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Role of Community Pharmacists in Pain Management in Norway

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Syed Hassan Mujtaba

Abstract:

Introduction: Our study explores the role of community pharmacists in the management of pain within Norway´s healthcare system, a critical aspect of healthcare due to the prevalence and complexity of chronic pain conditions. Chronic pain, affecting a significant portion of the population, poses challenges for individuals and healthcare providers alike. Community pharmacists, due to their accessibility, can play a vital role in advising pharmacological and non-pharmacological pain management strategies and also in the multidisciplinary approach to pain management.

Purpose: The study aimed to explore the current knowledge, attitudes, and practices of community pharmacists in Norway regarding pain management. Specifically, the study aimed to identify both the barriers to and facilitators of effective pain management from the perspective of community pharmacists. It sought to evaluate their potential to improve pain care through education, personalization of pain management strategies, and collaboration with other healthcare professionals.

Methods: A cross-sectional study employing a comprehensive survey was conducted to gather data from community pharmacists across Norway. Quantitative methods were used to analyze responses to a detailed questionnaire designed to explore pharmacists´ knowledge, skills, and attitudes toward pain management, as well as their experiences with barriers and facilitators in providing pain care. Data collection was facilitated through an anonymous online questionnaire, with descriptive statistics utilized for analysis. The chi-square test and the ordinal regression analysis were applied to identify associations between variables.

Results: The findings revealed that community pharmacists have a strong foundational knowledge of pain management. However, there are significant opportunities for enhancing their skills and capabilities through further targeted education and training. The study also identified several barriers to effective pain management in community settings, including limited time with patients and the need for more comprehensive guidelines. Facilitators

included the potential for increased collaboration with other healthcare professionals and the utilization of pharmacists´ skills in patient education and medication management.

Conclusion: The study underscores the critical role of community pharmacists in pain management in Norway. The study revealed community pharmacists' substantial knowledge base, alongside the necessity for ongoing education and training to further enhance their competencies in this area. By addressing identified barriers and capitalizing on facilitators, there is a clear pathway to enhance their role in providing pain care. Advocating for a multidisciplinary approach, this thesis highlights the necessity of integrating community pharmacists into the broader healthcare team focused on pain management. The study also emphasized the need for continuous professional development and collaborative practices to equip community pharmacists fully for effective patient care in pain management.

Sammendrag:

Innledning: Vår studie utforsker rollen til apotekfarmasøyter i håndteringen av smerte innefor Norges helsevesen, et kritisk aspekt av helsehjelp på grunn av prevalensen og kompleksiteten av kroniske smertetilstander. Kronisk smerte, som påvirker en betydelig del av befolkningen, utgjør utfordringer for både individer og helsepersonell. Apotekfarmasøyter, på grunn av deres tilgjengelighet, kan spille en viktig rolle i å rådgive farmakologiske og ikke-farmakologiske smertehåndteringsstrategier samt i den tverrfaglige tilnærmingen til smertehåndtering.

Formål: Studien hadde som mål å utforske den nåværende kunnskapen, holdningene og praksisene til apotekfarmasøyter i Norge når det gjelder smertehåndtering. Spesifikt ønsket studien å identifisere både barrierene for og tilretteleggerne av effektiv smertehåndtering fra prespektivet til apotekfarmasøyter. Studien søkte å evaluere deres potensial til å forbedre smertebehandling gjennom utdanning, personalisering av smertehåndteringsstrategier, og samarbeid med andre helsepersonell.

Metoder: En tverrsnittstudie som brukte en omfattende undersøkelse ble gjennomført for å samle data fra apotekfarmasøyter over hele Norge. Kvantitative metoder ble brukt for å analysere svarene på et detaljert spørreskjema designet for å undersøke farmasøytenes kunnskap, ferdigheter, og holdninger mot smertebehandling, samt deres erfaringer med barrierer og tilretteleggere i å tilby smerteomsorg. Datainnsamling ble tilrettelagt gjennom et anonymt online spørreskjema, hvor deskriptiv statistikk ble brukt for analyse. Kji-kvadrat testen og den ordinale regresjonsanalysen ble anvendt for å identifisere assosiasjoner mellom variabler.

Resultater: Funnene avslørte at apotekfarmasøyter har en sterk grunnleggende kunnskap om smertehåndtering. Det er imidlertid betydelige muligheter for å forbedre deres ferdigheter og kapasiteter gjennom ytterligere målrettet utdanning og opplæring. Studien identifiserte også flere barrierer for effektiv smertehåndtering i apotekene, inkludert begrenset tid med pasienter og behovet for mer omfattende retningslinjer. Tilretteleggerne inkluderte potensialet

for økt samarbeid med andre helsepersonell og utnyttelse av farmasøyters ferdigheter i pasientesopplæring og medikamenthåndtering.

