

# Prevalence and barriers of reporting needle-stick injuries amongst government pharmacists working in Perak, Malaysia

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## ABSTRACT

**Introduction:** Needle-stick injuries (NSIs) are common amongst healthcare workers including pharmacists. Studies have reported a range of 0–5.65 per 1,000 pharmacists handling vaccinations that suffered at least one incident of NSI. The objective of this study was to determine the prevalence of NSI and the barriers encountered in reporting it amongst government pharmacists working in Perak.

**Materials and methods:** This was a cross-sectional study conducted amongst all government pharmacists in Perak. We excluded those who did not consent or were unreachable electronically. The researchers provided an online link that was forwarded to all heads of departments in Perak via social media. The respondents answered their demographic details, questions assessing their knowledge of NSI transmissible diseases, needle-stick handling practices, detail experiences of them suffering an NSI (all self-developed questionnaires), and their barriers in reporting an NSI (validated questionnaire). All responses were auto-tabulated in an excel sheet. A sample size of 516 pharmacists was needed for this study. A respondent was deemed to have inadequate knowledge when they answered any question wrongly about NSI knowledge-related questions and inappropriate practice in needle handling when respondents answered any questions wrongly for questions assessing practices.

**Results:** A total of 524 pharmacists participated. The overall prevalence of NSI was 23.1% (n=121), of which, those with contaminated NSI were 10.3% (n=54, 95%CI: 7.9-13.30). Two-thirds of the participants (66.6%) had inadequate knowledge and nearly all of them were unable to describe the appropriate needle-handling practices (94.7%). Amongst the reported barriers were “not knowing whose duty it was to report an NSI” (45.5%) and “busy schedules” (44.7%).

**Conclusion:** One in every five pharmacists in the state of Perak had a history of NSI, and 1 in every 10 had sustained a contaminated NSI. The barriers to reporting a NSI were mainly due to uncertainty about whose responsibility to report the incident and being too busy to report it.

## KEYWORDS:

*Needle-stick injuries, reporting, Pharmacists, Perak, Malaysia*

## INTRODUCTION

Any cut or prick to the person by a needle that is sterile/contaminated with the patient's bodily fluids and incurred within the hospital premises is referred to as a needle-stick injury (NSI).<sup>1</sup> The most concerning outcome of an NSI is the transmission of blood-borne infections such as HIV, Hepatitis B virus (HBV), and Hepatitis C virus (HCV). This has resulted in a significant number of HBV, HCV, and HIV infections amongst healthcare providers with an estimated transmission rate of 30%, 1.8%, and 0.3%, respectively.<sup>2,3</sup>

The top three procedures that induced NSI were needle recapping, intravenous line administration, and blood collection, and these NSI incidences have been prevalent amongst nurses.<sup>4</sup> According to a study conducted in Malaysia in 2007, medical assistants had the highest rates of NSI (50.0%), followed by nurses (37.0%), and doctors (22.7%) with pharmacists not included in the sample.<sup>5</sup> Limited similar research on NSI have been conducted amongst pharmacists. One study conducted amongst pharmacy students reported that the main activities related to NSI were finger-strip blood glucose monitoring and insulin delivery.<sup>6</sup> Most of the NSI-related research had not targeted pharmacists as respondents. The incidence of NSI amongst the pharmacy professionals could be an oversight.

