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ORIGINAL RESEARCH

Perceptions of Painful Diabetic Peripheral Neuropathy in South-East Asia: Results from Patient and Physician Surveys

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Abstract: There are no data on physician–patient communication in painful diabetic peripheral neuropathy (pDPN) in the Asia–Pacific region. The objective of this study was to examine patient and physician perceptions of pDPN and clinical practice behaviors in five countries in South-East Asia. Primary care physicians and practitioners, endocrinologists, diabetologists, and patients with pDPN completed separate surveys on pDPN diagnosis, impact, management, and physician–patient interactions in Hong Kong, Malaysia, the Philippines, Taiwan, and Thailand. Data were obtained from 100 physicians and 100 patients in each country. The majority of physicians (range across countries, 30–85%) were primary care physicians and practitioners. Patients were mostly aged 18–55 years and had been diagnosed with diabetes for >5 years. Physicians believed pDPN had a greater impact on quality of life than did patients (ranges 83–92% and 39–72%, respectively), but patients believed

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pDPN had a greater impact on items such as sleep, anxiety, depression, and work than physicians. Physicians considered the diagnosis and treatment of pDPN a low priority, which may be reflected in the generally low incidence of screening (range 12–65%) and a lack of awareness of pDPN. Barriers to treatment included patients' lack of awareness of pDPN. Both physicians and patients agreed that pain scales and local language descriptions were the most useful tools in helping to describe patients' pain. Most patients were monitored upon diagnosis of pDPN (range 55–97%), but patients reported a shorter duration of monitoring compared with physicians. Both physicians and patients agreed that it was patients who initiated conversations on pDPN. Physicians most commonly referred to guidelines from the American Diabetes Association or local guidelines for the management of pDPN. This study highlights important differences between physician and patient perceptions of pDPN, which may impact on its diagnosis and treatment. For a chronic and debilitating complication like pDPN, the physician–patient dialogue is central to maximizing patient outcomes. Strategies, including education of both groups, need to be developed to improve communication.
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Keywords: Chronic pain; Diagnosis; Diabetes; Impact; Painful diabetic peripheral neuropathy; Patient–physician dialogue

INTRODUCTION

Diabetic peripheral neuropathy (DPN) is a common complication of type 1 and type 2 diabetes [1–3], and may be accompanied by painful diabetic peripheral neuropathy (pDPN). In the United States (US) and Europe, pDPN is estimated to occur in up to one-third of all patients with diabetes [4–8]. Although diabetes is an increasing problem in Asia [9–11], studies estimating the prevalence of pDPN are scarce. In a nationwide, hospital-based, observational study of approximately 4000 patients with type 2 diabetes in Korea, the estimated pDPN prevalence was 14.4%, or 43.1% of patients with DPN [12]. In Japan, 22.1% of 298 diabetic outpatients were found to have pDPN [13].

pDPN negatively affects patient function, mood, and sleep, thereby impacting quality of life and leading to reduced productivity and greater healthcare resource use and costs [6, 14–17]. The disease burden in patients with pDPN is substantial compared to individuals without diabetes, patients with diabetes but no DPN, or those with painless DPN [17–19]. The burden of pDPN worsens with increasing pain severity [6, 15, 19].

pDPN requires timely and accurate diagnosis and tailored management, which must include effective communication between patients and physicians to maximize patient outcomes [20–23]. There is a lack of data on the patient–physician dialogue around pDPN. Recent results from a survey of physicians and patients in the US identified misperceptions on the cause and management of pDPN between these two groups [24]. However, there is little information on patient and physician perspectives and interactions in the Asia–Pacific region. The objective of this study was to examine patient and physician perceptions and clinical practice behaviors in the management of pDPN, by undertaking a multinational survey in five countries in South-East Asia.

METHODS

The physician and patient surveys (see Supplementary Information) were conducted by Kantar Health, Singapore, a market research provider, on behalf of Pfizer Inc. between November 2014 and March 2015. Surveys were conducted with physicians and patients in five countries in South-East Asia: Hong Kong, Malaysia, the Philippines, Taiwan, and Thailand. The survey process and analysis of results were not influenced by Pfizer Inc. Neither the physician nor patient surveys are validated. Informed consent was obtained from all participants included in the study.