Konklusjon: Studien understreker den kritiske rollen til apotekfarmasøyter i smertehåndtering i Norge. Studien avdekket apotekfarmasøyters betydelige kunnskapsbase, ved siden av nødvendigheten av videre utdanning og opplæring for ytterligere å forbedre deres kompetanser på dette området. Ved å adressere identifiserte barrierer og utnytte tilretteleggere, er det en klar vei for å forbedre deres rolle i å tilby smerteomsorg. Ved å fremme en tverrfaglig tilnærming, fremhever denne avhandlingen nødvendigheten av å integrere apotekfarmasøyter i det bredere helsearbeidslaget fokusert på smertehåndtering. Studien understreket også behovet for kontinuerlig faglig utvikling og samarbeidspraksiser for å ruste apotekfarmasøyter fullt ut til å gi effektiv pasientomsorg i smertehåndering.

List of Abbreviations

ATC: Anatomical Therapeutic Chemical

CP: Chronic Pain

CBT: Cognitive-behavioral Therapy

CDC: Centers for Disease Control and Prevention

NO: Natural Opioid

NPPM: Non-Pharmacological Pain Management

NSAID: Non-Steroidal Anti-Inflammatory Drug

OTC: Over-the-counter

SO: Synthetic Opioid

SSO: Semi-Synthetic Opioid

SNRIs: Serotonin-Norepinephrine Reuptake Inhibitors

TENS: Transcutaneous Electrical Nerve Stimulation

TCAs: Tricyclic Antidepressants

WHO: World Health Organization

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1 Introduction

1.1 Pain Definition and Impact:

International Association for the Study of Pain (IASP) defines pain as "*an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage"(1)*. Pain serves as a vital warning signal, alerting an individual to take action to protect themselves from potential harm. However, pain is not merely a physiological response but is also influenced by psychological, emotional, and cultural factors, making its perception highly individualized and variable (2).

Pain undeniably constitutes a substantial global health challenge, with estimates indicating that one out of every five adults worldwide experiences chronic pain (3). These figures underscore the urgency of addressing pain as a critical health matter that demands prompt and effective treatment. A series of population-based surveys have been conducted across various European countries indicating that a significant proportion of adults, ranging from approximately 25% to 35%, report the presence of chronic pain in their lives (4). This prevalence underscores the widespread nature of chronic pain as a health issue affecting a substantial segment of the adult population in these regions. Drawing from health survey data, it becomes evident that chronic pain is a significant concern among the adult population in Norway, with its prevalence potentially reaching as high as 30% (5). This finding highlights the substantial and noteworthy impact of chronic pain on a considerable portion of the adult demographic in the country. Chronic pain emerges as the leading cause of prolonged sick leave and disability benefit claims, shedding light on its profound economic implications (6). This indicates that chronic pain not only affects an individual´s physical and emotional well-being but also exerts a substantial financial burden on both healthcare systems and the broader economy. The high prevalence of chronic pain-related absences from work and the necessity for disability benefits underscore the urgency of addressing this issue comprehensively, not only for the well-being of individuals but also for the overall economic stability of society.

Pain is a frequently encountered condition that has the potential to impact individuals across all age demographics. Chronic pain, in particular, is a health concern that disproportionately impacts older adults, especially those aged 65 and above. It often results in considerable distress, and social isolation and imposes substantial financial costs and strain on healthcare systems (7-9). This age group experiences chronic pain at a higher rate compared to younger populations. The consequences of chronic pain in older adults are multifaceted and can have a profound impact on their overall well-being. It not only influences their physical health but also their social engagement and financial aspects of healthcare. Several studies have consistently found that women tend to report experiencing more intense pain and greater levels of disability related to pain when compared to men (10, 11). Addressing chronic pain in this population necessitates a comprehensive, patient-centered approach to enhance their overall quality of life and alleviate the burden on healthcare systems.

Chronic pain is not solely a physical ailment; it often goes hand-in-hand with significant mental health challenges, including conditions like depression and anxiety, which can profoundly impact an individual´s overall quality of life (12). This association between chronic pain and mental health underscores the importance of addressing both aspects comprehensively in healthcare, as improving one can often positively influence the other, ultimately enhancing an individual´s overall well-being and quality of life.

1.1.1 Types of Pain:

As outlined by (Paulina Świeboda1, 2013) pain can be categorized into different types based on the duration of symptoms. These classification includes: acute pain, chronic pain, and survived pain (13).