In a Malaysian context, according to the Malaysian Ministry of Health's Occupational Health Unit, the most common type of injury amongst healthcare workers were NSI, which had a rate of 6 injuries per 1000 Healthcare Workers (HCW) in 2016.<sup>7</sup> In the same survey, it was discovered that 4.2 out of 1000 pharmacists in Malaysia (51 out of 12,048 pharmacists) suffered from NSI.<sup>7</sup> It is predicted that pharmacists working in government health facilities were exposed to NSI risks while providing insulin administration or functionality counselling, conducting blood sugar monitoring with a glucometer during Diabetes Mellitus Medication Adherence Therapy Clinic (DMTAC), performing Cytotoxic Drug Reconstitution (CDR), or Total Parenteral Nutrition (TPN) where these tasks involved needle handling.<sup>8-11</sup>

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The Malaysian Ministry of Health (MOH) requires all NSIs to be reported. However, the researchers felt that these injuries may be under-reported especially amongst pharmacists. In other nations, 36.8% of Iranian nurses with NSIs were discovered to have filed an official report.<sup>4</sup> Dissatisfaction with follow-ups, low risk among source patients, unfamiliarity with the reporting process, busy schedules, and low-risk perceptions were amongst the reasons for not reporting.<sup>4</sup> The aim of this research was to determine the prevalence of NSI amongst government pharmacists in Perak, as well as to assess their knowledge in handling an NSI, their needle handling practices, and common barriers faced in reporting an NSI.

## MATERIALS AND METHODS

This was a cross-sectional study conducted from June 2017 to February 2018 amongst all government pharmacists working within the state of Perak—a central state within Peninsular Malaysia, with the second largest population in West Malaysia. There are 6 specialised hospitals, 9 district hospitals, and 11 district health offices (PKD or *Pejabat Kesihatan Daerah*) in Perak, with 88 health clinics. Government pharmacists are distributed amongst the aforementioned health facilities, along with the Pharmaceutical Services Division (BPF or *Bahagian Perkhidmatan Farmasi*), Pharmacy Enforcement Division, and Clinical Research Centre (CRC). These pharmacists consist of two groups- the Provisionally Registered Pharmacists (PRP) and Fully Registered Pharmacists (FRP), where PRPs are usually stationed at specialist hospitals only.

We included all pharmacists hired within the government service, who were currently working in the state of Perak by sending them an online self-administered questionnaire. First, the researchers approached the Perak Pharmaceutical Services Division to request the contact list for all Chief Pharmacists in the government service within Perak. This was to enable the researchers to reach them and request permission to conduct the study in their department. Had the Chief Pharmacists agreed, they were sent an email and a *Whatsapp*® message that briefly explained about the study. They were also given a link (URL) to access the electronic participant information sheet. Upon deciding to participate, they were routed to the link with the questionnaire and no identifiers were recorded to protect respondents' identity. Those who did not consent or those that were electronically unreachable were excluded.

The self-developed questionnaire consisted of several parts (i) demography, (ii) number of NSI, (iii) knowledge on NSI transmissible diseases, (iv) needle handling practices, (v) NSI training, (vi) immediate steps to be taken after sustaining an NSI, and the last section consisted of an adapted validated questionnaire assessing (vii) barriers to reporting an NSI. For items (iii) to (vi), the Cronbach's alpha ranged from 0.60 to 0.89.

The questionnaire was pre-tested amongst 10 government pharmacists from other states (outside Perak) to assess its readability and understanding (construct validity). While the targeted respondents were pharmacists, and they were deemed to be able to comprehend the questionnaire

structured in English, the researchers did not translate the questionnaire to other languages. The words-contaminated NSIs were described as "needles being contaminated with bodily fluids or contaminated with bodily wastes" before the questions were displayed.

The basic demographic details collected included age, sex, place of work, number of years in the service, and current place of work. It was followed by assessing the frequency and details of an NSI, including the condition of the needle involved in the NSI (sterile or contaminated), the frequency of NSI at work, the most common department, and institution where the NSI occurred, and whether the NSI incident was reported. Then, respondents were asked a series of questions regarding the NSI knowledge of transmissible diseases and the practices of needle-stick handling. The scoring for knowledge was done as follows: Getting all the answers right was deemed as having "*adequate knowledge*" and getting any one of the answers wrong was deemed to be having "*inadequate knowledge*". This score was decided by taking into consideration that all questions asked were basic and essential—adapted from the standard preventive guidelines by the Ministry of Health Malaysia. The appropriateness of needle handling practices was determined by—having answered all the practice questions correctly, they were considered to have "*appropriate practice*." Having any one of the practices answered incorrectly was considered to have "*inappropriate practice*." The awareness of the needle-stick reporting mechanism within the Malaysian Ministry of Health and their choice of the timing an NSI-related education (when should it be given) was assessed as well. An open-ended question was included to assess the immediate steps that would be taken by the respondent should they accidentally sustain an NSI.