Physicians were recruited online. Patients were recruited online, through doctor referral, at clinics and surgeries, and by word-of-mouth.

Participating physicians with at least 3 years of experience in their current specialty included primary care physicians (PCPs; general practitioners, primary care practitioners, or family medicine doctors), endocrinologists, and diabetologists. Primary care physicians had to be treating at least 20 patients with diabetes in an average month, including at least five patients with pDPN per month in Malaysia, the Philippines, Taiwan, and Thailand, and at least three patients with pDPN per year in Hong Kong. Endocrinologists and diabetologists had to be treating at least 10 patients with pDPN per month in Malaysia, the Philippines, Taiwan, and Thailand, and at least five patients with pDPN per year in Hong Kong. All physicians had to have an active role in prescribing treatment for neuropathic pain.

Participating patients aged 18–65 years had to be experiencing at least two common symptoms of pDPN, including: burning sensation; numbing sensation; electric shocks; tingling pain; sharp or stabbing pain; or feelings of pins and needles.

Physicians took the survey online and patients took the survey either online or during a face-to-face meeting. Each survey was developed in English and translated into the relevant language as appropriate. The physician survey focused on: patient load; diabetes management; impact of pDPN; patient engagement; diagnosis; classification; monitoring; treatment; barriers to treatment; and the use of pDPN management guidelines. The patient survey focused on: background understanding of pDPN; impact of pDPN; interactions with physicians; diagnosis; management; and treatment of pDPN. To ensure patients were not excluded from participating because of a lack of understanding of medical terminology (such as the term "painful diabetic peripheral neuropathy"), and to avoid excluding those patients who could not determine whether their pain was related to their diabetes, the term "chronic pain" was used throughout the patient survey.

Each survey took approximately 20 min to complete. Responses to survey questions were based on the self-recall of information rather than information in medical records. Reported data are descriptive only, and data were analyzed separately for each individual country to assess variation across the region.

RESULTS

Respondent Characteristics

Surveys were completed by 100 physicians and 100 patients in each participating country, enabling a robust comparison between the two groups within each country. The physician response rate ranged from 4% to 11% across the countries, and the patient response rate ranged from 17% to 20%. The characteristics of participating physicians and patients are shown in Table 1. The majority of physicians were PCPs, except in Taiwan, where most physicians were endocrinologists. Approximately one-fifth of participating physicians in the Philippines were diabetologists.

The majority of patients in Hong Kong and Taiwan were male, whereas in the Philippines and Thailand the majority were female. The percentages were similar in Malaysia. In Hong Kong, Malaysia, and Thailand, the majority of patients were aged $\leq$45 years, but, in the Philippines and Taiwan, most were aged 46–65 years. In Hong Kong and Malaysia, the majority of patients had Type 1 diabetes, whereas in the Philippines, Taiwan, and Thailand, most patients had Type 2 diabetes. The mean duration of diabetes ranged from 5.5 to 10.2 years. The mean time between diabetes diagnosis and onset of pDPN ranged from 2.2 to 7.7 years, and the mean time between the onset of first painful neuropathic symptoms and presentation to a physician ranged from 1.0 to 2.4 years. Most patients reported the presence of at least one comorbid condition, the most common being hypertension.

Prevalence, Severity, and Impact of pDPN

Physicians in Hong Kong, Taiwan, and Thailand estimated the prevalence of pDPN to be 12–18%, while physicians in Malaysia and the Philippines estimated pDPN prevalence at 29% and 33%, respectively, similar to that reported in Western countries [4–7].

Table 1 Physician and patient characteristics

	Hong Kong	Malaysia	Philippines	Taiwan	Thailand
Physician characteristics					
Specialty, %					
PCP	80	85	60	30	70
Endocrinologist	19	15	21	68	26
Diabetologist	1	0	19	2	4
Patient characteristics					
Gender, %					
Male	62	50	38	56	35
Female	38	50	62	44	65
Age, %					
18–35 years	36	45	25	10	29
36–45 years	53	16	15	12	29
46–55 years	8	14	29	25	24
56–65 years	3	25	31	53	18
Diabetes type, %					
Type 1	81	65	30	20	35
Type 2	19	35	70	80	65
Mean duration of diabetes, years	5.5	6.2	6.6	10.2	5.9
Mean time between diabetes diagnosis and onset of pDPN, years	2.2	3.3	2.7	7.7	2.8
Mean time between onset of first pain symptoms and presentation to a physician, years	2.4	1.7	1.1	1.0	1.1
Reported comorbid conditions, %					
Hypertension	66	68	61	48	66
Obesity	46	37	29	30	38
Arthritis	42	20	55	26	24
Chronic heart disease	29	27	27	20	29
Kidney disease	17	18	16	10	15
None of the above	20	17	9	34	21

