

# Healthcare systems in South Africa: a review of integration of community pharmacists into multidisciplinary healthcare teams through musculoskeletal patient referrals

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## Abstract

**Background:** Musculoskeletal conditions are a major health concern and are ranked among the highest leading causes of disability. Patients with musculoskeletal conditions tend to endure the symptoms or self-medicate with over-the-counter medication. A pharmacist's role extends beyond dispensing medication. Community pharmacists are well-positioned to identify patients at risk of chronic musculoskeletal symptoms, provide advice, and refer them for diagnosis and early medical intervention. Pharmacists need to be part of an integrated healthcare system to refer these patients in a timely and effective manner. Research indicates that there are challenges to integrating pharmacists into healthcare systems.

**Aim:** This review highlights the importance of integrating pharmacists into multidisciplinary healthcare teams within the South African healthcare system, by fostering a culture change and implementing a realistic workflow system through management and referral of patients with musculoskeletal conditions.

**Methods:** A scoping review was conducted using the Joanna Briggs Institute (JBI) method.

**Findings and conclusion:** There were 45 publications included in the review, where there are policies on the integration of pharmacists into multidisciplinary healthcare teams. Nevertheless, pharmacists are frequently excluded from these teams. It is also important for pharmacists to be equipped with the knowledge and training that will enable them to integrate into multidisciplinary healthcare teams.

**Contribution:** The review has highlighted the need for integrating community pharmacists into multidisciplinary healthcare teams for managing musculoskeletal conditions, emphasising their role in early intervention, patient referrals, and addressing barriers to effective integration within the South African healthcare system.

**Keywords:** interprofessional collaboration, joint diseases, community pharmacists, primary healthcare, therapeutic window, patient referral systems, musculoskeletal conditions

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## Introduction

Musculoskeletal conditions are disorders or injuries of the musculoskeletal system, which includes joints, bones, muscles, cartilage (including spinal discs), tendons, ligaments, nerves and supporting blood vessels.<sup>1-3</sup> These conditions can lead to temporary or permanent impairment, commonly associated with pain, paraesthesia, and inflammation.<sup>1-3</sup> In 2017, the World Health Organization launched the Rehabilitation 2030 Initiative, which aims to highlight and address the unmet need for rehabilitation among people living with chronic musculoskeletal conditions by strengthening health systems.<sup>2</sup> The implementation of the National Health Insurance (NHI) in South Africa aligns with this initiative by promoting universal health coverage and ensuring equitable access to rehabilitation services for all citizens, particularly those from underserved communities.<sup>4</sup>

Chronic musculoskeletal conditions are not medically managed in a curative model; it is therefore not expected that the analgesics commonly prescribed will function by "curing" pain after a course of treatment.<sup>5</sup> These conditions require ongoing care, which can

place a burden on healthcare systems.<sup>6</sup> If these conditions are not well-managed, they may lead to disability, diminished quality of life, impaired function, sleep difficulties, opioid misuse, and psychiatric disorders.<sup>7,8</sup> To reduce the burden of disease on the healthcare system and improve the quality of life for patients, healthcare providers who are accessible and available when needed, such as pharmacists, are crucial.<sup>6</sup> Community pharmacists play a crucial role in optimising medication therapy and improving patient outcomes.<sup>9</sup> Their responsibilities extend beyond dispensing medications to include patient education, medication therapy management, and health promotion initiatives (such as smoking cessation programmes, vaccination campaigns).<sup>9</sup> Community pharmacists contribute to the prevention and management of chronic diseases by providing screening services (such as blood pressure checks, blood glucose testing, cholesterol screening, body mass index assessments) and counselling on medication adherence.<sup>9</sup> Additionally, pharmacists contribute significantly to primary healthcare by engaging in patient consultations, conducting clinical assessments, prescribing medications, and managing therapeutic outcomes under structured frameworks.<sup>10</sup>

While they do not diagnose, community pharmacists collaborate with healthcare teams to enhance patient care.<sup>11</sup> Their integration reduces medication errors, improves outcomes, and promotes cost-effective care, yet their role remains underrecognised.<sup>9,11</sup>

Community pharmacists are an integral part of the healthcare system, often serving as the first point of contact for many patients, and they see patients more frequently than any other healthcare provider.<sup>12,13</sup> Evidence suggests that integrating pharmacists into the primary healthcare system improves patient health outcomes and reduces patient burden in both the public and private healthcare sectors, thereby minimising the workload for healthcare providers, such as doctors and nurses.<sup>14,15</sup> Nevertheless, pharmacists are often omitted from discussions and implementation of an integrated primary healthcare system.<sup>15</sup> It is therefore essential that opportunities for collaboration between community pharmacists and other healthcare providers are created to enhance cultural transformation and practical workflow improvement.<sup>15,16</sup>

In 2020, the South African National Department of Health (NDOH) published the Referral Policy for South African Health Services and Referral Implementation Guidelines.<sup>17</sup> Referral refers to the processes by which professionals and institutions communicate and collaborate to safeguard, promote, and restore the health of an individual.<sup>17</sup> The policy and guidelines aimed to address the gaps in processing and facilitating timely patient referrals within the healthcare delivery system.<sup>17</sup> The policy and guidelines also encourage and foster close relationships among all levels of the health system, assisting in the cost-effective use of hospital and primary care services.<sup>17</sup> However, these guidelines and policies make no mention of the role of a pharmacist, nor how pharmacists and community pharmacies can be integrated to assist with patient referrals. A pharmacist is mentioned once in the context of medication movement.

Furthermore, no studies have been conducted on the creation of culture change and realistic workflow systems to integrate community pharmacists into the healthcare system. At present, there is also no formalised reimbursement model in South Africa for pharmacist-led referral or collaborative clinical services within the primary healthcare system, which further limits integration and sustainability of such initiatives. This publication focuses on the integration of community pharmacists (pharmacists who work in the retail sector). Hospital pharmacists are not mentioned, as they practise within a hospital setting, working alongside healthcare teams in a structured environment and engaging with patients who have already seen a doctor or nurse.<sup>9,18</sup> This review highlights the need for the creation of culture change and realistic workflow systems in South Africa to integrate community pharmacists into the healthcare system. The creation of culture change is proposed to be through collaboration in the management of specific disease groups. Musculoskeletal conditions were identified to demonstrate and ascertain that pharmacists are best suited to refer such patients accordingly.

## Aim

This paper aims to address the research question: Can the referral of patients with musculoskeletal conditions by community pharmacists lead to cultural transformation and foster collaboration among healthcare providers?

## Methods

A preliminary assessment of available research (scoping review) was conducted using the Joanna Briggs Institute (JBI) method, which involves methodically identifying and mapping the breadth of available evidence to clarify important concepts and as essential characteristics associated with the research question. The study focused on pharmacists (Population) and their role in multidisciplinary management (Concept) of musculoskeletal conditions within primary healthcare systems (Context), emphasising pharmacist-led referrals and collaborative care. A comprehensive literature search was conducted using key terms such as 'pharmacist management of musculoskeletal conditions', 'role of pharmacists in a multidisciplinary team', 'multidisciplinary management of musculoskeletal conditions', 'primary healthcare systems', and 'referrals by pharmacists'.

The databases included search engines such as Google Scholar™, PubMed® (Medline®), ScienceOpen®, CORE™, ResearchGate®, The Lancet® and Public Library of Science (PLOS®). Furthermore, to find any studies that could have been overlooked, references cited in all identified articles were also reviewed. A complementary literature review was conducted to identify and address the gaps and definitions not included in the identified publications. The results of the scoping review were summarised and presented using the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA).

### **The following selection criteria were applied:**

- Inclusion criteria
  - Publications published after the year 2010 (except for publications from regulatory authorities such as the SAPC Government Gazette published in 2008)
  - Full text publications (if full text was unavailable, it was searched on a different search engine, purchased, or the corresponding author was contacted)
- Exclusion criteria
  - Non-peer-reviewed publications and editorials
  - Publications which refer to the integration of other healthcare practitioners but excluded pharmacists
- Ethical considerations

The study received ethical clearance from the University of Witwatersrand Human Research Ethics Committee (Medical) with clearance reference number: M220344.

