

RESEARCH ARTICLE

# Assessment of doctor-pharmacist collaboration in the treatment of diabetes mellitus patients at Airlangga University Hospital Surabaya from the pharmacist's perspective

Liza Pristianty<sup>1</sup> , Ibrahim Abdullah<sup>2</sup> , Pradana Z. Rhamadan<sup>3</sup>, Andi Hermansyah<sup>1</sup> 

<sup>1</sup> Department of Pharmacy Practice, Faculty of Pharmacy, Universitas Airlangga, Surabaya, Indonesia

<sup>2</sup> School of Pharmacy, Management Science University, Shah Alam, Malaysia

<sup>3</sup> Airlangga University Hospital, Surabaya, Indonesia

## Keywords

Diabetes Mellitus  
Doctor-pharmacist collaboration  
Pharmacist perspective  
Universitas Airlangga Hospital

## Correspondence

Liza Pristianty  
Department of Pharmacy Practice  
Faculty of Pharmacy  
Universitas Airlangga  
Surabaya  
Indonesia  
liza-p@ff.unair.ac.id

## Abstract

**Background:** Collaboration between doctors and pharmacists is needed in treating Diabetes Mellitus (DM) patients to optimise treatment regimens. Collaboration between healthcare professionals illustrates teamwork in solving the problem of DM patients.

**Methods:** This study is observational with a cross-sectional design. Respondents were all Internal Medicine doctors and pharmacists of the Universitas Airlangga Hospital. The observed variables were individual, context, and exchange characteristics that affect collaborative practice in dealing with DM patients from the pharmacist's perspective.

**Results:** The results showed that the communication pharmacists-doctors rarely occurred. The pharmacist-doctor collaborative practice was quite effective, according to the pharmacist's perspective. The multiple linear regression test of the exchange characteristics and practice collaboration showed that the trust domain was significant.

**Conclusion:** The communication between pharmacists and doctors is rare. The collaborative practice is in sufficient category. Trust significantly affects this practice.

## Introduction

Healthcare professional collaboration is the process of communicating and making joint decisions to achieve successful patient therapy (Zillich *et al.*, 2004). Interprofessional collaboration between pharmacists and doctors generally involves open communication, information sharing, and joint decision-making. The benefit of interprofessional collaboration is better therapeutic efficacy for patients. A better collaborative relationship between pharmacists and doctors also benefits the profession by facilitating the exchange of information about patients, solving drug therapy problems faster, and creating a more conducive work environment (Van *et al.*, 2012). One of the efforts to

improve drug therapy collaboration is communication and joint decision-making between doctors and pharmacists (Liu, Doucette & Farris, 2010). Two-way communication is required to be able to share patient information. The level of confidence in the competence of each profession supports collaborative drug therapy management. Collaboration can be started by exchanging information between the two professions.

The problem with collaboration between pharmacists and doctors in the room is that communication does not run optimally, and it takes a long time for doctors to trust and acknowledge the existence of pharmacists and their essential role in patient health care. The lack of self-confidence from pharmacists is one of the barriers to communicating and collaborating.

Pharmacists fear being wrong in giving recommendations; they feel they are juniors compared to doctors and believe they do not need each other, which is another obstacle to collaboration between pharmacists and doctors in hospitals (Liu & Doucette, 2011). Research on collaboration conducted at the Asmara hospital, Eritrea, showed that 88% of doctors accepted the professionalism of pharmacists; as many as 60% of doctors did not agree that pharmacists used their potential in patient care, but 96% of doctors strongly agreed that they should accept pharmacist recommendations for patient therapy (Awalom, Kidane & Abraha, 2013).

One of the collaborative relationship models is the Collaborative Working Relationship (CWR) model. It is a framework for analysing the factors influencing pharmacist and doctor collaboration (McDonough & Doucette, 2001). In the CWR model, the professional relationship between pharmacists and doctors is put forward through a collaborative development process. Three variables drive the development of CWR collaboration relationships, i.e., individual characteristics, context characteristics, and exchange characteristics. Each of these characteristics can play a role in the development of collaborative relationships (Zillich *et al.*, 2004).

Individual characteristics reflect personal variables, such as demographics (gender, age, education level, work experience, and working time). Context characteristics include the practice environment for patient therapy, such as work facilities and organisational structures. They describe the interactions that occur between two health professions in the same practice setting. Organisational structure, available facilities, and a good working environment can affect the growth and development of collaborative relationships (Sisson *et al.*, 2016). The exchange characteristics consist of the nature of the social exchange between the two parties, including communication, trust, power and justice, norm development, and role specification (Brock & Doucette, 2004). A study on CWR in Iraqi health services showed that the initiation relationship, trust and specific roles of pharmacists and doctors were dominant factors in giving effect or influencing collaboration (Al-Jumaili *et al.*, 2017). Collaboration can improve the accuracy of the patient's medical history, drug information services, prescribing error detection and drug safety through drug therapy monitoring (Sandeep & Jasdeep, 2008). One example of a chronic disease that requires continuous treatment is Diabetes Mellitus (DM).