PCP primary care physician

Most patients described their pain severity as mild or moderate, but 2–12% of patients described it as being so disabling that they were unable to perform daily tasks. Most patients experienced pain first in their feet (range 32–79%), followed by their legs (range 27–50%),

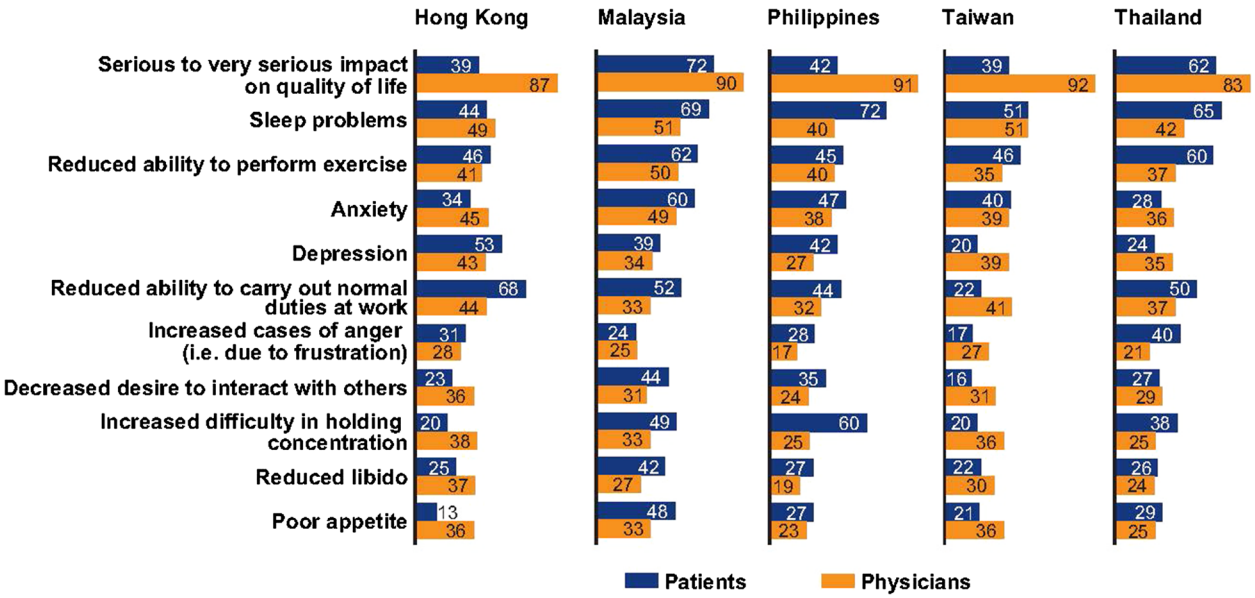

Fig. 1 Comparison of patient and physician perspectives on the impact of pDPN. Data show the proportion of patients and physicians reporting that pDPN impacted each of the items listed. *pDPN* painful diabetic peripheral neuropathy

and then fingers and/or toes (range 18–64%). Physicians' stated that patients reported their pain occurring first in the feet (range 90–97%), followed by fingers and/or toes (51–77%), and then legs (42–60%).

There was a clear difference in patient and physician perspectives on the impact of pain (Fig. 1), but these were not consistent across countries. More physicians believed the patients' pain had a serious to very serious impact on quality of life compared to the patients themselves. Patients reported that their pain had a greater impact on sleep, anxiety, depression, ability to perform exercise, and ability to carry out work than did the physicians.

Screening, Diagnosis, Treatment, and Monitoring of pDPN

The proportion of patients being screened for pDPN varied widely between countries (Fig. 2). The lower active screening rate was reflected in the low priority status assigned by physicians to the relief of pain from pDPN, particularly in Taiwan and Hong Kong (Fig. 3). Physicians considered glycemic control, maintenance of kidney function, and management of lipid disorders to be higher treatment priorities than relief of pain from pDPN.

