OPEN ACCESS

Pharmacists' perceptions on real-time prescription monitoring (RTPM) systems – a cross-sectional survey

Ziyue Zhang [a], Lin Guo [a], Ran Si [a], Leanne Chalmers [a], Patricia Filippin [b], Jane Carpenter [b], Petra Czarniak [a,*]

[a] *Curtin Medical School, Faculty of Health Sciences, Curtin University, Kent Street, Bentley, Western Australia 6102, Australia*
[b] *Department of Health, Medicines and Poisons Regulation Branch, Royal Street, East Perth, Western Australia 6004, Australia*

ARTICLE INFO

ABSTRACT

Background: Real-time prescription monitoring (RTPM) systems are an effective tool to help health practitioners monitor opioid use and reduce opioid-related harm but little has been reported about the support required by pharmacists to engage with them effectively in practice.
Objective: To evaluate the current understanding and perceptions of Western Australian pharmacists regarding RTPM systems and opioid-related harm, and investigate their self-reported training and support requirements prior to RTPM system implementation.
Methods: This cross-sectional, prospective study involved an online Qualtrics survey distributed to Western Australian community or hospital pharmacists involved in dispensing and patient-centred roles via local professional pharmacy newsletters and social media. Data collection included demographic information, responses to authentic case scenarios and Likert-scale questions regarding perceptions and training requirements of a RTPM system, pain management and opioid-related harm. Descriptive analysis was utilised.
Result: Sixty-two pharmacists responded to the questionnaire. Most (58/61; 95.1%) had a positive attitude towards RTPM systems, but only 33/61 (54.1%) reported being prepared for its implementation. Perceived barriers to successful implementation included lack of remuneration (46/60; 76.6%), conflict with prescribers (40/60; 66.7%), increased workload (37/60; 61.7%), staff safety concerns (34/60; 56.7%) and lack of knowledge regarding RTPM systems (32/60; 53.3%). Even though most participants were satisfied with training previously received, over 90% reported requiring further training and education, especially regarding RTPM systems (51/57; 96.2%) and opioid-related harm (56/57; 98.2%).
Conclusion: Among a small sample of participants, there was a strong positivity regarding the value of RTPM systems and a high degree of receptiveness to further training in preparation for RTPM implementation.

1. Introduction

Opioids have a significant role in pain management. However, long-term therapy with opioids has limited therapeutic benefits for patients with chronic non-cancer pain.[1] Furthermore, opioids have a substantial risk of misuse and abuse, and patients may develop dependence and sensitisation.[1,2] The increased rate of hospitalisation and mortality caused by inappropriate utilisation of opioid analgesics has been reported in recent decades.[3] The number of opioid-related deaths in Australia has increased three-fold from 2004 – 2008 to 2014 – 2018, from 995 during 2004 – 2008 to 2,707 during 2014 – 2018.[3] Internationally, a series of measures, such as opioid alarm systems and opioid monitoring systems, have been implemented to address the "opioid crisis".[4,5]

Prescription drug monitoring programs (PDMPs) have been adopted in the United States of America (USA), Canada and several states of Australia.[4–10] PDMPs are comprehensive prescription monitoring programs that collect prescribing and dispensing data relating to opioids and, in some cases, other high-risk medications, such as benzodiazepines, which are often termed 'monitored medicines'. In Australia, these programs are moving towards being real-time prescription monitoring (RTPM) systems and states that had not previously had a PDMP have implemented RTPM. This means prescribers, pharmacists and regulators can view prescribing and dispensing data as they occur, via a secure online platform. The effectiveness of RTPM systems in reducing the rate of opioid overprescribing has been proven in several countries and states where they have been implemented.[4,5,7] After the implementation of a RTPM system, high-dose

---

* Corresponding author.
E-mail addresses: ziyue.zhang1@postgrad.curtin.edu.au (Z. Zhang), lin.guo3@postgrad.curtin.edu.au (L. Guo), ran.si@postgrad.curtin.edu.au (R. Si), Leanne.Chalmers@curtin.edu.au (L. Chalmers), Patricia.Filippin@health.wa.gov.au (P. Filippin), Jane.Carpenter@health.wa.gov.au (J. Carpenter), P.Czarniak@curtin.edu.au (P. Czarniak).

pharmaceutical opioid usage decreased in Canada by 50%,[4] the opioid prescribing rate dropped by 24.2% in the USA and opioid-related overdose deaths halved in Tasmania.[6,7] Moreover, RTPM systems can support prescribers and pharmacists in clinical decision making, which can lower the risk of drug diversion and doctor shopping.[8,11]

RTPM system implementation is currently underway in Western Australia (WA).[12] As pharmacists are dispensers who control access to medicines, they play an important role in identifying potential drug related-harm and providing professional health advice.[13] However, there is no literature available describing the requirements and readiness of WA pharmacists for the implementation of RTPM systems. Therefore, this study aimed to evaluate the understanding and perceptions of Western Australian pharmacists regarding RTPM systems and opioid-related harm prior to its implementation, and investigated the training and support pharmacists believe they require to help with the successful implementation.

