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A microscopic image of various cells, including several large, rounded cells with prominent nuclei and some smaller, more irregular cells. The image is rendered in shades of blue, with the cells appearing as glowing, semi-transparent structures against a darker blue background.

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Pharmacist contributions in the treatment of diabetes mellitus in Southeast Asia: a narrative review

Ayu Wulan Dwiputri, Liza Pristianty, **Andi Hermansyah**

Article number: 20190322

Abstract

Background The growing burden of diabetes mellitus (DM) in Southeast Asia puts pharmacists in the ideal position to provide management of DM. This narrative review aims to describe the evidence of pharmacist contribution in improving DM in Southeast Asia. **Content** A literature search was conducted to identify relevant research articles published from 2010 to 2018 in four databases (Scopus, Pubmed, MEDLINE, and Springerlink) describing pharmacist roles and activities intended to improve management of DM in Southeast Asian countries. Results were synthesized narratively and divided into three main sections: (1) the role of pharmacist in DM management, (2) the impact of pharmacist role, and (3) the barriers to the implementation of services in DM management. A total of 16 studies were identified, of which ten studies mentioned services that were conducted exclusively by a pharmacist and the remaining collaborated with other health professionals. A number of pharmacist services were reported including prevention, dispensing, medication review, drug information services, patient counselling and education, monitoring, follow-up, and referral. Barriers related to individual, organizational, and public recognition were described. **Summary and outlook** The Pharmacist can contribute to improve DM management in a variety of settings. Action research on pharmacist intervention in DM is recommended.

 Requires Authentication | December 20, 2019

The implementation of a chronic disease management program (Prolanis) in Indonesia: a literature review

Sesty Rachmawati, Hanni Prihhastuti-Puspitasari, Elida Zairina

Article number: 20190350

Abstract

Background The Chronic Disease Management Program or Program

Pengelolaan Penyakit Kronis (Prolanis) is a program initiated by the Social Insurance Administration Organization or Badan Penyelenggara Jaminan Sosial (BPJS) in Indonesia. Prolanis aim to provide a proactive healthcare service approach for patients with chronic diseases particularly those with diabetes mellitus and hypertension. Prolanis also aims to achieve the optimal quality of life in patients with chronic disease through effective and efficient healthcare services including cost. All primary healthcare centers and a few of the private clinics in Indonesia have implemented Prolanis, however, the impact of the program has not been reviewed. This review aimed to see the implementation of Prolanis in healthcare facilities in Indonesia. Methods A literature review was conducted by searching articles through Google Scholar and PubMed databases up to August 2019. The following keywords or terms were used: Prolanis, BPJS indexed with terms related to blood pressure or hypertension in Indonesia. The references, citations and similar articles from the identified articles were used to identify additional sources. Results Twenty-four articles were identified through the first search using the key terms although only eight articles met the inclusion criteria. This review showed that the implementation of Prolanis in the healthcare facilities in Indonesia was varied in terms of the activities and services provided. The healthcare professional involved in the implementation of Prolanis were also varied. There were some barriers faced by the healthcare facilities including the availability of funding, the healthcare facilities and infrastructures, the unavailability of standard operating procedures (SOPs) as well as the limitation of human resources involved in Prolanis. Conclusions The implementation of Prolanis in Indonesia has not been optimized, as there were some barriers during its implementation in the healthcare facilities.

Original Articles

 Requires Authentication | November 28, 2019

Quercetin attenuates acute predator stress exposure-evoked innate fear and behavioral perturbation

Putri Anggreini, Chrismawan Ardianto, Mahardian Rahmadi, Junaidi Khotib

Article number: 20190242

Abstract

Background Oxidative stress plays a pivotal role in the pathophysiology and

pathogenesis of mental diseases, such as depression or anxiety. Psychological stress induced by predatory stimulus is one of the models that explain how induced affective behavior is manifested as a depression-like state. Quercetin is a flavonoid that exhibits potential pharmacological activity on mental diseases. Thus, the present study was designed to investigate the effect of quercetin on innate fear and affective behavior induced by repeated predator stress exposure on mice. Materials and methods ICR mice were exposed to predatory stress for 3 days. Quercetin at a dose of 50 mg/kg was given intraperitoneally along with stress induction. The freezing behavior during the stress induction was analyzed. The anxiety-like and depressive-like behaviors and cognitive and motor functions were examined on the last day of induction. Results Predatory stress increased the affective behaviors (anxiety-like and depressive-like behaviors) and produced freezing behavior without alterations in the cognitive function and exploratory behavior. Treatment with quercetin 50 mg/kg attenuated the freezing, anxiety-like and depressive-like behaviors. Conclusions Repeated predator stress exposure causes both innate fear and depression-like state for the prey animals. Quercetin may have a protective effect against depression and alleviates the fear of traumatic events.

 Requires Authentication | February 7, 2020

Evaluating current practices and policies in the use of injectable medicines for treating myalgia in a primary care center in Pamekasan, Indonesia

Eko Prasetio, Wahyu Utami, Zulhabri Othman, Ari Wardani, Abdul Rahem, Andi Hermansyah

Article number: 20190328

Abstract

Background Myalgia in patients can be associated with a large array of conditions, including injuries, infections and inflammations. Treatment for myalgia may include the use of oral, topical and injectable medicines (IM). However, the use of IM has been restricted by the World Health Organization due to the common hazards associated with inappropriate medicine use, risks of disease transmission and more expensive spending for using IM. Accordingly, the Ministry of Health of Indonesia (MoH) has limited the use at the level of $\leq 1\%$ in every primary care center (Puskesmas) across the nation. The aim of this study was to report and evaluate rational drug use injection in myalgia in a Puskesmas in Pamekasan, Indonesia. Methods This study

reviewed official documents, such as rational drug use report, medicine use databases and drug request report. The documents were obtained from the district health office or public domain from 2014 to 2018. Data were then collated, extracted and presented as frequencies. Results The average rate of use of IM for myalgia in Pamekasan was 36.15%. All 20 Puskesmas in Pamekasan conducted injection practice above the recommended level, thus reflecting a major gap between practice and policy implementation. This study implies that a substantial effort is needed to enforce the policy. Conclusions The use of IM for myalgia treatment in Pamekasan from 2014 to 2018 was significantly higher than the recommended level, thus reflecting a major problem in the practice. This is an alarming call for the local healthcare stakeholders to improve such a situation.

 Publicly Available | December 4, 2019

The contemporary role and potential of pharmacist contribution for community health using social media

Andi Hermansyah, Anila Impian Sukorini, Fadli Asmani, Kandi Aryani Suwito, Titik Puji Rahayu

Article number: 20190329

Abstract

Background Social media (SM) is everywhere, and it affects all aspects of life, including health care. This study aimed to identify pharmacist activity in SM and explore the potential for pharmacist contributions using SM. Methods Focus group discussions (FGDs) were conducted in four cities in Indonesia. The investigators collaborated with a local pharmacist association to select a wide range of pharmacists as participants. The discussions were audiotaped, transcribed, and thematically analyzed. Results Forty-one pharmacists participated in the FGDs. Four broad themes were identified: pharmacist use of SM, current initiatives using SM, public acceptance, and opportunities for role expansion. WhatsApp was the most used SM and had meaningful contribution to spread information and change a patient's behavior. Participants used SM mainly for personal purposes, but when it came to pharmacy and health issues, they were among the first to be contacted by patients or to counter misleading information in SM. A number of participants actively used SM for health promotion in form of sharing health information, promoting use of medicines, providing drug reminders, and encouraging compliance to medication. The public had a high trust to

information provided by pharmacists in SM. Although participants believed pharmacists can play a role in educating patients and influencing the health of the communities, they considered being active in SM as burdensome, time consuming, and potential for lawsuit. Conclusions SM has become a venue for pharmacists to improve the health of the people. Several unique features in SM may facilitate pharmacist contributions; however, whether pharmacists continue to undertake such initiative cannot be guaranteed.

