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Research in Social and Administrative Pharmacy xxx (xxxx) xxx

Contents lists available at ScienceDirect

Research in Social and Administrative Pharmacy

journal homepage: www.elsevier.com/locate/rsap

A scoping literature review of pharmacy-based opioid misuse screening and brief interventions

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ARTICLE INFO

Keywords:
Screening
Prevention
Opioid misuse
Pharmacy
Opioid use disorder
Naloxone

ABSTRACT

Background: Although prescription opioid dispensing rates have continued to decrease, overdose deaths involving prescription opioids have increased during the COVID-19 pandemic. Screening and brief interventions (SBI) are an effective prevention strategy to identify and address opioid misuse and safety risks. Emerging literature on pharmacy-based SBI needs to be systematically appraised to develop robust interventions.

Objective: Our objective was to conduct a scoping review of the literature regarding pharmacy-based opioid misuse SBI to identify relevant literature that explore the topic, evaluate the patient-centeredness of included studies, and explore the use of dissemination and implementation science in the literature.

Methods: The review was conducted according to Preferred Reporting of Systematic Reviews and Meta-analyses –Scoping reviews (PRISMA-Sc) guidelines. We searched PubMed, CINHAL, PsychInfo, and Scopus for studies regarding pharmacy-based SBI, published in the last 20 years. We also conducted a separate grey literature search. Two of three total reviewers screened each abstract individually and identified eligible full-texts for inclusion. We critically appraised quality of included studies and qualitatively synthesized the relevant information.

Results: The search resulted in 21 studies (categorized as intervention, descriptive, and observational research) and 3 grey literature reports. Of the recently published 21 studies, 11 were observational research, with six interventions in the pilot stages. Screening tools varied but naloxone was the brief intervention in 15 of the 24 results. Only eight studies had high validity, reliability, and applicability and only five were patient-centered. Implementation science principles were addressed in eight studies (mainly interventions). Overall, the findings suggest high potential for evidence-based SBI to be successful.

Conclusions: Overall, the review suggested a strong lack of a patient-centered and implementation science-focused approach to designing pharmacy-based opioid misuse SBI. Findings suggest that a patient-centered, implementation focused approach is needed for effective and sustained pharmacy-based opioid misuse SBI.

1. Introduction

Although prescription opioid dispensing rates have decreased since 2012, deaths involving prescription opioids increased by 16% in 2020.[1] In the US, about 29% of patients on opioid prescriptions misuse them, 12% of people using an opioid for pain subsequently develop an opioid use disorder (OUD), and 6% of people misusing opioids transition to heroin use.[2] Therefore, there is a critical need for prevention interventions that address opioid misuse and safety risks while maintaining access to appropriate opioid medications for patients who need them.

One type of prevention model for substance misuse is the Screening and Brief Intervention (SBI), or its more comprehensive version, the Screening, Brief Intervention, and Referral to Treatment (SBIRT) model. SBIRT as defined by the Substance Abuse and Mental Health Services Administration (SAMHSA) is a comprehensive, early intervention for individuals at risk for substance misuse that may involve referral to more intensive treatment depending on the individual's needs.[3] According to SAMHSA's model description, any SBIRT intervention must be brief, include a universal screening, address a specific behavior, occur in a

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https://doi.org/10.1016/j.sapharm.2023.05.003
Received 4 October 2022; Received in revised form 4 April 2023; Accepted 8 May 2023
Available online 16 May 2023

non-substance abuse treatment facility, be comprehensive (i.e. include all three components), and have supportive evidence of its effectiveness.[3] However, based on this definition, SBIRT has mostly demonstrated effectiveness for intervening on alcohol misuse only.[4]

The less comprehensive version i.e., the SBI only is defined similarly to SBIRT but without referral to treatment. The SBI model has been studied more extensively in a variety of settings. SBI for people who misuse alcohol in outpatient settings has strong evidence for effectiveness.[5] While some brief interventions for patients with alcohol use disorders in primary care settings have not been shown to be highly effective,[6] others report positive findings.[7] Alternate formats of delivery such as using digital health technologies for alcohol misuse SBI have shown moderate effect in reducing misuse behaviors such as binge drinking.[8,9] Although some studies have reported effectiveness of SBI programs for drug misuse,[10] the evidence is not consistent across different settings.[11] Moreover, most SBI programs have mostly focused on illicit drug use and not prescription opioid misuse. One study evaluated an SBI for prescription drug use, but it was part of a randomized controlled trial in a hospital setting.[12]

SBI offers opportunities to identify opioid misuse and safety risks and intervene accordingly, without significantly disrupting provider workflow.[3] Community pharmacists are uniquely positioned to offer opioid misuse SBI due to their high accessibility and medication expertise.[13] Exploring the role of pharmacists in OUD prevention interventions is an emerging topic of interest. While some narrative reviews have explored the broader topic,[14,15] the literature on pharmacy-based or pharmacist-led SBI specifically has not been appraised. To design an effective SBI, it is important to consolidate the literature on SBI involving pharmacists and examine its strengths and weaknesses. Using a systematic approach to this literature review would ensure that relevant literature is captured and inferences on these studies can be made without a high risk of bias.

While efficacy data for SBI is strong, effectiveness data in real world settings is mixed. To avoid these gaps in translation for pharmacy-based SBI, implementation science principles must be used during the design stage to ensure optimum translation of the intervention into pharmacy practice. Designing for dissemination and implementation (D4D&I) principles provide a framework for this purpose.[16] These principles are categorized into three domains: system changes, processes, and products. While system changes address how research should be funded, processes and products include principles that researchers can apply in research studies. The D4D&I framework also lists potential actions that can be undertaken by researchers corresponding to each principle.[16] Sample actions include engaging stakeholders, identifying appropriate implementation frameworks (processes) and documenting evidence of effectiveness and implementation costs (products).

Ideally, SBI models include patient preferences and needs in their design to ensure that patients find the intervention acceptable. Patient involvement in development of SBI for opioid misuse is particularly important because of the delicate nature of the topic of addiction. If patients screen positive for opioid misuse, treatment referrals and harm reduction strategies can be employed, without stigmatizing patients or hindering their autonomy to choose treatment. Other than engaging patients in SBI research, we can improve effectiveness of SBI by developing patient-centered interventions. Morgan and Yoder define person-centered care as holistic, individualized, autonomous, and empowering patients.[17] This definition is based on a thorough literature review and concept analysis of person-centered care, and also describes the antecedents required (organizational commitment and attitudes, shared governance) and consequences (improved care quality, outcomes, and satisfaction) of person-centered care.

