ORIGINAL ARTICLE

Health and Social Care in the community    WILEY

# Pharmacists' preferences for the provision of services to improve medication adherence among patients with diabetes in Indonesia: Results of a discrete choice experiment

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## Abstract

Little is known about pharmacists' preferences for services to improve medication adherence in patients with diabetes in Indonesia. Identification of such preferences can provide valuable insights on suitable services from a pharmacist's perspective. This study elicits pharmacists' preferences for services to improve medication adherence among their patients. A discrete choice experiment (DCE) method was used to survey pharmacists in all community health centres and three hospitals in Surabaya, Indonesia. Four attributes of consultation, namely duration of consultation, place of consultation, access to a pharmacist and patient copayment, and two attributes on additional services (educational and behavioural-based services) were included. The 16 profiles generated for DCE were partially balanced and partially without overlap. A random-effect logistic regression was used in the analysis. In total, 99 pharmacists completed the questionnaire, but only 80 were included in the study based on a consistency check. All attributes were found to determine preferences for a pharmacist service package. Pharmacists preferred a consultation with a shorter duration accompanied by flexible access to the pharmacist as well as a private consultation room and a lower patient copayment. Providing the patient with a brochure/leaflet was the most preferred additional service to help improve medication adherence. Patient group discussion and medication review were also preferred in combination with a consultation. Pharmacists' socio-demographic background characteristics influence preferences. These findings can be considered in evaluating current practice and designing pharmacist services to help improve medication adherence among patients with diabetes.

**KEYWORDS**

adherence, diabetes, discrete choice experiment, pharmacist, preference, services

## 1 | INTRODUCTION

In recent years, the pharmacist's role has changed into a patient-oriented care provider focused on the appropriate, effective, and safe use of medication (Dalton & Byrne, 2017; Toklu & Hussain, 2013). Pharmacists are expected to contribute to better access to medical information, as well as patient outcomes and quality of life. The shifting pharmacist's role in patient

care influences the development of pharmaceutical care (Alhabib et al., 2016).

In particular, in diabetes care, the pharmacist's role could include medication review, monitoring medication use, educating patients about their medication, and treatment goals (Hughes et al., 2017). These can improve medication adherence among patients with diabetes, as was found in a systematic literature review (Presley et al., 2019). Medication adherence in diabetes is essential to increase the effectiveness of treatment, which means maintaining blood glucose control and minimising diabetes complications (American Diabetes Association, 2019). The prevalence of medication non-adherence among diabetes patients worldwide is still high, ranging between 36%–93% (evidence based on two systematic reviews) (Cramer, 2004; Krass et al., 2015). Pharmacists can have a role in the diabetes care team to help reduce this problem.

Several pharmacist services to improve medication adherence among patients with diabetes have been developed. Various types of educational, behavioural and combination-based services have been identified (Presley et al., 2019). These include consultation, digital/non-digital education material, medication review, telephone call and training group discussion (Presley et al., 2019). These services have been developed by pharmacists to assist patients with diabetes from different socio-demographic and cultural backgrounds. Due to the diversity in patient population, effective pharmacist services cannot always be translated into other contexts. Thus, careful consideration is necessary before implementing these services.

Indonesia has the sixth-highest number of patients with diabetes in the world based on information from the International Diabetes Federation (International Diabetes Federation, 2017). It also has a problem with a high prevalence of medication non-adherence among patients with diabetes (Alfian et al., 2016; Cahyadi, 2015). The pharmacist's role in Indonesia is in transition and becoming more focused on patient-oriented services, even though many pharmacists are still product-oriented. According to the Indonesia Ministry of Health, in 26% of the community health centres (facilities that provide public health services including services of a general practitioner, dentist and pharmacist), the number of physicians is still insufficient (Indonesia Ministry of Health, 2019). This report encourages pharmacists to contribute to the delivery of patient care within their role and authority, but without any intention to replace physicians.

It should be recognised, however, that pharmacists in Indonesia are rather overloaded with administrative tasks, which they routinely perform alongside the pharmacy care provision (Supardi, Susyanti, et al., 2012). Adding extra tasks to their existing duties creates an additional burden for them. In Indonesia, the targeted standard ratio of pharmacists is one pharmacist for 50 patients per day in a community health center and 30 patients in a hospital (Indonesia Ministry of Health, 2016a, 2016b). In reality, one pharmacist usually needs to serve more than 100 patients per day because of the shortage of pharmacists, especially in primary care (Supardi, Susyanti, et al., 2012). There are several reasons for this problem. In the era of universal health coverage in Indonesia, community health centres have become the gatekeeper for patients with government health insurance to get

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**What is known about this topic?**

- Pharmacists have a role in the improvement of medication adherence among patients with diabetes.
- Various pharmacist services have been shown to improve medication adherence in diabetes patients.
- There are few studies that have looked at preferences of pharmacists for interventions to improve medication adherence among diabetes patients.

**What this paper adds?**

- Insight into pharmacist services in medical facilities in Indonesia that can help to improve medication adherence.
- Pharmacists prefer a brochure and patient group discussion in combination with consultation to improve medication adherence.
- Pharmacists prefer flexible access to a consultation with a shorter duration in a private consultation room with a low co-payment by patients.

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healthcare. This has increased the number of patients in community health centres. The lack of adjustment in the number of healthcare professionals, including pharmacists, to balance the ratio between pharmacists and patients, results in a work overload for pharmacists. In many cases, there is only one pharmacist available in a community health centre to take care of medication management, administrative functions and pharmaceutical care (Supardi, Susyanti, et al., 2012). This study is focusing on community health centres that have pharmacists. Thus, prioritising the type of tasks or services has become essential for pharmacists to be able to provide the best possible services to patients (Grindrod et al., 2010; Scott et al., 2007). It is, therefore, important to explore pharmacists' preferences for service delivery before assigning new tasks, e.g., services for improving medication adherence for patients with diabetes.