2. Material and method

2.1. Design

This was a cross-sectional, prospective study involving an online survey, administered via the Qualtrics platform, accessible from 19 March to 23 April 2021. The questionnaire was distributed via social media and online newsletters of local professional pharmacy organisations. Pharmacists who were members of one of the professional pharmacy organisations (a high proportion of Australian pharmacists[14]) received the questionnaire link via an online newsletter from the organisation (eg the Pharmaceutical Society of Australia (PSA), Pharmaceutical Society of Western Australia (PSWA), and the Society of Hospital Pharmacists of Australia (SHPA)). Pharmacists who did not have a professional pharmacy organisation membership were able to access the questionnaire through the School's Facebook page, Instagram, or the Western Australian Department of Health's weekly 'Medicines and Poisons Regulation Branch Pharmacy Update'. The questionnaire link took respondents to the 'Participant Information Statement' and 'consent to participate' page prior to providing access to the questionnaire. Participants were invited to enter a prize draw as a token of gratitude. Ethics approval was obtained from the Human Research Ethics Committee of Curtin University (approval number HRE2020–0007).

2.2. Participants

Registered pharmacists in WA, who were practising as community or hospital pharmacists and involved in dispensing prescriptions and patient education roles were eligible for inclusion in this study as the future users of a RTPM system. Pharmacists who were not practising in these roles were excluded. As of June 2020, there were 3411 general registered pharmacists in WA.[15] Assuming 80% agreement with the value of RTPM systems,[8] a sample size calculation estimated 228 participants would be statistically adequate at a confidence interval of 5% and *p* value = 0.05.

2.3. Measures

A questionnaire was developed based on current literature and Western Australian Department of Health workshops.[16–20] It was divided into five sections with 32 questions. The sections were Part A: Demographic information of pharmacists and their pharmacies (14 questions); Part B: Pharmacists' perceptions of RTPM systems (3 questions); Part C: Perceptions on the management of chronic non-cancer pain and opioid-related harm (2 questions); Part D: Education and training (3 questions); Part E: Scenario-based questions (10 questions). In Parts B, C and D, perceptions were assessed through five-point Likert scales (1 = strongly agree to 5 = strongly disagree). In Part E, pharmacists were presented with five hypothetical pharmacy practice-based scenarios based on patient behaviours (doctor shopping, sudden increased dose, a potential forged prescription, early supply, potential overuse) and asked to indicate what actions they would take in response to these situations and their confidence in their

actions based on a four-point Likert scale (very confident, confident, somewhat confident, not at all confident). The questionnaire was face and content validated by six academic pharmacists at Curtin University, some with current community or hospital pharmacy experience. Their feedback was incorporated into the questionnaire. The questionnaire has been attached as Supplementary material.

2.4. Analysis

Data were downloaded into an Excel spreadsheet and analysed using SPSS 27.0.1.0 (IBM USA, 2020). Questionnaires not completed beyond the demographic section were excluded from data analysis. Standard descriptive analyses (frequencies and percentages) were used to summarise the survey responses. To identify potential targets for future education and training initiatives, both in terms of pharmacist sub-populations and topics, univariate analyses were undertaken. Likert scale responses were transformed into dichotomous variables (strongly agree/agree vs other; and very confident/confident vs somewhat confident/not at all confident) and chi-square analyses were conducted to investigate associations with respondents' gender, age, pharmacy degree, years practising as a pharmacist, hours worked per week and pharmacy role (management vs non-management); and between respondents' confidence in providing patient care for each of the scenarios in Part E. A *p* value of <0.05 was considered statistically significant for all analyses.

3. Results

3.1. Pharmacists and pharmacies' characteristics

Of the 95 responses received, 78 participants were both currently registered pharmacists working in WA and involved in patient-care and dispensing roles. Sixteen of the 78 qualifying questionnaires were not completed beyond the demographic data and were excluded from data analysis. The shortest duration of questionnaire completion was 429 s (seven minutes), which was adequate to complete the questionnaire (range: 429–65,647 s). Of the 62 questionnaires included in the study, the majority (38/62; 61.3%) were from females and around two-thirds (38/62; 61.3%) were aged between 20 and 40 years. Most (43/62; 69.4%) had a Bachelor degree and had been working for less than 20 years (46/62;74.2%). More than half of the participants (32/62; 51.6%) worked 31–50 h per week. Most respondents worked in community pharmacy practice (58/62; 93.5%) as a sole or partner proprietor, pharmacy manager, pharmacist-in-charge or employee pharmacist.

Most participants reported that their pharmacies were engaged with harm minimisation services, including staged supply (48/62; 77.4%) (involving a pharmacist supplying a medicine in time instalments rather than all at once, usually in response to a request by a prescriber), opioid substitution therapy (29/62; 46.8%) (ie replacement of drugs of dependence [eg illegal drugs such as heroin], with a legally prescribed substitute, such as methadone or buprenorphine), needle and syringe programme (35/62; 56.5%) and take home naloxone (29/62; 46.8%). Seven participants (11.3%) reported that their pharmacies did not offer any of these harm minimisation services. For a majority of pharmacies, the internet connection was reported as fast and reliable (50/62; 87.7%), although 11.3% (7/62) reported it as fast but unreliable, or slow but reliable (5/62; 8.1%).