 Requires Authentication | February 7, 2020

Evaluation of rational drug use based on World Health Organization prescribing indicators in a primary care center in Pamekasan East Java, Indonesia

Eko Prasetio, Wahyu Utami, Zulhabri Othman, Ari Wardani, Abdul Rahem, Andi Hermansyah

Article number: 20190326

Abstract

Background The Government of Indonesia has put in place many interventions for rationalizing drug use at all levels of the health services including in primary care centers (puskesmas). One of the programs for the rational use of drugs at the puskesmas is the monitoring and evaluation of drug use conducted by pharmacists. The purpose of this research was to evaluate the rationality of drug use in Pamekasan puskesmas that use World Health Organization (WHO) prescribing indicators and to find the difference in the percentage of rationality of drug use between puskesmas in Pamekasan. **Methods** This study reviewed official documents considering reporting of rational drug use. The documents were obtained from the district health office or from the public domain from 2014 to 2018. Data were then collated, extracted, and presented as frequencies. **Results** The percentage prescribed for antibiotics for acute respiratory infection (ARI) non-pneumonia was 47.27% and percentage prescribing antibiotic drugs in a non-specific diarrhea was 59.85%. The percentage prescribed for injection was 36.15%. The average number of drugs prescribed per treatment was 2.61. **Conclusions** The majority of WHO guidelines stated that prescribing indicators were not met by the puskesmas in Pamekasan, except for the parameters for the average number of drugs prescribed per consultation. This shows an alarming clarion call for the local healthcare stakeholders to improve such situations.

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Review

Ayu Wulan Dwiputri¹ / Liza Pristianty¹ / **Andi Hermansyah¹**

Pharmacist contributions in the treatment of diabetes mellitus in Southeast Asia: a narrative review

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Abstract:

Background: The growing burden of diabetes mellitus (DM) in Southeast Asia puts pharmacists in the ideal position to provide management of DM. This narrative review aims to describe the evidence of pharmacist contribution in improving DM in Southeast Asia.

Content: A literature search was conducted to identify relevant research articles published from 2010 to 2018 in four databases (Scopus, Pubmed, MEDLINE, and Springerlink) describing pharmacist roles and activities intended to improve management of DM in Southeast Asian countries. Results were synthesized narratively and divided into three main sections: (1) the role of pharmacist in DM management, (2) the impact of pharmacist role, and (3) the barriers to the implementation of services in DM management. A total of 16 studies were identified, of which ten studies mentioned services that were conducted exclusively by a pharmacist and the remaining collaborated with other health professionals. A number of pharmacist services were reported including prevention, dispensing, medication review, drug information services, patient counselling and education, monitoring, follow-up, and referral. Barriers related to individual, organizational, and public recognition were described.

Summary and outlook: The Pharmacist can contribute to improve DM management in a variety of settings. Action research on pharmacist intervention in DM is recommended.

Keywords: contribution, diabetes mellitus, pharmacist, review, role

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Introduction

Diabetes mellitus (DM) is a global health threat. In 2012, there were approximately 1.5 million people who died from diabetes [1]. The prevalence of DM continues to increase. At least one in 10 adults will suffer from diabetes in 2020 compared with that in 2015, which is only one in 11 people [2]. The Southeast Asia region is the second largest region in terms of prevalence of DM globally after the Western Pacific Region [1].

DM is a long-term chronic condition. The increased prevalence of DM is caused by a lack of control over the disease. Uncontrolled conditions can lead to many complications, such as neuropathy, retinopathy, and nephropathy. The aggressive management of these parameters has been proven to reduce the undesirable effects [3]. Therefore DM management is needed.

Pharmacist is one of the healthcare professionals who have an important role in DM management [4]. In many countries, pharmacists are among the most accessible health professional [5]. Pharmacists do not diagnose diabetes, yet they can play an important role in helping individuals to stay in control of their condition [6]. Pharmacists have the ability to provide treatment management services [7].

Pharmacists have an important role to play in health care, which is much more than selling medicines [8]. Thus, in health services, pharmacists have two approaches that can be done as an effort in conducting treatment management services, namely (1) the prescription-focused and (2) the patient-centered approach. The first approach refers to all activities carried out during the dispensing process of medicinal products to patients. Meanwhile, the second approach focuses on patient involvement in the service process [7].

The scope of pharmaceutical care includes educating patients (or people caring for patients) about their treatment and conditions to ensure maximum benefit and safety of the therapy obtained; review the patient's

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medical history; continuous monitoring of patient therapy; screening for possible side effects; and monitor the patient's ability to take his medication properly and to comply with prescribed therapies [9].

In relation to diabetes management, pharmacists can play a role in the process of identification, assessment, education, referral, and monitoring [10]. There are seven evidence-based factors needed in diabetes management including cardiovascular disease (CVD) risk, cholesterol, glycemic, medication, blood pressure, lifestyle, and education [11]. In practice, pharmacists also often collaborate with doctors, nurses, or other health professionals. In several studies, this effort was proven to help improve glycemic control [12], [13]. As an effort to increase collaboration between pharmacists, doctors, and other professionals, increase communication between patients and the healthcare team, and optimize the use of drugs to get better outcomes, there is also a model called medication therapy management (MTM). MTM is a patient-focused service, consisting of five main elements: medication therapy review (MTR), personal medication record (PMR), medication-related action plan (MAP), intervention and/or referral, documentation and follow-up [14]. Therefore, the aim of this narrative review is to illustrate the evidence of pharmacists' contribution in increasing DM in Southeast Asia.

Materials and methods

Search strategy

The keywords used in the database search are "pharmacist" and "diabetes." The study is limited to countries in Southeast Asia. The database used includes Scopus, Pubmed, MEDLINE, and Springerlink. Searches were limited to articles in English, published between January 2010 and December 2018, and included type 1 and type 2 diabetes. The findings from the search were presented as narrative reviews.

Inclusion and exclusion criteria

Studies that will be reviewed as well as inclusion criteria include (1) original research, (2) studies in Southeast Asian countries, and (3) availability in full paper form that can be open accessed. The exclusion criteria in this study were no involvement of pharmacists in the service.

Data extraction

The studies were analyzed and categorized by country, sample size and population, study design, pharmacist contribution, outcome measures, and findings in a matrix format (Table 1).

Table 1: Matrix of publication included.