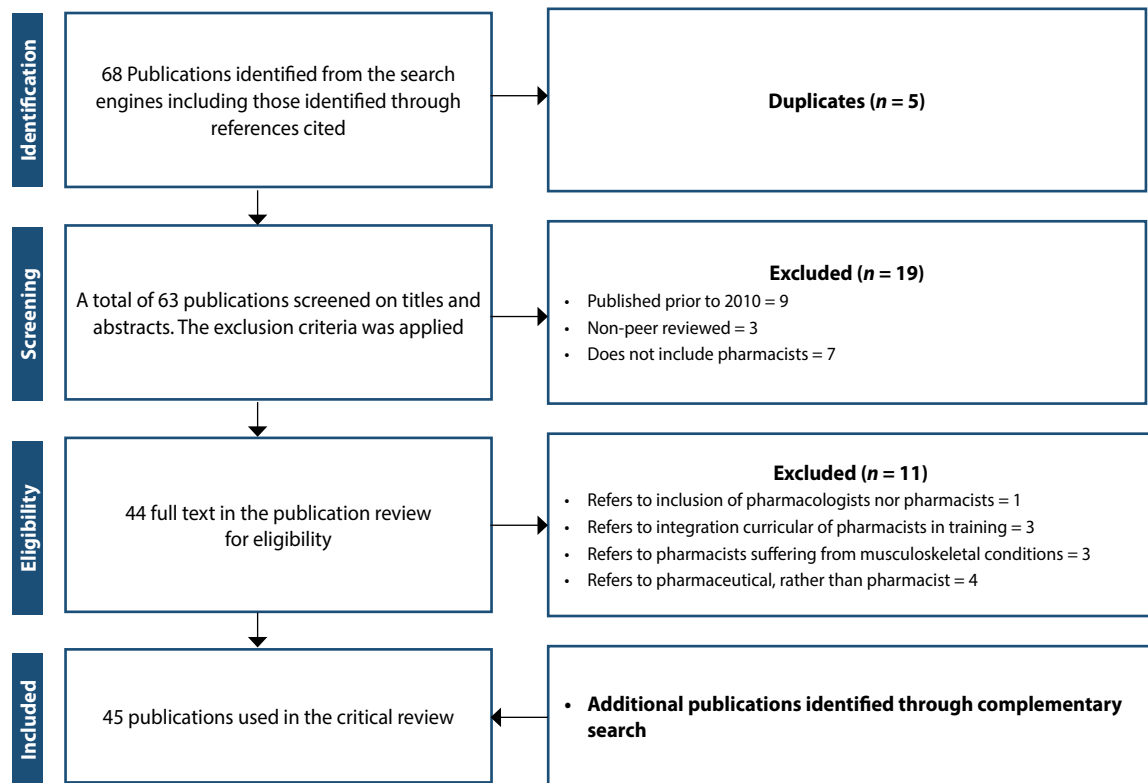


Figure 1: PRISMA flow diagram (Adapted from Page et al., 2021).<sup>19</sup>

## Results

The online search yielded a total of 68 potential publications for inclusion. Figure 1 demonstrates the PRISMA flow diagram. There were five duplicates from different search engines, which were removed. A total of 63 publications were screened based on their titles and abstracts; the exclusion criteria were applied, resulting in the removal of 19 publications. This left 44 publications, which were then reviewed for eligibility. Furthermore, 11 publications were excluded following a full-text analysis, as they mentioned pharmacists in the abstract, but were not specifically pharmacy-related. The remaining 33 articles were included in the study, which was followed by a complementary search that was subsequently conducted using reference lists and citation tracking to identify further relevant studies not captured in the initial database search. Twelve additional publications were included, bringing the total to 45.

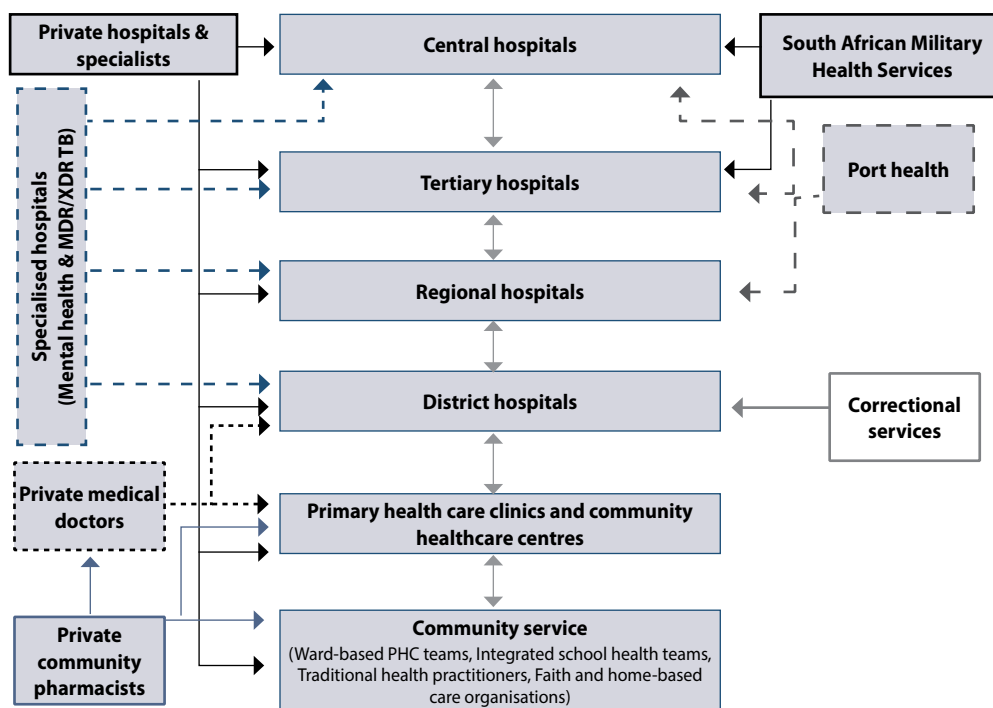
A total of 45 publications identified following the exclusion criteria and complementary search were categorised into two main groups, i.e. healthcare systems/multidisciplinary healthcare teams' integration (Supplementary data: Table S1) and management of musculoskeletal conditions by pharmacists/role of pharmacists (Supplementary data: Table S2).

## Findings and discussion

The review as summarised in Tables S1 and S2, indicates that governments in countries such as Australia, Canada, Finland and Portugal are embracing the integration of healthcare providers (which includes pharmacists) in healthcare systems;

however, referral strategies among these healthcare providers need to be strengthened to ensure consistent communication, defined referral pathways, and structured feedback mechanisms that support coordinated, patient-centred care through clear protocols, shared records, and defined feedback loops. To illustrate the practicality of workflow systems that incorporate such integration, musculoskeletal conditions were selected as an example. The burden of musculoskeletal diseases in Africa could not be determined, but it has been reported that it is the third most common chronic condition on the continent.<sup>20</sup> Historically, musculoskeletal conditions received less attention compared to infectious and communicable diseases such as tuberculosis (TB), HIV/AIDS, and malaria.<sup>20</sup> This historical phenomenon similarly impacted South Africa, nevertheless, recent findings have reported that non-communicable diseases, including musculoskeletal conditions, are on the rise.<sup>21</sup> Approximately one-fifth of the South African adult population lives with chronic pain.<sup>22</sup> Although not all chronic pain cases are musculoskeletal, a significant portion of this pain is related to musculoskeletal conditions.<sup>22,23</sup>

The South African public healthcare system manages musculoskeletal conditions at a primary healthcare level, whereby patients with certain comorbidities, uncertain diagnosis, or complicated cases are referred to the next level of care.<sup>21</sup> The South African healthcare system has a hierarchical structure, with community-based services at the base and central hospitals at the top.<sup>17</sup> These central hospitals are the highest level of care, defined as a public hospital which has a capacity of 1 200 beds, providing training to healthcare providers, conducting research and affiliated with a medical school as the primary teaching platform.