The purpose of this study was to conduct a scoping review of the literature regarding pharmacy-based SBI to 1) identify all experimental and observational studies and grey literature that explore the topic or involve design and implementation of SBI, 2) evaluate the patient-centeredness of included SBI, and 3) explore the prevalence of dissemination and implementation (D&I) science in the literature.

The specific research questions that guided the review are:

- What is the state of science concerning pharmacy-based SBI for opioid misuse?
- What types of pharmacy-based SBI exist? What are their characteristics?
  - •Were patient perspectives included in the development or evaluation of these interventions?
  - •Were D4D&I principles[16] used in developing and implementing these interventions?
- Are the interventions and research in the field patient-centered? If yes, to what extent?
  - •Criteria used to evaluate the SBI were based on attributes defined by Morgan and Yoder of patient-centered care[17]: holistic, individualized, respect for autonomy, and empowerment.
- What are some limitations of the studies?
  - •How can inclusion of patient-centeredness have helped with these limitations?
  - •How can addressing D&I science principles have improved these limitations?

2. Methods

The search was carried out according to Preferred Reporting of Systematic Reviews and Meta-analyses –Scoping reviews (PRISMA-Sc) guidelines.[18] The search protocol was registered as an open-ended registration at Open Science Framework, OSF Registries (Registration DOI: 10.17605/OSF.IO/FPGN6) and is publicly accessible.[19] The search process is illustrated in Fig. 1.

2.1. Eligibility

The initial eligibility criteria (using search limits) were years, language, and publication status. As literature on the topic is spread out over the last 20 years without any large change attributable to a particular period, literature published after the year 2000 was included. No geographical limits were placed but only English publications were included. Both published literature and all papers with full texts available online were selected. Papers without freely available full texts were requested through the university libraries. However, to avoid publication bias, we also conducted a grey literature search. Grey literature is information produced outside of peer-reviewed academic publishing and includes organizational reports, blogposts, dissertations, white papers, newsletters, etc.

Additional eligibility criteria used during the screening and extraction stage were study populations, study designs, and full-text access. Studies that included patients prescribed opioids for acute or chronic non-cancer pain were included. Studies with only patients who had a formal diagnosis of OUD were excluded. Although pharmacists were most likely to be community based, studies including other pharmacists (clinical/hospital/specialized) who interact with patients were also included. Studies that described SBIs (even if not using the term) for opioid misuse in pharmacy or were related to such interventions were included. We did not exclude any type of study design initially. Study designs such as case studies/quality improvement (QI) initiatives, observational studies, experimental intervention, systematic reviews, commentaries, and editorials were included. However, other types of reviews such as narrative literature reviews that did not generate novel results beyond summarizing the literature were included only at the abstract screening stage. At the extraction stage, the bibliography of these reviews were checked for relevant studies. The relevant studies from the bibliography of the narrative reviews that met our eligibility criteria were included in the final extraction instead of the original study. As full texts are essential for complete qualitative synthesis of the article, papers with only abstracts were excluded. Any full texts that

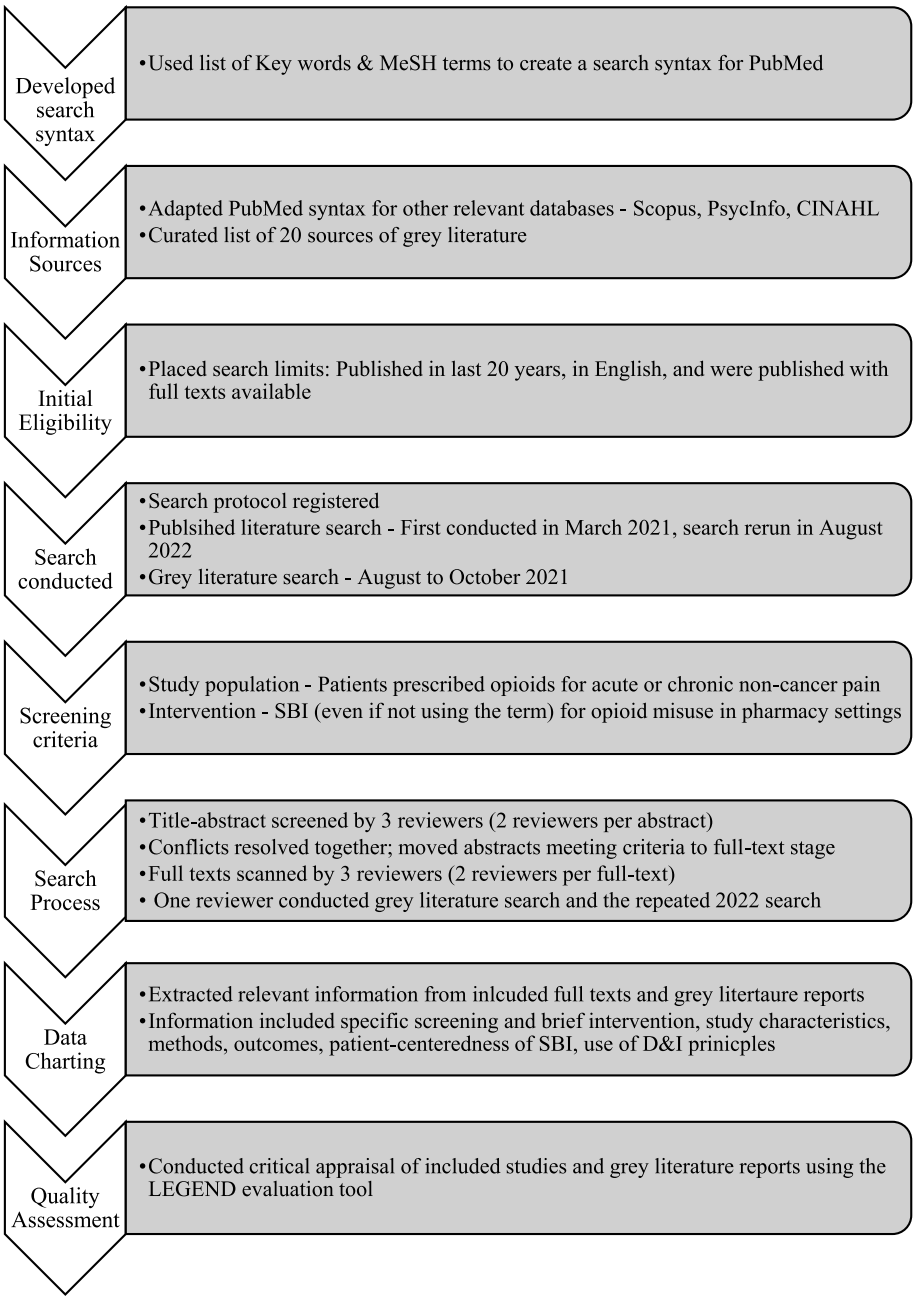

Fig. 1. Steps involved in the scoping review process.

were not accessible, even from the library one-month after the request was made, or after contact with author, were not included.