1.1.1.1 Acute Pain:

Acute pain is commonly defined as “the anticipated and natural physiological response to unfavorable chemical, thermal, or mechanical stimulus. It often manifests in association with surgical procedures, traumatic events, or acute medical conditions” (14, 15). Acute pain is the body´s immediate reaction to an injury or harm, serving as a protective mechanism, primarily acting as a warning signal in response to various situations such as post-operative recovery, traumatic injuries, or medical procedures. It typically arises suddenly and is a short-lived

experience, closely linked to a specific cause or event. The usual duration of acute pain is less than 3 months (13).

1.1.1.2 Chronic Pain:

According to the International Association for the Study of Pain (IASP), chronic pain is defined as *"pain that persists or recurs for longer than 3 months"* (16). It is not solely tied to a specific injury or event and can significantly impact an individual´s quality of life. Research findings reveal a substantial prevalence of chronic pain, with figures varying from 13% to 51% among populations in developing countries, and notably higher, reaching up to 60% in developed countries (17). These statistics underscore the global impact of chronic pain, emphasizing the importance of addressing this widespread health concern across different socio-economic contexts. Chronic pain is a condition that transcends age, ethnicity, and gender boundaries, exerting a profound influence on the overall quality of life not only for individuals who experience it but also for their family members and loved ones (18). This persistent impact underscores the universality of chronic pain as a health concern that extends beyond demographic distinctions and emphasizes its far-reaching implications within the broader social context. The economic impact of chronic pain has a significant influence on the economies of numerous countries worldwide (3, 19-21). The economic ramifications of pain are staggering, with estimates indicating a financial burden ranging from $ 560 to $ 635 billion in the United States alone (22). Furthermore, in European countries like Ireland pain-related costs account for approximately 3% of the Gross Domestic Product (GDP) (23), while in Sweden, they reach as high as 10% of the GDP (24). These divergent cost projections highlight the significant economic impact of pain, underlining its substantial financial implications relative to the scale of national economics. This underscores the critical importance of effective pain management not only from a healthcare perspective but also as a crucial factor influencing the economic well-being of various countries.

The effective handling of chronic pain presents a complex array of difficulties, encompassing factors such as patient compliance personalized treatment approach, addressing a person´s psychological well-being, and medication management (25). Chronic pain can be more specifically categorized into seven distinct subtypes, each representing a unique aspect of prolonged pain experiences. These subtypes include chronic primary pain, chronic cancer pain, chronic postsurgical and posttraumatic pain, chronic neuropathic pain, chronic headache

and orofacial pain, chronic visceral pain, and chronic musculoskeletal pain (26). In this thesis, chronic pain is used as an umbrella term for these subtypes.

1.1.1.3 Survived Pain:

Survived pain frequently emerges due to inadequately managed acute pain and continues to persist even after the tissues initially affected by acute pain have fully healed (13). This phenomenon underscores that survived pain often persists as a lasting consequence of unresolved acute pain, despite the successful recovery of the tissue initially responsible for the acute pain. It emphasizes the intricate relationship between acute and survived pain, emphasizing the importance of effective pain management strategies throughout the entire healing process.

Pain remains a persistent issue, primarily due to the challenges in effectively treating and preventing it. One potential factor contributing to this challenge is our limited understanding of the mechanisms underlying chronic or persistent pain and the transition from acute to chronic pain. Enhancing our knowledge in this area could lead to more precise and improved targeting of pain management strategies.

1.1.2 Pain Mechanisms:

Acute Pain Mechanisms:

Acute pain primarily involves processes occurring at the site of injury or pain, known as peripheral mechanisms. These mechanisms serve as the initial responders to noxious stimuli, such as injury or illness (27). Acute pain plays a crucial biological role by alerting individuals to potential harm, thereby triggering protective reflexes. During acute pain episodes, multiple elements come into play: Peripheral mechanisms, situated at the injury or pain site, initiate the pain response. Concurrently, central sensitization becomes active, rendering the central nervous system, including the spinal cord and brain, more sensitive to pain signals and intensifying the perception of pain. Immune system activation is another component of acute pain episodes, aiding the body´s response to injury and inflammation, often linked to painful conditions. Additionally, epigenetic factors can influence the pain experience by modifying genetic processes that impact how the body processes and responds to pain (28-30).

The Transition From Acute Pain to Chronic Pain:

In cases of persistent injuries, significant changes can occur in both peripheral (at the injury site) and central (within the spinal cord and brain) components of the pain transmission pathway. These alterations may result in heightened pain signals and increased sensitivity, a state commonly referred to as hypersensitivity (31). Initially, this heightened response may serve a protective function. However, if these changes persist, they can contribute to the development of chronic pain (29).