Country	Citation	Sample	Study design	Pharmacist contributions	Measurement of outcomes	Findings
Indonesia	Wibowo et al. [15]	Total: n = 196	Questionnaire survey	Dispensing and education	Type of community pharmacy-based service	Most patients used community pharmacies for dispensing (100%) and education on how to use medications (79.6%)
	Keban et al. [16]	Total: n = 59	Cross sectional	Education by distributing brochures or providing information directly to the samples about diabetic neuropathy	a. Prevalence and risk factors for DN b. The effect of pharmacist intervention toward DN patients	a. 18.6% had DN and the risk factors such as ages, duration of diabetes, sex, cardiovascular disease, and lifestyle b. Pharmacist intervention showed an increase on the patient's knowledge about DN and decrease on the patient's blood glucose level
Singapore	Adikusuma and Nurul [17]	Total: n = 40 Intervention: n = 20 Control: n = 20	Quasi-experimental	Counseling and education and SMS as reminder and motivation	The effects of counseling and SMS	Counseling and education and SMS can improve treatment adherence and decrease HbA _{1c} level significantly in the intervention group
	Siaw et al. [18]	Total: n = 411 Intervention: n = 214 Control: n = 197	Randomized controlled trial	Clinical pharmacists managed CAREPILLS, optimized medications, furnished prescriptions, and followed up regularly with all patients via face-to-face visits or phone calls	a. Clinical outcomes b. Scores from the PAID and the DTSQ, and diabetes-related health service utilization rates and costs	a. A mean decrease in HbA _{1c} of 0.8% (intervention group) with unchanged HbA _{1c} values (control group); the change in mean SBP, LDL _c , and TG between two arms were insignificant b. Improvements in PAID and DTSQ scores, reduction in physician workload and an average cost savings of US\$91.01 per patient (intervention group)
	Siaw et al. [19]	Total: n = 330 Intervention: n = 141 Control: n = 189	Randomized controlled trial	Multidisciplinary care with regular clinical pharmacist follow-up with all patients via face-to-face visit or telephone call in addition to usual care.	a. HbA _{1c} change b. Total direct outpatient medical costs for diabetes-related care	a. The intervention group had greater improvement in HbA _{1c} b. Lower mean total direct outpatient medical costs per patient in the intervention group

Author(s)	Total: n	Study Design	Intervention	Control	Findings	Limitations
Siaw et al. [19]	Total: n = 26	Qualitative study	PMDS services consist of optimizing diabetes treatment and self-management education		PMDS care experiences with PMDS in four themes: a. Fulfilling patients' needs b. Delivery and quality of service c. Changes attributed to the service d. Suggestions for improvement	
Lim and Lim [20]	Total: n = 43	Retrospective cross sectional	Routine follow-up and meet the pharmacists. Patient received counseling and education through The DMATC program		a. Glycemic control b. Lipid parameters c. Patient adherence	
Huri and Lee [21]	Total: n = 208	Retrospective	Assess the DRPs by the pharmacist		a. Types of DRPs b. Factors associated with its occurrence	
Chung et al. [22]	Total: n = 241 Intervention: n = 120 Control: n = 121	Prospective randomized controlled trial	PC by pharmacist, including medication review, resolve any DRPs and educated patients		a. Medication adherence b. Glycemic levels	
Chan and Mohamed [23]	Total: n = 110 Standard group: n = 35 Font-enlarged group: n = 35 Pictogram-incorporated group: n = 40	Randomized controlled trial	Modified labels through font-enlarged and pictogram-incorporated labels used for long-term medications		a. Patients' adherence b. Patients' comprehension c. Patients' preferences	
Butt et al. [24]	Total: n = 73 Intervention: n = 37 Control: n = 36	Randomized controlled trial	Patients in intervention group received standard care and PEPP intervention.		a. Clinical outcomes b. Medication adherence	

Malaysia	Lim et al. [25]	Total: n = 76 Intervention: n = 39 Control: n = 37	prospective randomized	Patient received DMTAC program on top of their routine clinical follow-up	Clinical outcomes	Mean HbA _{1c} , FBG, and LDL cholesterol levels reduced significantly. a. There were many misconceptions among participants about diabetes management that could be attributed to lack of knowledge b. Long waiting hours, overcrowded clinics, short consultation times, and long duration gap between appointments were described by most participants about constraints of the current healthcare system c. Participants seen that some community pharmacists were perceived as prioritizing profit over patient care with little to no discussion of health-related needs d. Most participants acknowledged that community pharmacists could provide information or education for patients on diabetes self-management e. There were challenges including privacy in the community pharmacy and added costs that would incur from using community pharmacies for diabetes care
	Lee et al. [26]	Total: n = 14	Qualitative	Interviews were conducted by ELL (pharmacist and graduate student)	a. Experience and perception of diabetes self-management b. Constraints of the current healthcare system c. Perception of the community pharmacist and community pharmacies d. Perceived roles for community pharmacists in diabetes care e. Challenges in utilizing community pharmacies to provide DSME/S	a. Types of PCI: Drug-use problems, insufficient awareness and knowledge about disease condition and medication, ADR, therapeutic failure, drug-choice problems and dosing problems b. The main causes of PCIs were deterioration of disease state that led to failure of therapy and also presentation of new symptoms or indications. There were 52% with clinically insignificant, 38.9% with minimal clinical significance, 8.9% as definitely clinically significant and could cause patient harm, while one issue (0.2%) was classified as life threatening
	Chua et al. [27]	Total: n = 477	Controlled trial	The pharmacist reviewed patient medications and counselled patient, noted any PCIs encountered by the participants and helped to resolve the PCIs	a. Types of PCIs encountered by the participants b. The causes and clinical significance of the PCIs	

Thailand	Dhippayom et al. [28]	Total: n = 397	Descriptive	The pharmacist assessed the participants' risk of diabetes by using the diabetes risk prediction tool as screening. All participants received educational information from pharmacists as health promotion	a. The number of participants with high risk of diabetes b. The number of high risk individuals undertaking a fasting CBG test; individuals with elevated fasting CBG; and confirmed diagnosis of diabetes)	a. There were 49.4% of participants who had a high risk of diabetes (risk score: ≥ 9) b. There were 48.5% of these high risk individuals undertook fasting CBG. Elevated fasting CBG (≥ 126 mg/dL) was found in 12 persons (12.7%). Overall, two patients with diabetes were identified during the provision of the program
Thailand	Saengcharoen et al. [29]	Total: n = 143	pre- and post-intervention	a. The pharmacist checked the accuracy of the medications and DRPs and then advised the patient about the drug use b. The pharmacist provided the patients with education using a DVD and then asked them to show how to use insulin injection.	Clinical outcome	a. Significant reductions in HbA _{1c} , FBG, systolic BP, triglycerides, and total cholesterol were detected in patients who received the intervention. Increased LDL cholesterol level, but no significant change in HDL cholesterol were found b. Medication adherence, diabetes knowledge, and skill in using insulin injection improved at the end of the study
Cambodia	Otgontuya et al. [30]	Total: n = 5433	Cross sectional	Management with pharmaceutical and lifestyle advice interventions	a. Prevalence of conditions that was associated with CVD factors b. Prevalence of early identification of hypertension and diabetes c. Prevalence of uncontrolled hypertension and diabetes and its possible cause	a. Prevalence respectively in hypertension (12.3%), diabetes (3.1%), hypercholesterolemia (3.2%), and overweight (15.5%) b. There were 45.4% of all hypertensives and 50.3% of all diabetics in the age group 35–64 years that had been previously diagnosed c. Only 28.6% of all hypertensives and 23.9% of all diabetics, respectively, were adequately controlled. Estimates suggest deficits in delivery of important advice for lifestyle interventions

ADR, adverse drug reaction; BMI, Body Mass Index; CAREPILLS, Closer monitoring, Adherence problem, Resistance to drug therapy, Empowerment in patient's own therapy, Polypharmacy, Insulin titration, Lack in drug knowledge, Lack in drug administration techniques and Switching of drugs; CBG, capillary blood glucose; DMTA, Diabetes Medication Therapy Adherence Clinic; DN, diabetic neuropathy; DRP, drug related problem; DSME/S, diabetes self-management education and support; DTSG, Diabetes Treatment Satisfaction Questionnaires; FBS, fasting blood glucose; HbA_{1c}, glycated hemoglobin; HDL-C, high-density lipoprotein; LDL, low-density lipoprotein; PAID, problem areas in diabetes; PC, pharmaceutical care; PCI, pharmaceutical care issue; PEPP, patient education by pharmacist program; PMDS, pharmacist-managed diabetes services; SBP, systolic blood pressure; SMS, short messages service; TG, triglyceride.