2.2. Information sources

Four databases were searched for published literature: PubMed (Medline), Scopus, PsycInfo, CINAHL. Cochrane was searched for other reviews and any relevant registered trials. Although Web of Science was searched, the results were not included because they were mostly duplicates. For the included reviews, the bibliography was scanned for additional articles. Contact with authors was made only for articles unavailable through the library for their full texts.

For grey literature, 20 sources were purposefully searched or browsed. These included grey literature repositories such as GreyNet, Grey Literature Report, repositories such as Google Scholar, ProQuest Dissertations &Theses, government document sources such as WorldCat, NIH Publications list, NIDA Clinical Trials Network Dissemination Library, and individual organizations such as SAMHSA, American Pharmacists Association and College of Psychiatric and Neurologic Pharmacy. A general Google search in incognito mode was also conducted and the first two pages of the search results were browsed. The full list of grey sources is provided in Appendix 1.

2.3. Search

The keywords included in the search were pharmacist, substance use disorder, opioid use disorder, screening, attitude, stigma, perceptions, patient satisfaction, and patient-centered. MeSH terms for these keywords were included in the syntax and formulated for PubMed. Then the syntax was adapted for other databases. The full search strategy for all databases with accompanying limits was created in collaboration with a health sciences librarian and has been included in Appendix 2. The

overall search was conducted in March 2021. Filters such as human subjects and English language were activated. Search terms for grey literature search included opioid misuse, screening, and pharmacy for all sources. The grey literature sources were searched from August to October 2021. While the grey literature search was not repeated, the published literature search was rerun in August 2022 to identify any new publications.

2.4. Selection of sources of evidence (search process)

Covidence software was used for the review. Initially, title-abstracts were screened to remove irrelevant articles by three reviewers. Two reviewers screened each abstract individually. Conflicts were resolved after discussion between the two reviewers or by the third reviewer. Abstracts that met the criteria discussed above were included for further review. Full texts were then scanned for relevancy by two reviewers independently. Reasons for exclusion for each full text manuscript were documented by each reviewer. Conflicts were resolved after discussion among all three reviewers. Grey literature search was conducted by only one reviewer. Relevant results from the grey literature search were added to the list of included articles. The repeated search in 2022 was also conducted by only one researcher and Covidence was not used for this portion of the review.

2.5. Data charting process

Data charting began at the full-text screening stage. All reviewers independently made note of the specific type of screening and brief intervention described in each of the full texts determined to be eligible for inclusion. Finally, one reviewer conducted qualitative synthesis of the last eligible and relevant articles. Although the other two reviewers did not duplicate this charting process, they reviewed the final extracted data for accuracy and completeness. This extraction table also included data synopsized from the grey literature search. Finally, the few relevant studies found in the rerun were also added to the extraction table.

2.6. Data items

Information about all study characteristics, methods, outcomes, and the SBI components were extracted in the charting process. This synthesis included extraction of key data and exploring how the SBI described in the studies fared according to our chosen definition of patient-centered care i.e. if the SBI was individualized, holistic, respected patient autonomy, or led to patient empowerment.[17] This definition is sufficiently broad that it can be applied to any SBI described in the published literature. We also evaluated the use of designing for dissemination and implementation science principles in the studies.[16] As we expected to find literature at early stages of SBI development, we needed a framework that was suitable for the design stage of interventions in addition to its implementation. Unlike other implementation frameworks, designing for dissemination and implementation principles[16] are appropriate for early-stage studies. This charting process was also applied to the grey literature included in the final synthesis. All data (except for studies included in the repeat search) were charted in Covidence.

2.7. Critical appraisal of individual sources of evidence (quality assessment)

Critical appraisal of individual studies is typically conducted to reduce information overload by eliminating weak studies or to evaluate the evidence collected for validity and usefulness. As the studies included for final synthesis were not a large number, critical appraisal was only done for quality assessment of the included studies. The LEGEND evaluation tool system[20] for evidence appraisal was used for the quality assessment of the included studies. This publicly available tool system consists of 13 different appraisal forms and is appropriate for scoping reviews that include multiple different study designs. For each study, a specific form was selected based on its study design. Each study was assessed (using the questions on the form) for the validity of its findings, reliability of the reporting, and its applicability for our overall project. Each study was then scored as 'high', 'medium' or 'low', based on the aggregate responses on the validity, reliability, and applicability questions. Only one reviewer conducted the assessment, but reasons behind each decision were reported for clarity. These reasons were based on the questions of the appraisal form. As the total number of included studies were not large in number, studies that were of low quality were not eliminated. Covidence was also used for logging and organizing this information.

2.8. Synthesis of results

All data items from included papers were organized into two extraction tables. The first table included information about the studies immediately relevant to our search i.e., the SBI components, patient-centeredness, and D&I focus. The second table provided detailed information about methods and outcomes of each study. The results of the quality assessment table were organized in a separate table. All the studies in the final extraction were categorized as either interventions (quasi-experimental), descriptive studies/QI initiatives, or observational research.

3. Results

The search resulted in 3048 records, of which 2197 title-abstracts were screened for relevance. Of those, we had 624 full-texts that were potentially relevant. When full-texts were part of the same project or overall study, they were combined and assessed together as one study. We assessed 602 studies for eligibility. Finally, 21 studies were included for qualitative synthesis. The grey literature search identified 10 reports, of which 7 were assessed (3 full texts were unavailable) and 3 were included in the final synthesis. The full results of the search process are shown in the PRISMA diagram (Fig. 2) below. It also shows the subset of studies identified in the rerun search (denoted by +). The results of the individual studies relevant to our research questions are provided in Table 1 and study characteristics of the charted data are presented in Table 2 (Appendix 3). Finally, results of the critical appraisal are presented in Table 3 (Appendix 4).