DM is a chronic disease that requires continuous medical care. Prevention of acute complications and reducing the risk of long-term complications can be

done with education and support for patient self-management (Srivastava, 2015). Diabetes mellitus is classified into Type 1, Type 2, gestational diabetes, and other types due to other diseases. T1DM occurs when Langerhans beta cells are damaged such that insulin needs are not met. Type 2 diabetes occurs when there is a decrease in insulin secretion in the beta cells of Langerhans (American Diabetes Association, 2017).

Clinical symptoms of DM are polyuria (frequent urination), polydipsia (frequent thirst), and polyphagia (eating excessive amounts of food). Other common clinical symptoms include blurred vision, impaired coordination of body movements, tingling in the hands or feet, itching that is often very annoying (pruritus), and weight loss for no apparent reason. In 2014, 8.50% of DM patients worldwide had adult-onset diabetes (WHO, 2016). According to the World Health Organisation Diabetes Country Profiles data, the prevalence of DM in Indonesia in 2016 was 6.6% in males and 7.3% in females. Based on blood sugar examination, the prevalence of DM based on a doctor's diagnosis in the population aged 15 years from 2013 to 2018 increased from 6.9% to 10.9% (Ministry of Health of the Republic of Indonesia, 2018).

When managing patient health, especially DM, it is necessary to support interprofessional collaboration, as pharmacists play an essential role in optimising patient treatment regimens. Indeed, about 75% of problems in health services are drug-related, including unnecessary, ineffective, unsafe drug therapy, inappropriate indications, and inconsistent drug monitoring (Smith *et al.*, 2011). This collaboration process can occur in health facilities such as hospitals where the interaction between professions is quite intensive. Treatment of DM patients in hospitals allows for comprehensive treatment and collaboration between doctors and pharmacists to achieve optimal therapy.

This study aims to analyse the collaboration of pharmacists and doctors at Airlangga University Hospital Surabaya, dealing with DM patients from the pharmacist's perspective, including the factors that influence this collaboration, i.e., individual characteristics, context characteristics, and exchange characteristics, based on CWR theory.

## Methods

### Design

This observational cross-sectional study adopted total sampling (Sugiyono, 2007) and included all doctors and pharmacists who treated DM patients at Airlangga

University Hospital Surabaya and were willing to participate.

The independent variables in this study were individual characteristics that reflect personal variables such as demographics (gender, age, education level, work experience, and working time). The context characteristics were related to the practice environment in patient therapy, such as work facilities and organisational structures. The exchange characteristics included relationship initiation, trustworthiness, and role specification of the two professions. These were measured by the PPCI (Pharmacist-Physician Collaboration) graded scale. Collaborative practice between pharmacists and doctors in treating DM patients was measured using the CPS (Collaborative Practice Scale) questionnaire. The instrument used has been tested for validity and reliability (Siyoto & Sodik, 2015).

### Assessment

The data collected were analysed descriptively to provide an overview of individual characteristics, context characteristics, exchange characteristics, and pharmacist-doctor collaboration practices in treating DM patients. Furthermore, a correlation analysis was carried out between the exchange characteristics and the pharmacist-doctor collaboration from the pharmacist's perspective.

## Results

### Characteristics of individual, context, and exchange

This research was conducted at Unair Hospital Surabaya in July 2020 among 15 pharmacists. The results showed that most participants were female (67%), aged between 25-30 years (60%), with a pharmacist education level (73%), a work experience of 1-5 years (80%), and worked 8 hours per day.

The context characteristics showed that 93% of pharmacists who served DM patients communicated rarely with doctors, while 1% communicated intensely with doctors. Facilities for communication were available in the form of telephone or computer. Pharmacists who served DM patients were practising pharmacists at the Pharmacy Installation.

The exchange characteristics cover three domains, i.e., trust, initiation relationship, and role specification. In the trust domain, 46.7% of pharmacists highly trusted doctors, while 53.3% moderately trusted them. Regarding relationship initiation, 13.3% of pharmacists showed a strong relationship initiation with doctors, and 86.7% reported moderate relationship initiation. In the role specification domain, most pharmacists reported that the doctor had a medium specification role (73,3%), and 26,7% attributed a big specification role to doctors. Overall characteristics can be seen in Table I.

