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## ABSTRACT

*Aim:* To explore and synthesise evidence of the literature about healthcare professionals involved in the provision of diabetes management within an Indonesian context.

*Background:* Indonesia is challenged to control the major burden of diabetes prevalence rate that requires a multidimensional approach with the aim to optimise existing health services by involving healthcare professionals who can promote access and provide diabetes management.

*Methods:* This literature review, which is integrated with a scoping study framework, used the electronic databases including CINAHL, PubMed, Scopus and Web of Science to locate papers particular to the Indonesian context. From the total of 568 papers found, 20 papers were selected.

*Results:* The literature review identified physicians, nurses, pharmacists, dieticians and diabetes educators as the providers of diabetes care and management in Indonesia. Collaborative management involving either inter-disciplinary or intra-disciplinary teams, was mentioned in several papers. Internal challenges included: limited skills and knowledge. External challenges included: high patient volumes; a shortage of healthcare professionals and reduced funding.

*Conclusions:* Overcoming the challenges cannot be undertaken with a workforce dominated by any one single healthcare profession. Coordinating with the government to improve the implementation of different roles in diabetes management will improve patient outcomes and thus reduce the burden of diabetes.

*Implication for nursing and health policy:* Health policy reform should support nurses and other healthcare professionals in their professional development at all levels of healthcare. Policy makers can use the review findings to modify the current healthcare system to address key issues in: workforce development; funding for services and medications; and fostering multidisciplinary care for diabetes management.

*Keywords:* Chronic Disease Care; Developing Countries; Diabetes; Health Service Management; Indonesia; Literature Review; Nursing; Nursing Roles; Scoping Review

## Introduction

The International Diabetes Federation (IDF) reports that diabetes presents an enormous global burden, with a global prevalence rate of 8.3% and 387 million people living with this disease (IDF 2013; IDF 2014). While developed countries have only a 20% increase in diabetes cases, it is predicted that Indonesia and other developing countries will have a 69% increase within three decades (Shaw et al. 2010).

In Indonesia, diabetes is widely acknowledged as a population health problem. The World Health Organization (WHO) reports that since 2012, diabetes has been a major cause of death in Indonesia (WHO 2014). Indonesia was ranked ninth in the world in terms of having people living with type 1 and type 2 diabetes mellitus in 2010. The same report indicates that by 2030 this ranking will increase to sixth position, with a projected 12 million affected adults (Shaw et al. 2010). However, research results on diabetes prevalence rates usually do not distinguish between diabetes type one and two (National Institute for Health Research and Development 2013; Mihardja et al. 2014; Soegondo et al. 2011).

Age, family history, obesity, smoking, hypertension, gender and physical activity are identified as diabetic risk factors for the Indonesian population (Mihardja et al. 2009; Soegondo et al. 2011). With a relatively low health expenditure on managing diabetes, adequate resources (Zhang et al. 2012) and wide-ranging approaches are required for screening, preventing and managing diabetes and the

complications (Mihardja et al. 2014). These management approaches need to involve healthcare professionals (HCPs) from various health disciplines (Soewondo et al. 2010), as recommended by the WHO (2016) and the IDF (2012).

Diabetes management, which focuses on glycaemic control through lifestyle modification and medication, requires a person-centred approach that involves multi-disciplinary HCPs (Chatterjee & Davies 2015). The benefits of multi-disciplinary teams include: complementary skills; better developed relationships between HCPs; and most importantly, the person with diabetes having improved access to assessment and treatment via additional contacts; all of which results in the person being more supported in their self-management (Ritholz et al. 2011). While Ritholz et al.'s (2011) study provides a solid case for multi-disciplinary teams, Shortus et al. (2007) found that a lack of collaboration between HCPs providing care to people with diabetes was a problem with some team members unconvinced that collaboration would improve health care delivery in fulfilling individuals' complex care requirements, instead suggesting that working together in this way may decrease the potential for holistic care. The contradiction in the evidence base concerning the provision of care to Indonesian people living with diabetes indicates a gap in understanding about each HCPs' role. Identifying the role that each can play in this complex space will provide clarity, avoid role overlap and reduce the likelihood of any one HCP's role becoming dominant. With the global shortage of HCPs able to provide care for those living with diabetes (IDF 2013), a shortage that includes Indonesia (Soewondo et al. 2013), it is important to profile HCPs with expertise in diabetes care as described in the Indonesian literature.

## **Background**

As a low to middle income developing nation, Indonesia is challenged to control immense burdens of both communicable diseases and chronic diseases (Ministry of Health Republic of Indonesia 2015). These double burdens require a multidimensional approach (Bygbjerg 2012) with the aim to optimise existing health services. Thus, HCPs can promote access and provide diabetes management for all Indonesians living with diabetes.

In Indonesia, diabetes services are managed at various levels of the health care system. People with diabetes usually go to *Puskesmas* (Public/Community Health Centres) to have their diabetes treated (Widyahening et al. 2014). Once provided with a referral, people can choose to either go to a secondary or tertiary health care setting to access outpatient and inpatient services, from either a public or private hospital (Soewondo 2011; Hartayu et al. 2012). Healthcare service accessibility is a concern for everyone, not just those with diabetes. Indonesia still struggles with health coverage as not all Indonesians are covered by insurance, especially in remote areas (Kanbara et al. 2008) and only 63% of Indonesians are covered by particular forms of health insurance that pay for chronic care (Simmonds & Hort 2013).

A comprehensive national strategy for diabetes management is required for diabetes prevention and its treatment (Mihardja et al. 2014). The WHO also emphasise that skilful HCPs should provide accessible diabetes care both systematically and continuously (WHO 2016), ideally within a multidisciplinary team (IDF 2012). There is, however, limited information about which HCPs are providing diabetes care in Indonesia. A previous literature review on diabetes management in Indonesia (Soewondo et al. 2013) mentioned only a few healthcare disciplines and did not provide any specific job descriptions for these roles, giving rise to the concern that there may well be other HCPs involved in diabetes care in Indonesia whose role has not yet been identified, let alone described (Soewondo et al. 2013). There is also little evidence of models of multidisciplinary diabetes care provision, with the national diabetes clinical practice guideline only focusing on a single health discipline; medicine (Rudijanto et al. 2011; Indonesian Diabetes Association 2014). It is vital therefore to explore which HCPs are involved in providing diabetes management and provide a clear description of their roles and the challenges they encounter in deploying their expertise. This work would provide a strong foundation for making

recommendations about the role each HCP should perform to support an ideal diabetes care model of service, in the Indonesian context.