3.1. Intervention research

3.1.1. Summary

Of the 24 records included in the qualitative synthesis, only six were intervention-based studies (Ref ID 1–6).[21–36] Two of these studies by Cochran et al. involve the same intervention initially evaluated in a small-scale randomized control trial (RCT) (Ref ID 1)[21,22] with a larger active-control RCT (Ref ID 2) currently underway.[24] They used the Prescription Opioid Misuse Index as a screener and conducted motivational interviewing, counseling, medication therapy management, and naloxone navigation as brief interventions, with referral to treatment. The control group in the trial received standard medication counseling. The pilot trial showed significant improvements in misuse, pain control, and depression scores. It was feasible to implement and associated with higher patient satisfaction.[21–23]

The other four intervention studies (Ref ID 3–6) used a cohort study design and reported positive outcomes related to pharmacist SBI practices.[25–36] One of these interventions (Ref ID 3) used naloxone as the brief intervention but did not specify their screening method.[25] Two intervention studies from the same research group (Ref ID 4&5) used patient counseling, partial fill, referral, and naloxone if indicated as their brief interventions and the Opioid Risk Tool as their main screening method.[26–33] Their SBI showed good efficacy, patient satisfaction, and

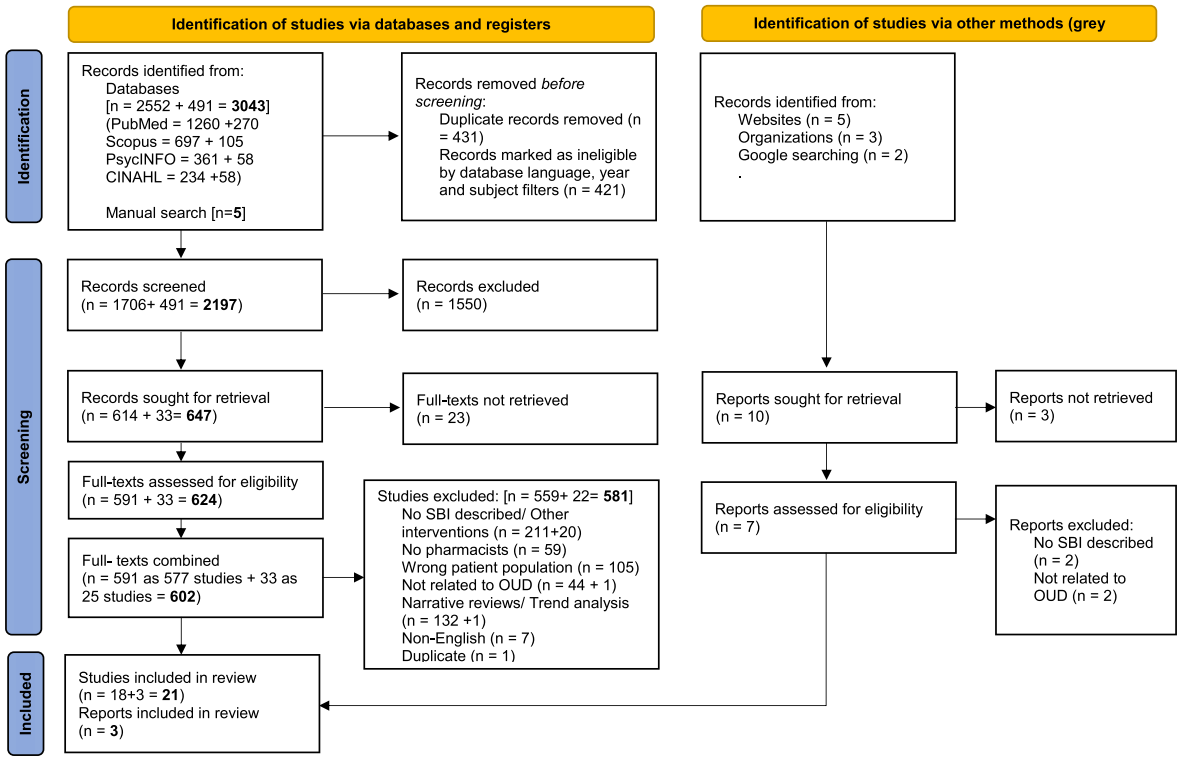

Fig. 2. Prisma diagram of search process.

adoption and maintenance rates but needed improvement in the areas of reach and implementation.[28–33] Lastly, one intervention study from Australia (Ref ID 6) was a small-scale single-arm hybrid effectiveness and implementation study.[34–36] Their SBI screened for both opioid misuse and overdose risk through the Routine Opioid Outcome Monitoring Tool and included education, counseling, naloxone, and contacting prescribers as their brief interventions. Although the project increased pharmacist confidence in providing care, effectiveness data of the SBI on opioid safety-related outcomes is forthcoming.[35,36]

3.1.2. *Quality assessment*

Five of the six intervention studies[21–24,26–36] (all except Ref ID 3) were rated high on all three factors: validity, reliability, and applicability. These studies had clear descriptions of appropriate methods and outcomes and used standardized instruments (validity), had sufficient sample sizes, and reported significant statistics (reliability), and had a clearly described SBI that could be used for future research (applicability).

3.1.3. *Patient-centeredness*

Among the four intervention studies (Ref ID 1, 2, 5, 6) that incorporated some aspect of patient-centeredness as per Morgan and Yoder's criteria, no study included all criteria. The pilot trial and the larger RCT protocol study by Cochran et al. (Ref ID 1&2) attempted to take a holistic view by evaluating mental health and overall patient-reported health status, providing patients with the option to choose naloxone (autonomy), and including individualized motivational interviewing, but it did not empower patients.[21,22,24] Although the ONE Rx pilot study (Ref ID 4) was not patient centered, the statewide implementation study (Ref ID 5) described individualized interventions for patients.[26–33] Both the pilot trial by Cochran et al. (Ref ID 1)[21] and the statewide ONE Rx program (Ref ID 5)[29,32] reported good patient satisfaction with their SBIs. Nielsen et al. (Ref ID 6) described a relatively individualized model including screening and naloxone information.[34–36]