Results and discussion

Studies included in this narrative review are shown in Figure 1. There are 142 titles identified and further selected. Exclusion criteria are duplicated titles; review, commentary, or protocol; pharmacists are not involved; and countries that are not located in Southeast Asia. Finally, 16 papers were eligible for the review process (Figure 1).

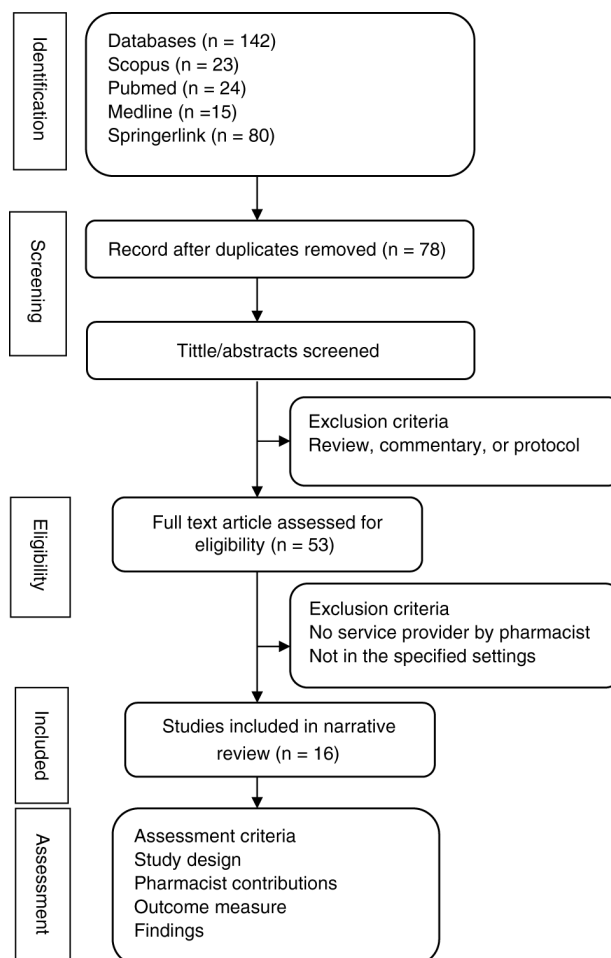


Figure 1: PRISMA Diagram of Literature search strategy and review procedure.

Five countries in Southeast Asia were included in the study, consisting of Indonesia (three studies) [15], [16], [17], Malaysia (eight studies) [20], [21], [22], [23], [24], [25], [26], [27], Singapore (two studies) [18], [19], Thailand (two studies) [28], [29], and Cambodia (one study) [30].

The role of the pharmacist in DM management

The pharmacist contributions found in the study are illustrated in Figure 2 and the references used are summarized in Table 2.



Figure 2: Pharmacist contributions in Southeast Asia.

Table 2: Pharmacist contributions at various setting in Southeast Asia.

Country	Citation	Setting	Services delivery	Type of contributions
Indonesia	Wibowo et al. [15]	Community pharmacy	Exclusively	a. Dispensing b. Counselling and education c. Monitoring d. Referral
	Keban et al. [16]	Hospital	Exclusively	Counselling and education
Singapore	Adikusuma and Nurul [17]	Outpatient in hospital	Exclusively	a. Counselling and education b. Follow-up
	Siaw et al. [18]	Outpatient in healthcare institution	Collaborative	a. Counselling and education b. Monitoring c. Follow-up d. Referral
	Siaw et al. [19]	Ambulatory care and community	Collaborative	a. Counselling and education b. Monitoring
Malaysia	Lim and Lim [20]	Hospital	Collaborative	a. Counselling and education b. Follow-up c. Monitoring
	Chua et al. [27]	Primary care	Collaborative	a. Medication review b. Counselling and education c. Referral
	Huri and Lee [21]	Tertiary care	Collaborative	a. Medication review b. Counselling and education
	Chung et al. [22]	Hospital	Exclusively	a. Medication review b. Counselling and education c. Follow-up
	Chan and Mohamed [23]	Hospital	Exclusively	Dispensing
	Butt et al. [24]	Endocrine clinic	Exclusively	a. Counselling and education b. Follow-up
	Lim et al. [25]	Hospital	Exclusively	a. Medication review b. Counselling and education c. Follow-up d. Monitoring
	Lee et al. [26]	Primary care	Exclusively	a. Dispensing b. Drug Information services

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Thailand	Dhippayom et al. [28]	Community pharmacy	Exclusively	a. Prevention b. Education c. Referral
	Saengcharoen et al. [29]	Hospital	Exclusively	a. Medication review b. Counselling and education
Cambodia	Otgontuya et al. [30]	Community	Collaborative	Education

Prevention

The contribution of pharmacists in prevention was found in one study. Prevention is carried out in the form of screening and health promotion. The screening process employed risk prediction tools developed by Aekplakorn et al. to select individuals who are at high risk for capillary blood glucose (CBG). Assessment was based on risk factors for participants, including age, sex, Body Mass Index (BMI), waist circumference, hypertension, and history of diabetes in parent or sibling [28]. The higher the score obtained, the greater the risk of diabetes. Although this tool can be used as a diabetes screening, there is no agreement yet that the tools must be used in all community pharmacies in Thailand [31]. In addition, the type of health promotion to be delivered depending on the diabetes risk score obtained. Those who had a score of ≤ 5 were informed about lifestyle regarding exercise and weight reduction, and subjects who had a score of ≥ 6 would receive additional information regarding diet control. Meanwhile, subjects who have a diabetes risk score of 9 will continue the fasting CBG test, and if an increase in fasting CBG is found (≥ 126 mg/dL), participants will be referred to the hospital [28]. Screening using risk prediction tools is relatively easy to use to measure the risk of diabetes in community settings as compared with glucose measurements that are more costly. The tools have also been developed in other countries such as Western, Oman, India, Japan, and China [28].

Dispensing

The contribution of pharmacists in the dispensing process was found in two studies, one each in Indonesia and Malaysia. Community pharmacists in Indonesia actively play a role in this process [15]. Similarly, pharmacists in Malaysia also contributed in this process, although dispensing of drugs can be carried out by doctors [31]. The results of interviews with the perception of type 2 diabetes patients about pharmacists showed that pharmacists in community pharmacies still prioritize the process of “selling and buying.” Based on their experience, the communication that occurs between pharmacists and patients is mostly related to the costs of purchasing certain products, with little or no discussion about health-related needs [26].

The dispensing process actually has an important value in a pharmaceutical care service. Pharmacists have a responsibility to ensure that the drugs received are safe and effective for use. Therefore, pharmacists are required to do prescription screening [3].

Several problems were found, such as inability of patients with type 2 diabetes to read the instructions on the drug label that turned out to be one of the local predisposing factors of patients to poor medication adherence, even though the literacy rate in Malaysia was 93.1%. The instructions contained on the medication label at the hospital have relatively small fonts, making it difficult for patients to read them. Therefore, try to make modifications to the drug label. Drug labels are then made with larger fonts, and some are combining instructions on drug labels with pictograms [23].