Many studies have reported on the importance of patients' preferences (Feehan et al., 2017; Hertroijs et al., 2019; Patterson et al., 2019). However, studies related to healthcare professional preferences are limited, especially those focusing on pharmacist services (Grindrod et al., 2010; Munger et al., 2017; Scott et al., 2007). Both patients' and pharmacists' preferences are important to identify the most suitable interventions to implement in practice (Grindrod et al., 2010; Scott et al., 2007). Evidence on pharmacists' preferences might provide valuable information on the way they recommend services to patients. It is, therefore, relevant to investigate their preferences for different services based on their experience and workload. Implementing pharmacist services without taking into account pharmacists' preferences can hinder their implementation (Grindrod et al., 2010). No studies on pharmacists' preferences for services to improve medication adherence among patients with diabetes are currently available in Indonesia.

Therefore, this study aims to elicit pharmacists' preferences for services to improve medication adherence among patients with diabetes. The results of this study give insight into the design of pharmacist services from a pharmacist perspective and how to promote the role of pharmacists in practice.

## 2 | METHODS

This study analyses data collected in an interview-based survey among pharmacists in community health centres and hospitals in Surabaya. In particular, the study used a discrete choice experiment (DCE) method to elicit pharmacists' preferences on the provision of pharmacist services for improving medication adherence among diabetes patients. The method requires the development of choice tasks (DCE questions), which are used in a survey to elicit preferences (Johnson et al., 2013). In this study, each DCE question consisted of two profiles, and the respondent was asked to choose one profile based on his/her preferences. The profiles consisted of specific combinations of attributes and attribute levels of the service being studied (Johnson et al., 2013). All attributes and attribute levels were identified based on the literature (Feehan et al., 2017; Naik-Panvelkar et al., 2012), and discussions with pharmacists who had experience on the topic (Bridges et al., 2011). It was assured that the attributes and attribute levels included in this study are appropriate and relevant to the Indonesian context.

In this study, consultation (patient and pharmacist interaction regarding medication use) was used as the baseline pharmacist service because it is the most common type of service to improve medication adherence (Presley et al., 2019). We distinguished four generic attributes of consultation, namely duration of the consultation, place for consultation, access to pharmacists and the patient copayment (flat-rate fee) for the consultation. Two levels represented each of these attributes (see Table 1). These attributes were included to capture possible variations in service characteristics not directly related to the service content. These attributes were modified based on the conditions in Indonesia, i.e., access to pharmacists was included because pharmacists do not always have enough time to provide consultation immediately when requested by the patient. The attribute 'patient copayment' was included to analyse pharmacists' preferences for patient fees. In Indonesia, the patient fee for pharmacist services is not always included in the health insurance contract. In some settings, the local government/district government regulates the reimbursement of pharmacist services. However, in most cases, reimbursement is limited to medication preparation only. For a consultation, the Indonesia Pharmacist Association endorses a patient fee. In this context, patient copayment here is an additional fee that patients have to pay out of pocket to receive additional services. We also added two attributes with three levels to describe additional services provided next to the consultation to improve medication adherence. These attributes were: educational-based services (attribute levels: brochure/leaflet, patient group discussion, and none) and behaviour-based services (attribute levels: medication review, phone call refill reminder, and none). Both attributes were presented to the respondents as additional services (without specifying the type of additional service) to make it simpler for the respondents to answer. The duration, place, access and copayment for these additional services were not indicated.

The combination of attributes and attribute levels resulted in 64 possible profiles of pharmacist services (full factorial design). Orthogonal main effect fractional factorial design was generated (SPSS) to obtain a subset of 16 profiles in the DCE. This method of reducing the number of profiles provided a minimum subset compared to other methods, and it ensures relative efficiency (Voelkel, 2005). It was, therefore, suitable for our study given the relatively small population size, i.e., total number of pharmacists in community health centres and hospitals in Surabaya. This method is, however, only applicable when the selected attributes may vary independently of each other (no attribute dependency) like in this DCE (see Table 1). The subset of profiles generated was partly balanced and partly without overlaps (Mangham et al., 2009). From the 16 profiles, one profile that represents an average pharmacist consultation in Indonesia was chosen as a baseline profile, while the other profiles were used as alternatives. The baseline profile was neither the best nor the worst. The ideal profile was not used as the baseline profile to avoid bias to the respondents' choices. There were 15 DCE questions and consistency was tested by repeating the first DCE question after the 15 DCE questions were asked. Thus, in total, 16 DCE questions were included in the data collection. The overall explanation of the theoretical background model of the DCE methods used in the study can be found in Supporting Information 1. Overall, this minimal study design was chosen to reduce the risk of fatigue that might occur when a lot of choice sets are included. The position of the baseline profile varied across the DCE questions to minimise potential response bias. In this study, respondents were asked to choose between the baseline and alternative profiles. No opt-out option was given to respondents, assuming that, in general, a pharmacist would always offer some kind of service to patients. We did not test the effect of other baseline profiles by, for example, using a block design, because this was the first study of this kind in Indonesia and considering the work overload of pharmacists, we were not sure if we would have a sufficient number of respondents to study the variation in the baseline profile.

The research instrument had the form of a questionnaire. The questionnaire included several questions on respondents' sociodemographic characteristics and preferences towards pharmacist services before getting into the DCE questions. At the beginning of the DCE part, a scenario was included as an introductory to help respondents understand the context of the DCE questions. The English wording of the questions is presented in Supporting Information 2.

Face validity was tested among nine potential respondents (pharmacists) to check their understanding of the concepts used in the questionnaire, including their understanding of the attributes and their levels. In this way, potential respondents provided input to the questionnaire design before the data collection began and helped to assure that the attributes and their levels are realistic and meaningful.