The last section of the questionnaire was regarding the barriers to reporting an NSI. This questionnaire was a validated questionnaire adapted from Evans et al.<sup>12</sup> It consists of 19 questions that were answered as "Yes" or "No." Once the respondents were done answering, they clicked the "submit" button to affirm their responses. All responses submitted online were anonymously sent to the researchers via email. Only the researchers listed in this study had access to the content in this email box.

### Sample size

After performing a check with the Pharmaceutical Services Division (BPF), it was found that there were 773 pharmacists working within the government health facilities in Perak. Thus, by using the prevalence table, the population to proportion calculation was used for the sample size (this book used the STATA sample size calculator).<sup>13</sup> Assuming that the population involved was deemed to be large (more than 1000), setting the precision intended for this study at 3% (3% being selected to yield a larger sample size for better generalisability), the final sample size needed for this study was 516.

### Data analysis

All responses collected were tabulated in SPSS v21.0 for further analysis. A descriptive analysis was performed to analyse the respondents' demography, knowledge and practices, awareness for reporting and training, and barriers

for not reporting. The prevalence of NSI amongst the respondents was determined in the form of a percentage by dividing the accumulated NSI over the total number of pharmacists who responded to this study with 100%. The open-ended responses were recoded into themes in which respondents stated the first step they would take if they sustained an NSI.

## RESULTS

### Response rate

The total respondents for this study were 524 (101.5% of the intended sample size), or 67.8% of the 773 pharmacists working in Perak state at the time of the data collection.

### Demography

Table I shows the basic demographic details of the respondents. The mean age of the respondents was 29.06 years (SD 3.96) of age, with a mean working experience of 4.64 years (SD 4.00). The majority of them were females (81.3%) and FRPs (86.5%). From the total, 50% of the respondents were working in tertiary hospitals.

### Prevalence of NSI

A total of 54 pharmacists (10.3%, 95%CI: 7.9,13.3) from Perak self-declared that they had sustained at least one contaminated NSI. Three respondents (0.6%) mentioned that they sustained an NSI but not within Perak; these pharmacists were excluded from the final sub-group analysis (Table II).

### Knowledge and practices

Approximately two-third (66.6%) of the respondents scored "inadequate knowledge" where knowledge of transmissible diseases was concerned. The majority (94.7%) of respondents had inappropriate needle handling practices. Overall, 98.5% of pharmacists had inadequate knowledge in NSI-related diseases or inappropriate needle handling practices.

### Awareness of the NSI reporting system and education on NSI

A total of 39.5% and 42.2% of the respondents were not aware of the local NSI reporting systems and neither were they aware of the standard MOH reporting systems after an NSI. There were only 4.2% of pharmacists that had completed an NSI form—less than half of the 10.3% who had

sustained an NSI. Of the total, 73.1% did not know where to locate the NSI form, and 77.1% did not know what to do with a completed NSI form. At the point of data collection, 44.7% of the respondents had been educated on the prevention and actions to be taken if an NSI happens. A majority (98.1%) of them agreed that they should be educated on NSI prevention. The majority (97.5%) also felt that they should be educated on the Standard Operating Procedure (SOP) and the NSI reporting systems. From the total, 89.5% of the respondents felt that they should be taught about NSI during their university days and 99.2% felt that it should be taught during their PRP training tenure (Table II).