3.2. Pharmacists' perceptions of RTPM

Responses to statements assessing participants' perceptions regarding RTPM systems are shown in Fig. 1. Although many participants (45/61; 73.8%) had known about RTPM systems prior to this questionnaire, more than half were not ready for its implementation (33/61; 54.1%). Most participants agreed on the value of RTPM systems in promoting the safe and effective use of opioids and other high-risk medicines (58/61; 95.1%). The majority reported they were comfortable with the use of RTPM systems being mandated when clinicians prescribed opioid medicines (51/60; 85%)

Fig. 1. Participants' perceptions regarding RTPM systems.

and when pharmacists dispensed opioid medicines (53/60; 88.3%). Most (58/61; 95.1%) were also positive about an alert appearing on their dispensing screen when patients may be at risk of opioid-related harm. Many participants (41/60; 68.3%) reported being confident dealing with this situation. However, when it came to identifying patients at risk of opioid-related harm without the use of RTPM systems, over half of the participants (33/60; 55.0%) lacked confidence in their ability to do this. While responses regarding perceptions of RTPM were mostly positive, for the questions where there was some variability (preparation for RTPM implementation; confidence in dealing with an RTPM alert, and confidence in identifying patients at risk without RTPM), no associations were identified with any demographic variables investigated (analyses not shown; p all >0.05).

Some obstacles participants believed might occur during the implementation and use of a RTPM system are summarised in Fig. 2. The most significant barriers were lack of remuneration (46/60; 76.6%), conflict with prescribers (40/60; 66.7%), increased workload (37/60; 61.7%), staff safety concerns (34/60; 56.7%) and lack of knowledge regarding RTPM systems (32/60; 53.3%). Pharmacists working part-time were more likely to express concern about workload than those working full-time or more ($p = 0.035$); and non-managers were more concerned about conflict with prescribers than managers ($p = 0.007$).

3.3. Knowledge and confidence levels in dealing with opioid-related harm

As shown in Fig. 3, the majority of participants were positive about their knowledge and confidence levels in terms of pain management and opioid-related harm. Almost 85% (51/60) of participants were concerned about

patients receiving medium-term to long-term opioid treatment to manage non-cancer pain. Few participants (11/59; 18.7%) agreed that working with patients to reduce their risk of opioid-related harm was beyond their scope of practice as a pharmacist. A majority felt confident in their ability to assist patients in managing their chronic non-cancer pain (43/60; 71.7%) and contacting a doctor when a patient was at risk of opioid-related harm due to long-term or high dose opioid use (48/61; 78.7%). Nevertheless, around half of participants reported lacking access to resources regarding opioid-related harm (32/60; 53.3%).

3.4. Types of training required when implementing RTPM

As seen in Fig. 4, many participants were satisfied with the education and training they had previously received regarding the management of chronic non-cancer pain (31/57; 54.4%), non-opioid therapies for chronic non-cancer pain (34/57; 59.6%) and opioid-related harm (35/57; 61.4%). However, about 40% of the participants (23/58; 39.6%) were dissatisfied regarding the education and training received for helping patients manage opioid misuse and abuse. The majority of participants suggested a strong need for extra training for RTPM systems (44/57; 77.2%). There were no significant associations between demographic variables and knowledge regarding pain management and opioid-related harm, and perceived education and training needs (analyses not shown; p all >0.05).

Generally, participants indicated a desire to receive additional education and training regarding the management of chronic non-cancer pain (56/57; 98.2%), addressing opioid misuse and abuse (56/57; 98.2%) and rationalising opioid use to reduce the risk of opioid-related harm (56/57;
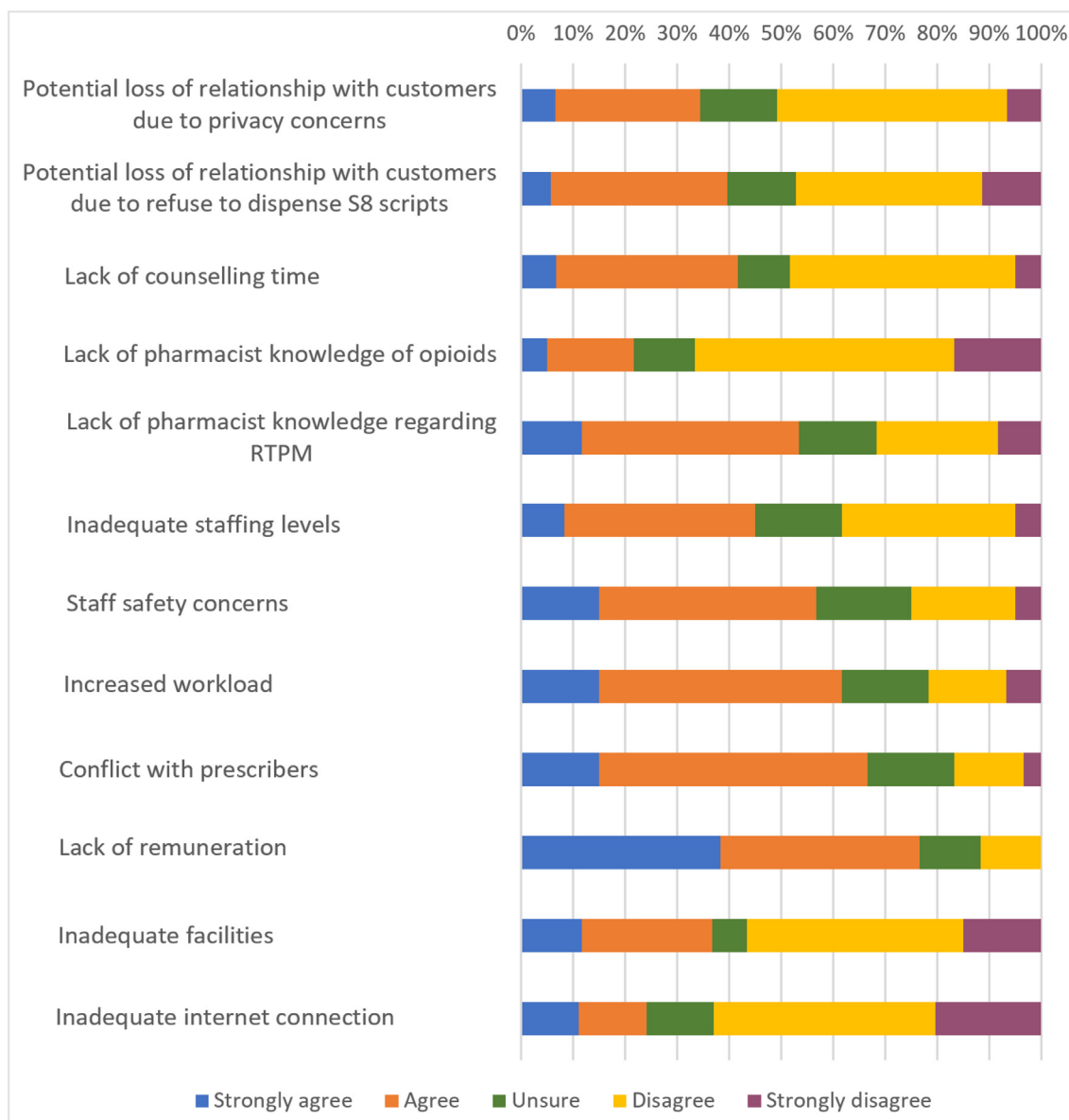
Fig. 2. Barriers for the successful implementation and use of RTPM systems.