**TABLE 1** Attributes and level coding

| Attributes | Baseline profile | Alternative profiles | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| Duration of services (20 min = 20; 40 min = 40) | 40 | 20 | 40 | 40 | 40 | 20 | 20 | 40 | 40 | 20 | 20 | 20 | 20 | 40 | 20 | 40 | 20 |
| Place for consultation (private room = 1; common area = 0) | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Access to pharmacist (walk-in any day = 1; appointment = 0) | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| Patient copayment (no additional copayment = 0; 10.000 IDR = 10.000) | 10,000 | 0 | 0 | 0 | 10,000 | 10,000 | 0 | 0 | 10,000 | 10,000 | 10,000 | 10,000 | 0 | 10,000 | 0 | 0 | 0 |
| Educational-based services | | | | | | | | | | | | | | | | | |
| Additional services (brochure/leaflet) | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Additional services (patient group discussion) | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 |
| Behaviour-based services | | | | | | | | | | | | | | | | | |
| Additional services (medication review) | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Additional services (phone call refill reminder) | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

*Note*: 10.000 Indonesian Rupiah (IDR) ≈ 0.74 USD.

The data were collected in Surabaya, Indonesia, in February–July 2019 by the main researcher. One research assistant helped to interview four respondents due to the temporary unavailability of the main researcher. The main researcher gave the necessary training to the research assistant.

Data collection was conducted in 63 community health centres and three hospitals (one public hospital and two private hospitals) in Surabaya. All community health centres in Surabaya were included in the study, while only three hospitals were involved due to difficulties in obtaining approval from other hospitals in Surabaya.

All pharmacists at the community health centres and hospitals, who had experience providing services to outpatients with diabetes, were invited to participate. Thus, we approached the entire population and no sampling was needed. Respondents who agreed to participate in the study were asked to sign a letter of informed consent. Keycards were used to help respondents visualise and answer DCE questions.

Descriptive analysis was performed on the socio-demographic characteristics and preferences for attribute levels. The analysis of DCE data is based on random utility theory (Hauber et al., 2016; Mangham et al., 2009). The responses to the DCE questions formed the dependent variable coded as 0 when the baseline profile was chosen and coded as 1 when the alternative profile was chosen. Independent variables were the differences in the attribute levels in each DCE question and interactions between these differences and socio-demographic characteristics. The response to the additional 16th DCE question was only used to check consistency, but it was not included in the DCE analysis. Specification of the DCE model estimated in the study can be found in Supporting Information 1. The data were analysed using random-effect logistic regression (STATA 15th version SE software).

Data analysis began with the analysis of the main effect model only using the attribute-level differences as independent variables. Then, the full model was estimated using the attribute-level differences and their interactions with socio-demographic characteristics. Marginal rates of substitution (MRS) and odds ratios were also calculated. MRS was calculated using the ratio between a given non-price attribute and the price attribute coefficients. The price attribute refers to the copayment attribute. The result of MRS can be interpreted as the willingness to substitute a change in a given non-price attribute for a change in the price-attribute when all other factors remain the same:

$$MRS = -\frac{\alpha_n}{\alpha_{price}},$$

where $\alpha_n$ is the coefficient related to the difference in a given no-price attribute, and $\alpha_{price}$ is the coefficient related to the difference in the price attribute.

## 3 | RESULTS

All 99 respondents approached participated in the study, which means a participation rate of 100%. The consistency of answers was checked by repeating the first DCE question, as mentioned in the methods section. Thus, an inconsistency indicator was created based on a cross-check of the answer of a given respondent on the first and last DCE questions. A total of 19 respondents were identified as having given inconsistent answers and were excluded from the analysis. Binary logistic regression analysis showed that there is no association between the socio-demographic characteristics of the respondents and the consistency of their responses to DCE questions (see Supporting Information 3). The results presented in this section only include respondents with consistent answers. The results for the entire sample are presented in Supporting Information 4–7.

Details on the socio-demographic characteristics of the respondents included in the analysis can be found in Table 2. Respondents in both hospitals and community health centres were, on average, 31.61 years old, female (90%), and had a non-master degree (93.8%). Medication administration and adverse drug reactions were the main focus of information to patients with diabetes in both hospitals and community health centres. Consultation was the most common service used to reduce non-adherence (42.5%). Socio-demographic characteristics of the total sample, including respondents with inconsistent DCE answers, can be found in Supporting Information 4.

Before the DCE questions, respondents were asked to state their preferences for the attribute levels for all attributes involved in the DCE questions. Details on the preferences for the attribute levels can be found in Table 3. Overall, the results show that most respondents preferred a shorter duration of consultation (87.5%) with flexible access to the pharmacist (78.8%). A private consultation room was perceived as essential and preferred by most respondents over a common area (97.5%). Medication review was the most preferred additional service by respondents, followed by phone call refill reminder, patient group discussion, and a brochure. Respondents who worked in hospitals frequently preferred to have patients to co-pay for the services provided and preferred phone call refill reminders as additional services compared to the respondents who worked in community health centres. Preference estimates on the total sample, including respondents with inconsistent DCE answers, showed similar results and can be found in Supporting Information 5.

The results of the main effect analysis, which only includes the attribute differences as independent variables, can be found in Table 4. Overall, the analysis showed that all attributes influence pharmacists' preferences for services provision, except for a phone call refill reminder as an additional service. Most respondents preferred a service package that offers a brochure as an additional service. The estimated MRS implies that respondents were willing to trade the inclusion of a brochure as an additional service in the package for a copayment increase of 11.226 Indonesian Rupiah (IDR) (±0.74 USD). A private consultation room was the second most influencing attribute, and respondents are willing to offer services in a private room for an extra copayment of 10.955 IDR (±0.68 USD). Flexible access to pharmacists and a shorter duration of the consultation were the attributes with the next highest impact on the choice of profile for the pharmacists. Also, the availability of medication