Medication review

Medication review is a structured evaluation of patient medicines with the aim of optimizing the use of drugs and improving health outcomes. The scope of medication review includes the process of detecting drug-related problems (DRP) and recommending interventions [32]. Recommended interventions aim to help resolve problems and support patient knowledge and compliance [33]. Such interventions include adding and adjusting medicines. In one study in Malaysia it was found that the pharmacist had received approval from a doctor to adjust the insulin dose in 4 units of the dose determined at a time according to the patient’s blood glucose level if needed [25].

Most pharmacists in studies in Malaysia and Thailand conducted a medication review process [21], [22], [27], [29]. In a study conducted by Huri et al. Chung et al. and Chua et al. showed that the identification and assessment of DRPs is a form of pharmaceutical care conducted by pharmacists. Interestingly, pharmaceutical

care services in the Huri et al. and Chua et al. study were conducted collaboratively between clinical apoeker and patients, as well as with other healthcare team members. All of these people are involved in the process of designing, implementing, and monitoring therapeutic plans to produce the desired specific outcomes.

The identification of DRPs in the Huri et al. and Chua et al. studies was carried out based on the Pharmaceutical Care Network Europe (PCNE) tool version 5.01. Pharmacist intervention based on PCNE tool version 5.01 are grouped into no intervention, prescriber level, patient/carer level, drug level, and or other interventions or activities [34].

About 91.8% of participants from the Huri et al. and 53.7% of participants from the Chua et al. studies were identified as having at least one DRP. Meanwhile, the RCT study by Chung et al. proved that the medication review had a positive impact. The results showed that there was a significant difference between the control group compared with the intervention group on the value of fast blood glucose (9.0 vs. 7.2 mmol) and glycated hemoglobin (9.1% vs. 8.0%) and the positive effect on treatment compliance in the group intervention.

Drug information services

Drug Information Service is an activity of providing information on impartial drugs, critically evaluated, and with the best evidence in all aspects of drug use to other health professionals, patients, or the public. Information about medicines includes that of prescription medicines, OTC drugs, and herbs. Drug information usually includes dosage, dosage form, special formulation, route and method of administration, pharmacokinetics, pharmacology, therapeutic and alternatives, efficacy, safety of use in pregnant and lactating women, side effects, interactions, stability, availability, price, and physical or chemical properties of the medicine [35].

Pharmacists are healthcare professionals who have knowledge about drugs, so in practice they can provide information related to it. The study by Lee et al. showed that for people in Malaysia who had interacted with pharmacists, community pharmacists were seen as providers of quality health services and were able to provide professional medical advice. Participants felt that community pharmacists had sufficient knowledge to provide appropriate medical advice, and some recognized that community pharmacists had a better understanding of medicine than doctors [26].

Patient counselling and education

Most of the pharmacists in the study contributed to counseling and education for patients. Counseling is known to be one of the most common interventions (38.8%) compared with other interventions such as patient referral to prescriber (20.8%), educating patients about their disease (12.0%), recommending changes in dosage or frequency drugs or add other drugs (5.8%), and to monitor the patient's condition (5.0%) [27].

Counseling is an interactive process between pharmacists and patients/families to increase knowledge, understanding, awareness, and compliance so that behavior changes occur in the use of drugs and resolve problems faced by patients [35]. Pharmacists play an important role in educating patients through counseling that helps increase patient confidence and compliance [18], [20], [18]. The impact is not only on improving the quality of life but also on the level of patient satisfaction with DM care [18].

It is also emphasized by WHO that educating patients or people caring for patients about their treatment and conditions to ensure maximum benefit and safety of the therapy obtained is one form of pharmaceutical care that can help medication adherence [9]. Adherence to diabetes medications is known to have a significant relationship with glycemic control. Those who did not adhere to treatment had significantly higher fasting blood glucose levels [27].

The counseling process is carried out in a private counseling room [24]. Based on The Pharmaceutical Services Division, Ministry of Health Malaysia, the allocation of counseling space for pharmacists and patients has been established. The counseling area must be a well-appointed, private, and comfortable area, aiming to maintain patient privacy so that more effective communication occurs that helps improve patient comfort [36].

Pharmacists can provide counseling and education on a continuing basis. This education can educate participants to dispel their doubts and misunderstandings, which will lead to understanding and hence better treatment compliance [24], [27]. The educational process not only is a method to resolve DRPs at the patient/carer level but also helps patients recognize complications that may occur due to DM, such as diabetic neuropathy [16], [21], [27].

Types of education provided include the following: (1) disease prevention [15]; (2) knowledge of diseases (diabetes, hypertension, and hyperlipidemia) [19], [20], [21], [22], [24], [28], [29] and their complications [19], [20], [24]; (3) medication knowledge, such as direction for use, common/important side effects and how to overcome them, storage requirements, and use of insulin devices [15], [16], [19], [20], [21], [25], [29]; (4) therapeutic

targets [15], [25]; (5) the importance of medication adherence [17], [19], [21], [22], [24]; (6) how to use pillboxes [19], [21], [22]; (7) the importance of self-monitoring [16], [17], [19], [21], [22], [24]; (8) symptoms of hypo- and hyperglycemia and its treatment [20]; (9) lifestyle modification, such as smoking cessation, diet control, weight control, and exercise [16], [19], [20], [24], [27], [28]; and (10) foot care [15], [16], [20].

The need for education by pharmacists is expected by patients. Pharmacists are considered able to meet the information needs of DM management [19]. Seventy percent of patients who come to pharmacies expect educational services provided by pharmacists [15].

The tools to provide education also varied, starting in the form of booklet guides [25], diagrams [19], leaflets [28], and even DVDs [29], so that they are more easily understood by patients.

Monitoring diabetes care

Monitoring can be carried out on (1) compliance monitoring (including in terms of antidiabetic treatment, exercise and diet plans, chronic complications prevention/treatment plans, and scheduled medical monitoring) [15], [19]; (2) monitoring therapeutic outcomes (including checking records on self-monitoring of blood glucose (SMBG), patient blood glucose test results, BMI measurements, blood pressure measurements, and patient laboratory test results) [15], [18], [20], [25], and (3) monitoring of side effects [15], [27]. Although monitoring services provided by pharmacists are still limited, 50% of patient respondents in community pharmacies support activities related to monitoring and hope that pharmacists can provide more monitoring services [15].

Follow-up

Follow-up by the pharmacist aims to remind the patient to come back at the next appointment or remind to take medicine. Follow-up can be done through face to face visits, telephone calls, or SMS [17], [18], [25]. Every meeting with the pharmacist, patients will be given counseling and education. Follow-up was also carried out to help participants solve pharmaceutical care or DRP problems via telephone [22]. One patient described his experience of hypoglycemic events caused by drugs and how he contacted a pharmacist by telephone. The patient explains how the pharmacist is able to overcome his fear and provide appropriate advice to minimize the side effects of the drug [19].

The timeframe of face to face between patients and pharmacists varies in several studies, ranging from every 1 to 2 months [18], [20], [27] and every 3 to 4 months [22], [24]. Each face to face session with the pharmacist can last for 20–30 min [18].

Referral

Referral is carried out by the pharmacist according to the needs of the patient [15], [18], [19]. Pharmacists can refer patients to prescribers related to treatment and dietitian related to diet and exercise management [27]. The referral can also be carried out by the pharmacist from the preventive efforts made. In a study it was shown that subjects who had a diabetes risk score of 9 based on diabetes risk tools were advised to continue the fasting CBG test, and if an increase in fasting CBG was found (≥ 126 mg/dL), participants would be referred to the hospital and further examination and enforcement diagnosis by a physician [28].