**Figure 2:** Proposed structure and organisation of the referral network (adapted from the Referral Policy for South African Health Services and Referral Implementation Guidelines, 2020).<sup>17</sup>

Patients from more than one province may be admitted to these hospitals.<sup>17</sup> This structure creates links between public healthcare facilities, the private sector, and community- and home-based care providers.<sup>17</sup> This hierarchical structure is relevant to community pharmacists, who function at the primary healthcare level as the first point of patient contact. By identifying and referring patients appropriately within this system, pharmacists can facilitate early intervention and reduce unnecessary referrals to higher levels of care.

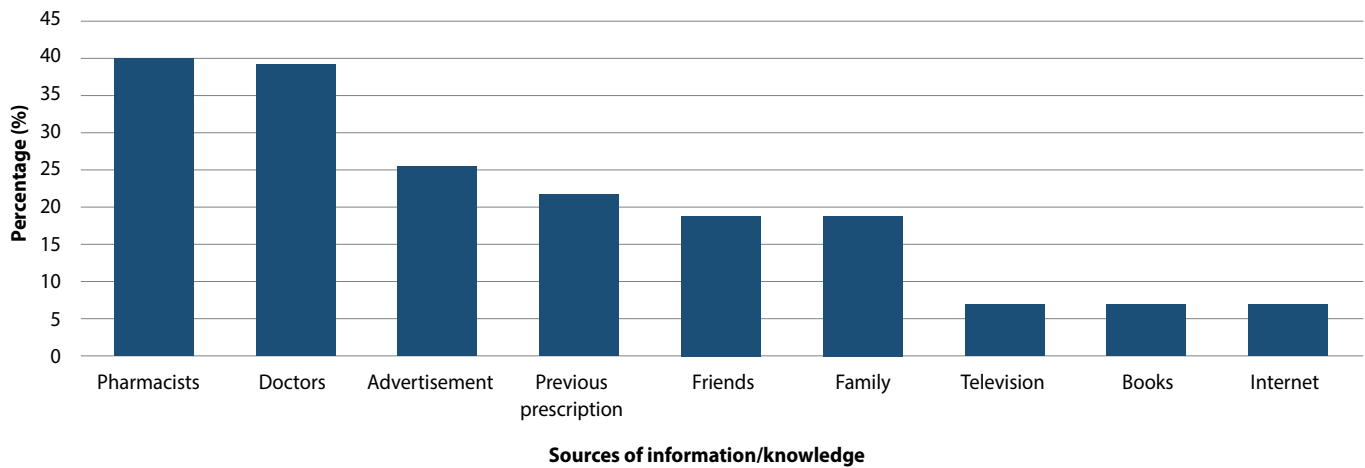
Figure 2 illustrates the proposed referral network links to include pharmacists and the different levels of care. This figure was adapted by the authors of this publication from the Referral Policy for South African Health Services and Referral Implementation Guidelines, which have been modified to include pharmacists. A patient may be transferred internally and referred vertically, horizontally, or laterally for continuity of care.<sup>17</sup>

The public health sector in South Africa has not produced the intended health system performance despite political commitment, strict policies, and sensible regulations.<sup>24</sup> Patients are supposed to enter the public healthcare system through primary healthcare clinics and community healthcare centres, which serve as the initial point of contact for medical care, whether promotive, preventive, curative, rehabilitative or palliative. If a patient needs more specialised care, they will be referred to a hospital.<sup>17,25</sup> There are inappropriate referrals reported in the South African public healthcare system, wherein patients enter the healthcare system at inappropriate levels, bypassing the primary healthcare clinics and seeking higher levels of care during their first visit.<sup>24,25</sup> This results in longer patient waiting times, higher healthcare costs, overcrowded and unclean facilities, poor infection control

practices, medicine shortages, overwhelmed healthcare workers, and negative attitudes among both patients and healthcare providers.<sup>24,25</sup>

An exploratory study on rehabilitation needs of individuals with osteoarthritis in South Africa revealed that patients are dissatisfied with the healthcare services offered at primary healthcare facilities, and as a result, these patients are discouraged from seeking further medical attention.<sup>21</sup> This confirms poor healthcare quality, as patient dissatisfaction is an indirect indicator of such.<sup>26</sup> Despite the lack of research on the relationship between patient satisfaction and self-medication, there is a global trend toward self-treatment with over-the-counter medication.<sup>27</sup> This dissatisfaction, combined with the ease of access and shorter waiting times at community pharmacies, often leads patients to seek immediate relief and self-medicate rather than attend public healthcare facilities.

The first point of contact for self-medication for patients is visiting community pharmacies, which are easy to access in convenient locations such as shopping centres, offer free consultation without prior appointment, and are currently only charged when they purchase a medicinal item.<sup>28,29</sup> This ease of access has been reported globally, including in developing countries within southern Africa.<sup>29</sup> Pharmacists are an integral part of the healthcare system and play a traditional role of dispensing medicine and ensuring its accessibility and safety. Moreover, the role of community pharmacists extends beyond dispensing of medicine, as they counsel patients on disease management, explaining and demonstrating the correct use of medicine, ensuring accuracy in dosing, encouraging adherence, alerting patients of the possible side-effects, and referring them when required.<sup>30,31</sup>



**Figure 3:** Sources of patient information/knowledge on self-medication (Adapted from Parulekar et al., 2016).<sup>33</sup>

According to a study conducted in the UK, 40% of the general public visit the community pharmacy prior to consulting with a medical doctor.<sup>32</sup> A systematic review determining self-medication practices and the influence of knowledge and information in developing countries reported that pharmacists are the most significant source of information (Figure 3).<sup>33</sup> As the first point of contact for patients and front-line healthcare providers, community pharmacists can proactively identify potentially problematic musculoskeletal conditions and refer patients for prompt medical attention (medical doctors), appropriate exercise (physiotherapist, biokineticist), weight loss (dietician), and, when necessary, a podiatrist for management of lower limb joint pain.<sup>34</sup>

Community pharmacists have the potential to offer a larger range of healthcare services and screening due to their frequent contact with patients. There is evidence of the effectiveness of pharmacist-led screening to identify self-limiting conditions suitable for self-management, as well as chronic conditions such as diabetes, dyslipidaemia and hypertension, which are suitable for referral to medical doctors for further intervention.<sup>32,35</sup> Musculoskeletal conditions were the second-most common conditions identified by community pharmacies in screening interventions using questionnaires, which were intended to identify undiagnosed patients, according to a systematic review study carried out in the United States, Australia, the United Kingdom, South Africa, Thailand, Switzerland, Ireland, Canada, and Spain.<sup>36</sup> Furthermore, an observational study conducted in Italy reported that community pharmacists were able to identify and manage patients with acute and chronic low back pain through both pharmacological and non-pharmacological support.<sup>37</sup> Randomised controlled trials conducted in community pharmacies reported that there was evidence that pharmacists were able to initiate a multidisciplinary intervention to identify people with knee osteoarthritis, improve treatment utilisation, enhance physical function and mobility, reduce pain, and thereby improve overall quality of life.<sup>32</sup>

Community pharmacists see patients who either have, or are at risk of, developing a chronic musculoskeletal condition, and they can identify new symptoms, advise and refer the patients

appropriately for early intervention.<sup>32</sup> Early intervention is beneficial to the patient to restore function and prevent long-term impairment, while promoting the reversibility of the condition through modulation of biological processes during the immature phases.<sup>1,38</sup> The majority of musculoskeletal conditions have a therapeutic window of opportunity, whereby early intervention is associated with a good response, leading to improved outcome and quality of life.<sup>1,32</sup>