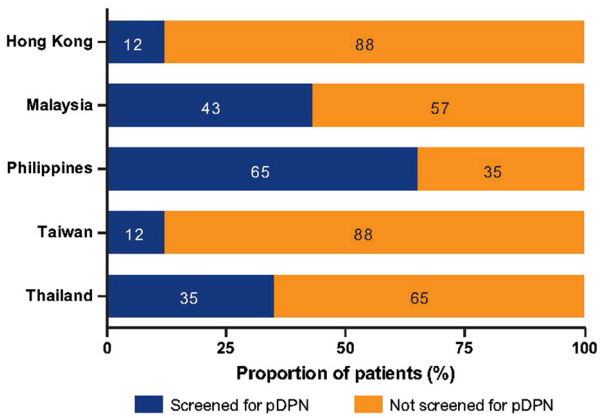

Fig. 2 Comparison of the proportion of patients screened and not screened for pDPN. Data show the proportion of patients reported by physicians as being screened or not screened for pDPN in a typical month. *pDPN* painful diabetic peripheral neuropathy

Most physicians believed that pDPN requires a formal diagnosis (range across countries, 77–96%). Of the patients presenting with painful neuropathic symptoms, up to one-third (range 5–33%) received a formal diagnosis of

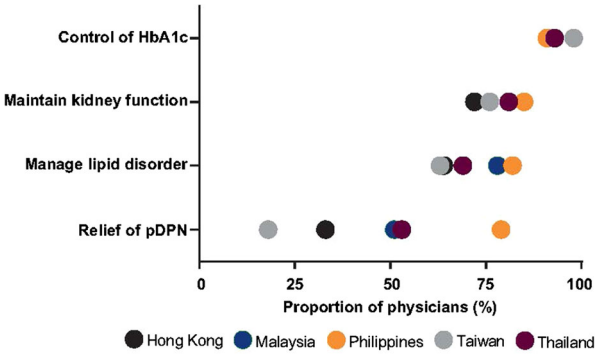

Fig. 3 Comparison of physician treatment priorities when managing diabetic patients. Data show the proportion of physicians who reported they were "extremely motivated" in the management of each item. Note that data points for some countries are not visible because they are hidden by other data points. *pDPN* painful diabetic peripheral neuropathy

pDPN at the initial meeting, with the majority receiving a diagnosis within 3 months. However, in some countries, approximately one-quarter of patients had to wait more than 6 months for a formal diagnosis of pDPN (Hong Kong = 26%; Malaysia = 23%; Thailand = 29%). Physicians and patients broadly agreed on the assessment parameters commonly used to diagnose pDPN. Clinical examination (physician-reported range, 34–96%; patient-reported range, 37–72%), symptom assessment (physician-reported range, 70–85%; patient-reported range, 42–77%), and medical history (physician-reported range, 62–95%; patient-reported range, 15–78%) were the most common parameters used. Other parameters that were used less frequently included foot examination, nerve conduction, and monofilament testing.

There was disparity between patient and physician reports on the specialties involved in the diagnosis and management of pDPN (Supplementary Fig. 1). Most physicians believed that PCPs were the most active in diagnosing pDPN (range across countries, 67–97%), whereas patients reported that PCPs provided the diagnosis less often (range 6–54%) (Supplementary Fig. 1A). By comparison, patients reported that endocrinologists or diabetologists were more likely to provide the diagnosis (range 21–72%), but physicians believed that an endocrinologist or diabetologist provided the diagnosis less often (range 2–23%). More physicians than patients believed that PCPs managed pDPN (ranges 27–65% and 1–49%, respectively), whereas patients believed that endocrinologists or diabetologists were more likely to manage pDPN compared with physicians (ranges 28–82% and 31–50%, respectively) (Supplementary Fig. 1B). Both groups agreed that other specialties, such as orthopedic surgeons and internists, were less commonly involved in the diagnosis and management of pDPN.

Physicians and patients believed that key barriers to treatment were patients' lack of awareness of pDPN (ranges across countries, 64–83% and 38–68%, respectively), their fears over potential additional costs of treatment (ranges 30–79% and 40–74%, respectively), their difficulty or hesitation in describing their pain (ranges 29–48% and 24–46%, respectively), and limited consultation time (ranges 10–54% and 41–62%, respectively). Additionally, a relatively high proportion of patients did not think their pain was a serious condition (range 26–57%), and some believed that management of pDPN was unimportant compared with their other conditions (range 18–53%).