All services provided by pharmacists are expected to be able to provide empowerment and motivation, thereby strengthening the seven self-management behaviors that are important for diabetes: healthy eating, being physically active, regular self-monitoring of blood glucose, adherence to medications, good problem-solving skills, risk-reduction behaviors, and healthy coping skills [37]. This behavior helps patients achieve their glycemic goals, which are very important for preventing diabetes-related morbidity and mortality [19].

Interestingly, from several studies, it was found that DM management was included in certain programs that were tried in each country, such as the Diabetes Prevention Program in Thailand [28], a pharmacist collaboration program with a doctor called Diabetes Medication Therapy Adherence Clinic (DMTAC) and Patient Education by Pharmacist Program (PEPP) in Malaysia [20], [24], [25], and Pharmacist-Managed Diabetes Services (PMDS) in Singapore [19]. Some studies also show that diabetes management has referred to the Diabetes Management Guidelines that are available. There are also those who develop DM content management such as PEPP, which combines the American Diabetes Association guidelines [38] with the Malaysian Ministry of Health guidelines [36]. At present, a small number of community pharmacies in Indonesia also strengthen DM management efforts through services for chronic diseases funded by the National Health Insurance Scheme [39].

Collaborative care can be performed between physician, dietitians, diabetes nurse educators, and clinical pharmacists. Collaborative and multidisciplinary teams are known to be most suitable for providing care for people with chronic conditions such as diabetes and can help patients to facilitate patient self-management [19]. Continuous and long-term support by health professionals is very important in helping patients sustain their efforts in diabetes self-management. Support for 2 years is shown to have an improvement on the quality of life of diabetic patients [40].

A team-based approach in the form of a visit is a delivery system design that moves from a reactive system to a proactive care delivery system that can optimize the care of patients with chronic illness. This concept has become part of the Chronic Care Model with Six Core Elements, as one of the concepts in diabetes management [41]. The relationship between participants, health care providers, and social support is a fundamental interpersonal factor that is closely related to treatment compliance. Some consultations with pharmacists allow the development and formation of better patient-pharmacist professional relationships. This consultation increases the confidence of the participants and therefore may contribute to improving medication adherence [22].

In Siaw et al.'s study, there is a concept that maps the division of roles between healthcare professionals in providing care to patients. Physicians play a role in diagnosing patients, assessing the severity of diabetes, and prescribing medications; dietitian plays a role in providing dietary counseling such as carbohydrate counting, choosing healthy foods, and weight management; clinical pharmacist plays a role in the management of CAREPILLS (Closer monitoring, Adherence problems, Resistance to drug therapy, Empowerment in patient's own therapy, Polypharmacy, Insulin titration, Lack in drug knowledge, Lack in drug administration techniques, and Switching of drugs), optimization of drug use using SIGN (Symptom-based Insulin adjustment for Glucose Normalization) algorithm, and furnishing prescriptions and telephone follow-up; and diabetes nurse educator plays a role in self-care counseling and basic screening in the feet and eyes [18]. The same division of tasks was carried out in the Chua et al. study of dietitians and nurses.

Other forms of collaboration in the study of Chua et al. and Chung et al. in Malaysia were demonstrated through communication between pharmacists and general practitioners (GPs) to discuss and if possible to assist in solving pharmaceutical care problems that could affect the clinical outcomes of participants. Meanwhile, the role of dietitian and nurse is also similar to the mapping found in a study in Singapore by Siaw et al.

Collaborative care is also carried out not only in managing the patient's diabetes condition but also in other possible risks that can occur due to diabetes. This was demonstrated in the Cardiovascular Risk Factors Intervention Strategies (CORFIS) trial program conducted in Malaysia. GPs, pharmacists, dietitians, and nurses collaborate in the process [27].

The results of collaborative care can help in reducing the average HbA_{1c} value of 0.8% in patients in the intervention group compared with the control group with the HbA_{1c} value that tends to not change, improvement in the Problem Areas in Diabetes (PAID) score and The Diabetes Treatment Satisfaction Questionnaires (DTSQ), a reduction in physician workload, and an average cost savings of US\$91.01 per patient were observed in the intervention group for 6 months [18].

The role of pharmacists in the management of DM in this narrative review can be part of the other roles of pharmacists that have been reviewed especially in developing countries in Southeast Asia, relating to pharmacists' contributions to the health of communities [42]

The Impact of the Pharmacist's Role

The impact of pharmacist contributions in DM management includes the following:

- a. Pharmacists contribute to the prevention of diabetes through screening people who are at risk of diabetes [28].
- b. The process of identifying DRP carried out by pharmacists is able to have an impact not only on the prevention of drug-related problems that may occur but also on the resolution of problems currently being faced by patients [21].
- c. Pharmacists are able to significantly increase clinical outcomes by decreasing HbA_{1c} values [20], [22], [24], significantly decreasing FBG values [20], [22], significantly decreasing LDL [20], and decreasing BMI in the intervention group [24].
- d. Pharmacists who are able to increase medication adherence are shown by increasing MMAS scores [20], [22], [24].
- e. Pharmacists are able to provide service satisfaction for patients. This is because pharmacists are able to meet the information needs of DM management and provide motivation for patients to change lifestyles for

the better, for example, through patient motivation to start exercising and eating healthy foods as well as motivation for routine self-monitoring [19].

Barriers to the implementation of services in DM management

Individual

In a promotive effort, a pharmacist needs to get training on effective approaches to patient education/behavior change so that it does not only focus on diabetes and lifestyle modification [28]. Training is also needed in the process of identifying pharmaceutical care problems, because it requires a long-time process. This can occur due to the lack of pharmacist experience in detecting and resolving pharmaceutical care issues (PCIs) [27]. In addition, the active participation of pharmacists in the treatment of DM cannot be separated from their knowledge, attitudes, and practices toward their current functioning. Therefore, these three components must be a concern for pharmacists in delivering pharmacy services [43].

Meanwhile, from the patient's perspective, the majority of participants were worried about the additional costs to be incurred from using community pharmacies for diabetes care, and for some people, this might prevent them from using the pharmacy despite the perceived benefits. There is also consideration whether this service will be commensurate with the amount charged. [26].

In addition, in several studies, language is one of the obstacles in providing services. Some patients are known to not speak Malay or English [24]. Countries in Southeast Asia are countries with populations of various ethnicities. In Malaysia and Singapore, for example, they consist of three main ethnicities, namely Chinese, Malay, and Indian [18], [22]. And Indonesia itself consists of various ethnic and ethnic groups, so there are diverse cultures in each region. This heterogeneous population is a unique characteristic in Southeast Asian countries. Apparently, this can be one of the considerations in determining appropriate health services, because it will affect the acceptance of a health service. Therefore, further studies are needed to evaluate the impact of ethnic differences, especially on glycemic control in countries in Southeast Asia [24].

Organizational

Community pharmacy in Thailand, for example, has not been formally integrated as part of the healthcare system [28]. Meanwhile, in Malaysia, the application of pharmaceutical care models on a broader scale can be limited by the healthcare infrastructure [22]. The high cost of glucometers and testing supplies that are not subsidized by the government prevents participants from conducting routine SMBG [26]. In the study in Malaysia, other obstacles to the current health system such as the overcrowded clinics, long waiting times, short consultation times, and long intervals for appointments can result in non-compliance with their medicines. As a result of this limitation, the patient-provider relationship also appears to be negatively affected [26].