**TABLE 2** Socio-demographics and characteristics of the respondents

| Characteristics variables | Value range | Community health centre Freq | Community health centre Median M ± SD | Hospital Freq | Hospital Median M ± SD | Total Freq | Total Median M ± SD |
|---|---|---|---|---|---|---|---|
| Age | 23–44 years | – | 34.00 33.14 ± 5.099 | – | 27.00 29.07 ± 6.113 | – | 32.00 31.61 ± 5.812 |
| Duration of work as pharmacist | 1–228 months | – | 120.00 101.50 ± 50.131 | – | 36.00 66.57 ± 66.783 | – | 96.00 88.40 ± 59.039 |
| Gender | Male = 0 | 6 (12.0%) | 1.00 0.88 ± 0.328 | 2 (6.7%) | 1.00 0.93 ± 0.254 | 8 (10.0%) | 1 0.90 ± 0.302 |
| | Female = 1 | 44 (88.0%) | | 28 (93.3%) | | 72 (90.0%) | |
| Educational background | Non-master's degree = 1 | 50 (100%) | 1.00 1.00 ± 0.000 | 25 (83.3%) | 0.00 0.17 ± 0.379 | 75 (93.8%) | 1 1.06 ± 0.244 |
| | Master's degree = 2 | – | | 5 (16.7%) | | 5 (6.3%) | |
| Medical institution | Hospital = 1 | – | 2.00 1.00 ± 0.000 | 30 (100%) | 1.00 1.00 ± 0.000 | 30 (37.5%) | 2 1.63 ± 0.487 |
| | Community health centre = 2 | 50 (100%) | | – | | 50 (62.5%) | |
| Instruction/ information regarding medication taking for regular diabetes patient being given by the pharmacist | Medication administration | 46 (92.0%) | | 28 (93.3%) | | 74 (92.5%) | |
| | Indication | 2 (4.0%) | | 2 (6.7%) | | 4 (5.0%) | |
| | Dosage | 6 (12.0%) | | 2 (6.7%) | | 8 (10.0%) | |
| | Treatment goal | 1 (2.0%) | | – | | 1 (1.3%) | |
| | Adverse drug reaction and management | 17 (34.0%) | | 7 (23.3%) | | 24 (30.0%) | |
| | Non-pharmacology therapy | 7 (14.0%) | | 5 (16.7%) | | 12 (15.0%) | |
| | Importance of medication adherence | 10 (20.0%) | | 4 (13.3%) | | 14 (17.5%) | |
| | Others | 29 (58.0%) | | 19 (63.3%) | | 48 (60.0%) | |
| Experience to help non-adherence patient with diabetes | No =0 | 25 (50.0%) | 0.50 0.50 ± 0.505 | 17 (56.7%) | 0 0.43 ± 0.504 | 42 (52.5%) | 0 0.48 ± 0.503 |
| | Yes = 1 | 25 (50.0%) | | 13 (43.3%) | | 38 (47.5%) | |
| Help/services provided by the pharmacist to help non-adherence patient with diabetes based on experience | Brochure/leaflet | – | | 1 (3.3%) | | 1 (1.3%) | |
| | Consultation | 22 (44.0%) | | 12 (40.0%) | | 34 (42.5%) | |
| | Medication review | – | | 1 (3.3%) | | 1 (1.3%) | |
| | Others | 7 (14.0%) | | 5 (16.7%) | | 12 (15.0%) | |

review or patient group discussion as additional services were preferred by the respondents but to a lesser extent compared to offering a brochure.

Results in Table 4 refer to respondents who gave consistent answers, while the results for all respondents, including data of respondents with the inconsistent answer, can be found in Supporting Information 6. The results in Supporting Information 6 slightly differ from the results in Table 4. In particular, all attributes were found to influence pharmacist's preferences, including a phone call refill reminder as an additional service. There were also differences in the

order of attributes that influence preferences based on the value of the MRS. A private consultation room was the attribute with the relative highest impact on the choice of profile, followed by a brochure as an additional service and a shorter duration of the consultation.

Table 5 presents the full model, which includes attribute differences and their interaction with socio-demographic characteristics as independent variables. Place of consultation and access to pharmacists are the two attributes that considerably influence the respondent's preferences. Respondents who worked in community health centres found it relatively less important to have a shorter

**TABLE 3** Preferences for attribute levels of pharmacist services

| Attributes | Level | Community health centre | | | Hospital | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Frequency | Median | M ± SD | Frequency | Median | M ± SD | Frequency | Median | M ± SD |
| Duration of the service | 20 min = 0 | 43 (86.0%) | 0 | $0.14 \pm 0.351$ | 27 (90.0%) | 0 | $0.10 \pm 0.305$ | 70 (87.5%) | 0 | $0.13 \pm 0.333$ |
| | 40 min = 1 | 7 (14.0%) | | | 3 (10.0%) | | | 10 (12.5%) | | |
| Place for consultation | Private room = 0 | 49 (98.0%) | 0 | $0.02 \pm 0.141$ | 29 (96.7%) | 0 | $0.03 \pm 0.183$ | 78 (97.5%) | 0 | $0.03 \pm 0.157$ |
| | Common area = 1 | 1 (2.0%) | | | 1 (3.3%) | | | 2 (2.5%) | | |
| Access to pharmacist | Walk at any day = 0 | 39 (78.0%) | 0 | $0.22 \pm 0.418$ | 24 (80.0%) | 0 | $0.20 \pm 0.407$ | 63 (78.8%) | 0 | $0.21 \pm 0.412$ |
| | Appointment = 1 | 11 (22.0%) | | | 6 (20.0%) | | | 17 (21.3%) | | |
| Patient copayment | Free of charge = 0 | 32 (64.0%) | 0 | $0.36 \pm 0.485$ | 11 (36.7%) | 1 | $0.63 \pm 0.490$ | 43 (53.8%) | 0 | $0.46 \pm 0.502$ |
| | 10.000 IDR = 1 | 18 (36.0%) | | | 19 (63.3%) | | | 37 (46.3%) | | |
| Brochure/leaflet | No = 0 | 26 (52.0%) | 0 | $0.48 \pm 0.505$ | 18 (60.0%) | 0 | $0.40 \pm 0.498$ | 44 (55.0%) | 0 | $0.45 \pm 0.501$ |
| | Yes = 1 | 24 (48.0%) | | | 12 (40.0%) | | | 36 (45.0%) | | |
| Patient group discussion | No = 0 | 26 (52.0%) | 0 | $0.48 \pm 0.505$ | 14 (46.7%) | 1 | $0.53 \pm 0.507$ | 40 (50.0%) | 0.5 | $0.50 \pm 0.503$ |
| | Yes = 1 | 24 (48.0%) | | | 16 (53.3%) | | | 40 (50.0%) | | |
| Medication review | No = 0 | 35 (70.0%) | 0 | $0.30 \pm 0.463$ | 18 (60.0%) | 0 | $0.40 \pm 0.498$ | 53 (66.3%) | 0 | $0.34 \pm 0.476$ |
| | Yes = 1 | 15 (30.0%) | | | 12 (40.0%) | | | 27 (33.8%) | | |
| Phone call refill reminder | No = 0 | 29 (58.0%) | 0 | $0.42 \pm 0.499$ | 22 (73.3%) | 0 | $0.27 \pm 0.450$ | 51 (63.7%) | 0 | $0.37 \pm 0.484$ |
| | Yes = 1 | 21 (42.0%) | | | 8 (26.7%) | | | 29 (36.3%) | | |