Physicians typically recommended changes in lifestyle, prescription medications, and tighter control of blood glucose levels to treat mild, moderate, and severe pain, irrespective of country. They also recommended vitamins and health supplements across all pain severities. Patients with mild and moderate pain responded that they were typically recommended changes in lifestyle, improved blood glucose control, vitamins and health supplements, as well as prescription medications. There were too few patients with severe pain to provide meaningful results.

The majority of patients reported that physicians started monitoring pDPN upon diagnosis (Fig. 4a). However, there was disparity between patients and physicians regarding the

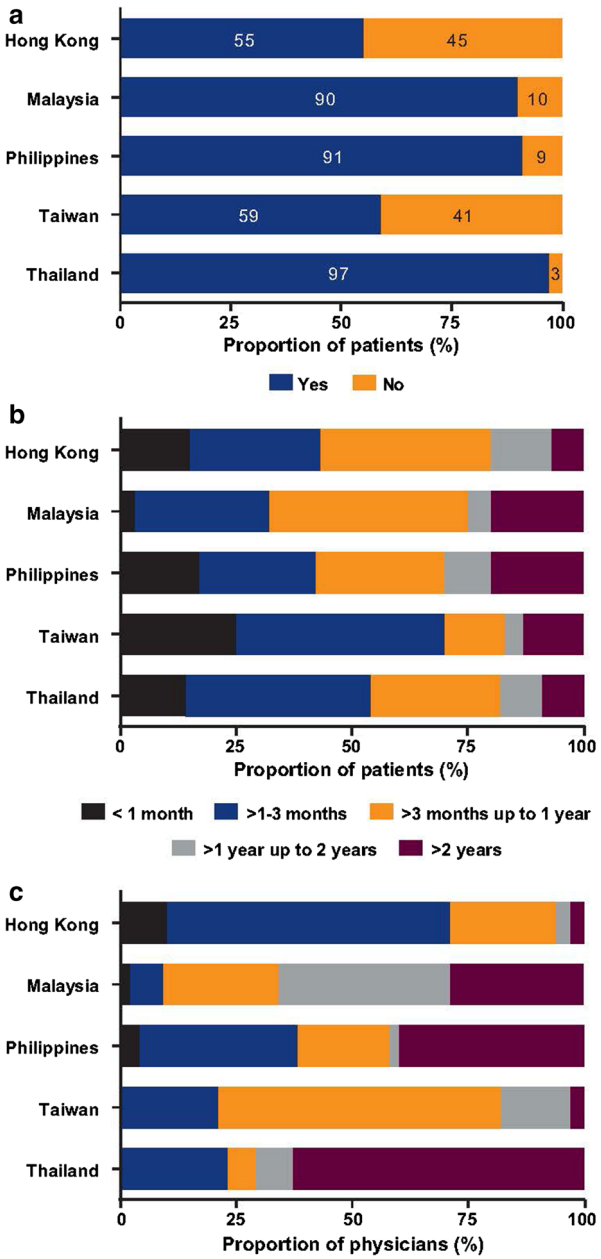

Fig. 4 Monitoring of pDPN following diagnosis. **a** Proportion of patients who had their condition monitored upon diagnosis of pDPN. **b** Length of time patients reported pDPN was monitored. **c** Length of time doctors reported they monitored pDPN. Key in (**b**) also applies to (**c**). *pDPN* painful diabetic peripheral neuropathy

reported duration of monitoring (Fig. 4b, c). Typically, patients reported shorter durations of monitoring compared with the physicians.

Communication, Engagement, and Information on pDPN

Regarding the initiation of conversations about pDPN, both patients and physicians agreed that the patients were more proactive (Fig. 5). The only exception to this was physicians in the Philippines who believed that they were more likely to start the conversations compared with their patients. Patients regarded physicians as their primary source of information on pDPN (range across countries, 62–92%), followed by their families (23–64%), and friends or colleagues (9–43%). Pharmacists were not reported as a common source of information, with the exception of Malaysia (51%). Patients across the region rarely referred to the media, e.g., newspapers, books, or television, for information (range 0–3%).