In connection with professional organizations, negotiations from the Indonesian Pharmacists Association are needed regarding adequate remuneration for pharmacists so that services expected by the community can be implemented more optimally, based on payment schemes including very low prescription fees [15].

Public recognition

People in Thailand have reportedly not felt comfortable accessing health services [28]. In addition, patients in Malaysian community pharmacies do not always feel comfortable about receiving recommendations by community pharmacists to modify their treatment regimens. This is due to concerns about the provision of accurate recommendations by pharmacists because pharmacists do not have access to patient case records and laboratory data. However, another study showed that most participants appreciated the advice of community pharmacists as pharmacists were considered professional and accurate. Pharmacists as medical experts are considered sure to be able to conduct drug reviews, and this can be a step in ensuring the use of drugs that are safe and provide a sense of security for users. It is believed that pharmacists can detect signs of hyperglycemia, hypoglycemia, or early stages of diabetes complications and provide immediate treatment and referral recommendations [26].

Study limitations

Studies on this narrative review were found in only five countries in Southeast Asia based on the database used. Indeed there are still many types of pharmacist contributions in various settings. However, this narrative review is limited to studies based on keywords that are determined, so some contributions may not be summarized.

Most of the studies are also still carried out in a short period of time, so it is not yet possible to detect the complications of long-term diabetes, long-term effects, and the benefits of the contribution made by pharmacists.

Summary and outlook

Pharmacists play a role in contributing to the improvement of DM in various settings from the community pharmacy, the primary care, to the tertiary care. The types of pharmacist contribution included prevention, dispensing, medication review, drug information services, counseling and education, monitoring, follow-up, and referral. Various types of intervention by pharmacists and their impact can provide a broader view of the important role of the pharmacist as a healthcare professional in DM management. The more varied the pharmacist's intervention, the more it is known what approach is most appropriate in managing DM. This intervention is expected to help reduce the prevalence of DM. Therefore, action research on pharmacist intervention in DM management is recommended.

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References

- [1] World Health Organization (WHO). Global report on diabetes. 2016:21. Available at: http://apps.who.int/iris/bitstream/handle/10665/204871/9789241565257_eng.pdf;jsessionid=587D4B6F9513729EC30A29455BE78FAD?sequence=1. Accessed on 19 October 2019.
- [2] International Diabetes Foundation (IDF). Diabetes atlas, 7th ed. 2015:50–2. Available at: <https://www.idf.org/e-library/epidemiology-research/diabetes-atlas/13-diabetes-atlas-seventh-edition.html>.
- [3] Farland MZ, Byrd DC, McFarland MS, Thomas J, Franks AS, George CM, et al. Pharmacist-physician collaboration for diabetes care: the diabetes initiative program. *Ann Pharmacother* 2013;47:781–9.
- [4] Hughes J, Wibowo Y, Sunderland B, Hoti K. The role of the pharmacist in the management of type 2 diabetes: current insights and future directions. *Integ Pharm Res Pract* 2017;6:15–27.
- [5] FIP Workforce report. 2012. Available at: <http://apps.who.int/medicinedocs/en/m/abstract/Js20206en>.
- [6] Khunti N, Willies A, Davies M, Khunti K. The role of pharmacists in the management of type 2 diabetes: a literature review. *Diabetes Prim Care* 2013;15:131–40.
- [7] Cipolle RJ, Strand LM, Morley PC, editors. *Pharmaceutical care practice: the patient-centered approach to medication management*, 3rd ed. New York: McGraw-Hill Education, 2012.
- [8] World Health Organization. *New tool to enhance role of pharmacists in health care*. Geneva, Switzerland: WHO, 2006. Available at: <http://bit.ly/CXEbm>.
- [9] World Health Organization. *Adherence to long term therapies: evidence for action*. 2003:7–9, 27–30. Available at: <http://apps.who.int/medicinedocs/en/d/Js4883e/>.
- [10] Champbell RK. *Role of the pharmacist in diabetes management*. Bethesda, MD: American Society of Health-System Pharmacists, Inc., 2002.
- [11] Ayadurai S, Hattingh HL, Tee LB, Said SN. A narrative review of diabetes intervention studies to explore diabetes care opportunities for pharmacists. *J Diabetes Res* 2016;2016:5897452.
- [12] Anaya JP, Rivera JO, Lawson K, Garcia J, Luna J Jr, Ortiz M. Evaluation of pharmacist-managed diabetes mellitus under a collaborative drug therapy agreement. *Am J Health Syst Pharm* 2008;65:1841–5.
- [13] Ramser KL, Sprabery LR, George CM, Hamann GL, Vallejo VA, Dorko CS, et al. Physician-pharmacist collaboration in the management of patients with diabetes resistant to usual care. *Diabetes Spectrum* 2008;21:209–14.
- [14] The American Pharmacists Association and The National Association of Chain Drug Stores Foundation. *Medication therapy management in pharmacy practice: core elements of an MTM service model*. The American Pharmacists Association and The National Association of Chain Drug Stores Foundation, 2008.