### Immediate steps to be taken after an NSI

Dressing with water or alcohol (52.1%), followed by getting medical attention/calling the infectious disease department (14.1%), and squeezing blood out of the injured area (5.2%) were the top three responses when they were asked for the first step they should take when sustaining an NSI. None of these answers were correct; only 3.4% of them gave the right answer of washing the wound with soap and water (Table II).<sup>14</sup>

### Barriers to reporting an NSI

Table III shows the reasons why the respondents chose not to report an NSI incident, involving the opinions of both who have suffered and those who did not suffer an NSI. Respondents who had not sustained an NSI stated that they would not report an incident because they did not know whose responsibility it was to make the report (45.5%) and being busy (44.7%) was the other reason given. Amongst those who sustained NSI—the same two reasons were stated at 50.4% and 51.2%, respectively. Less than one-third of the pharmacists were in common agreement that (i) they did not feel that the NSI form was kept anonymous, (ii) it did not lead to any system change, (iii) was probably too complicated to fill-in, (iv) were worried about their details being accessed by others, and (v) they would never get any feedback from it.

### Responses of Pharmacists that Sustained an NSI

The researchers performed a separate analysis to look at those who suffered from NSI. There was a total of 54 pharmacists who suffered an NSI. From the 54, only 19 (35.2%) of them reported the incident. From the total of 54, 98.1% of them had poor needle handling practices and

Table I: The basic demographic details of the pharmacists responded to the questionnaire

Socio-demographic data		n (%) N=524
Age	(mean ± SD)	29.06 ± 3.96
Years of practice	(mean ± SD)	4.64 ± 4.00
Gender	Male	98 (18.7)
	Female	426 (81.3)
Job Position	PRP	71 (13.5)
	FRP	453 (86.5)
Current Institution	Tertiary hospital	262 (50.0)
	District health office/ health clinic	166 (31.7)
	District hospital	72 (13.7)
	Perak Pharmacy Enforcement branch	13 (2.5)
	Pharmacy service division	6 (1.1)
	Clinical research centre	5 (1.0)

\*PRP= Provisionally Registered Pharmacists; FRP= Fully Registered Pharmacists

**Table II: Prevalence, knowledge, practices, awareness, training of NSI, and the first step initiated if a NSI is sustained**

<b>Variables</b>	<b>n (%) N=524</b>
Number of respondents sustained a contaminated NSI	
Yes	54 (10.3)
Maybe (Unsure if NSI was contaminated or not)	67 (12.8)
No	400 (76.3)
Yes, but not in Perak state	3 (0.6)
Adequate NSI knowledge of transmissible diseases	
Hepatitis A	251 (47.9)
Hepatitis B	456 (87.0)
Hepatitis C	425 (81.1)
Tuberculosis	411 (78.4)
HIV	519 (99.0)
Overall adequate NSI knowledge of transmissible disease	175 (33.4)
Appropriate needle handling practices	
Recap needles after use	168 (32.1)
Disassemble used needles or sharps with hands	366 (69.8)
Wear gloves when disposing of contaminated needles	458 (87.4)
Separate the needle from the syringe prior to disposal	271 (51.7)
Throw used needles into sharp bin immediately	511 (97.5)
Wear gloves when manipulating the sharp bin	441 (84.2)
Discarding needles into sharp bin	482 (92.0)
Overall appropriate of needle handling practice	28 (5.3)
Overall knowledge and handling practices	8 (1.5)
Awareness of NSI reporting system	
Aware of a local NSI reporting system	317 (60.5)
Aware of needle stick injury system in Ministry of Health Malaysia	303 (57.8)
Ever completed a NSI report form	22 (4.2)
Know where to locate or access a NSI report form	141 (26.9)
Know what to do with a completed NSI report form	120 (22.9)
NSI-related training	
Have you ever been educated on prevention and actions to be taken if a NSI happens	234 (44.7)
Do you think pharmacists should be educated on prevention of NSI?	514 (98.1)
Do you think pharmacists should be educated on Standard Operating Procedures and reporting system of NSI?	511 (97.5)
When should pharmacist be educated on NSI	469 (89.5)
Pharmacy university	
Hospital PRP training	520 (99.2)
<b>The first infection preventive step that you would take after sustaining a needle-stick injury</b>	<b>n (%) N=524</b>
Some sort of dressing with water/alcohol	273 (52.1)
Get medical attention/call infectious disease department	74 (14.1)
Squeeze blood out of injured area	27 (5.2)
Get blood tested immediately	20 (3.8)
Run under running water, wash with soap/disinfectant, see doctor for patient's screening and blood investigations (correct answer)	18 (3.4)
Report incident	18 (3.4)
Don't know what to do	17 (3.2)
Antiviral prophylaxis	17 (3.2)
Inform Head of department/ In-charge person	9 (1.7)
Inject vaccine	9 (1.7)
Some sort of dressing and blood check	6 (1.1)
Take an antidote	5 (1.0)
Antibiotic prophylaxis	5 (1.0)
Anti-tetanus prophylaxis	4 (0.8)
Ask help from colleagues	3 (0.6)
Evaluate source of contamination	3 (0.6)
Wear gloves while handling needles/discard the needle	1 (0.2)
Others	15 (2.9)