Chronic Pain Mechanisms:

Although a precise differentiation between acute and chronic pain is elusive, the prevailing consensus is that chronic pain results when discomfort persists beyond the anticipated healing duration (32). This temporal threshold is often established at three months, in accordance with the parameters stipulated in the International Classification of Diseases. In these instances, pain is deemed pathological, signifying its transition into a chronic state (16). Unlike acute pain, chronic pain often lacks a clear biological purpose and lacks a defined endpoint. This persistent pain state can be influenced by psychological factors and may manifest without a distinct biological cause. In cases of chronic pain associated with injuries or medical conditions such as diabetes, arthritis, or tumor growth, the underlying mechanisms frequently involve alterations in the properties of peripheral nerves. These changes can encompass nerve fiber damage, resulting in heightened spontaneous nerve activity or modifications in nerve conduction and neurotransmitter properties (29).

1.1.3 Pain Management:

General Approach:

The fundamental objectives of managing chronic pain encompass the identification of its underlying causes, the mitigation of distress, and the restoration of functional abilities. Chronic pain involves complex interactions between biological, psychological, and social factors, all of which contribute to its perception and persistence. Therefore, a comprehensive approach is essential, necessitating a thorough assessment and tailored management of each of these facets as required (33).

However, effective pain management often encounters barriers that hinder optimal care. These challenges encompass the absence of well-defined pain management protocols within

healthcare settings, insufficient knowledge and skills among healthcare providers, inadequate teamwork among healthcare staff, concerns regarding potential adverse effects of pain medications, and patients' reluctance to use analgesics (34). To address these challenges, a comprehensive approach is required, encompassing healthcare provider education and training, the development of standardized pain management guidelines, improved interprofessional communication, and patient education to dispel misconceptions about pain medications and foster a more informed and collaborative approach to pain management. Contemporary guidelines advocate a multimodal strategy for the management of chronic pain, advocating the integration of both pharmacological and non-pharmacological treatments (35). This approach acknowledges the multifaceted nature of chronic pain and emphasizes the importance of employing a combination of treatment modalities. Pharmacological and non-pharmacological approaches have the potential to alleviate pain severity (36, 37). Therefore, it is important to recognize that effective pain management often involves a combination of pharmacological and non-pharmacological strategies, to improve the patient´s overall quality of life. This thesis focuses on both pharmacological and non-pharmacological strategies for the management of pain. Importantly, it is a common practice for individuals to frequently consult with community pharmacists, not just in Norway but worldwide, seeking their expertise in both pharmacological and non-pharmacological management of pain (38, 39).

1.1.3.1 Pharmacological Management of Pain:

Pharmacological pain management strategies encompass a range of options, including non-opioid and opioid analgesics, adjuvant analgesics, and corticosteroids (40). These medications are employed to alleviate pain and may be tailored to the specific nature and intensity of the pain experienced by the patient. In the field of pain management, pharmacological approaches play a vital role, constituting a fundamental component of comprehensive pain relief strategies. It is imperative that these pharmacological methods are employed with discretion and careful consideration to attain the delicate balance between effectively alleviating pain and mitigating potential adverse effects (41). The practical use of pharmacological interventions is crucial in achieving the optimal relief of pain tailored to individual needs and circumstances. This approach ensures that patients experience the maximum benefit from pain medications while minimizing the risk of adverse effects. A summarized list of pharmacological options for the management of pain is presented in
Table 1:

Table 1: Classification and Examples of Pharmacological Pain Management Agents

Approach	Description	Examples
Pharmacological Pain Management	Pharmacological strategies encompass the utilization of medications for pain relief and treatment (42).	Various analgesics and other classes of medications.
a) Non-opioid analgesics: 1) Nonsteroidal Anti-inflammatory Drugs (NSAIDs)	NSAIDs like ibuprofen and naproxen reduce pain by reducing inflammation. They are effective for various types of pain, including musculoskeletal pain and mild to moderate pain (43, 44). NSAIDs are the most frequently utilized non-opioid analgesics (45).	Ibuprofen Naproxen
2) Acetaminophen	Another variety of non-opioid analgesics frequently employed for pain management is acetaminophen (46). Acetaminophen lacks effectiveness in reducing inflammation; however, it proves valuable in managing mild to moderate pain (47).	Paracetamol
3) Topical Agents	As implied by their name, these agents are administered directly onto the skin.	Capsaicin cream, Diclofenac gel (48).