3.1.4. *D&I science*

Implementation science principles were addressed in all six intervention studies. One study (Ref ID 3) indirectly measured SBI feasibility by noting that a significant number of pharmacists performed the intervention, implementing the SBI within workflow, and using the Systems Transformation Framework (principle: measure implementation outcomes, use D&I frameworks).[25] However, measuring implementation outcomes in this manner does not provide reliable results. It is possible that these outcomes were over-estimated, and data on ways to improve these outcomes are lacking. One intervention study (Ref ID 4) disseminated their training material widely to allow for easy adoption of their intervention (principle: develop user-friendly research summaries).[26,27] Cochran et al. summarized all research conducted using Consolidated Framework for Implementation Research (CFIR) and evaluated some initial implementation outcomes (principle: used implementation framework and measures) in their pilot trial (Ref ID 1).[23] They also have plans to use D&I principles in the larger RCT (Ref ID 2).[24] However, their SBI was designed only based on previous literature about alcohol SBIs. Implementation theory/frameworks or qualitative findings could have provided more information about barriers and facilitators of potential implementation. The other two interventions implemented the SBI within workflow (Ref ID 6) and used RE-AIM to measure implementation outcomes (principle: used implementation framework) (Ref ID 5).[33,34]

3.2. *Descriptive studies/quality improvement initiatives*

3.2.1. *Summary*

We found four studies that were descriptive reports of initiatives conducted within particular health systems/pharmacies (Ref ID 7–10).[37–40] These reports mainly used case study or cohort study designs. However, the main difference between these reports and the above interventions was the lack of focus on generalizability of findings. Therefore, they were classified as quality improvement rather than research. Initiatives in this category used standardized screening tools and naloxone was the brief intervention most often offered/studied.

Table 1
Extraction table (part 1).

Ref ID	Title	Lead author last name	Year	Country	Screening Method	Brief Intervention	Patient Centeredness	D&I focus	Main Finding/ Conclusion
Intervention Studies									
1[21–23]	A community pharmacy-led intervention for opioid medication misuse: A small-scale randomized clinical trial	Cochran/ Kenney	2018/ 2019/2021	United States	Prescription Opioid Misuse Index	MTM, motivational interviewing, referral to treatment and patient-navigation - naloxone sessions	Holistic, Autonomous, Individualized	Fidelity, feasibility and acceptability evaluated, findings from all research summarized using CFIR	It is a feasible misuse intervention associated with superior patient satisfaction and outcomes than standard medication counseling
2[24]	Addressing opioid medication misuse at point of service in community pharmacy: A study protocol for an interdisciplinary behavioral health trial	Cochran	2022	United States	Prescription Opioid Misuse Index, algorithm based on prescription records	MTM, motivational interviewing, referral to treatment and patient-navigation - naloxone sessions	Holistic, Autonomous, Individualized	Dissemination plans through stakeholder engagement and implementation strategies	Work in progress
3[25]	Preparing pharmacists to increase naloxone dispensing within community pharmacies under the Pennsylvania standing order	Santa	2021	United States	Not specified	Naloxone	Not patient-centered	Implemented within pharmacy workflow, used Systems Transformation Framework, stakeholders engaged in implementation	Pharmacists who received both trainings were more likely to change naloxone dispensing practices, leading to an overall increase in naloxone dispensing by community pharmacists
4[26,27]	A pilot study of community pharmacists screening for opioid misuse risk	Strand	2019	United States	Opioid Risk Tool, red flags (patient unknown to the pharmacy, history of early refills, requesting a particular brand, or cash paying), risk of accidental overdose, and PDMP	Naloxone, counseling, referral, partial prescription fill, medication take-back	Not patient-centered	Training materials disseminated widely	Utility and the feasibility of screening for opioid misuse risk at the community pharmacy level was demonstrated.
5[28–33]	Implementation and evaluation of statewide ONE Rx program	Skoy/ Strand/ Lothspeich/ Frenzel	2019–2022	United States	Opioid Risk Tool, risk for accidental overdose based on age, prescriptions, disease state, and PDMP	Naloxone, counseling, referral, partial fill, medication disposal	Individualized	Implementation strategies including training, dissemination, stakeholder involvement, toolkit, mentoring telephone calls, and advertisement. Evaluated using RE-AIM framework	SBI was successfully implemented. Patient acceptance of naloxone at the community pharmacy through SBI was higher than national naloxone dispensing rates. SBI showed good efficacy, adoption and maintenance, but needed improvement in the areas of reach and implementation. Pharmacists believed SBI was feasible and patients reported high satisfaction with SBI.
6[34–36]	Routine opioid outcome monitoring in	Nielsen	2019–2021	Australia	Routine Opioid Outcome Monitoring Tool,	Printed patient summary, verbal	Individualized	Intervention implemented within workflow	Pharmacists' confidence in providing SBI

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Table 1 (*continued*)

Ref ID	Title	Lead author last name	Year	Country	Screening Method	Brief Intervention	Patient Centeredness	D&I focus	Main Finding/ Conclusion
	community pharmacy: Pilot implementation study protocol, Open-label single-arm hybrid study outcomes, Secondary analysis predicting pharmacists' engagement				five overdose risk indicators from chart review	reinforcement of information by pharmacist, summary letter for prescriber, and naloxone		and setting. REAIM used to measure outcomes	significantly increased from baseline to follow up across several domains, however there is still significant scope to further increase confidence in responding to opioid-related problems. ROOM is feasible and acceptable, though more extensive pharmacist training with practice opportunity to may develop confidence and skills.
Descriptive study/Reports/QI Initiatives									
7[37]	The innovative role of an opioid overdose prevention pharmacists' at a mental health teaching hospital	Costa	2021	Canada	Clinician led -standardized tool: 'Ask, advise, assist' approach	Pharmacist-led Naloxone training	Not patient-centered	D&I Principles not used	The pharmacist acted as the central developer and coordinator of key deliverables, including an opioid overdose risk assessment tool, as well as providing much of the education and training regarding naloxone across the organization.
8[38]	Indian Health Service pharmacists engaged in opioid safety initiatives and expanding access to naloxone	Duvivier	2017	United States	Brief Risk Interview, PDMP, Opioid Risk Tool	Naloxone, MAT	Not patient-centered	D&I Principles not used	Pharmacist involvement in key initiatives including responsible opioid prescribing, expanded access to MAT and naloxone, coupled with an emphasis on enhanced education, illustrated pharmacists' impact on the opioid epidemic.
9[39]	The substance use intervention team: A hospital-based intervention and outpatient clinic to improve care for patients with substance use disorders	Tran	2021	United States	Medical record, Alcohol Use Disorder Identification Test and/or Drug Abuse Screening Tests by nurse/ social worker	Clinical consult, motivational interviewing by social worker, SUD treatment by team, naloxone counseling by pharmacist	Holistic, individualized	D&I Principles not used	SBIRT service was successfully implemented, with the SUD intervention team providing interdisciplinary addiction care and initiating medications for SUD in appropriate patients.
10[40]	Screening, Brief Intervention, and Referral to Treatment (SBIRT) in a retail pharmacy setting: The pharmacist's role in identifying and addressing risk	Shonesy	2019	United States	NIDA Quick Screen and NIDA Modified-ASSIST, Alcohol Use Disorder Identification Test, PDMP	Education, referral	Not patient-centered	D&I Principles not used	Feasibility of SBIRT in retail pharmacy settings was demonstrated.