### **Study Aim**

This review aims to explore and synthesise scholarly literature about HCPs involved in the management of diabetes within an Indonesian context.

### **Methods**

This scoping review paper provides a summary, explanation and interpretation of the breadth of the currently available qualitative and quantitative evidence that addressed the review questions. A scoping study framework uses a systematic approach with five distinct steps as detailed below, and does not limit the review to only primary research papers, but allows relevant, high quality grey literature to also be considered (Arksey & O'Malley 2005; Mays et al. 2005). This method enables the review to extract divergent data and develop it in a meaningful, transparent and systematic way (Grant & Booth 2009). The five essential steps are:

1. Identifying the research question(s)
2. Identifying relevant studies
3. Selecting the studies
4. Making a data chart
5. Collating, summarising and reporting the results

The following inclusion criteria were used: peer reviewed research and non-research papers including grey papers (such as government or organisational reports) providing information about HCPs caring for adults with diabetes type 1 and type 2; the role that HCPs perform when caring for adults with diabetes type 1 and type 2; be situated in the Indonesian context; and be written in both English and Indonesian languages. Conversely, exclusion criteria were papers reporting: laboratory based research about diabetes; children with diabetes; studies involving animal testing and diabetes; and papers discussing diabetes in conjunction with other chronic diseases.

#### **Step 1: Identifying the Research questions**

By having well-defined research questions, the scope of the studies included will be both practical and effective (Levac et al. 2010). For this review, three research questions were addressed:

1. Who are the HCPs that provide care for people living with diabetes mellitus in Indonesia?
2. What roles do different HCPs undertake when providing diabetes management?
3. What challenges do HCPs encounter during the provision of diabetes management?

#### **Step 2: Identifying relevant published papers**

Before identifying relevant papers, the authors determined keywords based on the research questions. The keyword “diabet\*”, from MeSH was used together with the following keywords: “healthcare professional\*”, “healthcare personnel\*”, “management”, “service\*”, “care” and “Indonesia\*”. Electronic databases including CINAHL, PubMed, Scopus and Web of Science and other sources like Google Scholar and Research Gate were searched using these terms to locate papers particular to the context of Indonesia that met the inclusion criteria. A hand search was also performed to locate papers ancestrally by searching specific journals and identified papers or reviews. Publication dates were limited to 1970 to 2016 because a diabetes association was formed in Indonesia in the early 1970s, increasing knowledge and awareness of the condition and marking a new phase in the provision of health care services and treatments.

### **Step 3: Selecting relevant papers**

From the search, 567 papers were found (430 in English and 137 in Indonesian language). Among this number, 134 papers were duplicates. After removing duplicate papers, 433 papers were assessed as meeting the inclusion criteria. These 433 papers were further examined based on the inclusion criteria by reading the titles and abstracts. Moreover, one grey papers were obtained and were added together with the screened papers. The total of 50 peer reviewed papers (2 of which were in the Indonesian language) and one grey paper were recorded and were read in full before finally selecting those eligible for a full review. After the full texts were read and assessed against the review questions, 20 papers were deemed suitable for inclusion in the final data set. The selection of relevant papers was based primarily on the research questions, rather than a critical appraisal process, although a minimum standard of quality was required for inclusion. The reviewed research papers' quality is usually not appraised in a scoping review as the review seeks the breadth of all available material (Arksey & O'Malley 2005; Grant & Booth 2009). Undertaking detailed methodological critiques of the studies may unduly limit the number of selected papers, and thus inappropriately exclude papers that would still provide rich information to answer the research questions; therefore it is suggested to include a wide range of methods and study designs to provide an appreciation of the scope or extent of literature available on a thinly researched topic (Arksey & O'Malley 2005). The procedure used to select the included papers is displayed in figure 1.

### **Step 4: Data charting**

Each of the included 20 full text papers were read thoroughly, several times, in order to capture all the relevant information and to ensure no important information was missed. A data set from the papers was constructed by extracting findings relevant to the questions asked. The data set was refined regularly by considering whether the extracted data were consistent with the review questions and the study aim. The extracted dataset was categorised using: authors, study aims, study design, participants or sample, and themes in a practical table (Table 1). The design of this data set was discussed among the review authors to ensure all relevant information was included.

### **Step 5: Collating, summarising and reporting of results**

The NVivo software (QSR International 2016) was used to organise extracted data and aid the authors in coding data extractions and consequently developing responses to the questions asked. Arksey & O'Malley (2005) state that there are various way to collate and summarise, including organising the data thematically. Thematic analysis helped to recognise, analyse and narrate patterns identified in the data set (Braun & Clarke 2006). The themes reflect the key concepts that occurred repeatedly in the texts (Mays et al. 2005) and answered the questions posed.

## **Results**

A total of 20 papers were reviewed. Almost all of the studies were quantitative studies and included both experimental (Ng et al. 2010; Pemayun et al. 2015; Pranoto et al. 2015; Sae-Sia et al. 2013) and non-experimental (Adriono et al. 2011; Arisandi et al. 2016; Haryanto et al. 2016; Padmawati et al. 2009; Radji et al. 2014; Yusuf et al. 2013) designs, which investigated the assessment, management and risk factors for diabetes. Interestingly, the oldest paper regarding HCP profile was published in 2000. After reviewing the literature, three major themes were developed: diabetes healthcare professionals; roles of diabetes healthcare professionals; and challenges encountered by diabetes healthcare professionals. These themes are explained as follows.