4) Adjuvant Analgesics	Adjuvant analgesics represent a diverse category of medications employed in conjunction with other pain management drugs. Their role is to augment the analgesic effects of primary medications or address particular pain conditions (49). They are particularly used to manage specific types of pain, such as neuropathic pain (50).	Antidepressants, Benzodiazepines, Anticonvulsants, and Corticosteroids (51, 52).
b) Opioids Analgesics	Due to their high potency, opioid analgesics are considered the most effective pain management drugs, necessitating vigilant patient monitoring to ensure safety and efficacy in pain management (44, 53).	Morphine, Oxycodone, Hydrocodone, Fentanyl, and Codeine (54, 55).
1. Natural Opioids (NO)	NO originates from the plant opium poppy (54).	Morphine, Codeine (54).
2. Synthetic Opioids (SO)	SO are opioids that are synthesized in the laboratory (54).	Methadone, Fentanyl (54).
3. Semi-synthetic Opioids (SSO)	Like SO, SSO is also synthesized in the laboratory (54).	Oxycodone, Diamorphine, Buprenorphine (54).

Table 2 shows the medications utilized for prevalent pain conditions along with their corresponding Anatomical Therapeutic Chemical (ATC) codes. The ATC classification system, developed by the World Health Organization (WHO), is a globally recognized and utilized method for organizing drugs into various categories based on their therapeutic, pharmacological, and chemical characteristics. This system classifies each drug according to its effects on specific organs or physiological systems, creating a comprehensive framework that extends across five distinct levels of classification (56). The data presented in Table 2 was gathered from the WHO Collaborating Centre for Drug Statistics Methodology (57).

Table 2: Pharmacological Management Strategies for Various Pain Conditions with Medication Examples and ATC Codes

Pain Condition	**Pharmacological Treatment**	**Examples of Medications**	**ATC Codes**
Musculoskeletal Pain	Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)	• Ibuprofen • Naproxen	• M01A E01 • M01A E02
	Muscle Relaxants	• Cyclobenzaprine • Methocarbamol	• M03B X08 • M03B A03
	Topical Analgesics	• Diclofenac gel • Capsaicin cream	• M02A A15 • N01B X04
Neuropathic Pain	Anticonvulsants	• Gabapentin • Pregabalin	• N02B F01 • N02B F02
	Tricyclic Antidepressants (TCAs)	• Amitriptyline • Nortriptyline	• N06A A09 • N06A A10
	Serotonin-Norepinephrine Reuptake Inhibitors (SNRIs)	• Duloxetine • Venlafaxine	• N06A X21 • N06A X16

Cancer Pain	Opioids (for moderate to severe pain)	• Morphine • Oxycodone	• N02A A01 • N02A A05
Postoperative Pain	Opioids (short-term use)	• Morphine • Oxycodone	• N02A A01 • N02A A05
Headache and Migraine	Analgesics	• Acetaminophen • Ibuprofen	• N02B E01 • M01A E01
	Triptans	• Sumatriptan • Rizatriptan	• N02C C01 • N02C C04
	Other Antimigraine preparations	• Pizotifen • Dimetotiazine	• N02C X01 • N02C X05
	Preventive Medications	• Propranolol • Topiramate	• C07A A05 • N03A X11
Fibromyalgia	Antidepressants	• Amitriptyline • Duloxetine	• N06A A09 • N06A X21
	Anticonvulsants	• Pregabalin • Gabapentin	• N02B F02 • N02B F01

ATC: the Anatomical Therapeutic Chemical (ATC) classification system

1.1.3.2 Non-Pharmacological Pain Management:

Non-pharmacological pain management (NPPM) interventions comprise a diverse range of methods that do not depend on medications to relieve pain. These approaches are designed to address pain through alternative means and do not involve the use of drugs. Non-pharmacological methods should be viewed as valuable complements to pharmacological treatments rather than substitutes. They play a pivotal role, particularly in the management of mild to moderate pain, by enhancing the overall effectiveness of pain management strategies. These non-pharmacological approaches work in synergy with medications, offering a holistic and multifaceted approach to pain relief. By addressing various aspects of pain, such as physical, psychological, and complementary factors, they contribute to a more comprehensive

and personalized pain management plan (40, 58, 59). Implementing pain treatments that require a significant time and effort investment, such as exercise or meditation, can be challenging within our society, even if their effectiveness has been demonstrated (60). One possible reason for this difficulty is the fast-paced and demanding nature of modern lifestyles, which may leave individuals with limited time and energy to consistently engage in these treatments. A detailed summary of each NPPM approach is described in Table 3:

Table 3: Non-Pharmacological Interventions For Pain Management: Approaches and Examples

Approach	Description	Examples
Physical Activity	Evidence indicates that engaging in exercise as a standalone intervention can provide benefits for individuals dealing with chronic pain conditions such as fibromyalgia (61). Engaging in regular physical exercise has been shown to have a positive impact on the advancement of chronic diseases such as cardiovascular disease, type 2 diabetes, and obesity. Additionally, when physical activity is incorporated into the management of chronic pain conditions, provided it adheres to suitable parameters regarding how often, how long, and how intense, it has been associated with notable enhancements in pain levels and the symptoms associated with it (62).	Exercise, Massage, Manual Therapy, Heat and Cold Therapy, and Transcutaneous Electrical Nerve Stimulation (TENS) (63).
Psychological Approaches	Cognitive-behavioral therapy (CBT) helps individuals manage pain-related thoughts and emotions. It teaches coping strategies and relaxation techniques, reducing the impact of pain on daily life (64).	Cognitive-Behavioral Therapy (CBT).

Medical Devices	Devices like Transcutaneous Electrical Nerve Stimulations (TENS) units and spinal cord stimulators provide pain relief by altering nerve signals or blocking pain perception (63, 65).	TENS units, Spinal cord stimulators.
Complementary and Alternative Therapies	The outcomes of these therapies differ, and certain individuals experience their usefulness in pain management. For the management of pain, these therapies encompass approaches like acupuncture, natural herbs, stress reduction, and focus on relaxation (66, 67).	Acupuncture, Mindfulness meditation, Yoga.
Self-Management Programs	Self-management programs have proven highly effective in enhancing physical function and alleviating pain in individuals living with chronic pain (68). These programs provide a structured framework for patients to learn skills and strategies for managing their pain, improving physical function, and enhancing overall quality of life.	Educational programs delivered through different mediums, including television, multimedia, videos, texts, etc., from reputable sources of information can be beneficial.
Lifestyle Factors	Encouraging a healthier lifestyle through a healthy diet, effective weight management strategies, ensuring optimal sleep, stress reduction, and promoting a smoke-free life. These lifestyle factors have a substantial impact on pain management and integrating them into a comprehensive approach can significantly enhance an individual´s overall well-being and pain relief (69).	Smoking cessation programs, Dietary recommendations, Sleep hygiene guidance, and Stress management programs.

To achieve effective pain management, it is often necessary to employ a combination of different approaches, and this is most accomplished through the collaborative efforts of a healthcare team (70, 71). This means that managing pain effectively often involves not just one strategy but a multimodal approach. These approaches are usually most effective when coordinated by a team of healthcare professionals working together. This collaborative approach ensures that all aspects of a patient´s pain are addressed, enhancing the chances of successful pain relief and improved quality of life.

1.1.3.3 Multidisciplinary Collaboration in Pain Management:

A multidisciplinary approach to pain management involves assessing a patient´s condition with the input of various healthcare professionals each offering their unique expertise, skills, and knowledge. These professionals often collaborate and consult with one another to create a comprehensive care plan. The primary team typically includes primary care doctors, anesthesiologists, psychologists, nurses, physical and occupational therapists, surgeons, neurologists, and pharmacists (72). This diverse group of experts ensures that all aspects of the patient´s pain, both physical and psychological, are addressed, resulting in a more holistic and effective pain management approach. In an ideal scenario, individuals experiencing uncontrolled chronic pain should be able to utilize a comprehensive array of diagnostic and therapeutic approaches tailored to their specific needs. Notably, in Norway, patients are granted a legal entitlement to receive prioritized healthcare services within multidisciplinary pain clinics under certain conditions. This privilege is extended to individuals whose quality of life has been significantly impaired by their chronic pain conditions, provided that there is access to treatments that have demonstrated effectiveness while remaining cost-efficient (4, 73). This means that in Norway, individuals suffering from chronic pain with a severe impact on their quality of life can expect to receive prioritized care in specialized pain clinics, as long as there are treatments available that have proven to be both effective and cost-effective.

Despite the widespread occurrence of pain, healthcare providers in various countries often demonstrate insufficient knowledge and suboptimal attitudes when it comes to managing pain, with extensive research primarily focusing on physicians and nurses (38, 39, 74-78). The primary factor contributing to insufficient knowledge and suboptimal attitudes is the limited availability of comprehensive training and education programs dedicated to pain

management for healthcare professionals (76, 79). Moreover, research in the available literature has predominantly focused on involvement in pain management within hospital settings (80-84), while there is a notable lack of studies conducted in outpatient environments, and only a limited number of these studies have included community pharmacists in their scope.