NSI: needle stick injury; PRP: provisionally registered pharmacist

Table III: The barriers to reporting NSI

I DID NOT report OR MAY NOT report NSI because: -	Yes n (%) N=524	Those with NSI n (%) N=121
I am worried about disciplinary actions	94 (17.9)	32 (26.4)
When I am busy, I forget to make a report	234 (44.7)	61 (50.4)
I am worried about legal actions that may be taken against me	81 (15.5)	19 (15.7)
The NSI report form takes too long to fill and I just don't have time	183 (34.9)	50 (41.3)
My co-workers may be unsupportive	79.8 (20.2)	32 (26.4)
I don't know whose responsibility it is to make a report	238 (45.5)	62 (51.2)
I don't want the case discussed in meetings	143 (27.3)	35 (28.9)
I don't feel confident that the NSI report form is kept anonymous	161 (30.7)	41 (33.9)
The report is unlikely to lead to system changes that will improve the quality of care	137 (26.1)	37 (30.6)
I don't want to get into trouble	136 (26.0)	37 (30.6)
Junior staff are often blamed unfairly for NSI	149 (28.4)	35 (28.9)
I don't see any point in reporting it	65 (12.4)	18 (14.9)
If I report something, I never get any feedback on what action is taken	180 (34.4)	42 (34.7)
The NSI report form is too complicated and requires too much detail	185 (35.3)	48 (39.7)
I feel that if I discuss the case with the person involved, nothing else needs to be done	101 (19.3)	26 (21.5)
I worry about who else is privy to the information that I disclose	158 (30.2)	33 (27.2)
The incident was too trivial	104 (19.8)	30 (24.8)
It's not my responsibility to report somebody else's mistakes	75 (14.3)	21 (17.4)
Even if I don't give my details, I'm sure they'll trace me down	108 (20.6)	33 (27.3)

NSI: needle stick injury; n=121 was summation of both respondents sustained a contaminated NSI (n=54) and may be a contaminated NSI (n=67)

Table IV: Prevalence, knowledge, practices, awareness, and training of NSI amongst those who sustained an NSI, n=54