Both physicians and patients believed that pain scales (range across countries, 59–81% and 43–80%, respectively) and local language descriptions for pDPN-related symptoms (range 52–81% and 50–82%, respectively) were the most useful tools in helping patients to describe their pain. When describing pDPN-related symptoms, "numbing sensation" was used by approximately 80% of patients across the region, with the exception of Hong Kong (33%). "Tingling pain" (range across countries 38–67%) and "pins and needles"-like feeling (range 43–89%) were also common terms. Individual countries used some terms more commonly than others, such as "sharp or stabbing" pain (65%) and "electric shocks" (54%) in the Philippines, and "burning sensation" in Malaysia (55%).

Physicians most commonly referred to guidelines from the American Diabetes Association (ADA) [25] (range across countries 37–87%) or local diabetes guidelines (range 43–90%) for diabetes management (Supplementary Fig. 2). They were generally aware of sections referring to the management of pDPN in the guidelines they used, especially in those from the ADA (range 26–74%) and local guidelines (range 16–75%). However, in Hong Kong and the Philippines, 41% and 22% of physicians, respectively, were not aware of any

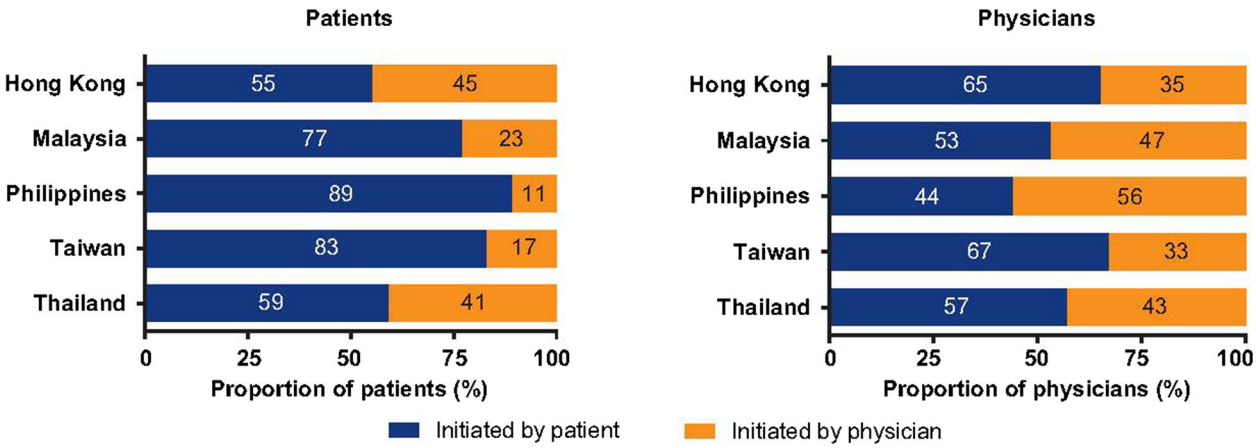

Fig. 5 Comparison of patient and physician perspectives regarding who initiates pDPN pain discussion. Data show proportion of patients (*left*) and physicians (*right*) who reported discussion on pDPN pain was initiated by patients or physicians. *pDPN* painful diabetic peripheral neuropathy

reference related to the management of pDPN in the guidelines they used.

DISCUSSION

Our study shows that disparities exist between physician and patient perceptions around pDPN in five countries in South-East Asia, notably around the impact of pDPN on patients' lives, the specialties involved in pDPN diagnosis and management, and the duration of post-diagnosis monitoring. The fact that neither physician- nor patient-reported findings were necessarily consistent across countries may indicate differences in ethnic and/or sociocultural factors around pain and its perception [26, 27]. Moreover, demographic characteristics, such as physician specialty and patient gender, age, and diabetes duration, may have led to differences between countries. Some of the differences between physicians and patients have important implications for patient screening, treatment, and adequate follow-up.

There were areas where physicians and patients were in agreement. Both groups agreed that pDPN-related pain was first reported in the feet. They also agreed that clinical examination, symptom assessment, and medical history were the assessment parameters most commonly used to provide a diagnosis, and that patients' lack of awareness of pDPN, their fears over potential additional costs of treatment, and limited consultation time were important barriers to the diagnosis and treatment of this condition. Educating patients about the first two items and addressing the consultation time limitations would likely be beneficial. In terms of communication between physicians and patients, both groups agreed that it was patients who were more likely to initiate a conversation about their pain, and that pain scales and local language descriptions for the pDPN-related symptoms were most useful in helping patients to discuss their pain.