*Note:* 10.000 Indonesian Rupiah (IDR) ≈ 0.74 USD.

**TABLE 4** Result of the discrete choice experiment regarding among pharmacist, main effect model (with the exclusion of respondents with inconsistent answers)

| | Choice of profile | | | | |
|---|---|---|---|---|---|
| | Dependent variable (0 = if respondent choose the baseline profile; 1 = if respondent choose the alternative profile) | | | | |
| | | | 95% CI | | |
| | Regression coefficient | Standard error | Lower | Upper | MRS (IDR) |
| Independent variables | | | | | |
| Δ Duration of services[a] 1-min extra | −0.03590* | 0.00774 | −0.05106 | −0.02073 | 7,977.78 (willing to substitute for 20 min less service duration) |
| Δ Place for consultation[a] Private room instead of common area | 0.98958* | 0.15260 | 0.69048 | 1.28867 | 10,995.33 (willing to substitute for private room) |
| Δ Access to the pharmacist[a] Walk on any day instead of appointment | 0.76039* | 0.15117 | 0.46411 | 1.05667 | 8,448.78 (willing to substitute for walk-in any day) |
| Δ Brochure/leaflet[a] Brochure/leaflet added | 1.01035* | 0.16801 | 0.68106 | 1.33964 | 11,226.11 (willing to substitute if brochure added) |
| Δ Medication review[a] Medication review added | 0.42781* | 0.18545 | 0.06433 | 0.79129 | 4,753.44 (willing to substitute if medication review added) |
| Δ Phone call refill reminder[a] Phone call refill reminder added | 0.27955 | 0.17972 | −0.07269 | 0.63179 | 3,106.11 (willing to substitute if phone call refill reminder added) |
| Δ Patient group discussion[a] Patient group discussion added | 0.51353* | 0.22271 | 0.07702 | 0.95004 | 5,705.89 (willing to substitute if patient group discussion added) |
| Δ Patient copayment[a] 1 IDR extra | −0.00009* | 0.00002 | −0.00013 | −0.00006 | |
| Constant | −1.07041* | 0.28138 | −1.62190 | −0.51891 | |
| ρ (correlation between the observations of respondent) | 0.37754 | | | | |
| Observations (respondents) | 80 | | | | |
| Log-likelihood function | −651.3314 | | | | |
| Wald $\chi^2$ | 137.13* | | | | |

*Note:* 1 Indonesian Rupiah (IDR) = 0.000074 USD. Δ = difference.

Abbreviation: MRS, marginal rate of substitution.

[a]Δ Duration of service (no changes = 0; 20 min less waiting), Δ Place for consultation (no changes = 0; changes from private to common area = −1), Δ Access to pharmacist (no changes = 0; changes from walk in any day to appointment = −1), Δ Patient copayment (no changes = 0; <10.000 IDR = −10.000), Δ Brochure/leaflet (not added = 0; added = 1), Δ Patient group discussion (not added = 0; added = 1), Δ Phone call refill reminder (not added = 0; added = 1), Δ Medication review (not added = 0; added = 1).

*$p < 0.05$.

consultation duration. Still, they found it relatively more important to provide services with a lower patient copayment compared with respondents who worked in a hospital. Respondents with a master's degree preferred making appointments instead of flexible access to pharmacists and appreciated services with a higher patient copayment than respondents with a non-master degree. Medication review as an additional service also had a significant impact on those

who worked in community health centres, while older respondents tended not to prefer medication review services. Also, a phone call refill reminder was preferable to respondents who had experience helping non-adherence patients.

The full model that included all respondents, also those with inconsistent DCE answers, can be found in Supporting Information 7. Results slightly differ from those in Table 5, as the place for

**TABLE 5** Result of discrete choice experiment among pharmacists, full model (with the exclusion of respondents with inconsistent answers)