Variables	n (%) N=54
<b>Adequate NSI knowledge of transmissible diseases</b>	
Hepatitis A	20 (37.0)
Hepatitis B	46 (85.2)
Hepatitis C	45 (83.3)
Tuberculosis	5 (9.3)
HIV	54 (100)
Overall adequate NSI knowledge of transmissible disease	17 (31.5)
<b>Appropriate needle handling practices</b>	
Recap needles after use	34 (63.0)
Disassemble used needles or sharps with hands	18 (33.3)
Wear gloves when disposing of contaminated needles	39 (72.2)
Separate the needle from the syringe prior to disposal	22 (40.7)
Throw used needles into sharp bin immediately	53 (98.1)
Wear gloves when manipulating the sharp bin	42 (77.8)
Discarding needles into sharp bin	51 (94.4)
Overall appropriate of needle handling practice	1 (1.9)
Overall knowledge and handling practices	1 (1.9)
<b>Awareness of NSI reporting system</b>	
Aware of a local NSI reporting system	40 (74.1)
Aware of needle stick injury system in Ministry of Health Malaysia	37 (68.5)
Ever completed a NSI report form	18 (33.3)
Know where to locate or access a NSI report form	26 (48.1)
Know what to do with a completed NSI report form	20 (37.0)
<b>NSI-related training</b>	
Have you ever been educated on prevention and actions to be taken if a NSI happens	31 (57.4)
Do you think pharmacists should be educated on prevention of NSI?	54 (100)
Do you think pharmacists should be educated on Standard Operating Procedures and reporting system of NSI?	54 (100)
When should pharmacist be educated on NSI	
Pharmacy university	48 (88.9)
Hospital PRP training	54 (100)

Table V: Barriers among pharmacists who sustained needle-stick injury to report the incident, n=54

I DID NOT report OR MAY NOT report needle-stick injuries because:-	Yes n (%)	No n (%)
I am worried about disciplinary actions	16 (29.6)	38 (70.4)
When I am busy I forget to make a report	27 (50.0)	27 (50.0)
I am worried about legal actions that may be taken against me	12 (22.2)	42 (77.8)
The needle-stick injury report form takes too long to fill and I just don't have time	25 (46.3)	29 (53.7)
My co-workers may be unsupportive	17 (31.5)	37 (68.5)
I don't know whose responsibility it is to make a report	26 (48.1)	28 (51.9)
I don't want the case discussed in meetings	20 (37.0)	34 (63.0)
I don't feel confident that the needle-stick injury report form is kept anonymous	20 (37.0)	34 (63.0)
The report is unlikely to lead to system changes that will improve the quality of care	18 (33.3)	36 (66.7)
I don't want to get into trouble	24 (44.4)	30 (55.6)
Junior staffs are often blamed unfairly for needle-stick injuries	12 (22.2)	42 (77.8)
I don't see any point in reporting it	8 (14.8)	46 (85.2)
If I report something, I never get any feedback on what action is taken	17 (31.5)	37 (68.5)
The needle-stick injury report form is too complicated and requires too much detail	23 (42.6)	31 (57.4)
I feel that if I discuss the case with the person involved, nothing else needs to be done	12 (22.2)	42 (77.8)
I worry about who else is privy to the information that I disclose	19 (35.2)	35 (64.8)
The incident was too trivial	17 (31.5)	37 (68.5)
It's not my responsibility to report somebody else's mistakes	10 (18.5)	44 (81.5)
Even if I don't give my details I'm sure they'll trace me down	13 (24.1)	41 (75.9)

68.5% of them had poor overall knowledge of transmissible diseases from an NSI. Full details of this analysis is available in Table IV. In Table V, we described the reasons a person with an NSI would not report an incident in future. Some of the reasons those with NSI would not report: Half (50.0%) of the participants mentioned that they were too busy and forgot about it, 48.1% said they did not know whose responsibility it was to make a report, 46.3% said that reporting takes too long, 44.4% said that they did not want to get into trouble and 42.6% said that it was too complicated and required too much details.

## DISCUSSION

This study found the NSI prevalence amongst pharmacists in the public service in Perak, Malaysia was 10.3%. Most NSI-related studies focused on medical officers, medical assistants, nurses, as well as the students in the medical profession, commonly leaving out pharmacists from the sample<sup>5,7,12,14</sup>. It is noteworthy that this study found that about 1 in 10 pharmacists sustained a contaminated NSI throughout their practice, indicating that this profession is at risk of NSI and being predisposed to the risk of blood-borne transmissible diseases. Most of them chose not to report an NSI incident as they were unsure of who was supposed to report and due to their busy schedules.