98.2%). Moreover, the need for education and training related to RTPM systems (51/57; 96.2%) and appropriate referral points (55/57; 96.5%) was also frequently recognised. Comparatively, the perceived need for training regarding counselling skills (49/57; 86%) and pharmacotherapeutic knowledge of opioids (48/57; 84.2%) were slightly lower.

Most participants indicated that they preferred learning in their own time. The most acceptable choice for participants in receiving education was online modules (52/57; 94.7%) followed by written resources with multiple-choice questions (47/57; 82.5%) and information on the Department of Health website (44/57; 77.2%). Online 'real-time' interactive sessions/webinars were a less popular option (40/57; 70.2%). Only around half of the participants were willing to attend face-to-face lectures and role-play workshops (33/57; 57.9% and 28/57; 49.1%). 'Resource packs' for patients who are at risk of opioid-related harm were also highly welcomed by participants (52/57; 91.2%).

3.5. Case scenarios

Five scenarios were utilised to evaluate the self-reported actions of WA pharmacists in real-life practice (Fig. 5). The scenarios were based

on patients' behaviours regarding doctor shopping, a sudden increased dose, a potentially forged prescription, early supply and potential overuse of opioids. For each scenario, except the forged prescription, most participants reported that they would discuss the situation with patients and offer counselling and support regarding medication use. Almost all participants would contact the prescriber before dispensing when they received any prescriptions of concern (50/62; 80.6%). Most participants (42/62; 67.7%) would record the incident when they suspected a patient was doctor shopping. No participants chose to dispense when they received a suspected forged prescription or were faced with a potential oversupply issue. Table 1 shows the respondents' confidence levels regarding their response to the five scenarios. Over 80% of participants had a relatively high confidence level when dealing with patients who presented with a rapid dose increase (49/56; 87.5%), forged prescription (48/55; 87.3%) and early supply issues (44/55; 80%) (Table 1). Comparatively, respondents were less likely to feel very confident/confident in their proposed actions when they met with potential drug-seeking (38/56; 67.9%) and overuse behaviours (31/55; 56.4%) ($p < 0.001$), which suggests that these are possible areas for focus of future education and training.
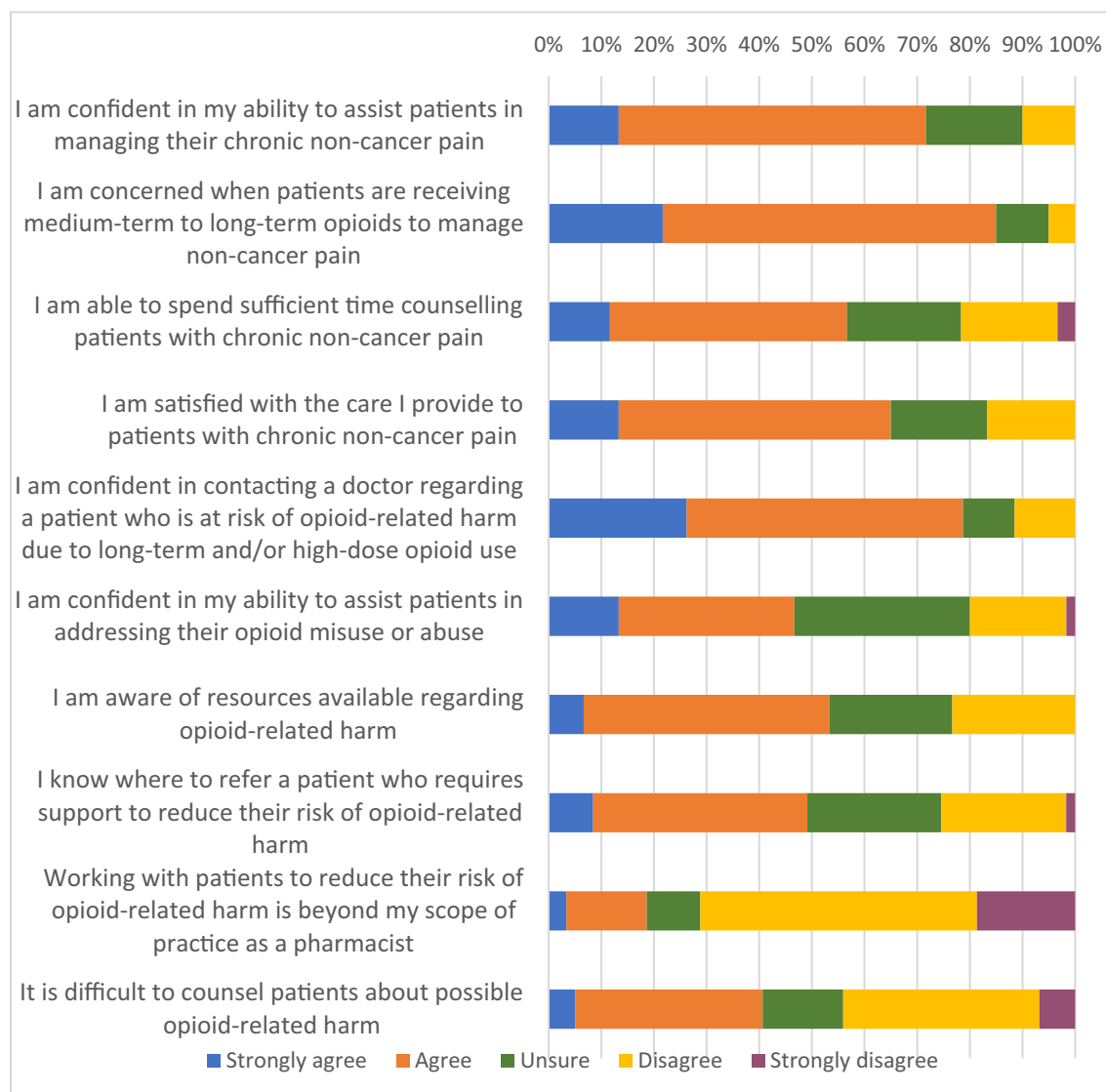
Fig. 3. Participants' knowledge regarding pain management and opioid-related harm.