## **Diabetes Healthcare Professionals**

All papers, except one (IDF 2014), identified several HCPs as responsible for caring for people with diabetes. These included: physicians; nurses; pharmacists; dieticians; and diabetes educators. Physicians were mentioned in most of the reviewed papers (n=16) and comprised both general practitioners (GPs) and specialised doctors such as internists, endocrinologists, infectious disease specialists, vascular surgeons, plastic surgeons, cardiologists and orthopaedic surgeons. Conversely, nurses were almost invisible in the context of the literature concerned with diabetes in Indonesia. Some papers (Arisandi et al. 2016; Haryanto et al. 2016; Pemayun et al. 2015; Sae-Sia et al. 2013; Soewondo et al. 2013; Yusuf et al. 2013) briefly mentioned the role of nurses in managing diabetes complications, such as diabetic foot ulcers. Most papers described nurses working in private clinics rather than in public hospitals (Arisandi et al. 2016; Haryanto et al. 2016; Yusuf et al. 2013). Only three studies described pharmacists as diabetes HCPs (Wibowo et al. 2015a; Wibowo et al. 2015b; Radji et al. 2014). These pharmacists worked in tertiary settings (hospital pharmacies) and primary settings (stand-alone pharmacies or a pharmacy integrated with a private clinic). Dieticians were also discussed in two papers reporting wound management for people with diabetes in a hospital setting (Pemayun et al. 2015; Purnamasari & Waspadji 2009). Similarly, another two papers investigated diabetes educators, but they did not specify the type of health care setting. These two papers were published 17 years apart indicating the paucity of research being conducted in this area (Malini et al. 2017; Sutanegara et al. 2000).

## **Roles of Diabetes Healthcare Professionals**

The second review question asks what role each of these HCPs undertook when providing diabetic care. To answer this question, the literature was examined for specific activities and duties that each HCP performed when providing diabetic management to people in Indonesia. The role most evident in the literature, physician, will be discussed first.

The physician's role was prevalent in most of the papers reviewed (Adriono et al. 2011; Faillace et al. 2012; Ng et al. 2010; Padmawati et al. 2009; Pemayun et al. 2015; Pranoto et al. 2015; Purnamasari & Waspadji 2009; Sae-Sia et al. 2013; Soewondo et al. 2013; Soewondo et al. 2010; Wibowo et al. 2015b; Widyahening et al. 2014). The role of the physician included undertaking examinations, providing treatment and counselling individuals with diabetes. The physician played an important role in referring people with diabetes to a higher level of care that better suited their needs, for example from a primary health care (PHC) facility to a secondary healthcare facility (Pranoto et al. 2015) or to a specialist physician, such as an ophthalmologist (Adriono et al. 2011). The physician's role included screening people for diabetes, diagnosing diabetes and conducting specific examinations such as eye and foot examinations (Faillace et al. 2012; Sae-Sia et al. 2013; Adriono et al. 2011).

The physician's role also included providing treatment in the form of prescribing medication and providing wound management services to people with diabetes, who may or may not have experienced complications. Providing counselling (Padmawati et al. 2009; Ng et al. 2010) and education (Sutanegara et al. 2000) to people with diabetes was also articulated in the literature. This type of consultation was largely about diet and medication (Padmawati et al. 2009), and information on smoking cessation related to diabetes or diabetic foot care was also mentioned, but less often (Padmawati et al. 2009; Sae-Sia et al. 2013; Ng et al. 2010).

Generally, the role of nurses in diabetes management was poorly described in the literature. However, when discussing people who were experiencing specific complications, for example a diabetic foot ulcer, the role became more evident. Three papers explained the role that wound care nurses undertook to assess diabetic foot ulcers; this mostly occurred in the setting of private clinics (Sae-Sia et al. 2013; Arisandi et al. 2016; Haryanto et al. 2016). Predominately the literature showed that assessing diabetic foot ulcers was undertaken by either a physician and/or a nurse. However, one paper written by Yusuf et al. (2013) described the role of nurses employed in a wound care clinic that did not provide medical

treatment. The nurses worked quite independently, providing a high standard of wound assessment care. A collaborative working relationship between nurses and physicians (dermatologists) was also represented in Arisandi et al.'s (2016) study, which described the development of a valid instrument in assessing diabetic foot ulcer.

Two papers have reported that one established role of a pharmacist is dispensing medications and providing education to people on how to take and use their medications correctly and safely (Wibowo et al. 2015a; Wibowo et al. 2015b). Another more specific role of the pharmacist, is in the prevention of diabetic foot infections (Radji et al. 2014). Two studies found that pharmacists advocated to extend their role to include assessment, patient education, treatment and monitoring of people with diabetes (Wibowo et al. 2015a; Wibowo et al. 2015b). While pharmacists thought the extension of their role was important, the majority of the physicians did not support this extended role; for example, one physician in Wibowo et al.'s (2015b) study thought that the extended role would be impractical as physicians did not agree with the recommendations made by pharmacists.

A stand-alone role for the dietician was not evident in the literature. In Pemayun et al. (2015), the role of the dietician was only generally described as working collaboratively with other hospital HCPs in delivering wound management as per standard wound care protocols, with no specific tasks delineated. In contrast, Purnamasari & Waspadji (2009) clearly stated the role of the dietician was to provide nutritional therapy for people with diabetic foot ulcers.

Similar to the dietician, the diabetes educator's role was only briefly stated in two secondary sources (Malini et al. 2017; Sutanegara et al. 2000). Both papers highlighted the scarcity of diabetes educators. Furthermore, a number of different types of HCPs can choose to become diabetes educators by undertaking further education in this area. Malini et al. (2017) and Sutanegara et al. (2000) did not explain what the original role of the HCPs were in these papers, prior to them becoming diabetes educators; nor clearly delineated their new diabetes education role.

Collaborative management involving either inter-disciplinary (Arisandi et al. 2016; Haryanto et al. 2016; Pemayun et al. 2015; Purnamasari & Waspadji 2009) or intra-disciplinary teams (Adriono et al. 2011; Faillace et al. 2012; Soewondo et al. 2010) were mentioned in several papers. An inter-disciplinary collaboration of a dermatologist and a nurse wound specialist resulted in the development of a valid instrument for assessing diabetic foot ulcers (Arisandi et al. 2016) and Pemayun et al. (2015) explored how a team of medical, nursing and nutrition HCPs helped to manage people who had diabetic foot ulcers while monitoring their risk for amputation. Purnamasari & Waspadji (2009) illustrated how medical and nutrition teams worked together to manage diabetic foot ulcers for people living with diabetes, by providing holistic care that included pressure relief management, nutrition therapy, antibiotic provision, wound care and patient education. Two papers described intra-disciplinary collaboration of the physicians' established role in different hospital departments, such as the endocrinology clinic and eye clinic (Adriono et al. 2011; Faillace et al. 2012). Both clinics worked collaboratively to provide diabetes education and eye examination to people newly diagnosed with diabetes and annual screening for people previously diagnosed.