The prevalence of 10.3% of pharmacists having experienced a contaminated NSI was comparatively lower than what Wichai reported where 17.4% of the pharmacy students in Thailand experienced an NSI.<sup>6</sup> Nevertheless, the overall NSI prevalence, including the incidence of sterile NSI, reported by the respondents in this research was 23.1%. The rate in this study is relatively lower in comparison with other studies (reported between 36.3 and 45%) of healthcare workers in other professions and medical students had a history of NSI.<sup>15,16</sup> The prevalence found in this study deserves attention and stake holders should apply precautionary measures to alert pharmacists about the hazards of needle handling and NSI. Less attention has been given to the issue of NSI amongst

pharmacists in the past, which could be attributed to the comparatively lower incidence of NSI occurring in this profession- perhaps due to under-reporting as found in this study. This is evident in a study conducted in 2016 by the Malaysian Ministry of Health which revealed that 6 out of every 1000 healthcare worker (HCW) had an NSI, of which medical doctors had the greatest rate of infection (21.1 per 1000 HCWs), followed by dental staff (7.5), pharmacy staff (4.2), nurses (3.7), medical assistants (3.4), and allied and auxiliary personnel (1.0).<sup>7</sup> A comparable incidence of NSI amongst pharmacists was a study done in the United States that showed that 5.65 per 1000 immunizing pharmacists reported the incidence of NSI in a retail pharmacy setting.<sup>17</sup>

This study showed that about one-third of the respondents demonstrated adequate knowledge of transmissible diseases attributed to NSI. Another similar study reported that 13% of the students perceived that they had adequate knowledge regarding NSI.<sup>17</sup> This reflects that knowledge of NSI amongst pharmacists was deemed to be inadequate and it is high time for improvement to be made. In addition, a mere 5.3% of our study respondents had appropriate practice in needle handling. Unsafe practices such as needle recapping and inappropriate needle disposal were critical risk factors that resulted in an NSI, and unsafe practices remain a major problem.<sup>7</sup> The report also advised that safe and uniform practices (such as proper discarding of needles and not recapping used needles) for various healthcare practitioners should be developed, implemented, and monitored—something that has not been done for pharmacists yet.<sup>7</sup>

Another concern is the lack of awareness about the existence of an NSI reporting system (approximately 40%) and pharmacists being unsure on how to obtain forms as well as how/where to submit it (approximately 70%). Although it is assumed that pharmacists are given the same needle-handling training and NSI prevention as their counterpart professions across the MOH settings, this study found that not all pharmacists were exposed to the NSI reporting system. Malaysian pharmacists may be perceived as less involved in

handling needles and sharps, as evident in many NSI awareness research studies on the professions of medical doctors, dentists, and paramedics extensively, with little to no research reporting on pharmacists.<sup>18-20</sup> Consistently, the results reported by a Malaysian national study found that 78% of the 49 incidences of NSI events associated with insulin needle handling amongst pharmacy staff in the MOH have been categorised as other or non-specific tasks. Unlike the other professions, such as medical doctors and nurses, NSI-related tasks were specifically grouped into "giving injections," "drawing blood," and "surgical procedures".<sup>7</sup> To date, pharmacy staff have not received adequate attention in NSI training, and this might be due to the cliché of the profession being perceived as conventionally dispensing medications with minimal or no sharp handling.<sup>21</sup> Provision of the same training to pharmacists on NSI and the reporting system should be implemented- especially when there is an expansion to their current roles, including being in-charge of medication therapy adherence in diabetic clinics where handling of insulin needles is inevitable.<sup>8</sup> This would also include simplifying the system of reporting, making it more user-friendly and to reinforce compulsory reporting as well as making the process non-punitive.