Physicians considered treatment of pDPN-related pain a low priority compared to glycemic control, maintenance of kidney function, and managing lipid disorders. Considering the patient burden of pDPN [6, 14–19], and the treatment options available for its management [28], this may represent a lost opportunity for physicians to improve patient outcomes. Educating physicians about the potential benefits of treating pDPN may therefore be of considerable value. There was broad agreement between physicians and patients that changes in lifestyle, improved glycemic control, and prescription medications were recommended to treat pDPN. Changes in lifestyle, such as exercise, may improve neuropathic symptoms including pain [29], glycemic control may reduce the risk of developing DPN [30] and slow its progression [31], but it has not been shown to impact on

pDPN. While pain relief through prescription medications [28] is the most beneficial option for managing pDPN, this was considered less often. Physicians most commonly referred to the ADA guidelines [25] and local diabetes guidelines for diabetes management, and these two sources were also most commonly referred to when managing pDPN. The fact that 41% of physicians in Hong Kong and 22% in the Philippines were not aware of the sections in international guidelines related to pDPN management indicates another area where physician education may be valuable.

Published data on the dialogue between physicians and patients around pDPN are scarce. A recent study of patient and physician perceptions around pDPN in the US [24] identified both important similarities to and differences from the current study. Similar to the current study, patients in the US reported that pDPN impacted daily activities to a greater extent than did physicians. Another point of agreement was the identification of glycemic control as the highest treatment priority for physicians in the US, whereas pDPN was reported to be of lower priority. The study in the US also reported miscommunication between patients and physicians around diagnosis and management. In contrast to South-East Asia, physicians in the US believed they initiated conversations on pDPN symptoms more often than did patients, but patients reported that physicians tended to discuss pDPN only when asked. Difficulty in describing and reluctance to discuss the symptoms with physicians were seen as important barriers to communication. One important difference between the two studies was the proportion of patients with severe pain due to pDPN. Approximately 50% of patients in the US had severe pain, compared with approximately 10% in the current study, although the two studies used different methods to categorize pain severity. Nonetheless, this aspect requires further study, as recent data from the Middle East have shown a higher than expected prevalence of pDPN [32, 33].

This study had several limitations. This is the first time these surveys have been used, therefore there are no previously published results and the surveys are not validated. The lack of validation should be considered when viewing the results. The data collected are descriptive because the lack of previously published data using these surveys means a power analysis could not be conducted. The response rates of the physicians and patients were low and may have affected the results. The selection of participants was not free from the risk of potential bias; for instance, the characteristics and perceptions of physicians and patients who agreed to participate may be different from those of physicians and patients who decided not to participate. The results therefore may not be generalizable to the wider populations of either physicians or diabetic patients with pDPN in the participating countries. Furthermore, the data may not be representative of South-East Asia as a whole, or the broader Asia–Pacific region, because the survey was conducted in only five countries. The responses to the questions in the surveys were based on individual recall, which may also have led to unintentional bias. The patient survey did not capture other facets that may contribute to the painful experience of patients with pDPN, such as concomitant anxiety or depression, sleep disruption, and general loss of function [6]. Participating patients were not necessarily recruited from the clinics or surgeries of participating physicians, therefore the results for the two groups may be unrelated. If the patients surveyed had been patients of the physicians surveyed, the degree of disparity between the two groups may have been different. Lastly, data collected are descriptive and no statistical comparisons between physicians and patients, or between countries, were made.

CONCLUSION

This study highlights the perceptions of physicians and patients regarding important aspects of pDPN, including diagnosis, impact, physician–patient dialogue, and management, in five countries in South-East Asia. It also tries to identify disparities and similarities in patients' perceptions and those of the physicians who manage them. Therefore, we would recommend that physicians require education to ensure that

patients with pDPN are effectively diagnosed and managed. Improved communication between physicians and patients is vital to maximize patient outcomes.

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Compliance with Ethics Guidelines. Informed consent was obtained from all participants included in the study.

Data Availability. The datasets during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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