| | Choice of profile | | | |
|---|---|---|---|---|
| | Dependent variable (0 = if respondent choose the baseline profile; 1 = if respondent choose the alternative profile) | | 95% CI | |
| Independent variables | Regression coefficient | Standard error | Lower | Upper |
| Δ Duration of services[a]<br>1-min extra | -0.04382 | 0.02729 | -0.09731 | 0.00967 |
| Δ Place for consultation[a]<br>Private room instead of common area | 1.33164* | 0.54958 | 0.25448 | 2.40880 |
| Δ Access to the pharmacist[a]<br>Walk on any day instead of appointment | 1.28015* | 0.55910 | 0.18433 | 2.37596 |
| Δ Patient copayment[a]<br>1 IDR extra | -1.54e-06 | 0.00006 | -0.00011 | 0.00011 |
| Additional services | | | | |
| Δ Brochure/leaflet[a]<br>Brochure/leaflet added | 0.59610 | 0.62492 | -0.62872 | 1.82091 |
| Δ Medication review[a]<br>Medication review added | -0.22756 | 0.69879 | -1.59715 | 1.14204 |
| Δ Phone call refill reminder[a]<br>Phone call refill reminder added | -0.44287 | 0.66135 | -1.73910 | 0.85336 |
| Δ Patient group discussion[a]<br>Patient group discussion added | -0.66322 | 0.93784 | -2.50136 | 1.17492 |
| Δ Duration of services × age[b] | -0.00536 | 0.01529 | -0.03532 | 0.02460 |
| Δ Duration of services × female[b] | -0.01676 | 0.02505 | -0.06587 | 0.03234 |
| Δ Duration of services × master degree[b] | 0.01440 | 0.03631 | -0.05676 | 0.08556 |
| Δ Duration of services × experience help non-adherence patient[b] | -0.00415 | 0.01458 | -0.03274 | 0.02443 |
| Δ Duration of services × community health center[b] | 0.03442* | 0.01702 | 0.00106 | 0.06778 |
| Δ Place for consultation × age[b] | -0.24975 | 0.31825 | -0.87351 | 0.37401 |
| Δ Place for consultation × female[b] | 0.17066 | 0.50597 | -0.82102 | 1.16233 |
| Δ Place for consultation × master degree[b] | 1.68324 | 0.98358 | -0.24453 | 3.61101 |
| Δ Place for consultation × experience help non-adherence patient[b] | -0.02132 | 0.30463 | -0.61838 | 0.57574 |
| Δ Place for consultation × community health centre[b] | -0.50640 | 0.35446 | -1.20113 | 0.18832 |
| Δ Access to pharmacist × age[b] | 0.33346 | 0.31795 | -0.28970 | 0.95663 |
| Δ Access to pharmacist × female[b] | -0.48687 | 0.52124 | -1.50849 | 0.53474 |

**TABLE 5** (Continued)

| Choice of profile | | | |
|---|---|---|---|
| Dependent variable (0 = if respondent choose the baseline profile; 1 = if respondent choose the alternative profile) | | | |
| | | | 95% CI |
| | Regression coefficient | Standard error | Lower | Upper |
|---|---|---|---|---|
| Δ Access to pharmacist × master degree[b] | −2.04227[*] | 0.71367 | −3.44104 | −0.64350 |
| Δ Access to pharmacist × experience help non-adherence patient[b] | 0.71091[*] | 0.30298 | 0.11708 | 1.30474 |
| Δ Access to pharmacist × community health centre[b] | −0.53975 | 0.35641 | −1.23830 | 0.15879 |
| Δ Patient copayment × age[b] | 0.00001 | 0.00003 | −0.00005 | 0.00008 |
| Δ Patient copayment × female[b] | −0.00006 | 0.00005 | −0.00016 | 0.00004 |
| Δ Patient copayment × master degree[b] | 0.00027[*] | 0.00009 | 0.00009 | 0.00045 |
| Δ Patient copayment × experience help non-adherence patient[b] | −0.00001 | 0.00003 | −0.00007 | 0.00005 |
| Δ Patient copayment × community health centre[b] | −0.00009[*] | 0.00003 | −0.00016 | −0.00002 |
| Δ Brochure × age[b] | 0.32152 | 0.36560 | −0.39503 | 1.03808 |
| Δ Brochure × female[b] | 0.71152 | 0.58326 | −0.43165 | 1.85469 |
| Δ Brochure × master degree[b] | 1.09237 | 1.02462 | −0.91585 | 3.10060 |
| Δ Brochure × experience help non-adherence patient[b] | −0.41504 | 0.34818 | −1.09746 | 0.26738 |
| Δ Brochure × community health centre[b] | −0.18920 | 0.39752 | −0.96833 | 0.58992 |
| Δ Medication review × age[b] | −0.92105[*] | 0.39124 | −1.68787 | −0.15423 |
| Δ Medication review × female[b] | 0.25155 | 0.63513 | −0.99330 | 1.49639 |
| Δ Medication review × master degree[b] | −1.14825 | 0.88369 | −2.88025 | 0.58376 |
| Δ Medication review × experience help non-adherence patient[b] | 0.58843 | 0.37186 | −0.14039 | 1.31726 |
| Δ Medication review × community health centre[b] | 0.93705[*] | 0.45112 | 0.05288 | 1.82123 |
| Δ Phone call refill reminder × age[b] | −0.33073 | 0.38321 | −1.08181 | 0.42036 |
| Δ Phone call refill reminder × female[b] | 0.18610 | 0.60617 | −1.00197 | 1.37417 |
| Δ Phone call refill reminder × master degree[b] | 0.13493 | 1.05085 | −1.92471 | 2.19456 |
| Δ Phone call refill reminder × experience help non-adherence patient[b] | 0.76063[*] | 0.36572 | 0.04385 | 1.47742 |
| Δ Phone call refill reminder × community health centre[b] | 0.55228 | 0.41970 | −0.27031 | 1.37488 |
| Δ Patient group discussion × age[b] | 0.04734 | 0.49566 | −0.92414 | 1.01882 |
| Δ Patient group discussion × female[b] | 1.42048 | 0.86836 | −0.28148 | 3.12244 |
| Δ Patient group discussion × master degree[b] | 2.10884 | 1.09952 | −0.04618 | 4.26386 |
| Δ Patient group discussion × experience help non-adherence patient[b] | −0.32756 | 0.47811 | −1.26464 | 0.60952 |
| Δ Patient group discussion × community health centre[b] | 0.03060 | 0.57273 | −1.09193 | 1.15314 |

(Continues)

**TABLE 5** (Continued)

| Choice of profile | | | |
| --- | --- | --- | --- |
| Dependent variable (0 = if respondent choose the baseline profile; 1 = if respondent choose the alternative profile) | | | |
| | | 95% CI | |
| Regression coefficient | Standard error | Lower | Upper |
| Constant | $-1.09539^*$ | 0.29027 | $-1.66432$ | $-0.52647$ |
| ρ (correlation between the observations of respondent) | 0.36932 | 0.05499 | | |
| Observations (respondents) | 80 | | | |
| Log-likelihood function | $-608.13495$ | | | |
| Wald $\chi^2$ | $168.63^*$ | | | |

*Note:* 1 Indonesian Rupiah (IDR) = 0.000074 USD; Δ = difference.