4. Discussion

This is the first study investigating Western Australian pharmacists' perceptions and reported training needs regarding the implementation of a RTPM system. Many participants had some awareness of RTPM systems and most held a strong positive attitude to its implementation and felt comfortable with the idea of using it to protect patients from opioid-related harm. Similar findings have been reported in the USA and other parts of Australia, regarding patients who were at risk of opioid harm.[7,8,21] However, many participants reported they were not prepared for the implementation of a RTPM system without adequate training.

Despite their perceptions of the potential benefits of RTPM systems, participants recognised there were also some barriers preventing successful implementation. Significant perceived barriers included the lack of remuneration, and potential conflict with prescribers, both of which have been reported as concerns in previous studies.[16,22–25] Participants in this study indicated the loss of relationship with patients and lack of counselling time would unlikely be major barriers, which contradicts findings from the USA.[26] Therefore, additional remuneration, strategies to enhance the collaboration between prescribers and pharmacists, as well as methods to reduce workload, such as integrating the RTPM system into the current dispensing system, may be useful in promoting the smooth transition to a RTPM system, especially for the part-time workforce and pharmacists working in non-management roles.

Most participants believed they had a key role in pain management and to reduce the risk of opioid misuse or abuse. A higher proportion of participants were satisfied with their current knowledge about opioid-related harm and the management of non-cancer pain than their knowledge of management of opioid misuse and abuse. Inadequate knowledge of opioid misuse and abuse was also reported by USA pharmacists.[27–30] When patients were at risk of opioid-related harm due to misuse or abuse, most participants stated they were more confident in discussing this situation with doctors, rather than addressing this directly with the patient. Although gender differences were not identified in this study, in a recent study in Australia, researchers reported that female pharmacists were less comfortable intervening when concerned about prescription opioid supply but more likely to call patients' prescribers in this situation than male pharmacists.[31] Approximately 50% of participants were aware of available resources and treatment services to assist patients at risk of opioid related harm.