**Table I: Characteristics of individual, context, and exchange**

| Individual characteristics |   | Pharmacists                           |           |
|----------------------------|---|---------------------------------------|-----------|
| Gender                     | Man   | 5 (33%)                               |           |
|                            | Woman   | 10 (67%)                              |           |
| Age                        | 25 – 30 years   | 9 (60%)                               |           |
|                            | 31 – 35 years   | 6 (40%)                               |           |
|                            | 36-40 years   | -                                     |           |
|                            | > 40 years  | -                                     |           |
| Pharmacist education level | Profession pharmacist   | 11 (73%)                              |           |
|                            | Magister pharmacist   | 4 (27%)                               |           |
| Long work experience       | 1-5 years   | 12 (80%)                              |           |
|                            | 6-10 years  | 3(20%)                                |           |
|                            | > 10 years  | -                                     |           |
| Working duration per day   | 5 hours   | 1 (7%)                                |           |
|                            | 6 hours   |                                       |           |
|                            | 7 hours   |                                       |           |
|                            | 8 hours   | 14 (93%)                              |           |
| Context characteristics    |   |                                       |           |
| Variables                  | Statement   | Activity                              | n(%)      |
| Work environment           | In a day, how often do pharmacists discuss with doctors regarding treatment for Diabetes mellitus patients?   | Intense                               | 1 (7%)    |
|                            |   | Seldom                                | 14 (93%)  |
| Work facilities            | To be able to conduct discussions related to the treatment of Diabetes Mellitus patients, work facilities are available such as telephones or computers | Phone or computer and books available | 1 (7%)    |
|                            |   | Phone or computer available           | 14 (93%)  |
| Organizational structure   | Position in the work organization structure   | Practice Pharmacist                   | 15 (100%) |

| Exchange characteristics in the domain of pharmacist trust to doctors                           |             |           |            |
|---|-------------|-----------|------------|
| Category  | Range score | Frequency | Percentage |
| High Trust  | >19-24      | 7         | 46.7       |
| Medium Trust  | >12-19      | 8         | 53.3       |
| Low Trust   | 6-12        |           |            |
| Exchange characteristics in the domain of initiation relationships pharmacists – doctors        |             |           |            |
| Strong Initiation Relationship  | >9-12       | 2         | 13.3       |
| Medium Initiation Relationship  | >6-9        | 13        | 86.7       |
| Weak Initiation Relationship  | 4-6         |           |            |
| Exchange characteristics in the domains role specifications of doctors according to pharmacists |             |           |            |
| Big Specification Role  | >15-20      | 4         | 26.7       |
| Medium Specification Role   | >10-15      | 11        | 73.3       |
| Small Specification Role  | 5-10        | -         | -          |

**Pharmacists and doctors collaborative practice**

The results showed 13.3% of effective collaborative practice, 73.4% of quite effective collaborative practice, and 13.3% ineffective collaborative practice (Table II).

**Table II: Pharmacists-physician collaborative practice from the pharmacist’s perspective**

| Category                                    | Range score | Frequency | Percentage |
|---|-------------|-----------|------------|
| Effective collaborative practice            | >12-16      | 2         | 13.3       |
| Collaborative practices are quite effective | >8-12       | 11        | 73.4       |
| Ineffective collaborative practice          | 4-8         | 2         | 13.3       |

The characteristics of exchange in the trust domain, initiation relationship, and role specification were the highest in the moderate category, while most collaborative practice was in the quite effective category (Table III).

**Table III: Highest category of exchange characteristics and collaborative practices**

| Variables               | Percentage | Category                                    |
|-------------------------|------------|---|
| Trust                   | 53.3       | Medium Trust                                |
| Initiation Relationship | 86.7       | Medium Initiation Relationship              |
| Specification Role      | 73.3       | Medium Specification Role                   |
| Collaborative Practice  | 73.4       | Collaborative Practices Are Quite Effective |

**Multiple regression test**

The relationship between exchange characteristics (trust, initiation relationship, role specification) and pharmacist-physician collaboration practice used multiple linear regression test, the results can be seen in Table IV. It is known that the trust variable has a significance of 0.017 < 0.05 while the other two variables are > 0.05, meaning that only the trust variable has an effect on the practice of pharmacist-doctor collaboration. The magnitude of the effect of trust on the practice of collaboration is 0.453 or 45.3%. Meanwhile, in the multiple regression analysis, it is known that the significance value is 0.075 > 0.05, this indicates that the three variables of exchange characteristics together have no effect on the practice of pharmacist-physician collaboration according to the pharmacist's perspective.