[a] Δ Duration of service (no changes = 0; changes = 0; 20 min less waiting), Δ Place for consultation (no changes = 0; changes from private to common area = −1), Δ Access to pharmacist (no changes = 0; changes from walk in any day to appointment = −1), Δ Patient copayment (no changes = 0; <10,000 IDR = −10,000), Δ Brochure/leaflet (not added = 0; added = 1), Δ Patient group discussion (not added = 0; added = 1), Δ Phone call refill reminder (not added = 0; added = 1), Δ Medication review (not added = 0; added = 1).

[b] Gender: 1 = female; age: 1 = age >32; educational background: 1 = master degree; medical institution: 1 = community health centre; experiences: 1 = have experience help non-adherence patient.

$^*p < 0.05$.

## 4 | DISCUSSION

consultation is the only attribute that influences respondents' preferences. Some interactions with socio-demographic profiles show a similar effect as the results in Table 5.

The pharmacists in the study overall preferred a shorter duration of the consultation. An overall range from 5 to 45 min duration of the consultation is reported in several published studies in diabetes (Chan et al., 2012; Clifford et al., 2005; Shah et al., 2013). There is no specific standard on the length of pharmacists' consultation because it depends on the problem and patient's characteristics. Adequate time is important for the pharmacist to provide a thorough discussion and education related to medication, including adherence. The specific conditions might also influence respondents' preference for a shorter duration in Indonesia, i.e., a high number of patients per day, limited time, lack of pharmacists, and a high burden of administrative and reporting tasks (Supardi, Raharni, et al., 2012; Supardi, Susyanti, et al., 2012). This might lead to pharmacists reducing the time for consultations to accommodate more patients per day. This might also be why pharmacists mainly provide basic services instead of more comprehensive care to patients.

Overall, pharmacists in this study preferred to provide flexible access to patients, i.e., walk-in consultations. A walk-in consultation is easier for the patient because the patient can consult the pharmacist when convenient. The need to make an appointment might be more efficient for the pharmacists, but flexible access might enable them to serve more patients (Naik-Panvelkar et al., 2012). A previous study also reported that most pharmacists provide on-the-spot consultation without a prior appointment (Kooy et al., 2007). However, we find that the importance of flexible access is higher for pharmacists who have experience in helping non-adherent patients. Simultaneously, pharmacists with a master's degree prefer making appointments with the patient before the consultation. An appointment might be perceived as more effective by pharmacists with higher education because it reduces waiting time and can allow for more optimal and thorough care to the patients (Naik-Panvelkar et al., 2012). However, this preference might also depend on the workload, the number of patients and pharmacists. In community health centres, making an appointment might be less effective for the pharmacist because of the high number of patients per day, the high workload, and the shortage of pharmacists (Herman et al., 2013; Supardi, Raharni, et al., 2012). Easy access to pharmacists can encourage patients to discuss their medication problems with the pharmacist, including medication adherence.

In all analyses reported in this paper, we find a strong preference for a private consultation room, which means that pharmacists recognise the need for privacy and confidentiality. The presence of a private room assures the patient's privacy. Patients might also feel more comfortable discussing sensitive medical problems (Hattingh et al., 2016; Mobach, 2008; Twigg et al., 2013; Wirth et al., 2010). Several studies have stressed the importance of private consultation

rooms to discuss personal medication conditions (Tan et al., 2013; Twigg et al., 2013). However, not all community health centres and hospitals in Indonesia have private consultation rooms, even though this is required by the national standard (Indonesia Ministry of Health, 2016a, 2016b). Private consultation rooms are expected to improve patient participation in chronic disease care programs, which is generally hindered by privacy matters when contact with a pharmacist takes place at the counter (Hattingh et al., 2016). Nevertheless, the limited space in medical facilities might be the reason for the unavailability of a private room. The lack of such rooms in Indonesia needs to be addressed if pharmacists want to provide patient-tailored consultation to improve medication adherence among patients with diabetes. If this privacy matter is overcome, it can encourage patients to discuss their medication problems more conveniently.

Most respondents in this study prefer to provide services with a lower patient copayment. Another study, however, has shown that pharmacists prefer to receive a fee (Grindrod et al., 2010). In our study, the pharmacist's preference for patient copayments, however, differs among pharmacists. In practice, the pharmacist provides general medication information for free to the patient in Indonesia, but there are fees that need to be paid out of pocket by patients to receive additional services such as a consultation. Pharmacists with a higher education prefer to get rewarded by a copayment fee to provide the services. In contrast, pharmacists in community health centres indicate that patient copayment is relatively less important. There is no clear explanation why most pharmacists prefer lower copayment. A probable reason could be that the patient copayment might reduce the interest of patients to use the services (Mansell & Perepelkin, 2011).

Patient group discussion is the most preferred additional service when respondents are asked directly about their preferences for attribute levels. In the analysis, however, a brochure appears to be the most preferred additional service. A high workload and time limitation (Supardi, Susyanti, et al., 2012) might be why the brochure is one of the important additional services for pharmacists. In particular, a brochure might be a more practical way for pharmacists to deliver knowledge to patients compared to medication reviews that require more time for in-depth conversations and a thorough assessment of the patient (Duncan et al., 2019). Those might be the possible reasons that older respondents did not prefer to provide medication reviews.

This study showed the preferences of pharmacists in Indonesia for the type of services that can improve medication adherence among patients with diabetes. The pharmacists' preferences, coupled with information on patients' preferences, are vital to design suitable pharmacist services. However, pharmacists' preferences found in this study might be influenced by limitations or barriers that exist in practice, especially in community health centres and hospitals in Indonesia, such as limited pharmacist staff and a high number of patients. These barriers might hinder the optimisation of the pharmacist role in patient care, particularly to improve medication adherence in diabetes. Therefore, based on the results of this study, it is possible to evaluate current pharmacist services and to recommend further research to explore and identify these barriers. Attention in community health centres, hospitals, Indonesia Pharmacist Association, and Ministry of Health, should focus on finding solutions to these barriers for optimal patient care in Indonesia.