The term 'therapeutic window of opportunity' has several definitions, which have been narrowed to two.<sup>38</sup> The first definition is described as the 'old definition', which states that the therapeutic window of opportunity is between one and two years, supported by randomised clinical trials, while the 'new definition' is not supported by any clinical trials, and does not have a duration linked to it due to the lack of a clear starting point.<sup>38</sup> A study of a multidisciplinary team of pharmacists, rheumatologists, primary care researchers and psychologists reported that the therapeutic window of opportunity is estimated to be between three to four months following the onset of symptoms.<sup>32</sup> Despite the various definitions, research indicates that the therapeutic window of opportunity varies for different musculoskeletal conditions owing to the unique aetiology of each condition and the specific periods at which disease progression may be modified or reversed.<sup>39</sup>

Studies conducted in the UK and Belgium have reported that the majority of patients miss the therapeutic window for getting to an early referral, thus intervention, with reasons including the fact that they frequently visit the pharmacy and self-medicate their pain with over-the-counter medications because they do not consider their symptoms to be significant or deserving of medical care.<sup>32</sup> Furthermore, it has been reported that older patients tend to endure symptoms of musculoskeletal conditions, as it is believed that these are expected in old age and are a natural progression of life.<sup>40</sup> Typically, these patients choose to self-medicate with over-the-counter analgesics or alternative management, rather than seeking medical advice from healthcare providers.<sup>40,41</sup>

It has been established that community pharmacists are best placed to identify patients with chronic conditions, such as

musculoskeletal conditions.<sup>32,42</sup> Over the years, the community-based pharmacy practice paradigm continues to evolve from medicine-centred towards a collaborative role that is patient-centred.<sup>43</sup> According to a study involving a total of 681 456 patients in the US, community pharmacies were visited twice as often as compared to the visits made to a medical doctor.<sup>42</sup> Since pharmacists encounter patients more frequently, their evolving role involves enhancing patients' health conditions through collaboration with patients, medical doctors, and other healthcare professionals.<sup>44</sup>

According to literature, pharmacists have a significant role in healthcare and disease management.<sup>44</sup> However, several factors, including time restraints, remuneration, access to patient records, poor communication amongst healthcare providers, insufficient education and training, lack of policies, regulations and guidelines, have hindered the effective integration of pharmacists in the healthcare system.<sup>15,44</sup> The South African Pharmacy Council's rules relating to the Code of Conduct for pharmacists state that *"The pharmacist must co-operate with other healthcare professionals to achieve the best possible outcomes for the patient. The pharmacist shall respect the skills and competencies of other healthcare providers and endeavour to work co-operatively with them to optimise the health outcomes of mutual patients and the public"*, furthermore, subsection 1.5.4 of the Code of Conduct mandates that the pharmacist refers patients to other members of the multidisciplinary team or to other services when appropriate, or the pharmacist may consult with colleagues or other healthcare providers when additional knowledge of experts is required.<sup>45</sup> Even though there are policies and literature that support the inclusion of pharmacists in healthcare systems, pharmacists are frequently excluded in discussions and implementation of integrated primary healthcare systems.<sup>14,16</sup> This is mainly due to the interprofessional tension caused by the expansion of non-medicine related services provided by community pharmacists (turf wars amongst other healthcare professionals), remuneration structures for community pharmacists which are based on dispensing fees and not services provided and a lack of clarity on the training/education of pharmacists regarding non-medicine related services.<sup>15,46</sup>

The NHI Act has the potential to redefine the roles of pharmacists in referral pathways and primary care, maximising their expertise in patient-centred care and ensuring that they are being reimbursed accordingly.<sup>4</sup> However, despite its 2024 enactment, rollout may be delayed.<sup>47,48</sup> The NHI gaps include insufficient funding, unclear reimbursement frameworks, and governance issues.<sup>4,48</sup> Concerns also exist regarding the NHI fund's over-centralisation, risking inefficiencies, resource misallocation, and corruption.<sup>4,47</sup>

Policymakers have been informed of the challenges surrounding the integration of pharmacists into healthcare systems, but progress has largely remained at the consultative and working-document stage, with limited formal policy implementation to date.<sup>15</sup> A study investigating why pharmacist integration into the healthcare system had not been addressed at a national

level in Australia found several contributing factors.<sup>15</sup> The key advocate actors (general practitioners, allied health professionals, pharmacy associations, government officers, consumer health advocates, Pharmacy Council of Australia, health economists and service analysts, as well as pharmacists from academia, hospital and community sectors) were unable to support integration through policy initiatives.<sup>15</sup> In addition, neither the policy nor the political streams were prepared for a policy change, funding was insufficient, and inter-organisational conflict persisted between pharmacists and other health professions.<sup>15</sup> The study recommended that creating opportunities for collaboration between pharmacists and other healthcare providers will most likely aid in cultural transformation and practical workflow improvement.<sup>15</sup>

Lessons can also be drawn from the South African Orthopaedic Registry (SAOR), which collects national data on orthopaedic procedures, outcomes, and medicine use across both public and private sectors.<sup>49</sup> The registry illustrates how structured data collection and clinician collaboration can improve clinical decision-making, rehabilitation planning, and rational medicine use.<sup>49</sup> However, the registry primarily focuses on orthopaedic surgical care and does not yet capture community-level or pharmacy-linked data. This highlights an opportunity to extend such collaborative frameworks to include community pharmacists, who can contribute to post-surgical medicine optimisation, pain management, and continuity of care within the primary healthcare system.

No study has been conducted on the creation of a culture change and a realistic workflow system to integrate community pharmacists in the healthcare system through collaboration in the management of specific disease groups, such as musculoskeletal conditions. It is apparent that a significant number of patients visit pharmacies prior to consulting medical doctors, and this presents an opportunity for pharmacists to contribute and collaborate with other healthcare professionals. This collaboration may be through the identification of patients with conditions which require referral and have these patients referred appropriately. Pharmacists require guidance on the identification of these patients in order to refer them to the relevant healthcare professionals, and there is limited, if any, knowledge regarding pharmacists' referral practices of patients living with these conditions. This lack of knowledge may contribute to poor management of progressive disorders, whereby such patients continue living with the disease without appropriate multidisciplinary team management, which may worsen the disease outcome and/or lead to disability.

## Recommendations

The following recommendations aim to address the gaps identified in integrating community pharmacists into multidisciplinary healthcare teams for managing musculoskeletal conditions:

- Develop clear and structured guidelines for pharmacists to identify and refer patients with musculoskeletal conditions to the appropriate healthcare professionals, and operationalise

these through collaboration with the National Department of Health and the South African Pharmacy Council, integration into Good Pharmacy Practice standards, and pilot implementation within primary healthcare settings.

- Promote cultural transformation within healthcare systems to enhance collaboration between pharmacists and other healthcare professionals, reducing interprofessional tensions.
- Equip pharmacy graduates with the skills and knowledge necessary to integrate into multidisciplinary teams, focusing on referral practices.
- Advocate for new and updated policies that facilitate pharmacist integration into primary healthcare systems, with a focus on collaborative workflows and remuneration structures.
- Leverage the accessibility of pharmacists as first points of contact to screen, manage, and appropriately refer patients with musculoskeletal conditions.
- Future studies exploring pharmacist integration in the management of other chronic and non-communicable diseases.

### Limitations

The limitations of the study included constraints imposed by the availability of research, as only studies published after 2010 were considered, potentially excluding relevant older data. The exclusion of non-peer-reviewed publications and editorials further limited insights into emerging practices or informal knowledge. Lastly, the focus on musculoskeletal conditions as an example may not fully reflect other disease groups.