Participants felt less confident in their proposed actions when they met with potential drug-seeking and overuse behaviours than with less complex or forensic issues, perhaps because they perceived that these issues would be more complex to resolve or that this group would be more difficult to
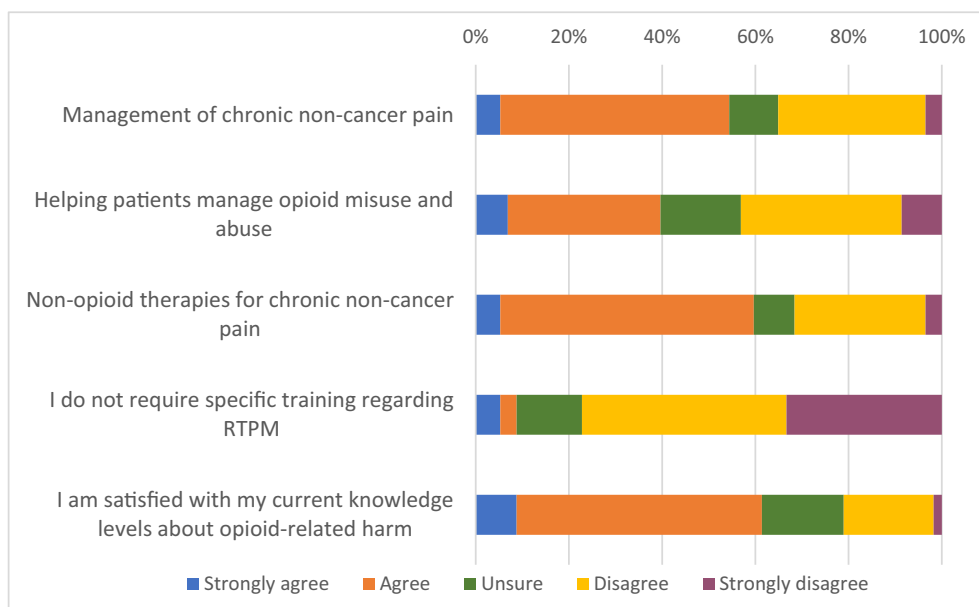
Fig. 4. Level of agreement regarding education and training needs in relation to RTPM systems and opioid-related harm.

Scenario 1: Patient presents to the pharmacy with a prescription for oxycodone 5mg tablets triggering an RTPM system alert. The patient previously received multiple oxycodone prescriptions from several different prescribers over the past two months.

Scenario 2: While filling a prescription for morphine sustained release 60mg twice daily, an RTPM system alert appears indicating that this is a significant dose increase. Prescription last month was for morphine sustained release 30mg twice daily.

Scenario 3: While dispensing for a new patient, you check the RTPM system and cannot see any record of the script. Forgery is suspected.

Scenario 4: A long-time client of the pharmacy with a chronic lower back pain previously purchased ibuprofen/codeine from your pharmacy; now sees their GP for codeine tablets and buprenorphine patches and purchases doxylamine tablets from your pharmacy every 2-3 weeks. Today, requests an early supply of codeine prescription for a holiday next week. An RTPM system alert appears mentioning the patient has received eight early supplies of prescription opioids this year.

Scenario 5: A long-term patient with chronic pain comes into the pharmacy. A locum GP has refused the patient a prescription for tapentadol claiming the RTPM system suggests they are taking too many opioids. You are also aware the patient has been escalating their use of tapentadol in recent months, which they are taking together with regular paracetamol, ibuprofen, sertraline, and diazepam, and today the patient smells strongly of alcohol.
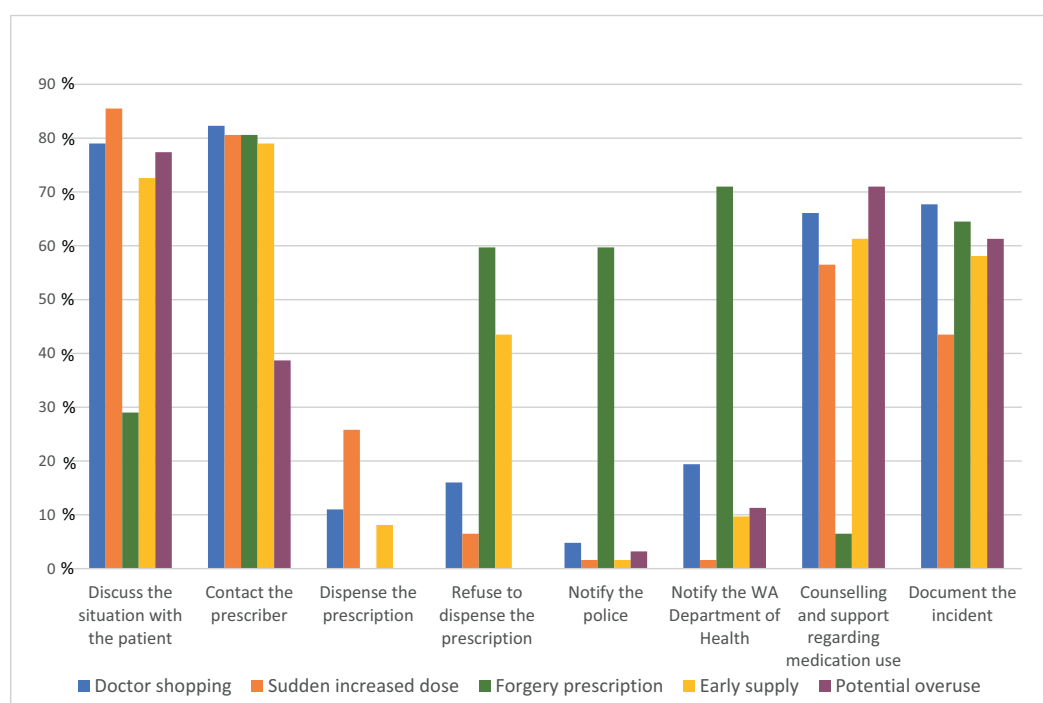
Fig. 5. Self-reported actions of participants in reponse to five different scenarios.

engage. In a recent study investigating challenges of opioid deprescribing experienced by health professionals, researchers reported that certain populations may be at a higher risk of opioid-related harm, such as those with chronic pain and mental health issues. The researchers suggested that due to a variability of individual patients and their circumstances, there was a need for guidelines to address patient psychological factors.[32] Pharmacists reported feeling least confident when working with patients in the areas of mental health and substance abuse, although with adequate training, pharmacists' confidence in responding to a range of opioid-related problems increased.[33] Further, most opioid prescribing guidelines provide advice on treatment initiation and rarely address discontinuation of monitoring

of opioids.[32] In support of our findings, previous authors[10] have identified that the implementation of RTPM systems must be accompanied by adequate resourcing of specialist services, and training and resources for prescribers and pharmacists, to address the often complex health needs of people at risk of opioid-related harm, to minimise any unexpected harms.