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Table 1 (*continued*)

Ref ID	Title	Lead author last name	Year	Country	Screening Method	Brief Intervention	Patient Centeredness	D&I focus	Main Finding/ Conclusion
	of substance use disorder								
Observational Studies									
11[41]	Naloxone for Opioid Overdose Prevention: Pharmacists' Role in Community-Based Practice Settings	Bailey	2014	United States	High risk patients, prescription and medical records	Naloxone	Not patient-centered	D&I Principles not used	Pharmacists were enthusiastic but education, reimbursement, and ethical issues were barriers. Dispensing naloxone required a provider's prescription in 5 of the 6 locations included.
12[42]	A Comparative Exploration of Community Pharmacists' Views on the Nature and Management of Over-the-Counter and Prescription Codeine Misuse in Three Regulatory Regimes	Carney	2016	Ireland, South Africa and the UK	No specific method mentioned	Counseling and opioid tapering discussed	Not patient-centered	D&I Principles not used	SBIRT were described as a useful system but complicated by lack of resources, including lack of referral structures and reimbursement.
13[43,44]	Pharmacists' knowledge, attitudes and beliefs regarding screening and brief intervention for prescription opioid abuse	Cochran	2013/2015	United States	No specific screening	No specific intervention but indicates counseling	Not patient-centered	D&I Principles not used	Pharmacists are interested in helping those who misuse prescription opioids and believe pharmacies are appropriate settings for SBI services to be tested and delivered. Practice location and pharmacists' interest in addressing opioid issues are important factors for implementing SBIs.
14[45,46]	Changes in Pharmacists' Perceptions/ Practice and Outcomes After a Training in Opioid Misuse and Accidental Overdose Prevention	Eukel	2019/2020	United States	Chart review, PDMP, Opioid Risk Tool	Naloxone, Patient-Centered Counseling	Not patient-centered	D&I Principles not used	The information presented in the training influenced pharmacists' attitudes and perceptions about the value of screening for opioid misuse or overdose risk and counseling patients about the benefits and risks of opioids. Survey results and opioid harm reduction interventions indicate the training resulted in sustained pharmacy practice behavior change.
15[47]	Using the theory of planned behavior to investigate community pharmacists' beliefs regarding	Fleming	2019	United States	PDMP	Counseling	Not patient-centered	D&I Principles not used	Challenges faced by community pharmacists when considering counseling of patients who

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Table 1 (*continued*)

Ref ID	Title	Lead author last name	Year	Country	Screening Method	Brief Intervention	Patient Centeredness	D&I focus	Main Finding/ Conclusion
	engaging patients about prescription drug misuse								misuse prescription opioids need to be addressed to increase pharmacists' willingness to provide SBI.
16[48]	Pharmacists' training, perceived roles, and actions associated with dispensing controlled substance prescriptions	Fleming	2014	United States	PDMP	Document incident, refuse to dispense, contact prescriber or law enforcement, counsel patients	Not patient-centered	D&I Principles not used	Older pharmacists with a BSPharm degree may be more willing to provide counseling to patients with opioid addiction based on their work experience and additional CPE related to controlled substances after identifying misuse through PDMP.
17[49]	How does use of a prescription monitoring program change pharmacy practice?	Green	2013	United States	PDMP	Contacting prescribers, counseling patients, referral to treatment	Not patient-centered	D&I Principles not used	Current PDMP use with prevailing systems had limited influence on pharmacy practice.
18[50]	Attitudes and perceptions of naloxone dispensing among a sample of Massachusetts community pharmacy technicians	Kurian	2019	United States	Chart review for high risk prescriptions	Naloxone	Not patient-centered	D&I Principles not used	Pharmacy technicians would benefit from overdose prevention training and are well positioned to recognize overdose risk and offer preventive interventions, such as naloxone.
19[51]	Feasibility and acceptability of a proposed pharmacy-based harm reduction intervention to reduce opioid overdose, HIV and Hepatitis-C	Meyerson	2020	United States	PainCas [(Inflexxion, Inc Newton, MA)] tool	Motivational interviewing, Naloxone, syringe services, referral	Autonomous, Individualized	CFIR used to design study	An implementation trial of a modified version of PharmNet is likely feasible; yet will be challenged by structural pressures particularly in chain pharmacies. Successful implementation will involve the development of resources and policy components to manage outer and inner setting characteristics and align the intervention to the implementation environment.
20[52]	An opioid dispensing and misuse prevention algorithm for community pharmacy practice	Rickles	2019	United States	Prescription review, PDMP, clinical and observational patient profile review	Contact prescriber	Not patient-centered	D&I Principles not used	Developed algorithm should be tested for effectiveness and feasibility
21[53]	Roles, barriers and behavioral determinants related to	Alenezi	2021	United Kingdom	Medication use review, PDMP	Education, Counseling, Contacting prescriber	Not patient-centered	Theoretical Domains Frameowrk used to design data	The contribution of community pharmacists to optimize opioid

(*continued on next page*)

Table 1 (*continued*)

Ref ID	Title	Lead author last name	Year	Country	Screening Method	Brief Intervention	Patient Centeredness	D&I focus	Main Finding/ Conclusion
	community pharmacists' involvement in optimizing opioid therapy for chronic pain: a qualitative study							collection and analysis	therapy in chronic pain is unclear and impeded by lack of appropriate training and systemic constraints. There is a need to develop innovative practice models by addressing the barriers identified in this study.
Grey Literature									
22[54]	Pharmacists' role in addressing opioid abuse, addiction, and diversion	Lofton (APhA)	2013	United States	Red Flags, VIGIL (verification, identification, generalization, interpretation, and legalization), PDMP	MTM, Opioid Education, Referral	Unable to determine	D&I Principles not used	Although eliminating misuse, abuse, and diversion of opioids may not be possible, pharmacists' use of a number of tools and strategies would improve patient management and benefit public health.
23[55]	Opioid Use Disorders: Interventions for Community Pharmacists	DiPaula (CPNP)		United States	Verify prescription, red flags, PDMP	Naloxone, counseling regarding medications	Unable to determine	Includes resources for implementation	Guideline document intended to educate community pharmacists on interventions they can employ to provide safe and appropriate access to opioids while also protecting the public from the hazards of misuse and abuse
24[56,57]	Role of Community Pharmacy in Improving Public Health	Pringle	2018	United States	Validated tool	Naloxone, counseling, referral	Unable to determine	Stakeholders involved, integrated into workflow	Project Lifeline expected outcomes include integrating SBIRT services into existing workflows at participating sites increasing positive health outcomes for patients, reducing SUD-related costs in Allegheny County, and advocating for reimbursement models for pharmacists providing SBIRT services in Pennsylvania.