### **Challenges Encountered by Diabetes Healthcare Professionals**

This review has recognised several challenges faced by HCPs in managing diabetes in Indonesia. The challenges are classified into internal and external challenges.

#### *Internal challenges*

Malini et al. (2017) highlighted limited skill of HCPs in delivering diabetes education. The authors asserted that a lack of skill was the result of inadequate training and further described that existing clinicians who provided diabetes education did not have specific training about diabetes and therefore delivered unstructured diabetes education.

Actual limited knowledge and skill in providing diabetes care was also reported in Pranoto et al. (2015), who studied the safety and efficacy of insulin therapy initiation provided by GPs. Pranoto et al. (2015) argued that GPs had limited knowledge in dispensing insulin at PHC clinics and more specifically reported deficits in the areas of indication, dosage, regimen selection, blood glucose self-monitoring and insulin side effects. Fear of the adverse side effects of insulin therapy also made GPs more hesitant to provide insulin in PHC settings (Pranoto et al. 2015).

Besides the actual limited knowledge and skill, perceived limited knowledge and skill was also identified. Wibowo et al. (2015b) claimed that other HCPs were reluctant to support pharmacists in taking on extended roles in direct patient care due to pharmacists' perceived lack of knowledge. In Faillace et al. (2012), physicians were perceived to have limited skill and knowledge in alerting people to the risk of diabetic retinopathy as well as the need for eye screening. Regardless of whether the people have diabetic retinopathy or not, they need to have their eyes checked regularly every year (Faillace et al. 2012).

### *External challenges*

High patient volumes and a shortage of HCPs are still major issues challenging the provision of diabetes healthcare in Indonesia. An overload of people with diabetes has resulted in HCPs having limited time to screen all people with diabetes for diabetic neuropathy (Soewondo et al. 2010) and even to educate people with diabetes individually (Sutanegara et al. 2000). There is also an unequal number of HCPs working in urban and rural areas (Soewondo et al. 2013). For example, diabetes educators are mostly located in major cities (Malini et al. 2017; Sutanegara et al. 2000).

Underfunding was cited as another challenge faced by HCPs in managing diabetes (Soewondo et al. 2013). Underfunding contributes to reduced distribution of medications to all geographic areas of Indonesia and in certain health care levels, for example insulin is not distributed to PHC settings or “*Puskesmas*” (Pranoto et al. 2015; Soewondo et al. 2013).

## **Discussion**

The current scoping review is the first to describe the profile of HCPs working in diabetes care in Indonesia. Information about the role that each HCP performs has also been described. Significant findings from the reviewed papers indicated that some systemic improvements are required for HCPs to better manage and care for Indonesian people with diabetes; the suggested areas for improvement vary, depending on the HCP in question.

The literature reviewed in this paper has shown the physician has an established and visible role, opposed to other diabetes HCPs, whose roles were less visible. Even though the role of physicians is more evident in the literature as compared to other HCPs, it does not mean the role of other HCPs is insignificant or non-existent. It merely implies that the role of the physician has been studied more extensively in the literature in reference to the Indonesian context. Other HCPs roles were identified in the literature, however, these roles still need development in the areas of providing patient information and providing diabetes care, for example diabetes foot care (Sae-Sia et al. 2013).

The literature has suggested that both intra-disciplinary and inter-disciplinary working relationships need to be maintained and improved (Radji et al. 2014; Wibowo et al. 2015b). A collaborative multidisciplinary team is recommended and required for systematic diabetes care (IDF 2012; WHO 2016). Maintaining collaborative working relationships is important for helping each HCP to fully contribute to overcoming the massive burden of diabetes in Indonesia. Collaborative working relationships need to foster the creation of a comprehensive diabetes management plan for individual people that includes: education, medication, exercise and diet. Involving HCPs from multiple



disciplines will improve patient outcomes and cost effectiveness (Bratcher & Bello 2011). Moreover, intra- and inter-disciplinary collaborations are vital in preventing people with diabetes from developing secondary complications; for example nurses working collaboratively with a wound nurse specialist to monitor people at risk of a diabetic foot ulcer and also facilitating individuals to self-manage foot care at home.

The literature reviewed here indicated that HCPs have a lack of skills and knowledge in providing diabetes care and informing people with diabetes of its risks (Faillace et al. 2012; Sutanegara et al. 2000; Wibowo et al. 2015b). Lack of skill and knowledge was recognised by the HCP themselves or by another group of HCPs; it may then lead to a reluctance to respect and concur with their recommendations (Wibowo et al. 2015b). It is therefore vital for the HCPs to continually increase their skill and knowledge specific to diabetes, because the formal education they have received about diabetes care may not be adequate (Livingston & Dunning 2010) to manage complex diabetic presentations. Having specific skills is necessary to complement each other's roles (Gucciardi et al. 2016) and to improve diabetes care (Ugur et al. 2015). Thus, HCPs need to be more highly skilled in managing people with diabetes with physical complications or psychological impacts in a creative way, especially those who live in rural and remote areas having a deficit of either human or non-human resources.

Unequal distribution of diabetes expertise occurs among clinical settings and among geographic areas where the concentration of diabetes expertise is greater in urban areas than rural areas (Soewondo et al. 2013). Conversely, the diabetes prevalence rate in rural areas is higher compared to urban areas (National Institute for Health Research and Development 2013). Despite a geographical issue in accessing rural areas, the unequal distribution can be further exacerbated by low salaries for HCPs and is hampered by either low health workforce production and/or reduced HCP graduates' employment capacity (Kanchanachitra et al. 2011). It is the responsibility of government to reform the policy that supports both HCPs and people with diabetes by increasing, supporting and appreciating the commitment of HCPs working in rural areas; for example ensuring the cost of living in rural areas does not outweigh the salary.