Our study found that less than half of the pharmacists were educated on NSI, and the vast majority of them agreed that they should receive education to prevent NSI. Most of them suggested that needle handling and NSI prevention training should be included in the university undergraduate curriculum and almost all of them suggested that PRPs should be trained on NSI prevention. This indicates that pharmacists' exposure towards NSI and needle handling remained far from satisfactory. Education and training concerning NSI that have been well established for healthcare workers such as medical doctors and nurses, should be implemented in the pharmacy profession.<sup>7,14</sup> It is therefore suggested that the Malaysian Pharmaceuticals Service Division, Ministry of Health, should consider this suggestion by incorporating it into the PRP training modules.

The barriers perceived by the respondents in this study to reporting an NSI were not knowing whose duty it was to report and due to busy schedules. This situation was similar to those observed in other studies in the United States where the main reason for not reporting NSI amongst surgeons was attributed to the time-consuming process of reporting.<sup>22</sup> Meanwhile, Iranian nurses gave a different reason in this context- not reporting an NSI was mainly due to the lack of follow-up investigation(s) after a reported event.<sup>4</sup> Amongst some of the possible reasons for this is that the nurses felt that regardless of reporting or not, they were not going to see improvements within the process or system.<sup>4</sup> In general, NSI are considered as an incident that should be reported to the occupational health and safety department. As reported by medical doctors and nurses in Australia- not reporting an incident without regards to its type was due to a lack of feedback.<sup>12</sup> Another main reason for not reporting an NSI in this study was that they were uncertain whose responsibility it was to make an incident report for NSI. This is most likely attributed to being unaware of the NSI reporting mechanism in the Malaysian Ministry of Health, as evident in the findings of this study, where slightly more than half of the

respondents were aware of the procedure for reporting NSI. Training pharmacists for NSI reporting, especially those who work in the Malaysian Ministry of Health, for the process of reporting is deemed necessary.

#### *Strengths*

This study is the first-known local study carried out amongst registered pharmacists in the government service in Perak, Malaysia between years 2017 and 2018. The sample size for this study was achieved, with 524 out of 773 Perak registered pharmacists (67.8%) participating in this study.

#### *Study limitations*

There were few limitations in this study. There may have been some "recall bias" of the timing (year) an NSI and where the injuries were sustained. The results also did not capture the job description of the pharmacists (PRP or FRP) during the NSI event. Data duplication may have also been possible—some pharmacists may have submitted the questionnaire twice by mistake. However, researchers have made efforts to screen the potential duplicate entries by checking whether there were two responses with the same demographic details submitted on the same date with very close timing. In which-such an incident could be due to clicking the "submit" button twice; nevertheless, no such incidence was encountered by the researcher during the data cleaning process.

#### *Implications for occupational and health practice*

One in every 10 pharmacists sustained an NSI. The majority of pharmacists had inadequate knowledge and needle-handling practices, whilst the main barrier to reporting an NSI was having a busy schedule and not knowing whose duty it was to report the incident. Pharmacists should be given proper training on prevention, Standard Operating Procedures for handling injectables, and the mechanism for reporting NSI. This can be done either by introducing it as a subject in the pharmacy school training syllabus or during the PRP training period. Other studies have recommended that the procedures of reporting could be made easier by simplifying the process, being anonymous and being supported by the superiors in reporting the incidents.<sup>23</sup> The reporting culture should be created in such a way that it is both encouraging for learning and not punitive in nature.<sup>24</sup>

#### **CONCLUSION**

This study affirms that NSI was prevalent among government pharmacists in Perak, with one in five having sustained NSI, of whom one in 10 pharmacists had a contaminated NSI experience. In general, they had inadequate knowledge of transmissible diseases by NSI and needle handling practices, with most of them having not received any form of NSI training and poor awareness about the reporting process. Policymakers should consider education and training for the pharmacists, especially focusing on preventing hazardous job-related injuries like sharps.

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