CFIR: Consolidated Framework for Implementation Research; MTM: Medication Therapy Management; PDMP: Prescription Drug Monitoring Program; NIDA: National Institute of Drug Abuse; APhA: American Pharmacists Association; CPNP: College of Psychiatric and Neurologic Pharmacists.

Interestingly, all reports in this category involved clinical pharmacists rather than community pharmacists (Ref ID 7–9)[37–39] except for one (Ref ID 10).[40] This was mostly because of how integrated the clinical pharmacist was within the healthcare system, reducing common barriers associated with SBI implementation such as access to clinical and patient information. However, in the retail setting study (Ref ID 10), a research coordinator rather than site staff mainly led the SBI.[40]

3.2.2. *Quality assessment*

All QI studies had mixed validity or reliability. This was mainly

because QI efforts do not focus on reliability of findings because they are not meant to be replicated at other settings, rather initiatives are designed for the specific care setting. Although results from these studies can be used for future research, caution must be exercised during the interpretation of their findings for other care settings.

3.2.3. Patient-centeredness

One of the QI initiatives (Ref ID 9) involved a hospital-based and outpatient clinic-based SBI that incorporated a clinical team and provided holistic and individualized services.[39] Other studies did not involve patient-centered SBI.

3.2.4. D&I science

As QI initiatives were focused on process and outcome improvement within the specific care settings, D&I principles were not used in any studies.

3.3. Observational research

3.3.1. Summary

The other 11 papers were observational studies that were mostly initial explorations on the topic (Ref ID 11–21).[41–53] All observational studies were focused on assessing pharmacist (or pharmacy technician) attitudes and practices regarding their role in opioid misuse prevention or some type of SBI. While six studies (Ref ID 13, 14, 16–19) used quantitative surveys,[43–46,48–51] five studies (Ref ID 11, 12, 15, 20, 21) used qualitative interviews or focus groups.[41,42,47,52,53] All observational studies reported generally positive attitudes regarding SBI but many reported practice challenges and implementation barriers. Interestingly, most observational research also evaluated chart review or prescription drug monitoring programs (PDMP) as their screening method. In addition, screening practices in the studies included were closely linked to naloxone dispensing as the brief intervention. However, a couple of studies (Ref ID 12&13) did not specify a screening method.[42–44] Only one paper (Ref ID 19) described the SBI in full detail and it was a harm-reduction based SBIRT where 'PainCas' was a screening tool and brief interventions included syringe exchange, naloxone dispensing, motivational interviewing, and treatment recommendations and referrals.[51]

3.3.2. Quality assessment

Only three observational studies (Ref ID 13, 19, 21)[43,44,51,53] were rated high on all three factors: validity, reliability, and applicability. Other studies either used unstandardized instruments (lacking validity), were low-powered (lacking reliability), or did not describe the SBI (lacking applicability).

3.3.3. Patient-centeredness

One observational study (Ref ID 19) involved a harm-reduction SBI that incorporated motivational interviewing, syringe services, and naloxone as potential brief interventions depending on patient's needs.[51] Thus this study described an individualized and autonomous patient-centered intervention. Other studies were not patient-centered.

3.3.4. D&I science

Only two observational studies (Ref ID 19&21) addressed D&I science.[51,53] Meyerson et al. (Ref ID 19) used the CFIR model in the development of the questionnaire and piloted the context-specific measure (principle: used implementation framework and measure).[51] However, it was unclear how implementation outcomes were associated with the evaluated CFIR constructs. In addition, the SBI was geared toward harm reduction overall rather than being specific to prescription opioid misuse. Alenezi et al. (Ref ID 21) used the Theoretical Domains framework to design interview guides and inform analysis (principle: used implementation framework).[53]

3.4. Grey literature

Three reports (Ref ID 22–24) were included in the final synthesis of the grey literature search.[54–57] Two were reports from professional pharmacy organizations: one (Ref ID 22) summarized different types of screening tools and interventions pharmacists can engage in and the other (Ref ID 23) described guidelines for opioid misuse pharmacy practice including SBI.[54,55] The final report (Ref ID 24) was a brief description of an ongoing statewide pharmacy-based SBI project.[56,57]

3.4.1. Quality assessment

All three reports (Ref ID 22–24) did not describe the SBI in sufficient detail, therefore were rated as low applicability as part of the quality assessment.

3.4.2. Patient-centeredness

We could not determine the patient-centeredness of these studies as the SBI were not described in sufficient detail.

3.4.3. D&I science

Two of the three reports (Ref ID 23&24) used D&I science principles. One (Ref ID 23) included resources for implementation (principle: develop user-friendly research summaries)[55] and the other (Ref ID 24) involved pharmacy stakeholders in development of the intervention (principle: engage stakeholders).[56,57]

4. Discussion

Overall, the review identified some intervention studies, few case studies, and mostly observational research on pharmacy-based SBIs. Interventional research was at the pilot stage with larger RCTs currently underway. Case studies and quality improvement efforts were focused on clinical pharmacist involvement in SBI. The intervention design relied on an inter-connected health system, where pharmacists have access to clinical records of patients. Observational research was older and identified barriers and facilitators of pharmacist-led SBI. We also identified three reports from our grey literature search that indicated the importance of pharmacy-based SBI in real-world settings.

From the included papers, it was apparent that pharmacy-based opioid misuse SBI was a relatively new topic in the field, with most papers published within the last five years. This was also why most studies were observational research, with completed intervention studies being in the development or pilot testing stage. Larger intervention studies (currently underway) are needed to prove SBI effectiveness on reducing opioid misuse and safety risks. However, the current findings suggest high potential for evidence-based interventions to be successful. Among the interventions, most followed the SBI model (rather than the SBIRT model) due to its prior use in alcohol screening and the relatively easy implementation. This model is also very appropriate for a fast-paced community pharmacy setting, where pharmacists only have time for a quick screening and brief intervention. Such a model can thus be implemented within the existing pharmacy work structures and not burden the pharmacist excessively.