While filling the positions for HCPs in rural areas is one problem, it becomes even more imperative to equip those few currently available HCPs with specific, comprehensive diabetes related knowledge and skills through professional development training. In poor resource areas, it may not be possible to increase the number of HCPs, so a more workable solution can be to increase the skill of the existing HCPs, as another way to achieve a skilful multidisciplinary care team (WHO 2016). Provision of continuing professional education can motivate HCPs working in rural areas (Efendi 2012). As there is an imbalance of expertise at all health care levels, HCPs working in PHC settings should have their skills improved in order to enhance their roles.

In a developing country like Indonesia, a substantial problem hindering the optimum implementation of HCPs' roles is funding issues such as health insurance, affordable diabetes medications for people with diabetes and updating the HCPs' skills. Acknowledging diabetes as a national problem is imperative to ensure that there will be a fair proportion of funding allocated for diabetes management, especially for people with low incomes and/or living in rural or remotes areas. Also, investing human and non-human resources in developing countries is recommended for the prevention of diabetes complications (Ezenwaka et al. 2014) by financially supporting the HCPs to update their skills regularly. Consequently, creative and skilful HCPs will still be able to perform their important role despite the lack of resources available.

### **Strengths and Limitations**

A strength of this literature review is that the search was very comprehensive, dating back to 1970. At this time, there was increasing awareness of diabetes in Indonesia that gave rise to the founding of the Indonesian Diabetes Association in 1976. Another strength is that the search included both Indonesian

and English language papers. While, the electronic databases used may have limited the number of Indonesian language papers located; the use of Google Scholar and Research Gate mitigated this effect.

### **Implications for education, nursing practice, health policy and research**

This review underlines the challenges faced by HCPs' that arise from having limited skills and knowledge in diabetes care (Malini et al. 2017; Pranoto et al. 2015). HCPs need to participate in continuing professional education to more expertly manage people with diabetes, particularly those with secondary complications. This strategy will also help address the shortage of HCPs in both rural and urban geographical areas because each available HCP will be more highly skilled. Healthcare facilities' administrators should provide opportunities for HCPs to continue their professional development.

Only two papers suggested that working collaboratively to provide diabetes care, should be maintained and improved (Radji et al. 2014; Wibowo et al. 2015b). Multidisciplinary collaborations are vital in preventing people with diabetes from developing secondary complications. Therefore, health care facilities in both rural and urban areas should establish a model of multidisciplinary teams that consist of HCPs who are highly skilled in providing care to people with diabetes.

Nationally, health policy reform must increase funding and improve insurance coverage to cover the cost of diabetes medications and to support HCPs in their professional development, at all levels of healthcare. Also, findings from this review can be used to inform health policy makers, both in Indonesia and in other countries with similar disease profiles and resourcing challenges, to modify their current healthcare systems. Modifications should address: ensuring an adequately sized, highly skilled diabetes workforce; more appropriate distribution of the workforce across all levels of care and all geographic locations; and fostering both structural and philosophical changes that will establish and sustain true multidisciplinary care.

There were limited studies about what types of tasks the Indonesian nurse performed in the care of people with diabetes. Therefore, it is crucial to conduct research in this area to fully understand the nurses' role in this context. Increasing visibility of the role of the nurse will also serve to illustrate and acknowledge the significant work that nurses do in this area, both nationally and internationally. Illuminating the role of the nurse may be helpful in developing more feasible models of care to promote high quality diabetes management.

### **Conclusion**

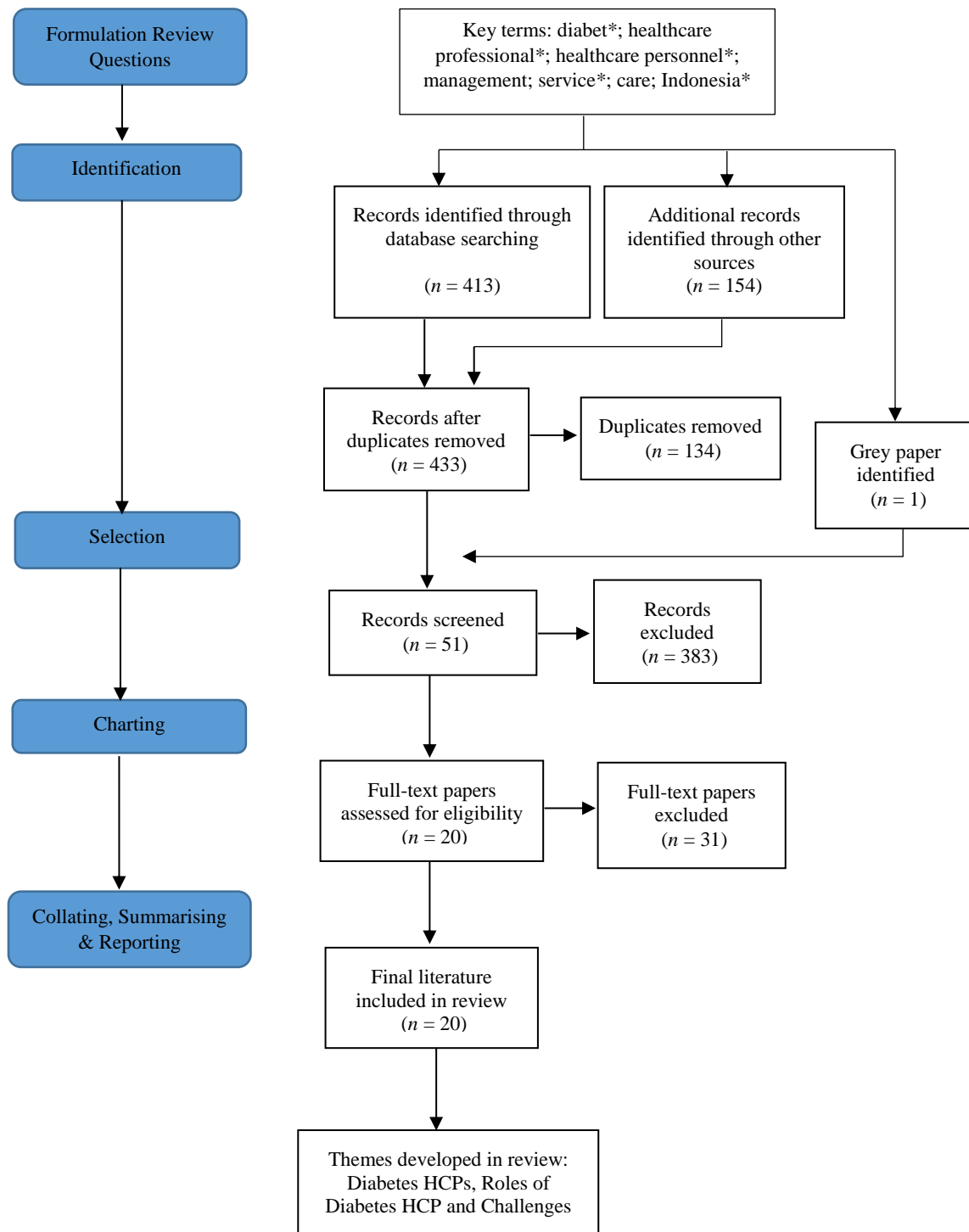
With the current prevalence rates of diabetes expected to increase over time, Indonesia needs a comprehensive strategy to prevent and manage the resultant burden of disease. Developing models of multidisciplinary care recommended by the international health organisations will make a significant difference to the impact this burden of disease will make on Indonesian society. Within a context of very limited scholarly information on diabetes HCPs and the application of the multidisciplinary care models in Indonesia, this paper has explored the profile of diabetes HCPs in Indonesia by identifying which professions they belong to and describing their roles. Both internal and external challenges they encounter in providing high quality diabetes care were also identified in this review. The challenges identified in this paper will enlighten global nurses and other diabetes HCPs about the current models of care with a view to improving diabetes management in this country. Also, this paper contributes to better understanding of the international context of diabetes care where it is commonly accepted that collaborative management is essential, especially in countries with limited human and non-human resources in the context of rapidly rising rates of chronic conditions.