**Table IV: Results of the multiple linear regression test characteristics of the exchange and practice of pharmacist-physician collaboration**

| Variables of exchange characteristics | t     | Sig   | F     | Sig   | R     | R <sup>2</sup> |
|---------------------------------------|-------|-------|-------|-------|-------|----------------|
| Trust                                 | 2.802 | 0.017 | 3.033 | 0.075 | 0.673 | 0.453          |
| Initiation relationship               | 0.125 | 0.903 |       |       |       |                |
| Role specification                    | 0.676 | 0.513 |       |       |       |                |

## Discussion

At the Internal Medicine Outpatient Clinic, Unair Hospital, 15 doctors treat DM patients and 15 pharmacists dispense medications in the pharmacy installation. Individual characteristics showed that most pharmacists were women, aged 25-30 years, with 3-5 years of work experience. Experience affects work productivity. Indeed, productivity increases with age and work experience.

Another factor that influences work productivity is the comfort of the work environment, which could create a passion for work so that productivity increases (Weber *et al.*, 2010). In this study, pharmacists and doctors rarely discussed DM patient therapy. The large number of patients who must be served immediately causes pharmacists and doctors to rarely discuss diabetes mellitus treatment therapy. Work facilities are a service to support performance and increase work productivity. Good work facilities could enable communication between pharmacists and doctors (Doucette, Nevins & McDonough, 2005)

Trust, relationship initiation, and role specification are three essential factors in the CWR theory. They can affect the collaborative relationship between health workers (Rathbone *et al.*, 2016). In CWR theory, trust and sharing perspectives are the basis for establishing a relationship. It is necessary to understand each other's roles to reach CWR. Collaboration is achieved when a relationship is built based on mutual trust and respect.

This study shows the results of each variable of exchange characteristics (trust, relationship initiation, and role specifications) on pharmacist-doctor collaborative practices. The influence of trust was 45.3%, while, exchange characteristics had no effect on the practice of pharmacist-doctor collaboration. Trust between pharmacists and doctors is a factor that influences their collaboration, and pharmacists find it essential in building collaboration between pharmacists and doctors, consistent with previous findings from Canadian hospitals (Makowsky *et al.*, 2013). A study at a Swedish hospital also showed that initiation and trust relationships influenced collaboration, followed by role specification (Håkansson Lindqvist, Gustafsson & Gallego, 2019).

The results of the exchange characteristics had no effect on the practice of pharmacist-doctor collaboration from the pharmacist's perspective, with a significant value of  $0.075 > 0.05$ . Research conducted in hospitals and health clinics in Iraq suggests that doctors are at the top of the hierarchy of healthcare providers and have higher authority than pharmacists to prescribe and change medication regimens. Thus, when doctors seek to build professional relationships with pharmacists, it is likely to

result in collaboration, given that the medical profession has a greater influence and power than the pharmacy profession. The results obtained show that it is necessary to build trust between the professions of doctors and pharmacists for interprofessional collaboration to work well.

## Conclusion

The context characteristics showed that the collaboration of doctors and pharmacists in treating patients with diabetes mellitus was not effective.

Regarding exchange characteristics, the most influential factor on the collaborative practice was trust, while the relationship between initiation and role specification had no effect on the pharmacist-physician collaboration from the pharmacist's perspective.

## Acknowledgement

Thanks are conveyed to the Chancellor of Airlangga University, who has provided the opportunity to conduct this research. Hopefully the results of this research will be beneficial to the Institution.

## Source of Funding

The authors would like to thank Airlangga University for funding this research through the Airlangga University-Management Science University collaborative research scheme.

## References

- Al-Jumaili, A. A., Al-Rekabi, M. D., Doucette, W., Hussein, A. H., Abbas, H. K., & Hussein, F. H. (2017). Factors influencing the degree of physician – pharmacist collaboration within Iraqi public healthcare settings. *International Journal of Pharmacy Practice*, *25*(6), 411-417. <https://doi.org/10.1111/ijpp.12339>
- American Diabetes Association (ADA) (2017) Standards of Medical Care In Diabetes — 2017 Standards of Medical Care In Diabetes D 2017 in The Journal Of Clinical And Applied Research And Education. <https://diabetes.org>
- Awalom, M. T., Kidane, M. E., & Abraha, B. W. (2013). Physicians' views on the professional roles of pharmacists in patient care in Eritrea. *International journal of clinical pharmacy*, *35*(5), 841–846. <https://doi.org/10.1007/s11096-013-9820-x>