Pharmacists play a crucial role in managing chronic conditions like pain and often have considerably more interactions with patients than their primary care providers, sometimes up to ten times as many (85). This extensive interaction provides pharmacists with a unique opportunity to closely monitor patients, offer counseling on medications, and address any concerns or questions related to chronic pain and its treatment. Their consistent presence in patient´s healthcare routines enables a more thorough and individualized approach to chronic pain management. Certainly, chronic pain frequently coexists with multiple comorbidities, necessitating complex drug regimens for treatment. This complexity not only heightens the potential for drug interactions but also increases the risk of side effects. As a result, individuals with chronic pain often face intricate medication regimens that require careful management to balance therapeutic benefits and potential risks effectively. Pharmacists, as readily accessible experts in medications, play a vital role in helping patients personalize their treatment plans. This personalization takes into account not only their chronic pain but also any coexisting health issues, concurrent medications, and individual preferences, expectations, and goals. Pharmacists strive to optimize therapy, ensuring it is tailored to each patient´s specific circumstances, thus minimizing potential risks and enhancing the effectiveness of pain management (39).

1.2 Hospital Pharmacists' Roles in Pain Management and Advantages:

Giannitrapani KF and colleagues (Karleen F. Giannitrapani, 2018) highlight the advantages of engaging specialized clinical pharmacists in pain management, which encompass alleviating the workload of physicians and optimizing the utilization of opioids (83). This collaborative approach, where clinical pharmacists work closely in a multidisciplinary team, can lead to more effective and safer pain management strategies, ultimately benefiting patients and the

broader healthcare system. In a review conducted by Bennett MI and colleagues (Bennett, et al., 2011), it was discovered that when pharmacists delivered pain education, it led to a reduction in medication-related adverse effects and a decrease in pain intensity (86). This underscores the significant role pharmacists can play in enhancing pain management outcomes. This collaboration between pharmacists and patients highlights the importance of a well-rounded approach to pain management, encompassing not only pharmacological interventions but also patient education and support.

Boren LL and coauthors (Lacey L Boren 1, 2019) emphasize that the integration of clinical pharmacists in pain management will result in decreased medication dosages, enhanced adherence to best practices, optimization of medication therapy, and improved patient access and safety (80). Another study by Mathew S and colleagues (Stacy Mathew, 2016) brought to the fore that the participation of pharmacists in an inpatient pain management consultation service yielded favorable outcomes, including a notable positive impact on pain scores and functional improvements among patients (84). This underscores the valuable role of pharmacists in contributing to pain management, emphasizing their potential to optimize patient care and well-being.

Semerjian M and coauthors (Maral Semerjian 1, 2019) presented study findings that highlight the role of clinical pharmacists in identifying and addressing medication-related problems and executing interventions within the context of chronic pain management (81). These findings underscore the valuable contribution of clinical pharmacists to enhancing patient care and safety in the management of chronic pain. Their expertise in pharmacotherapy allows them to assess medication regimens, minimize risks, and optimize pain management strategies, ultimately improving patient outcomes.

In essence, the involvement of clinical pharmacists in pain management offers multiple advantages, such as alleviating physician´s workloads, optimizing opioid utilization, reducing medication-related adverse effects, and decreasing pain intensity. The presence of clinical pharmacists in the multidisciplinary team enhances the effectiveness and safety of pain management, benefiting both patients and the broader healthcare system. Clinical pharmacists contribute significantly by reducing medication dosages, optimizing medication therapy, and enhancing patient access and safety. Their role is underscored by notable improvements in pain scores and functional outcomes observed in inpatients. Fundamentally, hospital

pharmacists play a pivotal role in comprehensive pain management, emphasizing the importance of a multifaceted approach encompassing both pharmacological and non-pharmacological interventions.

1.3 Community Pharmacists: Vital Contributors to Pain Management:

The primary cause for individuals to utilize the services of community pharmacists predominantly revolves around pain-related issues, underscoring the pivotal role that community pharmacists occupy within the continuum of pain care (38, 39). In this capacity, community pharmacists become vital constituents of the comprehensive pain management framework. Their accessibility and expertise position them as crucial assets in addressing and assisting patients with pain-related concerns within the community healthcare setting. Through their engagement with patients, community pharmacists contribute significantly to pain care by providing guidance, recommending suitable over-the-counter pain relief options-both pharmacological and non-pharmacological- and facilitating referrals when necessary, thereby enhancing the overall quality of pain management services.