## References

- Adriono, G., Wang, D., Octavianus, C. & Congdon, N. (2011) Use of eye care services among diabetic patients in urban Indonesia. *Archives of Ophthalmology*, **129** (7), 930-935.
- Arisandi, D., et al. (2016) Evaluation of validity of the new diabetic foot ulcer assessment scale in Indonesia. *Wound Repair Regen*, 10.1111/wrr.12464.
- Arksey, H. & O'Malley, L. (2005) Scoping studies: towards a methodological framework. *International Journal of Social Research Methodology*, **8** (1), 19-32.
- Bratcher, C. R. & Bello, E. (2011) Traditional or centralized models of diabetes care: the multidisciplinary diabetes team approach. *The Journal of Family Practice*, **60** (11 Suppl), S6.
- Braun, V. & Clarke, V. (2006) Using thematic analysis in psychology. *Qualitative Research in Psychology*, **3** (2), 77-101.
- Bygbjerg, I. C. (2012) Double burden of noncommunicable and infectious diseases in developing countries. *Science*, **337** (6101), 1499-1501.
- Chatterjee, S. & Davies, M. J. (2015) Current management of diabetes mellitus and future directions in care. *Postgraduate Medical Journal*, **91** (1081), 612-621.
- Efendi, F. (2012) Health worker recruitment and deployment in remote areas of Indonesia. *Rural and Remote Health*, **12** (2), 2008.
- Ezenwaka, C., Onuoha, P., Sandy, D. & Isreal-Richardson, D. (2014) Diabetes self-management education in a high-income developing country: survey of the opinion of nurses and dietitians. *International Journal of Diabetes in Developing Countries*, **34** (3), 163-168.
- Faillace, S., et al. (2012) Helping patients find their way to better diabetic retinopathy care. *Community Eye Health*, **25** (78), 34-34.
- Grant, M. J. & Booth, A. (2009) A typology of reviews: An analysis of 14 review types and associated methodologies. *Health Information & Libraries Journal*, **26** (2), 91-108.
- Gucciardi, E., Espin, S., Morganti, A. & Dorado, L. (2016) Exploring interprofessional collaboration during the integration of diabetes teams into primary care. *BMC Family Practice*, **17** (1), 12.
- Hartayu, T. S., Mi, M. I. & Suryawati, S. (2012) Improving of type 2 diabetic patients' knowledge, attitude and practice towards diabetes self-care by implementing Community-Based Interactive Approach-diabetes mellitus strategy. *BMC Res Notes*, **5**, 315.
- Haryanto, H., et al. (2016) Relationship between maceration and wound healing on diabetic foot ulcers in Indonesia: a prospective study. *Int Wound J*, <http://dx.doi.org/10.1111/iwj.12638>.
- IDF. (2012) *Clinical guideline task force: Global guideline for type 2 diabetes*. IDF, Brussels. Available at: <https://www.idf.org/e-library/guidelines/79-global-guideline-for-type-2-diabetes> (accessed).
- IDF. (2013) *IDF Diabetes Atlas*. Available at: <http://idf.org/diabetesatlas> (accessed 11 March 2016).
- IDF. (2014) *Global diabetes scorecard: Tracking progress for action*. IDF, Brussels. Available at: <http://idf.org/global-diabetes-scorecard/> (accessed 10 July 2015).
- Indonesian Diabetes Association (2014) Guidelines on the management and prevention of prediabetes. *Acta medica Indonesiana*, **46** (4), 348-359.
- Kanbara, S., et al. (2008) Social support, self-efficacy and psychological stress responses among outpatients with diabetes in Yogyakarta, Indonesia. *Diabetes Research and Clinical Practice*, **80** (1), 56-62.
- Kanchanachitra, C., et al. (2011) Health in Southeast Asia 5 Human resources for health in southeast Asia: shortages, distributional challenges, and international trade in health services. *Lancet*, **377** (9767), 769-781.
- Levac, D., Colquhoun, H. & O'Brien, K. K. (2010) Scoping studies: Advancing the methodology. *Implementation Science*, **5** (1), 69-69.
- Livingston, R. & Dunning, T. (2010) Practice nurses' role and knowledge about diabetes management within rural and remote Australian general practices. *European Diabetes Nursing*, **7** (2), 55-62.
- Malini, H., Copnell, B. & Moss, C. (2017) Considerations in adopting a culturally relevant diabetes health education programme: An Indonesian example. *Collegian*, **24** (2), 183-190.
- Mays, N., Pope, C. & Popay, J. (2005) Systematically reviewing qualitative and quantitative evidence to inform management and policy-making in the health field. *Journal of Health Services Research and Policy*, **10** (1), 6-20.