### Conclusion

Musculoskeletal conditions are a leading cause of disability globally, necessitating early intervention to reverse and/or retard disease progression. Community pharmacists are best placed to identify, advise, and appropriately refer patients with musculoskeletal conditions. This is because pharmacists are accessible in convenient locations such as shopping centres, offer free consultations without an appointment, and provide a wide range of products for the patients to select from based on their affordability. Evidence indicates that pharmacists are not yet fully integrated into the healthcare systems and are underutilised, despite the availability of policies developed to facilitate collaboration between pharmacists and other healthcare professionals. Cultural transformation to aid the integration of pharmacists is a good start to foster collaboration, as such, this can be achieved through guidelines which will assist pharmacists manage and refer patients appropriately. Furthermore, pharmacy graduates are required to possess the knowledge and skills necessary for them to swiftly integrate in multidisciplinary healthcare teams. The development of guidelines for pharmacists to refer patients with musculoskeletal conditions is a realistic acculturation which will not only foster collaboration among healthcare professionals, but it will also promote standardised practice, improve patient outcomes, resource optimisation and enhance professional development.

### Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

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### Ethical considerations

The study received ethical clearance from the University of Witwatersrand Human Research Ethics Committee (Medical) with clearance reference number: M220344.

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# Healthcare systems in South Africa: a review of integration of community pharmacists into multidisciplinary health-care teams through musculoskeletal patient referrals

## Supplementary tables:

Supplementary Table 1					
No.	Publication	Country	Aims and objectives	Intervention/comparison	Outcome
1	Airaksinen et al. Policy and vision for community pharmacies in Finland: A roadmap towards enhanced integration and reduced costs (2021).	Finland	The aim was to demonstrate the need for a roadmap towards integration of community pharmacies through policies supported by the ministry of social affairs and health.	Opportunities of the Finnish community pharmacy system were compared to the challenges that relate to the functional integration of community pharmacies with social health services.	The review demonstrated the need for roadmap which enables the implementation of new patient-oriented services and procedures, and further promote digitalisation in service provision.
2	Barry AR and Pammett RT. Applying the guidelines for pharmacists integrating into primary care teams (2016).	Canada	The aim of this review was to provide a detailed and practical approach to implementing guidelines for pharmacists integrating into primary care teams by looking at the practicality of the recommendations in real life, thereby aiding to validate their effectiveness.	The participants reviewed the guidelines independently and ranked the importance of each recommendation respective to their practice. They then provided feedback for each recommendation regarding the successes and challenges they encountered through implementation.	The guidelines have played an important role in the successful integration of primary care pharmacists (PCPs) into their respective practices. Focusing on building relationships (with an emphasis on face time) and demonstrating value to both pharmacists and patients. The study concluded that these guidelines hold up to real-life integration and emphatically recommend their use for new and existing PCPs.
3	Dineen-Griffin et al. Primary health care policy and vision for community pharmacy and pharmacists in Australia (2020).	Australia	The aim of this publication was to promote the integration of pharmacists into primary health care.	The review evaluated the policy context in Australia (considering the National Medicine Policy, Medicines Safety: the 10th National Health priority area, Primary health networks – primary health care organisations and the 10-year Primary Health Care Plan), integration of community pharmacy in the broader health system, pharmacy programmes and services, as well as the future directions for community pharmacy.	There is evidence that the Government is embracing a more integrated approach to health, with implementation of initiatives like primary health networks and the Government's Health Care Homes program. However, integration of community pharmacy into primary health care faces challenges, including the lack of realistic integration in PHNs, and in service and remuneration models from government. It is essential to prioritise integration, remuneration and resources which recognise the professional contribution and competencies of community pharmacy.
4	Khan et al. Pharmacists' viewpoint towards their professional role in healthcare system: a survey of hospital settings of Pakistan (2020).	Pakistan	The aim of the study was to report on pharmacists' attitudes on their role in the Pakistan's healthcare system, their interactions with physicians, and views on managing medication.	A hardcopy survey was administered and responded to by 396 practising hospital pharmacists.	Pharmacists are willing to carry out their role and provide patient care by utilising their clinical knowledge and expertise, pharmaceutical care abilities, and experience in medication management. It was reported that the new curriculum increased their clinical understanding, and health policy laws have given pharmacists additional possibilities to work with doctors in patient care. However, there was scepticism due to doctors' negative perception of pharmacists' clinical competence.
5	Malakoane et al. Public health system challenges in the Free State, South Africa: a situation appraisal to inform health system strengthening (2020).	South Africa	To evaluate the main public health system challenges in the Free State province in order to provide guidance for its improvement.	An appraisal utilising information collated from reports from the public facilities was employed. The reports were reviewed using the World Health Organisation health system building blocks as a priori themes with subsequent identification of emerging subthemes.	The main challenges reported in the study were found to be service fragmentation, staff shortages, and financial difficulties. In order to effect health systems strengthening there was particularly a need to improve integration and address human and financial deficiencies.

6	Naidoo et al. Policy developer's perceptions on the implementation of National Health Insurance in South Africa: a qualitative study (2023).	South Africa	This study aimed to identify potential obstacles, as perceived by policy developers, that may impede the achievement of the NHI's goal.	This study employed a qualitative research design, using semi-structured interviews with ten policy developers selected through a referral method.	South Africa is currently in the second phase of NHI implementation, which prioritises the development of robust legislation and structures. This study highlighted several concerns related to legislative inconsistencies and stakeholder involvement that may hinder the effective implementation of the NHI.
7	Naidoo et al. Medical Insurance Representatives Perceptions on National Health Insurance Primary Healthcare Re-Engineering in South Africa: A Qualitative Study (2024).	South Africa	The objectives were to examine the perspectives of medical insurance company representatives on NHI primary healthcare (PHC) re-engineering. Investigate potential reimbursement mechanisms for healthcare providers from the viewpoint of these representatives.	A qualitative approach was used, involving semi-structured interviews. A sample of 10 pharmacists (holders of a Bachelor of Pharmacy degree) employed at different medical insurance organizations in South Africa were selected through a snowball referral technique.	The findings of this study have revealed several gaps in the NHI Bill as it stands. To ensure standardized quality of care at the primary level, it is essential to develop reimbursement frameworks that include clear guidelines for service provision and accountability.
8	National Department of Health (nDOH). Referral Policy for South African Health Services and Referral Implementation Guidelines. August 2020.	South Africa	The policy was developed to address the gaps identified in processing and facilitating timely referral of patients within the healthcare delivery system.	A new Referral Policy for South African Health Services and Referral Implementation Guidelines was developed and finalised following the outdated draft referral policy from 2008.	The lack of an established referral strategy has resulted in a suboptimal referral system with poor links and retention in treatment, a poor continuum of care for patients, and hospital congestion due to inappropriate referrals. Thus, the formulation of this policy was a crucial instrument for improving the health system with a referral system to perform at its best for all levels of the healthcare delivery system.
9	Pillay I and Mahomed OH. Prevalence and determinants of self referrals to a District-Regional Hospital in KwaZulu Natal, South Africa: a cross sectional study (2019).	South Africa	The aim of this study was to determine the prevalence and determinants of patient self-referral at the out-patient department of Stanger Hospital.	A survey was administered to 385 patients through convenience sampling to determine self-referrals to inappropriate levels of care to the hospital.	This study indicates that most patients (64%) attending Stanger Hospital do comply with the prescribed referral pathway, however a significant proportion (36%) still bypass the referral system which may result in overburdening of higher levels of care and increased healthcare costs.
10	Ribeiro et al. Primary health care policy and vision for community pharmacy and pharmacists in Portugal (2020).	Portugal	The purpose of this study is to explore the challenges regarding the full integration of community pharmacy into primary healthcare.	The review reported on the general health policy in Portugal, Portuguese national health services and other key policy papers in the national plan for patient safety.	The scope of practice of community pharmacies has been shifting to service provision, currently supported by law and key changes envisaged for the future of pharmacists and their integration in primary care.
11	Schellack. Pharmacists are indispensable healthcare providers and are essential to the success of the NHI system (2024).	South Africa	The objective is to assess the impact of the National Health Insurance (NHI) Act on pharmacists and explore how they can adapt to changes in healthcare delivery, including new regulations, reimbursement models, and expanded roles in patient-centered care.	The implementation of the NHI Act and amendments to the Mid-Level Worker Regulations, which require pharmacists to register with the NHI Fund, adhere to new regulations, and adopt collaborative practice models to enhance pharmaceutical care.	The expected outcome includes increased responsibilities and recognition for pharmacists, improved integration within healthcare teams, enhanced patient access to pharmaceutical services, and the development of innovative service delivery models.
12	South African Pharmacy Council (SAPC). Rules relating to the Code of Conduct (Government Gazette No. 31534) (2008)	South Africa	To establish ethical and professional standards guiding pharmacists' conduct, including collaboration with other healthcare professionals and referral of patients when appropriate.	Regulatory framework governing professional practice of pharmacists under the Pharmacy Act; no comparative intervention.	The Code mandates interprofessional cooperation and referral to other healthcare providers when necessary, providing a regulatory foundation for integrating pharmacists into multidisciplinary healthcare teams within the South African healthcare system.
13	Thai et al. Beyond dispensing: Better integration of pharmacists within the Australian primary healthcare system (2022)	Australia	This publication explores the reasons why the integration of pharmacists in primary care has not been addressed at national level and suggests measures that could drive policy change.	A thorough and comprehensive examination of the strategy using the Multiple Stream Framework was conducted using a unique dataset obtained through semi-structured interviews with healthcare executives and policymakers from several disciplines.	Policy suggestions cannot survive in the current environment, despite the policy stream's suggestion that consumers would benefit from pharmacists being integrated into primary care to address these issues. The political stream indicates that disputes between interest groups within the profession and the healthcare industry are the source of political obstacles.

