, as shown in Figure 1.4. These include, first, the adjustment of doctors' visiting schedules, the limitation of human resources in terms of healthcare personnel, and time constraints. *".... But this has not been implemented here due to the limitation of human resources, and also time, because we cannot determine the doctors' visiting schedule in this hospital* (Pharmacy and Therapeutics Committee, Hospital X)".

The existence of these obstacles impacts the collaboration between doctors and pharmacists, which is only partial. *"……Here, the collaboration is independent; the doctor visits independently, and the pharmacist also visits independently* (Pharmacist, Hospital X)". The delay in the doctor's response when confirming the medication prescription given to the patient is also one of the collaboration obstacles. *"...So far, the communication barrier is when the doctor has gone home, so communication will also be hindered. If there is a situation like that, we usually confirm via WhatsApp, and there are some doctors who respond quickly and some who respond slowly*" (Pharmacist, Hospital X). For this matter, it has been anticipated in advance by requesting the patient's phone number so that the patient does not have to wait a long time when the pharmacist contacts the doctor to confirm the medication.

Pharmaceutical healthcare professionals have the obligation to monitor and evaluate patients after they receive the medication prescribed by the doctor, but what happens in that hospital is that the pharmaceutical staff's monitoring and evaluation have not been optimal. This is evidenced by the statement, "……*For pharmacists, visits usually occur when the patient is about to be discharged, and only then is the medication usage explained. From the pharmacy's perspective, monitoring/follow-up has not been done so far* (Pharmacist, Hospital X)". Collaboration barriers are also due to the presence of healthcare workers who do not yet understand the availability of SOPs for healthcare worker collaboration in patient care. "...*As for the SOP, it seems to be available, but for more clarity, you might want to ask the nurse or the pharmacist* (Doctor, Hospital X). The collaboration barriers that occur in the hospital are also influenced by the absence of SOPs involving the collaboration of healthcare workers, particularly between doctors and pharmacists. This is in line with the research conducted, which concluded that there are differences in perception regarding the domain of coordination and role distribution in implementing collaborative practices. The professional background of doctors/specialist doctors lacks understanding of their own roles and responsibilities as well as those of other healthcare workers, which creates a power hierarchy within a collaborative team (14,35). Based on research conducted by Kuman and Rahajeng (2016) was stated that the quality of life of outpatient hypertensive patients at RSUD Dr. H. Moch can be significantly improved by implementing collaborative interventions between nutritionists, pharmacists, and patients (13). There are several factors that influence the implementation of collaboration among professionals, such as communication, different educational backgrounds, and understanding of each other's roles. However, there are still some obstacles in the implementation of collaboration, such as lack of communication, different educational backgrounds, and limited understanding of each other's roles, as well as limited understanding of the roles of each profession (4).

Furthermore, earlier studies by Abdulkadir (2017) highlighted that M. M Dunda Hospital faced numerous challenges in fostering collaboration between doctors and pharmacists. These challenges stemmed from various factors, including a significantly limited number of pharmacists, inadequate quality and competence among pharmacists, insufficient communication skills of pharmacists with other health professionals, and the pharmacy installation's unclear status as a supporting institution within the hospital, leading to pharmacists not being recognized as professional partners like their counterparts in other health fields (7). Challenges are present in Ethiopia, where physicians anticipate that pharmacists will proactively introduce themselves and seek collaboration in areas such as drug selection, reviewing medication regimens, and evaluating and managing adverse drug reactions during patient

bedside visits and morning rounds. Nonetheless, it is common for physicians to conduct only short, routine visits to the hospital pharmacy and drug information center to obtain updates on newly available medications and drug information services that can enhance collaboration between medical professionals and pharmacists. This study demonstrates a significant relationship between the area of practice and collaboration, highlighting that the highest levels of collaboration occur in the field of internal medicine for physicians and inpatient pharmacies, as well as ART for pharmacists. The internal medicine ward serves as the primary setting for interaction between pharmacists and doctors, as it is where clinical pharmacy services are initiated (29).

Through careful observations and comprehensive interviews, we have gained insights into the roles, implementation, efforts, and challenges associated with the collaboration between pharmacists and doctors at Hospital X in Magelang City. The individual presented multiple suggestions for enhancement that had previously been deliberated with the informants during a focus group discussion. The suggested enhancements include the establishment of a standard operating procedure for pharmacist visits, heightened adherence by doctors to the formulary, enhanced accessibility and transparency in communication, a deeper comprehension of healthcare workers' responsibilities, the creation of a collaborative team, active engagement in PTC coordination meetings, pharmacists' involvement in delivering therapy feedback, joint efforts in health promotion, the engagement of hospital management in PTC decision-making, the formalization of the collaboration decree for clinical pharmacy visits and physicians, and forums for inter-collaboration discussions. This aligns with earlier findings, indicating that collaboration is fostered when professionals engage in joint community organizations that facilitate increased interaction among them (28). Comparable findings were observed in educational hospitals in Ethiopia (36) and Irak (37), with the most significant collaboration taking place in the pediatric ward. The findings of this study suggest that the initiation of relationships between pharmacists and doctors is significantly linked to the degree of collaboration. In a similar vein, research conducted in an educational hospital in Ethiopia (36) indicates that the initiation of relationships plays a significant role in determining the level of collaboration among pharmacists. A study carried out in the US (38) indicated that the initiation of relationships is the primary factor facilitating collaboration between pharmacists and doctors. A recent study conducted in Iraq (37) indicates that the initiation of relationships by medical professionals is positively correlated with collaboration. Additionally, substantial collaboration is fostered when practitioners actively engage with one another beyond mere transactional interactions (39). Evidence from fields such as marketing and sales further reinforces the notion that team cohesion contributes to overall effectiveness, even if it does not directly translate to heightened productivity (40,41).

CONCLUSION

The partnership between doctors and pharmacists at Hospital X in Magelang City in providing care for diabetes mellitus patients is in place but requires further optimization. Challenges include limited human resources, time constraints, communication issues, and the absence of a structured collaboration SOP. To strengthen collaboration, the hospital can implement a structured interprofessional framework, including formal communication channels, cross-professional training, supportive internal policies, and active involvement of hospital management. These efforts are expected to enhance team effectiveness and improve the overall quality of patient care. The case study in a class C private hospital research setting limits the generalizability of the results to other hospital classes. To compare the findings, it is necessary to conduct further research in different characteristic research settings. Furthermore, to enhance the measurable quality of life of patients, we need to develop further research on interprofessional collaboration interventions. Further research, particularly mixed-method or longitudinal studies, is needed to establish a stronger causal relationship.

AUTHOR'S CONTRIBUTION STATEMENT

The authors confirm contribution to the paper as follows: study conception and design: CDB and EL; data collection: CDB, YNZ, BRA and AY; analysis and interpretation of results: CDB, EL, BRA and PPH; draft manuscript preparation: CDB, EL, YNZ, and AY. All authors reviewed the results and approved the final version of the manuscript.

CONFLICTS OF INTEREST

We declare no conflicts of interest.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

The authors declare that they did not use Generative AI or AI-Assisted Technologies during the writing of this manuscript.

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