- Mihardja, L., et al. (2009) Prevalence and determinants of diabetes mellitus and impaired glucose tolerance in Indonesia (a part of basic health research/Riskesdas). *Acta medica Indonesiana*, **41** (4), 169.
- Mihardja, L., Soetrisno, U. & Soegondo, S. (2014) Prevalence and clinical profile of diabetes mellitus in productive aged urban Indonesians. *Journal of Diabetes Investigation*, **5** (5), 507-512.
- Ministry of Health Republic of Indonesia. (2015) *Strategic plan of Ministry of Health 2015-2019 (Rencana strategis Kementerian Kesehatan tahun 2015-2019)*. MoH RI, Jakarta. Available at: <http://depkes.go.id/resources/download/info-publik/Renstra-2015.pdf> (accessed 17 August 2016).
- Moher, D., et al. (2009) Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Medicine*, **6** (7), e1000097.
- National Institute for Health Research and Development (2013) *Basic Health Research (Riset Kesehatan Dasar)*. Jakarta, Ministry of Health Republic of Indonesia.
- Ng, N., et al. (2010) Bringing smoking cessation to diabetes clinics in Indonesia. *Chronic Illness*, **6** (2), 125-135.
- Padmawati, R. S., Ng, N., Prabandari, Y. S. & Nichter, M. (2009) Smoking among diabetes patients in Yogyakarta, Indonesia: cessation efforts are urgently needed. *Trop Med Int Health*, **14** (4), 412-419.
- Pemayun, T. G., et al. (2015) Risk factors for lower extremity amputation in patients with diabetic foot ulcers: a hospital-based case-control study. *Diabet Foot Ankle*, **6** (29629).
- Pranoto, A., Novida, H., Prajitno, J. H. & Tjokroprawiro, A. (2015) Safety and efficacy in early insulin initiation as comprehensive therapy for patients with type 2 diabetes in primary health care centers. *Acta Med Indones*, **47** (2), 104-110.
- Purnamasari, D. & Waspadji, S. (2009) A good teamwork will save the limb. *Acta medica Indonesiana*, **41** (4), 213-214.
- QSR International (2016) NVivo Qualitative data analysis software. *Version 11*.
- Radji, M., Putri, C. S. & Fauziyah, S. (2014) Antibiotic therapy for diabetic foot infections in a tertiary care hospital in Jakarta, Indonesia. *Diabetes Metab Syndr*, **8** (4), 221-224.
- Ritholz, M. D., et al. (2011) Physicians' perceptions of the type 2 diabetes multidisciplinary treatment team: A qualitative study. *Diabetes Educator*, **37** (6), 794-800.
- Rudijanto, A., et al. (2011) The Indonesian Society of Endocrinology's Summary Article of Diabetes Mellitus National Clinical Practice Guidelines. *Journal of the ASEAN Federation of Endocrine Societies*, **26** (1), 17-19.
- Sae-Sia, W., Maneewat, K. & Kurniawan, T. (2013) Effect of a self-management support program on diabetic foot care behaviors. *International Journal of Research in Nursing*, **4** (1), 14-21.
- Shaw, J. E., Sicree, R. A. & Zimmet, P. Z. (2010) Global estimates of the prevalence of diabetes for 2010 and 2030. *Diabetes Research and Clinical Practice*, **87** (1), 4-14.
- Shortus, T. D., et al. (2007) Multidisciplinary care plans for diabetes: How are they used? *Medical Journal of Australia*, **187** (2), 78-81.
- Simmonds, A. & Hort, K. (2013) *Institutional analysis of Indonesia's proposed road map to universal health coverage*. Nossal Institute for Global Health, University of Melbourne, Melbourne. Available at: [http://ni.unimelb.edu.au/data/assets/pdf\\_file/0004/834457/WP\\_33.pdf](http://ni.unimelb.edu.au/data/assets/pdf_file/0004/834457/WP_33.pdf) (accessed 23 March 2016).
- Soegondo, S., Widyahening, I. S., Istantho, R. & Yunir, E. (2011) Prevalence of diabetes among suburban population of Ternate, a small remote island in the eastern part of Indonesia. *Acta medica Indonesiana*, **43** (2), 99.
- Soewondo, P. (2011) Current practice in the management of type 2 diabetes in Indonesia: Results from the International Diabetes management Practices Study (IDMPS). *Journal of Indonesian Medical Association*, **61** (12), 474-481.
- Soewondo, P., Ferrario, A. & Tahapary, D. L. (2013) Challenges in diabetes management in Indonesia: a literature review. *Global Health*, **9**, 63.
- Soewondo, P., et al. (2010) The DiabCare Asia 2008 study - Outcomes on control and complications of type 2 diabetic patients in Indonesia. *Medical Journal of Indonesia*, **19** (4), 235-244.
- Sutanegara, D., Darmono & Budhiarta, A. A. G. (2000) The epidemiology and management of diabetes mellitus in Indonesia. *Diabetes Research and Clinical Practice*, **50** (SUPPL. 2), S9-S16.

- Ugur, E., Demir, H. & Akbal, E. (2015) Postgraduate education needs of Nurses' who are caregivers for patients with diabetes. *Pakistan Journal of Medical Sciences*, **31** (3), 637-642.
- WHO. (2014) *Noncommunicable diseases country profiles 2014*. Available at: <http://www.who.int/nmh/countries/en/> (accessed).
- WHO. (2016) *Global report on diabetes*. Available at: <http://www.who.int/diabetes/global-report/en/> (accessed).
- Wibowo, Y., Parsons, R., Sunderland, B. & Hughes, J. (2015a) Evaluation of community pharmacy-based services for type-2 diabetes in an Indonesian setting: pharmacist survey. *International Journal of Clinical Pharmacy*, **37** (5), 873-882.
- Wibowo, Y., Sunderland, B. & Hughes, J. (2015b) Pharmacist and physician perspectives on diabetes service delivery within community pharmacies in Indonesia: A qualitative study. *International Journal of Pharmacy Practice*, <http://dx.doi.org/10.1111/ijpp.12227>.
- Widyahening, I. S., et al. (2014) Awareness, agreement, adoption and adherence to type 2 diabetes mellitus guidelines: a survey of Indonesian primary care physicians. *BMC Family Practice*, **15**.
- Yusuf, S., Kasim, S., Okuwa, M. & Sugama, J. (2013) Development of an enterostomal therapy nurse outpatient wound clinic in Indonesia: A retrospective descriptive study. *Wound Practice & Research: Journal of the Australian Wound Management Association*, **21** (1), 41-47.
- Zhang, X., et al. (2012) Access to health care and control of ABCs of diabetes. *Diabetes Care*, **35** (7), 1566-1571.