Supplementary Table II					
No.	Publication	Country	Aims and objectives	Intervention/comparison	Outcome
1.	Abdu-Aguye et al. Management of musculoskeletal pain in retail drug outlets within a Nigerian community: a descriptive study (2017).	Nigeria	The study aims to describe the attitudes and behaviours of community pharmacies as well as patent and proprietary pharmaceutical vendor outlets concerning over-the-counter analgesic usage for musculoskeletal pain states.	The study was conducted in two phases, whereby in phase one, a survey was administered to pharmacies with a scenario of a patient seeking an analgesic. The second phase involved interviews to assess knowledge of analgesics.	The study reported that over-the-counter pain relievers that are suggested as well as the counselling that goes along with them both have issues. There is a need for awareness on appropriate use of analgesics in order to mitigate their misuse and prevent addiction.
2.	Alamneh et al. Musculoskeletal disorders among the population in Northwest Ethiopia (2022).	Ethiopia	The purpose of this study was to evaluate the prevalence and trends of chronic musculoskeletal problems in the general population.	A multistage sample approach was used in conjunction with a simple and systematic random sampling technique to conduct a community-based cross-sectional study with 846 recruited study participants. To collect data, face-to-face interviews, physical exams, and semi-structured questionnaires were employed.	Approximately one in every four individuals had at least one musculoskeletal condition. The most frequent musculoskeletal conditions were rheumatoid arthritis, osteoarthritis, low back pain, and gout arthritis. Hypertension, diabetes and obesity were the most common comorbidities.
3.	Alshayban et al. Patient Satisfaction and Their Willingness to Pay for a Pharmacist Counseling Session in Hospital and Community Pharmacies in Saudi Healthcare Settings (2020).	Saudi Arabia	This study determined patient satisfaction with pharmacist counselling services and their willingness to pay for them.	Surveys were administered to patients in community and hospital pharmacies to measure satisfaction with counselling as well as willingness-to-pay. Convenient sampling method was used, and sample size was calculated based on power analysis.	Patients were pleased with counselling and saw it as a valuable service. Less than one-third of the patients were willing to pay for the service. The pharmacist's helpfulness and knowledge were shown to be two important factors that might increase and satisfy customers' desire to pay for the service.
4.	Amedi and Gazerani. Deprescribing NSAIDs: The Potential Role of Community Pharmacists (2024).	Denmark	To investigate the feasibility of NSAID deprescribing at the community pharmacy level by assessing pharmacists' confidence, attitudes, and identifying potential barriers and facilitators.	A literature search and a cross-sectional digital questionnaire targeting community pharmacists in Norway to evaluate their perspectives on NSAID deprescribing, existing guidelines, and the need for training.	Pharmacists expressed confidence in identifying deprescribing needs but faced barriers such as time constraints, lack of financial compensation, and communication challenges. The study identified a gap in deprescribing guidelines and highlighted the need for better training and financial incentives to support pharmacists' involvement in NSAID deprescribing.
5.	Benavent et al., Looking through the window of opportunity in axial spondyloarthritis? (2023).	Various	To determine is the concept of therapeutic window of opportunity applies to axial spondyloarthritis.	A literature review was conducted to assist in identifying the concept of window of opportunity in axial spondyloarthritis	There was lack of evidence to fully understand the window of opportunity concept in axial spondyloarthritis and therefore the impact of early treatment on the clinical outcome was inconclusive.
6.	Berenbrok et al. Evaluation of Frequency of Encounters with Primary Care Physicians vs Visits to Community Pharmacies Among Medicare Beneficiaries (2020).	United States of America	The publication aims to assess the frequency of patient visits to community pharmacies and primary care physician visits among Medicare beneficiaries who actively seek medical attention.	The study measured the visits to community pharmacy and interactions with physicians. A 13-day interval between individual prescription medicine claims was used to establish unique visits to the community pharmacy. The medians for the two outcomes were compared using Kruskal-Wallis testing.	According to the study, community pharmacists are easily accessible healthcare professionals with frequent opportunities to interact with patients. Community pharmacists are able to assist with chronic disease management and the provision of preventative care, thus it is important for physicians to collaborate with them.
7.	Burgers et al. Window of opportunity in rheumatoid arthritis – definitions and supporting evidence: from old to new perspectives (2019).	Various	To review literature and establish if there is agreement on the concept of the window of opportunity in terms of its time period and the outcomes influenced. Secondly, to determine if there is evidence of the benefit of early versus delayed treatment as provided by randomised clinical trials.	The present review of the literature demonstrated that different definitions of the window of opportunity are used, of which two definitions were common. It is clarifying if subsequent studies that use the term the window of opportunity will specify which definition is meant. The current work does neither allow to make a statement about the best definition of the window of opportunity, nor determine the optimal period for starting disease-modifying antirheumatic treatment.	It was observed that the concept of the window of opportunity has changed with respect to timing and outcome since its first description. There is an 'old definition' pointing to the first 2 years after diagnosis with increased potential for disease-modifying treatment to prevent severe radiographic damage and disability. Strong evidence supports this concept. A 'new definition' presumes a therapeutic window in a pre-RA phase in which the biologic processes could be halted and RA development prevented by very early treatment. This definition is not supported by evidence, although is less well studied in trials.