Almost all participants suggested the requirement for specific training regarding RTPM systems. Interestingly, although the satisfaction with their previous training and education about pain management, opioid-related harm and RTPM systems varied, the majority of participants still indicated that they would like to receive additional training and education for all suggested topics, primarily via approaches that enable participants to

Table 1

Respondents' perceived levels of confidence in their selected course of action for each of the five scenarios.

Scenario (Total number of respondents)	How confident do you feel about taking this course of action?	
	Very confident/confident	Somewhat confident/not at all confident
	n (%)	n (%)
1 (56)	38 (67.9)	18 (32.1)
2 (56)	49 (87.5)	7 (12.5)
3 (55)	48 (87.3)	7 (12.7)
4 (55)	44 (80.0)	11 (20.0)
5 (55)	31 (56.4)	24 (43.6)

learn in their owntime, and resources for patients at risk of opioid-related harm. The survey identified that training and education for WA pharmacists should focus on addressing opioid misuse and abuse. Online education courses, such as the Resources Encouraging Safe Prescription Opioid and Naloxone Dispensing (RESPONSE) toolkit, have been successfully trialled in the US.[34] The toolkit, which contains distinct online modules of approximately 20 min duration each, has been shown to enhance understanding of pharmacists' roles in addressing opioid safety and enhance communication between pharmacists, prescribers and patients.[27,34] The provision of guidelines for referring patients on to other health practitioners or treatment services was also considered an important rescource for pharmacists.

4.1. Limitations

The overall response rate for the survey was very low, despite the offer of prize draw entry, precluding multivariate analyses and potentially rendering the univariate analyses underpowered. The emerging COVID-19 pandemic at the same time as the survey was published is believed to have been a contributing factor to the lower response rate. Care must be exercised in generalising the results of this study, especially as pharmacists who chose to respond may also be more engaged in the care of patients at risk of opioid-related harm and more positive about RTPM systems.

5. Conclusion

As the rollout of a RTPM system to prescribers and pharmacist draws closer, WA pharmacists need to be prepared to interact with and counsel patients who are identified as high-risk opioid users, and collaborate effectively with their prescribers. Although most participants were positive about the potential of a RTPM system in preventing opioid-related harm, barriers such as inadequate remuneration, conflict with prescribers, increased workload and lack of confidence in addressing opioid misuse and abuse should be addressed to facilitate successful implementation. There is a clear need to provide additional education and training to support pharmacists and ensure smooth implementation of a RTPM system in WA.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.rcsop.2022.100122.