**Figure 1. The search strategy recorded in a flowchart, adopted from Moher et al.'s (2009) PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) and Arksey & O'Malley's (2005) scoping study framework stages.**

**Table 1. Summary of selected papers**

Authors	Aims	Designs	Participants & Samples	Themes
Adriono et al. (2011)	To assess the use of eye care and predictors among urban people with diabetes in Indonesia	Cross sectional study	( <i>n</i> = 198) patients with type 2 diabetes	Diabetes HCP Roles of Diabetes HCP
Arisandi et al. (2016)	To evaluate the validity of an assessment scale for diabetic foot ulcer	Prospective cohort study	( <i>n</i> = 62) patients with diabetic foot ulcer	Diabetes HCP Roles of Diabetes HCP
Faillace et al. (2012)	To describe the provision of diabetic retinopathy care	Discussion paper	Not provided	Diabetes HCP Roles of Diabetes HCP Challenges
Haryanto et al. (2016)	To identify the relationship between maceration and wound healing	A prospective study	( <i>n</i> = 62) patients with diabetic foot ulcer	Diabetes HCP Roles of Diabetes HCP
Malini et al. (2017)	To review literature on the application of western models of diabetes education implemented in Indonesia	Literature review	( <i>n</i> = 11) papers	Diabetes HCP Challenges
Ng et al. (2010)	To examine the feasibility of interactive smoking cessation interventions for diabetes mellitus patients in clinical settings	Randomised clinical trial	( <i>n</i> = 66) patients with diabetes in cessation clinic group or in doctor advice group and ( <i>n</i> = 6) doctors	Diabetes HCP Roles of Diabetes HCP Challenges
Padmawati et al. (2009)	To report a study about the prevalence of tobacco used by male diabetes patients, patients' perceptions on the risk of smoking and the provision of tobacco related message from the doctors to the patients	In-depth interview, focus group discussion and cross sectional survey	( <i>n</i> = 21) diabetes patients and ( <i>n</i> = 778) male diabetes patients	Diabetes HCP Roles of Diabetes HCP Challenges
Pemayun et al. (2015)	To identify and determine the number of subsequent amputation risk factors in hospitalised patients with diabetic foot ulcers	Case control	( <i>n</i> = 47) Patients with diabetic foot ulcers with lower extremity amputation and ( <i>n</i> = 47) patients without lower extremity amputation	Diabetes HCP Roles of Diabetes HCP
Pranoto et al. (2015)	To analyse early insulin therapy safety and efficacy for type 2 diabetes mellitus patients provided by general practitioners in primary health care in Surabaya, Indonesia	Pre and post study	( <i>n</i> = 99) patients with diabetes mellitus type 2	Diabetes HCP Roles of Diabetes HCP Challenges
Purnamasari & Waspadji (2009)	To describe teamwork for diabetic foot ulcer treatment	Case report	A patient with diabetic foot ulcer	Diabetes HCP Roles of Diabetes HCP

Authors	Aims	Designs	Participants & Samples	Themes
Radji et al. (2014)	To determine microbiology of diabetic foot infections and to assess the antibiotic susceptibility pattern	Retrospective cross sectional study	( <i>n</i> = 35) patients admitted to hospital during a one year period; hospital length stay between 6 and 10 days	Diabetes HCP Roles of Diabetes HCP
Sae-Sia et al. (2013)	To examine the effectiveness of self-management support programs for people with diabetes living in Indonesia, which help improve foot care behaviour	Quasi experimental study	( <i>n</i> = 35) patients in control group and ( <i>n</i> = 35) patients in intervention group	Diabetes HCP Roles of Diabetes HCP
Soewondo et al. (2010)	To identify patients' diabetes management, complications and awareness of self-control	Cross sectional study	( <i>n</i> = 1832) patients with type 1, type 2 diabetes mellitus and other types of diabetes, ( <i>n</i> = 18) physicians	Diabetes HCP Roles of Diabetes HCP Challenges
Soewondo et al. (2013)	To review evidence on burden, expenditure, complications, treatment and outcomes of diabetes in Indonesia and the implications on health system developments	Literature review	( <i>n</i> = 23) papers	Diabetes HCP Challenges
Sutanegara et al. (2000)	To describe epidemiology of diabetes and diabetes management in Indonesia	Discussion paper	Not provided	Diabetes HCP Challenges
Wibowo et al. (2015a)	To evaluate current community pharmacy-based services, to identify pharmacists' perceived roles in type 2 diabetes care and to explore characteristics of pharmacy and pharmacists associated with current practice	Survey	( <i>n</i> = 240) pharmacists from 240 community pharmacies	Diabetes HCP Roles of Diabetes HCP Challenges
Wibowo et al. (2015b)	To explore physician and pharmacist perspectives about diabetes service delivery within community pharmacies in Indonesia	In-depth interview	( <i>n</i> = 10) community pharmacists and ( <i>n</i> = 10) physicians	Diabetes HCP Roles of Diabetes HCP Challenges
Widyahening et al. (2014)	To identify the level of awareness, agreement, adoption and compliance on the guidelines of type 2 diabetes mellitus	Cross sectional study	( <i>n</i> = 399) physicians who provide diabetes care, year of practice between 0-45 years	Diabetes HCP Roles of Diabetes HCP Challenges
Yusuf et al. (2013)	To investigate the challenge in developing an enterostomal therapy nurse (ETN) outpatient clinic in Indonesia	Retrospective descriptive study	( <i>n</i> = 73) patients with acute and chronic wound care, ( <i>n</i> = 18) patients with diabetic foot ulcer	Diabetes HCP Roles of Diabetes HCP Challenges
IDF (2014)	To describe diabetes and diabetes management in Indonesia	Score card	Not provided	Challenges