It is also important to note that lack of either comprehensive services or tailoring of interventions are generally proposed as limitations in SBI effectiveness for alcohol/other substances.[4,58] These limitations may continue in SBI for opioid misuse as well. It is possible that the limited time spent on intervention would lead to limited patient engagement, thereby resulting in no effect. In contrast, one intervention (Ref ID 1) was designed to be comprehensive including screening, individualized intervention (motivational interviewing), treatment referral, and continued monitoring.[21,22] Results of the pilot intervention show greater success, probably due to higher patient-centeredness. However, this intervention, unlike the typical SBI model, is extremely resource intensive and its sustainability would need to be measured separately.

As recommended by the PRISMA-Sc guidelines,[18] we conducted a

critical appraisal of the quality of the included studies. This quality assessment was conducted to provide context for the included studies. As the purpose of the review was to evaluate the existing SBI literature and inform future research, forming conclusions on low quality studies would be detrimental. Only one study (Ref ID 20) was considered low on all three factors,[52] while all other studies had high or mixed ratings. Although we did not eliminate this study, we have not focused on its findings. Thus, this quality assessment step in the review process increased confidence and reliability of our overall review conclusions.

An important aspect of our qualitative synthesis was to evaluate the patient-centeredness of existing research. Apart from the four intervention studies (Ref ID 1, 2, 5, 6)[21,22,24,26–36], one QI study (Ref ID 9),[39] and one observational study (Ref ID 19),[51] that included SBI that were holistic, autonomous, or individualized, none of the included SBI had any characteristics of patient-centered care. In addition, none of the included studies explicitly described the research as patient-centered. Even though pharmacist views and preferences were included or analyzed in the observational studies, patient preferences were not solicited in the development or implementation of the interventions. This is especially concerning as research indicates that patients may not believe that pharmacists have a role in opioid safety initiatives[59] and may have fears regarding future consequences of requesting naloxone.[60]

It is extremely important to explore the patient's perceptions of the pharmacist in relation to opioid misuse screening for many reasons. As most misuse screenings are based on self-reported behaviors, patients' perceptions of pharmacists and their views on screening tools will directly affect the validity of their responses (social desirability bias). Their experiences interacting with pharmacists regarding opioid medications or other services may provide better insight into the pharmacist-patient relationship and inform intervention design and acceptability overall. In addition, the patient's views and opinions regarding SBI may also lead to exploration of alternative formats of the intervention, such as digital SBI, which have shown moderate success for alcohol and tobacco misuse.[61]

The lack of focus on a patient-centered approach resulted in large knowledge gaps in the research. For example, conclusions regarding patient comfort in asking for naloxone varied across studies, which could have been accounted for by incorporating patient opinions and needs when designing interventions. Questions regarding patient acceptability of the SBI versus SBIRT or other hybrid models with digital self-reported screening and individualized interventions are still unanswered. Designing and implementing interventions by engaging pharmacists and not involving patients can lead to ineffective or unsustainable interventions.

While intervention studies addressed implementation science principles, most exploratory observational research did not. Also, addressing implementation outcomes such as feasibility and acceptability without direct measurement raises questions regarding the reliability of findings. For example, an intervention is not necessarily acceptable even if some pharmacists or patients initially participate in it.[25] Development of interventions without an implementation focus can lead to problems when translated into actual practice. To ensure successful translation of the developed SBI into pharmacy practice, researchers must pay heed to implementation science principles at the development stage as well.[16]

Our scoping review of pharmacy based SBI literature provides an overview of the existing knowledge on this topic and highlights gaps that need to be addressed. As more research is conducted on pharmacy-based OUD prevention (including SBI), findings from our review can inform development and implementation of interventions. In addition to engaging patients in SBI research, future studies need to explore patient perspectives on the role of the pharmacist in OUD prevention and value of SBI. We must address patient barriers to participation and develop novel modes of SBI delivery. To successfully implement pharmacy based SBI, researchers must address barriers at the individual and setting level. Pharmacist barriers such as lack of training and confidence in providing SBI (individual level) and lack of time, organizational incentives, and a clinical role (setting level) must be addressed in future studies.

Some limitations of this review may have affected the results. Mainly, the qualitative synthesis i.e., data extraction and the quality assessment of the included studies was conducted by only one reviewer. This may have led to some bias in the results. However, the final synthesis was reviewed by multiple researchers and rationale was provided for each assessment to reduce potential bias. It is possible that authors of the included studies did not report aspects of their SBI which are patient-centered, thereby limiting our evaluation of its patient-centeredness. However, we made every effort to link all published manuscripts together if they were related to the same SBI. This allowed us to assess use of patient-centered methods in previous studies that researchers may have used to develop their SBI. This search included studies that described some sort of SBI (based on the SAMHSA definition), even if the research was not explicitly stated as SBI to capture a broader set of studies. This could cause some bias as we may have excluded some studies that did not define their intervention as an SBI and did not appear to meet the SAMHSA criteria, such as interventions without universal screening. Although efforts were made to reduce publication bias through a grey literature search and no geographical limits, the results may be limited by language bias.

5. Conclusion

Overall, the review suggested a strong need for a patient-centered and implementation science-focused approach to designing pharmacy-based opioid misuse SBI. Future studies should include interventions designed based on the needs and perceptions of patients and pharmacists. Interventions may need to be individualized and could be developed as primary, secondary, or tertiary prevention interventions based on the specific components included. This in turn will depend on patient needs and preferences as well as on pharmacy work structures. Inclusion of implementation science principles in the development of these interventions will lead to a greater impact on pharmacy practice, because such interventions have a greater chance of being translated and sustained within regular practice. Findings suggest that robust patient-centered pharmacy-based opioid misuse screening interventions would be successful in this area.

Funding sources

This work was funded by Sonderegger Research Center for Improved Medication Outcomes. DR also received the Joseph B. Wiederholt Fellowship, 2021 to support this project.

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Declaration of competing interest

None.

Acknowledgements

We would like to acknowledge the health sciences librarian Paije Wilson for her contributions to the search strategy and creation of the search syntax.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.sapharm.2023.05.003.

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