References

1. Australian Institute of Health and Welfare. *Chronic pain in Australia Canberra.* Australian Government. 2020.
2. Electronic Therapeutic Guideline Complete (eTG). Therapeutic Guidelines: General principles of chroic pain management. 2021 cited In: Melbourne (Australia): Therapeutic Guidelines Limited. Available from: https://tgldcdp-tg-org-au.dbgw.lis.curtin.edu.au/viewTopic?topicfile=general-principles-chronic-pain-management. Accessed 10.11.21.
3. Penington Institute. *Australia's annual overdose report. Melbourne (Australia).* 2020.Available from: https://www.penington.org.au/wp-content/uploads/Australias-Annual-Overdose-Report-2020.pdf. [Accessed 11.02.22].
4. Fischer B, Jones W, Vojtila L, Kurdyak P. Patterns, changes, and trends in prescription opioid dispensing in Canada, 2005-2016. Pain Physician 2018;21(3):219–228.
5. Chisholm-Burns MA, Spivey CA, Sherwin E, Wheeler J, Hohmeier K. The opioid crisis: origins, trends, policies, and the roles of pharmacists. Am J Health-Syst Ph 2019;76(7):424–435.
6. Centres for Disease Control and Prevention. *Leveraging Prescription Drug Monitoring Program (PDMP) Data in Overdose Prevention and Response Atlanta, GA.* National Centre for Injury Prevention and Control, Division of Overdose Prevention. 2021.
7. Reynolds A, Boyles P. Clinical care and regulation of opioid use: The Tasmanian model. Med Today. [cited 10 February 2022];18 (Suppl):17–21. Available from: https://medicinetoday.com.au/system/files/pdf/MT2017-03SUPPL-PRESCRIPTION_OPIOID_MISUSE.pdf
8. Johnston K, Alley L, Novak K, Haverly S, Irwin A, Hartung D. Pharmacists' attitudes, knowledge, utilization, and outcomes involving prescription drug monitoring programs: a brief scoping review. J Am Pharm Assoc 2018;58(5):568–576.
9. Centres for Disease Control and Prevention. *U.S. Opioid dispensing rate maps [Internet].* 2021.Available from: https://www.cdc.gov/drugoverdose/rxrate-maps/index.html.
10. Haines S, Savic M, Picco L, Nielsen S, Carter A. Unintended consequences of using real time prescription monitoring systems. Med J Aust 2020;213(3):142.e1.
11. Australian Government. National Real Time Prescription Monitoring (RTPM), [Internet]. Available from: https://www.health.gov.au/initiatives-and-programs/national-real-time-prescription-monitoring-rtpm 2022.
12. Medicines and Poisons Regulation Branch. Real Time Prescription Monitoring [Internet]. Available from: https://ww2.health.wa.gov.au/Articles/N_R/Prescription-monitoring-in-Western-Australia 2021.
13. Gregory T, Gregory L. The role of pharmacists in safe opioid dispensing. J Pharm Pract 2020;33(6):856–862.
14. Pharmaceutical Society of Australia. PSA Annual Report 2020-21. Deakin West ACT. Available from: https://www.psa.org.au/wp-content/uploads/2018/09/PSA-Annual-Report-2016-17.pdf 2021.
15. Pharmacy Board of Australia. Pharmacy Board of Australia AHPRA: Statistics [Internet]. Available from: https://www.pharmacyboard.gov.au/About/Statistics.aspx 2020.
16. Sim TF, Wright B, Hattingh L, Parsons R, Sunderland B, Czarniak P. A cross-sectional survey of enhanced and extended professional services in community pharmacies: a pharmacy perspective. Res Social Adm Pharm 2019;16(4):511–521.
17. Pearson AC, Moman RN, Moeschler SM, Eldrige JS, Hooten WM. Provider confidence in opioid prescribing and chronic pain management: results of the opioid therapy provider survey. J Pain Res 2017;10:1395.
18. Dubé P-A, Vachon J, Sirois C, Roy É. Opioid prescribing and dispensing: experiences and perspectives from a survey of community pharmacists practising in the province of Quebec. CPJ 2018;151(6):408–418.
19. Gavaza P, Vickery P. Gaps in the pharmacist's pain management role. Pract Pain Manag 2018;18(6). [cited 11 Februry 2022]. Available from: https://www.practicalpainmanagement.com/resources/practice-management/gaps-pharmacist-pain-management-role.
20. Fleming ML, Barner JC, Brown CM, Shepherd MD, Strassels SA, Novak S. Pharmacists' training, perceived roles, and actions associated with dispensing controlled substance prescriptions. J Am Pharm Assoc 2014;54(3):241–250.
21. Freeman PR, Curran GM, Drummond KL, et al. Utilization of prescription drug monitoring programs for prescribing and dispensing decisions: results from a multi-site qualitative study. Res Social Adm Pharm 2019;15(6):754–760.
22. Gibbins AK, Wood PJ, Spark MJ. Managing inappropriate use of non-prescription combination analgesics containing codeine: a modified Delphi study. Res Social Adm Pharm 2017;13(2):369–377.
23. Gosdin MM, Pugliese J, Wintemute G, Henry SG. Philosophical barriers to using prescription drug monitoring programs: results from a statewide survey. Pain Med 2019;20(8):1636–1637.
24. Hamer AM, Spark MJ, Wood PJ, Roberts E. The upscheduling of combination analgesics containing codeine: the impact on the practice of pharmacists. Res Social Adm Pharm 2014;10(4):669–678.
25. Leong C, Alessi-Severini S, Sareen J, Enns MW, Bolton J. Community pharmacists' perspectives on dispensing medications with the potential for misuse, diversion, and intentional overdose: results of a province-wide survey of community pharmacists in Canada. Subst Use Misuse 2016;51(13):1724–1730.
26. Hagemeier NE, Gray JA, Pack RP. Prescription drug abuse: a comparison of prescriber and pharmacist perspectives. Subst Use Misuse 2013;48(9):761–768.
27. Alley L, Novak K, Havlin T, et al. Development and pilot of a prescription drug monitoring program and communication intervention for pharmacists. Res Social Adm Pharm 2020;16(10):1422–1430.
28. Hoppe D, Ristevski E, Khalil H. The attitudes and practice strategies of community pharmacists towards drug misuse management: a scoping review. J Clin Pharm Ther 2020;45(3):430–452.
29. Cochran G, Field C, Lawson K. Pharmacists who screen and discuss opioid misuse with patients: future directions for research and practice. J Pharm Pract 2015;28(4):404–412.

30. Fendrich M, Bryan JK, Hooyer K. Prescription drug monitoring programs and pharmacist orientation toward dispensing controlled substances. Subst Use Misuse 2018;53(8): 1324–1330.

31. Alvin M, Picco L, Wood P, Mnatzaganian G, Nielsen S. Community pharmacists' preparedness to intervene with concerns around prescription opioids: findings from a nationally representative survey. Int J Clin Pharmacol 2021;43(2):411–419.

32. Langford AV, Gnjidic D, Lin C-WC, et al. Challenges of opioid deprescribing and factors to be considered in the development of opioid deprescribing guidelines: a qualitative analysis. BMJ Qual Saf 2021;30(2):133–140.

33. Nielsen S, Picco L, Kowalski M, et al. Routine opioid outcome monitoring in community pharmacy: outcomes from an open-label single-arm implementation-effectiveness pilot study. Res Social Adm Pharm 2020;16(12):1694–1701.

34. Irwin AN, Novak K, Alley L, et al. Impact of the RESPOND Toolkit on community pharmacists' opioid safety attitudes, self-efficacy, and knowledge. J Am Pharm Assoc 2020;60(3):450–455.e3.