The finding of this study may reflect pharmacist healthcare services in Indonesia in general. The health services in community health centres in Indonesia are rather similar since the community health centres' responsibilities are clearly described in the national policy. Therefore, it could be expected that pharmacists' workload in Indonesian community health centres is rather similar. This means that our findings may reflect the preferences of pharmacists' in community health centres in all of Indonesia. Regarding hospitals in Indonesia, they are classified into four categories A–D, according to the bed-size and the availability of specialties. It is worth emphasising that around 60% of hospitals in Indonesia are private hospitals, and most public hospitals are in the same category as the public hospital in our study (Mahendradhata et al., 2017). The number of beds and pharmacists in private and public hospitals in Indonesia is similar to our research sites. Moreover, the responsibilities and job descriptions of hospital pharmacists are also similar across the country. Therefore, it is expected that participating pharmacists' preferences in this study may reflect the overall population of pharmacists in Indonesia.

This study has some limitations that need to be acknowledged. First, although, in general, the findings in this study may represent pharmacist care services in Indonesia in some aspects, the findings may differ and not be representative in other aspects. The three hospitals in this study have a connection with an educational institution, which may limit the possibility of generalising the findings to other hospitals in other cities in Indonesia, especially in the rural area that might not have educational institutions affiliated with the pharmacy. Secondly, the conclusions of this study might only apply to the community health centres that have pharmacists because many community health centres in Indonesia do not have pharmacists. Third, the opt-out option was not included in the study, which might bias the results of this study, although we assumed that a pharmacist will always offer some kind of service. Also, the use of the orthogonal main effect design for the selection of profiles for this study prevents the analysis of possible interactions between the attributes. We also did not study the effect of changing the baseline profile due to prior concerns about the participation rate (as explained in the methods section). We also relied on the validity of the DCE method in general, as established in its numerous applications in the area of health services research.

## 5 | CONCLUSIONS

This study provides evidence on pharmacists' preferences for services that can improve medication adherence among patients with diabetes in Indonesia. The results and discussion provide insight on how to design pharmacist services from a pharmacist perspective and promote the role of pharmacists in practice. A shorter duration

of consultation, private consultation rooms, flexible access to pharmacists and less patient copayment are attributes that need to be considered in designing pharmacist services to improve medication adherence in Indonesia (Surabaya). Alongside these attributes, brochure, patient group discussion or medication review, can be used as a combination with consultation as a package of pharmacist services in diabetes. As argued in our study, pharmacists' preferences give insight into the optimal design of pharmacist services.

## CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

## AUTHOR CONTRIBUTION

This work is part of BP's doctoral research supervised by WG and MP. BP, WG and MP had made all substantial contributions to the concept, design, method, analysis and interpretation of the data, including critical revision on the manuscript. BP developed the questionnaire, conducted data collection, conducted data analysis and wrote the first draft. All authors contributed to the preparation of the final manuscript. All authors have read and approved the final manuscript.

## ETHICAL APPROVAL AND CONSENT TO PARTICIPATE

University of Surabaya Institutional Review Board granted a research ethics approval to conduct this research. This ethical approval was also supported by an approval letter for data collection in community health centres from the Surabaya City Health Office, a letter of data collection approval in one public hospital, and two private hospitals. Informed consent was obtained from all respondents who participated in this study.

## CONSENT FOR PUBLICATION

Not applicable.

## DATA AVAILABILITY STATEMENT

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

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John Wiley and Sons Ltd

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# 81

**PUBLICATION TYPE**

Journals

**ISSN**

09660410, 13652524

**COVERAGE**

1993-2023

**INFORMATION**

Homepage

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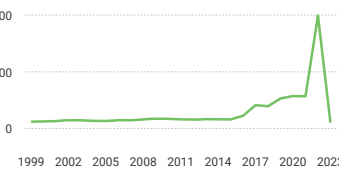Q Join the conversation about this journal

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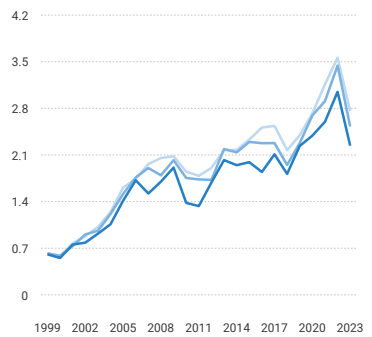


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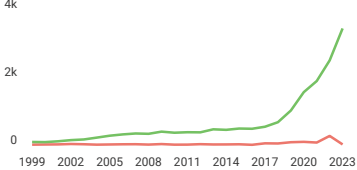


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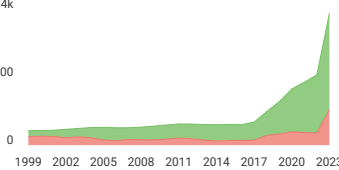- Cites / Doc. (3 years)
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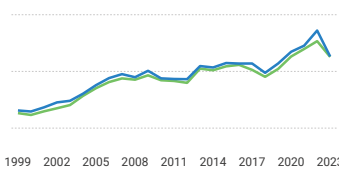
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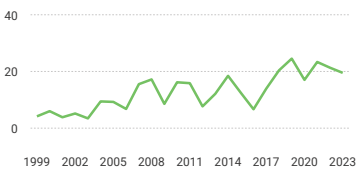


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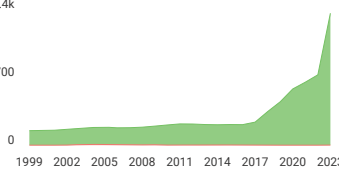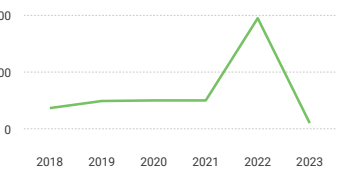


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