8.	Catic et al. Patients perception of community pharmacist in Bosnia and Herzegovina (2013).	Bosnia and Herzegovina	The aim of the study was to determine patients perception of community pharmacy and they role they play in disease management.	Self-administered questionnaire was developed and consisted of a sociodemographic part and 15 questions to completed by patients in 10 different pharmacies.	The study discovered that patients had a good overall view of community pharmacists and the services provided by community pharmacies, which is consistent to the findings of other studies. It also illustrates that relationships and pharmaceutical services may be improved.
9.	Centers for disease control and prevention (CDC), Workplace health promotion: work-related musculoskeletal disorders & ergonomics (2020).	Global	To identify and report on work-related musculoskeletal disorders.	A literature review was conducted for an ergonomics study to identify, prevent or control injuries and illnesses by eliminating or reducing worker exposure to work-related musculoskeletal conditions (WMSD) risk factors.	The review reported on common WMSDs which included carpal tunnel syndrome, arthritis, back injury and back pain, their interventions.
10.	Coetzee et al. Rehabilitation needs in individuals with knee OA in rural Western Cape, South Africa: an exploratory qualitative study (2020).	South Africa	The aim of this study was to investigate the rehabilitation requirements of people with knee osteoarthritis who reside in rural Western Cape, with the goal of identifying service shortages and providing guidance for rehabilitation programs in these environments.	Semi-structured in-depth individual interviews were performed on 16 individuals with knee osteoarthritis. In order to understand and compare the reported services obtained with the requirements of the persons, a deductive data analysis technique was employed to identify and categorise the needs of the individuals.	The rehabilitation needs of individuals with knee osteoarthritis in rural areas advocates for addressing barriers in rural primary health care systems including lack of human resources, inadequate referral mechanisms, and lack of continuity of treatment. This will make it possible to implement a thorough, person-centred, and context-specific interdisciplinary strategy that aims to improve functional participation and symptom management techniques while also empowering people with knee osteoarthritis through disease-specific education.
11.	Cottrell et al. Appropriate community pharmacy management of joint pain. (2021).	United Kingdom	The aim of this publication was to inform pharmacists in community pharmacies on best practice management of common musculoskeletal conditions causing chronic peripheral joint pain.	Best practice recommendations for pharmacists in community pharmacies were outlined in the publication, summarising the core National Institute for Health and Care Excellence (NICE) recommendations, as well as additional NICE treatments.	The publication served only as a guide for community pharmacists to opportunistically detect potentially problematic joint pain and signpost for timely medical review, refer to appropriate exercise and/or weight loss specialists.
12.	Crafford et al. Understanding of healthcare professionals towards the roles and competencies of clinical pharmacists in South Africa (2023).	South Africa	This study aimed to investigate the perspectives of other healthcare professionals on the role of clinical pharmacists in South Africa and identify the factors associated with it.	An exploratory, survey-based quantitative study was conducted. A survey evaluating healthcare professionals' understanding of the competencies and role of a clinical pharmacist was distributed to 300 doctors, nurses, pharmacists, and clinical pharmacists.	The findings emphasized the potential impact of role expectations and the lack of understanding among healthcare professionals. A standardized job description, along with recognition from regulatory bodies, could enhance both healthcare professionals' and clinical pharmacists' understanding of their roles. The results also pointed to the need for interventions such as interprofessional education, staff induction programs, and regular interprofessional meetings.
13.	Dzingirai et al. Risks to the community pharmacists and pharmacy personnel during COVID-19 pandemic: perspectives from a low-income country (2020).	Zimbabwe	This research examined the risks of infection that are specific to community pharmacy professionals and made recommendations to lower the risk of COVID-19 infection.	The study reported on the risks to pharmacists due to pharmacy design, risks when restocking, travelling to work during lockdown, when dispensing medicine, when making provision of point of care tests and lack of guidance.	The study demonstrated that pharmacists are on the frontline in the community-healthcare interface and are at risk of contracting the virus from the workplace. A number of ways to reduce the risk have been suggested, tailored for a low-income setting.
14.	George J and Zairina E. The potential role of pharmacists in chronic disease screening (2016).	United States of America, Australia, United Kingdom, Thailand, Switzerland, Spain, Canada, South Africa and Ireland	The publication aims to demonstrate the need for initiatives to improve patient access to healthcare and to reduce the workload of physicians by utilising the skills and competencies of allied health professionals, mainly pharmacists and nurses.	A systematic review of community pharmacy-based screening interventions was conducted, using publications from different countries.	The nature and frequency of contact between consumers and community pharmacists provides significant opportunities for the provision of a wider range of healthcare services through community pharmacies. Enabling pharmacists to have the skills and leadership to negotiate and secure funding for non-dispensing roles is the key for shaping the future of pharmacy in primary care.

15.	Gillsjö et al. Suffering in silence: a qualitative study of older adults' experiences of living with long-term musculoskeletal pain at home (2021).	Sweden	The aim of the study was to deepen the understanding of the phenomenon: how older adults experience living with long-term musculoskeletal pain at home.	Data were obtained from 20 community-dwelling older adults, aged 72–97 years. Data were collected through open-ended interviews and analysed to understand the meanings of the phenomenon.	It is necessary to foster increased attentiveness and sensitivity in meeting the needs of each older adult and provide a care that alleviates suffering and preserves and promotes health and well-being.
16.	Giua et al. Community Pharmacist's Role in Detecting Low Back Pain, and Patient Attitudes—A Cross-Sectional Observational Study in Italian Community Pharmacies (2020).	Italy	The purpose of the study was to determine whether it would be feasible for community pharmacists to administer questionnaires to patients who visit the pharmacy in order to assess their level of disability and the severity of their low back pain, as well as their attitudes toward both pharmaceutical and non-pharmacological pain management treatment.	Patients who visit twelve community pharmacies were asked to complete a questionnaire about low back pain. The questionnaire included a pain intensity scale, and two validated tools: the Roland and Morris Disability Questionnaire (RMDQ) and the Start Back Screening Tool (SBST) to determine the degree and risk of patient disability, respectively.	The study demonstrated the feasibility of validated tools for assessing the degree and risk of disability in low back pain patients administrable in community pharmacies. Furthermore, the community pharmacy led to the creation of a significant care portal for patients with moderate and severe low back pain but had never visited their doctor.
17.	Grindrod et al. After patients are diagnosed with knee osteoarthritis, what do they do? (2010).	Canada	The study aimed to understand more about the health services and products that patients use following the diagnosis of knee osteoarthritis, and the trajectory of their health-related quality of life.	Community pharmacists used a screening survey to identify patients with previously undiagnosed knee osteoarthritis. Further investigations were conducted to confirm those with osteoarthritis.	Within 6 months of being diagnosed with knee osteoarthritis, participants implemented multiple lifestyle changes, frequently without the assistance of a health professional, and observed improvements in their pain and function.
18.	Hawk et al. Best practices for chiropractic management of patients with chronic musculoskeletal pain: a clinical practice guideline (2020).	Various	The aim of the study was to create an evidence-based clinical practice guideline for the chiropractic therapy of patients suffering from chronic musculoskeletal pain through a broad consensus approach.	A steering group of professionals in research and care of patients with chronic musculoskeletal pain developed a set of recommendations based on systematic reviews identified during an initial literature search. Additional supporting literature was identified to fill gaps in the evidence base. The recommendations were evaluated by a broad panel of experienced practitioners and educators using a structured Delphi consensus method.	The study provided evidence-based recommendations for a variety of conservative treatment approaches to the management of common chronic musculoskeletal pain conditions may advance consistency of care, foster collaboration between provider groups, and thereby improve patient outcomes.
19.	Kammerman et al. Almost 1 in 5 South African adults have chronic pain: a prevalence study conducted in a large nationally representative sample (2020).	South Africa	The study aimed to investigate the prevalence of chronic pain among South African adults and to assess the association between chronic pain and various sociodemographic factors.	The study was a population-based survey conducted as part of the South African Demographic and Health Survey 2016. The survey included questions on chronic pain to determine its prevalence and analyse related sociodemographic variables.	The primary outcome was the prevalence of chronic pain, which was found to affect 18.3% of adults in South Africa. Chronic pain was associated with factors such as older age and female sex, with notable regional variations across provinces.
20.	Kammerman et al. A nation in pain: high-quality local research as a crucial step to improve pain prevention and care (2024).	South Africa	The study aimed to address the gap in understanding chronic pain in South Africa by generating locally relevant data. It sought to explore the prevalence of chronic pain and its unique social, cultural, and economic determinants, particularly in the context of high levels of unemployment, poverty, and healthcare disparities in South Africa. Additionally, the objective was to inform health policy and improve pain management practices tailored to the local population.	The research emphasises contextualising international best practices for pain management to South African conditions. It highlights the feasibility of telemedicine for pain management, the role of peer-delivered behaviour change interventions, and the importance of a person-centred care approach. These efforts were guided by previous findings in the local context to develop scalable, resource-appropriate pain management strategies.	The study underscores the significant burden of chronic pain in South Africa, affecting 20% of adults, with women and older individuals being most affected. It calls for the development of a national strategy to guide pain research and care. The expected outcomes include better detection, assessment, and management of pain through high-quality, locally relevant research and its integration into clinical practice.