- [15] Wibowo Y, Parsons R, Sunderland B, Hughes J. An evaluation of community pharmacy-based services for type 2 diabetes in an Indonesian setting: patient survey. *PeerJ* 2015;3:e1449.
- [16] Keban SA, Najuah N, Syamsudin A. The role of pharmacists in evaluating and intervening the patients with diabetic neuropathy. *Asian J Pharm Clin Res* 2017;10:127–31.
- [17] Adikusuma W, Nurul Q. Adherence level and blood sugar control of type 2 diabetes mellitus patients who gets counseling and short messages service as reminder and motivation. *Asian J Pharm Clin Res* 2018;11:219–22.
- [18] Siaw MY, Ko Y, Malone DC, Tsou KY, Lew YJ, Foo D, et al. Impact of pharmacist-involved collaborative care on the clinical, humanistic and cost outcomes of high-risk patients with type 2 diabetes (IMPACT): a randomized controlled trial. *J Clin Pharm Ther* 2017;42:475–82.
- [19] Siaw MY, Jing HT, Joyce Y, Chia L. Patients' perceptions of pharmacist-managed diabetes services in the ambulatory care and community settings within Singapore. *Int J Clin Pharm* 2018;40:403–11.
- [20] Lim PC, Lim K. Evaluation of a pharmacist-managed diabetes medication therapy adherence clinic. *Pharm Pract (Granada)* 2010;8:250–4.
- [21] Huri HZ, Lee CL. Drug-related problems in type 2 diabetes mellitus patients with dyslipidemia. *BMC Public Health* 2013;13:1192.
- [22] Chung WW, Chua SS, Lai PS, Chan SP. Effects of a pharmaceutical care model on medication adherence and glycemic control of people with type 2 diabetes. *Patient Prefer Adher* 2014;8:1185–94.
- [23] Chan HK, Mohamed AH. Modified labels for long-term medications: influences on adherence, comprehension and preferences in Malaysia. *Int J Clin Pharm* 2014;36:904–13.
- [24] Butt M, Adliah Ali M, Mohd MB, Norlaila M. Impact of a pharmacist led diabetes mellitus intervention on HbA_{1c}, medication adherence and quality of life: a randomised controlled study. *Saudi Pharm J* 2016;24:40–8.
- [25] Lim PC, Lim K, Embee ZC, Hassali MA, Thiagarajan A, Khan TM. Study investigating the impact of pharmacist involvement on the outcomes of diabetes medication therapy adherence program Malaysia. *Pak J Pharm Sci* 2016;29:595–601.
- [26] Lee EL, Wong PS, Tan MY, Sheridan J. What role could community pharmacists in Malaysia play in diabetes self-management education and support? The views of individuals with type 2 diabetes. *Int J Pharm Pract* 2018;26:138–49.
- [27] Chua SS, Kok LC, Yusof FA, Tang GH, Lee SW, Efendie B, et al. Pharmaceutical care issues identified by pharmacists in patients with diabetes, hypertension or hyperlipidaemia in primary care settings. *BMC Health Serv Res* 2012;12:388.
- [28] Dhippayom T, Anjana F, Sirirat T, Nathorn C. Opportunistic screening and health promotion for type 2 diabetes: an expanding public health role for the community pharmacist. *J Public Health* 2012;35:262–9.
- [29] Saengcharoen W, Rita M, Sanguan L. Assessment of multimedia-supported intervention in Muslim diabetic patients treated with insulin. *Int J Diabetes Dev Ctries* 2016;36:327–33.
- [30] Otgontuya D, Sophal O, Enkhtuya P, Manju R, Brian SB. Individual-based primary prevention of cardiovascular disease in Cambodia and Mongolia: early identification and management of hypertension and diabetes mellitus. *BMC Public Health* 2012;12:254.
- [31] Fathelrahman AI, Mohamed IM, Albert IW. *Pharmacy practice in developing countries: achievements and challenges*. London: Elsevier, 2013.
- [32] Mammen NG, Kurt EH, Markus M, Salja L, Nej H, Foppe, Mitja K. PCNE definition of medication review: reaching agreement. *Int J Clin Pharm* 2018;40:1199–1208.
- [33] Blenkinsopp A, Bond C, Raynor DK. Medication reviews. *Br J Clin Pharmacol*. 2012;74:573–80.
- [34] Pharmaceutical Care Network Europe Foundation (PCNE). PCNE classification for drug-related problems version 5.01. 2006. Available at: <http://www.pcne.org/sig/drpd/documents/PCNE%20classification%20V5.01.pdf>.
- [35] Kemenkes RI (Indonesian Ministry of Health). Peraturan Menteri Kesehatan Nomor 73 Tahun 2016: Standar Layanan Kefarmasian di Apotek (Minister of Health Regulation Number 73 In 2016: Standards for Pharmaceutical Care In Community Pharmacies). Jakarta: KemenkesRI, 2016.
- [36] Malaysian Ministry of Health. Management of type 2 diabetes mellitus. 2013. Available at: <http://www.moh.gov.my/attachments/3878.pdf>.
- [37] American Association of Diabetes Educators (AADE). AADE7—self-care behaviors: American Association of Diabetes Educators (AADE) position statement. 2014. Available at: <https://www.diabeteseducator.org/docs/default-source/practice/practice-resources/position-statements/aae7-self-care-behaviors-position-statement.pdf?sfvrsn=6>
- [38] American Diabetes Association (ADA). Standards of medical care in diabetes. *Diabetes Care* 2013;36(Suppl 1):S11–66.
- [39] Hermansyah A, Erika S, Ines K. Investigating the impact of the universal healthcare coverage programme on community pharmacy practice. *Health Soc Care Community* 2018;26:e249–60.
- [40] Tang TS, Funnell MM, Noorulla S, Oh M, Brown MB. Sustaining short-term improvements over the long-term: results from a 2-year diabetes self-management support (DSMS) intervention. *Diabetes Res Clin Pract* 2012;95:85–92.
- [41] American Diabetes Association (ADA). Standards of medical care in diabetes. USA: The American Diabetes Association, Inc., 2018.
- [42] Hermansyah A, Erica S, Ines K. Community pharmacy and emerging public health initiatives in developing Southeast Asian countries: a systematic review. *Health Soc Care Community* 2016;24:e11–22.
- [43] Athiyah U, Catur DS, Gesnita N, Elida S, Wahyu U. Assessment of pharmacists' knowledge, attitude and practice in chain community pharmacies towards their current function and performance in Indonesia. *Pharm Pract* 2019;17:1518.

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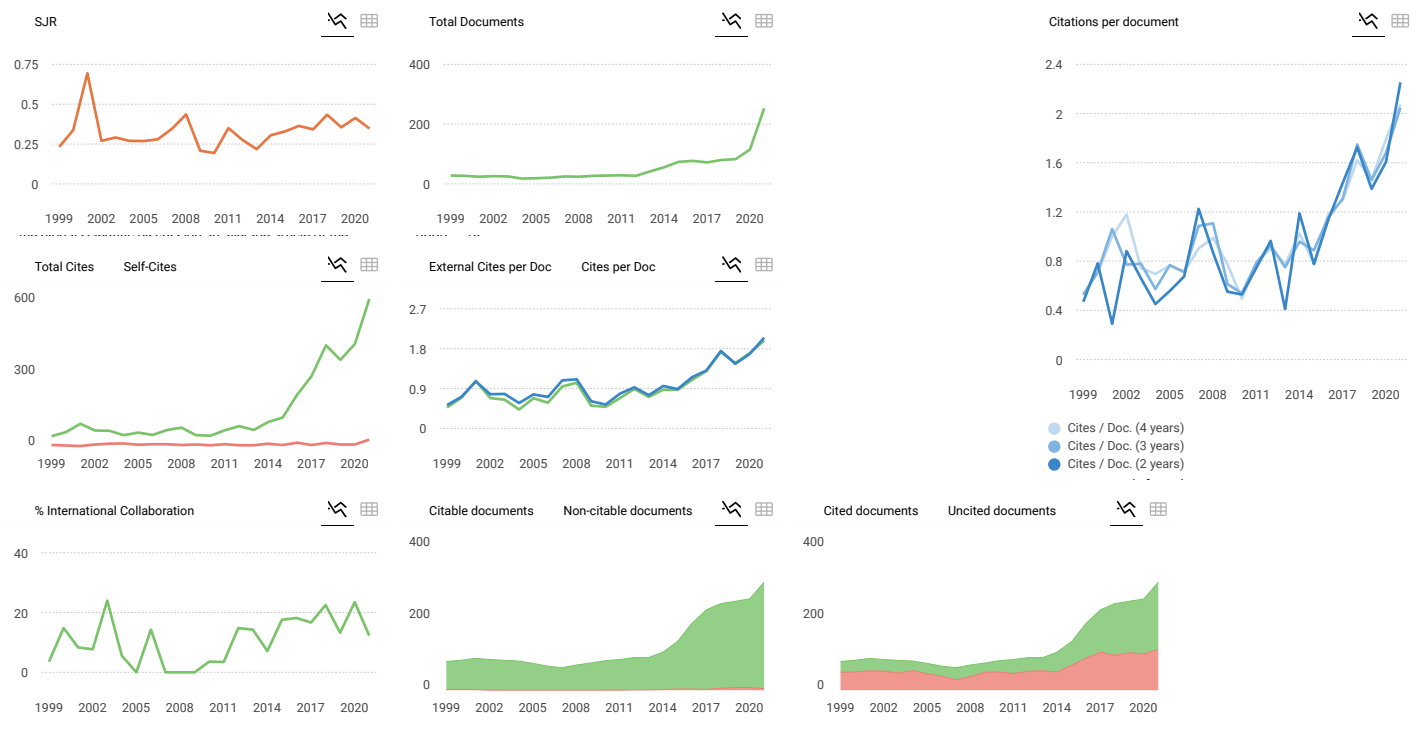
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D **Daniel Orieko** 3 years ago

Please how do you get original article submitted.

reply



Melanie Ortiz 3 years ago

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D **dr jhanvi vaghela** 3 years ago

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