- Brock, K. A., & Doucette, W. R. (2004). Collaborative working relationships between pharmacists and physicians: an exploratory study. *Journal of the American Pharmacists Association*, **44**(3), 358–365. <https://doi.org/10.1331/154434504323063995>
- Doucette, W. R., Nevins, J., & McDonough, R. P. (2005). Factors affecting collaborative care between pharmacists and physicians. *Research in Social and Administrative Pharmacy*, **1**(4), 565–578. <https://doi.org/10.1016/j.sapharm.2005.09.005>
- Håkansson Lindqvist, M., Gustafsson, M., & Gallego, G. (2019). Exploring physicians, nurses and ward-based pharmacists working relationships in a Swedish inpatient setting: a mixed methods study. *International journal of clinical pharmacy*, **41**(3), 728–733. <https://doi.org/10.1007/s11096-019-00812-8>
- Liu, Y., & Doucette, W. R. (2011). Exploring stages of pharmacist-physician collaboration using the model of collaborative working relationship. *Journal of the American Pharmacists Association*, **51**(3), 412–417, 418a–419a. <https://doi.org/10.1331/JAPhA.2011.10068>
- Liu, Y., Doucette, W. R., & Farris, K. B. (2010). Examining the development of pharmacist-physician collaboration over 3 months. *Research in social & administrative pharmacy*, **6**(4), 324–333. <https://doi.org/10.1016/j.sapharm.2009.11.002>
- Makowsky, M. J., Madill, H. M., Schindel, T. J., & Tsuyuki, R. T. (2013). Physician perspectives on collaborative working relationships with team-based hospital pharmacists in the inpatient medicine setting. *International Journal of Pharmacy Practice*, **21**(2), 123–127. <https://doi.org/10.1111/j.2042-7174.2012.00227.x>
- McDonough, R. P., & Doucette, W. R. (2001). Developing collaborative working relationships between pharmacists and physicians. *Journal of the American Pharmacists Association*, **41**(202), 682–692
- Ministry of Health of the Republic of Indonesia. (2018). 'Hasil Utama Riskesdas 2018 Provinsi Jawa Timur' [Main Results of Riskesdas 2018 East Java Province]
- Rathbone, A. P., Mansoor, S. M., Krass, I., Hamrosi, K., & Aslani, P. (2016). Qualitative study to conceptualise a model of interprofessional collaboration between pharmacists and general practitioners to support patients' adherence to medication. *BMJ open*, **6**(3), e010488. <https://doi.org/10.1136/bmjopen-2015-010488>
- Sandeep, N., & Jasdeep, G. S. N. (2008). Effective collaboration between doctors and pharmacists. *Hospital Pharmacist*, **15**, 179–181
- Sisson, E. M., Dixon, D. L., Kildow, D. C., et al. (2016). Effectiveness of a pharmacist-physician team-based collaboration to improve longterm blood pressure control at an inner-city safety-net clinic. *Pharmacotherapy*, **36**(3), 342–347. <https://doi.org/10.1002/phar.1710>
- Smith, V., Devane, D., Begley, C. M., & Clarke, M. (2011). Methodology in conducting a systematic review of systematic reviews of healthcare interventions. *BMC medical research methodology*, **11**(1), 15. <https://doi.org/10.1186/1471-2288-11-15>
- Srivastava, S. (2015). Diabetes mellitus: diagnosis and management guidelines. *JIMSA*, **28**(1), 47–50
- Sugiyono. (2007) *Business Research Methods (Quantitative, Qualitative, and R&D Approaches)*. Bandung: Alfabeta
- Siyoto, S., & Sodik, M. A. (2015). 'Dasar Metodologi Penelitian' [Basic Methodology in Research], 1st ed. Yogyakarta: Media Publishing Literacy
- Van, C., Costa, D., Mitchell, B., Abbott, P., & Krass, I. (2012). Development and validation of the GP frequency of interprofessional collaboration instrument (FICI-GP) in primary care. *Journal of Interprofessional Care*, **6**, pp. 297–304. <https://doi.org/10.3109/13561820.2012.685994>
- Weber, C. A., Ernst, M. E., Sezate, G. S., Zheng, S., & Carter, B. L. (2010). Pharmacist-physician comanagement of hypertension and reduction in 24-hour ambulatory blood pressures. *Archives of internal medicine*, **170**(18), 1634–1639. <https://doi.org/10.1001/archinternmed.2010.349>
- World Health Organization. (2016). Global report on diabetes. World Health Organization. <https://apps.who.int/iris/handle/10665/204871>
- Zillich, A. J., McDonough, R. P., Carter, B. L., & Doucette, W. R. (2004). Influential characteristics of physician/pharmacist collaborative relationships. *Annals of Pharmacotherapy*, **38**(5), 764–770. <https://doi.org/10.1345/aph.1D419>