21.	Makris et al. Ageism, negative attitudes, and competing comorbidities – why older adults may not seek care for restricting back pain: a qualitative study (2015).	United States of America	The goal of this study was to learn about older individuals' ideas and opinions about obtaining care for back pain that limits their activities.	Data was collected from a broad group of 93 older persons (median age 83) who reported experiencing back pain in during the past three months. In 23 individual interviews and 16 focus groups, a semi-structured discussion guide was utilised to urge participants to express their experiences, beliefs, and attitudes regarding dealing with restrictive back discomfort.	Older individuals' motivation to seek care for limiting back pain may be influenced by their perceptions of their illness, particularly attitudes about pain, and their encounters with healthcare professionals. These findings point to areas where older persons with debilitating back pain may receive better care.
22.	Maniki et al., Promoting the use of point of care testing in non-communicable disease screening among university students (2022).	South Africa	To improve healthcare access and reduce burden of non-communicable diseases (NCD) by promoting the use of Point of care testing (POCT) in universities.	Literature review study to demonstrate the use of POCT in screening individuals for NCD to promote health awareness and identify uncontrolled or undiagnosed conditions among university students.	Student led POCT can improve clinical skills among healthcare students and promote early diagnoses of NCD.
23.	Mohammed et al. Self-medication practice and associated factors among health care professionals at Debre Markos Comprehensive Specialised Hospital, Northwest Ethiopia (2021).	Ethiopia	The purpose of the study was to assess self-medication practices and associated factors among health care professionals.	A standardised questionnaire was used to perform a facility-based cross-sectional survey among health care professionals employed at a specialised hospital.	More than two-thirds of health care professionals self-medicated and reported the negative consequence of self-medication. The pharmacy profession served as a predictor of self-medication. Appropriate health education was recommended as a means of encouraging reasonable medication usage.
24.	Mohiuddin. The Excellence of Pharmacy Service: Past, Present and Future (2019).	Bangladesh	The aim of this publication is to demonstrate the need to enhance pharmacy education and expand the role of pharmacists to meet evolving healthcare needs, ensuring they can provide medication management, patient counseling, and preventive care.	To report on the integration of pharmacists into healthcare teams, allowing them to perform patient care activities such as counseling, medication therapy management, and disease state management to optimize patient outcomes and reduce healthcare costs.	Improved patient outcomes, reduced healthcare costs, enhanced public health impact, and optimized drug therapy management to address medication-related problems and improve overall healthcare system efficiency.
25.	Naqvi et al. Migration trends of pharmacy students of Pakistan: a study investigating the factors behind brain drain of pharmacy professionals from Pakistan (2017).	Pakistan	The purpose of this study was to identify the factors that influence the trend, country of choice, and reasons for migration. The study also investigated the challenges that students expected during and after relocation.	A 5-month cross-sectional research with a survey questionnaire was undertaken in three cities in Pakistan, with pharmacy students as participants.	The pharmacy students were eager to emigrate from Pakistan. The hypothesis was backed by both pull forces from industrialised countries and push factors from Pakistan. While Pakistan's pull factors showed promise in lowering brain drain, it remains uncertain if they can overcome migration tendencies.
26.	Parulekar et al. Self-medication in Developing Countries a Systematic Review (2016).	India, Pakistan, Ethiopia, Nepal, Nigeria, Jordan, Bahrain, Sri Lanka, Mexico	This systematic review aimed to identify factors influencing self-medication habits in developing countries and investigate the impact of knowledge and information on these practices.	A manual search approach was used to find research publications on self-medication in developing countries. The search was conducted using PUBMED, Ebsco, Proquest, and Google Scholar search engines, using the keywords self-medication, causes, and determinants. A total number of 52 survey articles were identified.	Self-medication, whether prescription or over-the-counter, can lead to abuse, overuse, or underutilisation of medications. To encourage healthy self-medication and rational drug use in developing countries, initiatives should be designed to educate consumers about the dangers and advantages of medicine.
27.	Schellack et al. COVID-19: Guidelines for Pharmacist in South Africa (2021).	South Africa	This evidence-based review aimed to provide pharmacists in South Africa with guidelines on managing patients with suspected or confirmed coronavirus in community and hospital settings.	Provide a guidance document which considers and incorporates recently discovered evidence and recommendations, especially with regard to COVID-19-related issues for pharmacists.	COVID-19 offers pharmacists a rare and exceptional chance to experience managing pandemics firsthand. It will also serve to highlight other pertinent health-related issues, like the value of childhood immunisation against illnesses and seasonal influenza, for which pharmacists are on the front lines.

28.	Simons et al. The potential role of community pharmacy staff in reducing patient delay in consulting with symptoms of rheumatoid arthritis: a qualitative study (2022).	United Kingdom	The purpose of this study was to determine whether training requirements and other possibilities for intervention exist to improve the role of community pharmacy personnel in the pathway to care by examining their knowledge, perspectives, and methods to managing patients who appear with symptoms of rheumatoid arthritis.	Semi-structured interviews were performed with 19 community pharmacy personnel during a 12-month period. Interviews were audio-recorded, transcribed, and evaluated by theme analysis.	This study suggested improving training for community pharmacists and pharmacy staff on inflammatory arthritis, as well as implementing public awareness campaigns on musculoskeletal diseases. Combined with existing referral services and pharmacy-based efforts, this might improve signposting to doctor consultations or other services for inflammatory symptoms, reducing treatment delays.
29.	The South African Pharmacy Council. BN 108 of 24 October 2008: Rules relating to Code of Conduct (Government Gazette No. 31534).	South Africa	The Code of Conduct is designed to provide a standard of professional conduct for all pharmacists and qualified pharmacy support staff subject to the Pharmacy Act.	To advise all people registered under the Pharmacy Act, including registered pharmacy owners, on how to maintain and improve the respect and dignity of the pharmacy profession, and to avoid any action that may bring the profession into disrepute.	Enhancing the honour and dignity of the pharmacy profession is a goal that may be achieved in part by adhering to a Code of Conduct.
30.	The South African Pharmacy Council. BN 384 of 27 January 2023: Primary Care Drug Therapy (PCDT) Pharmacist (Government Gazette No. 47926).	South Africa	To provide the scope of practice, Competency standards for a Primary Care Drug Therapy (PCDT) pharmacist. As well as Criteria for accreditation/approval by the South African Pharmacy Council of a curriculum of a PCDT course.	No intervention. This publication was for implementation by the regulator.	This publication has outlined the acts and services defined in the scope of practice for pharmacists as prescribed by Regulation 3 and 4 of the Regulations relating to the practice of Pharmacy, a pharmacist who has completed the PCDT supplementary training and holds the relevant Section 22A(15) permit may offer PCDT services in accordance with the PCDT list of conditions published by the National Department of Health.
31.	Tsuyuki et al. Pharmacists as accessible primary health care providers: Review of the evidence (2018).	Australia, Canada, United States of America, Oman	The aim of this study if to review evidence that suggest that pharmacists see patients more frequently than any other healthcare provider.	To address this topic, the following data bases were searched, including PubMed/MEDLINE, Scopus, EMBASE, Cochrane Library, Web of Science and CINAHL for relevant publications.	According to the data, pharmacists' accessibility helps them fulfil a significant primary care function. An expanded area of practice and compensation commensurate with this capacity might significantly improve this role. It has been stated that a nation's primary care system plays a crucial role in determining how strong its overall health care system is.
32.	WHO. Musculoskeletal conditions. 14 July 2022	Global	To report on key facts regarding musculoskeletal health.	To define musculoskeletal health, its magnitude, health estimates and the World Health Organisation (WHO) response.	WHO has reported on interventions of rehabilitation and their intention to develop evidence based clinical guidelines to manage musculoskeletal conditions such as chronic low back pain.