Furthermore, pharmacists regularly guide opioid treatment, encompassing insights into its advantages and potential drawbacks, the recognition and management of overdoses, and appropriate methods for storage and disposal. In addition to this, pharmacists can offer additional services such as enhancing patients' treatment through pain evaluation, conducting medication assessments, monitoring for potential interactions, verifying proper dosages, and offering guidance on transitioning or tapering medications like opioids (87). Their role in educating individuals about opioid therapy ensures that patients are well-informed about the safe and responsible use of these medications. Patients may also seek guidance and information from pharmacists regarding medications used to manage neuropathic pain, including Tricyclic antidepressants (TCAs) and certain Antiepileptic drugs known for their effectiveness in neuropathic pain management (50-52). Additionally, some individuals may present with comorbid pain conditions and might be prescribed medications to address issues such as anxiety, depression, and sleep disturbances. In such complex cases, community

pharmacists can play a valuable role in providing comprehensive assistance, and support and offering tailored recommendations (39).

Another critical role of community pharmacists is to recognize and mitigate drug interactions, a task of particular importance in the context of chronic pain management where polypharmacy is prevalent. This includes addressing both pharmacokinetic and pharmacodynamic interactions to ensure patient safety and the effectiveness of their treatment (88).

A significant body of literature has explored the positive impact of pharmacist-led educational initiatives and medication reviews in pain management (89). Despite these significant contributions, there is a lack of research examining the knowledge and attitudes of community pharmacists regarding pain management, especially in the context of Norway. This gap emphasizes the need for further research in this area to better understand the role of community pharmacists in pain management and potentially enhance their contribution to patient well-being.

Given this context, we formulated a research question as *"How do community pharmacists in Norway contribute to pain management, and what factors influence their knowledge, attitudes, and involvement in this area, including barriers and facilitators?"*. Our purpose was to explore the current knowledge, attitudes, and practices of community pharmacists in Norway as a part of primary health care for any type of contribution to pain management. In this endeavor, we set specific aims or objectives to identify perceived barriers to and potential facilitators of effective pain management by community pharmacists, and to evaluate the community pharmacists´ potential to enhance pain care. For that, we specifically focused on the identification of elements such as educational efforts, personalized pain management approaches through pharmacists' communication and consultation roles with individual clients, and collaboration with other healthcare professionals, such as physicians. We wanted to know how confident the community pharmacists are in such roles and how much help or improvements are required for optimization if they already have some experience. We speculated that community pharmacists are vital contributors to pain management, by offering essential services and expertise at the frontline of the healthcare system in society with direct contact with clients visiting the community pharmacies. We hypothesized that community pharmacists have the knowledge and skills for such contribution and to some extent execute this role in their daily practice. However, to comprehensively understand the extent of

community pharmacists´ contributions to pain management in Norway, we determined that it is essential to conduct this study and assess their knowledge and confidence levels. We hypothesized that community pharmacists in Norway play a significant role in pain management, and their level of knowledge can directly impact the effectiveness of pain care. We predicted that pharmacists with more work experience would demonstrate greater confidence in advising on non-pharmacological pain management strategies compared to less experienced pharmacists. Additionally, we anticipated that various factors, such as professional attitudes, organizational support, and access to resources, would serve as either facilitators or barriers influencing pharmacists´ involvement in pain management.

1.4 Aim of Thesis:

The overall aim of the thesis is to assess the proficiency and perspectives of community pharmacists in the realm of pain management in Norway. The specific aims are:

1. Examining the depth of community pharmacist´s understanding of the field of pain management.
2. Evaluating the community pharmacist´s level of confidence when it comes to providing pain-relieving medications or advice to patients seeking guidance or treatment at community pharmacies.
3. Gathering insights into pharmacist's viewpoints and convictions concerning pain management. This includes identifying any perceived facilitators, and barriers that could hinder optimal performance in this capacity or facilitator factors.

This will build up a solid evidence-based platform for identifying ways to overcome barriers and promote or encourage the facilitators in the next step of research and advancing the field by empowering community pharmacists as important team players in the pain management crew.

2 Methods and Materials

The methodological section of this thesis comprised several steps, each detailed below:

2.1 Study Design:

A quantitative, cross-sectional approach was used to explore the current knowledge, perspectives, and self-reported competencies of Norwegian community pharmacists in pain management. The study utilized an online, anonymous questionnaire as the tool for data collection, strategically targeting community pharmacists in Norway. This method allowed for fast data collection from the target group (90). To ensure the anonymity of responses and the use of collected data for academic purposes, no personal or sensitive information was collected through the online anonymous questionnaire. The questionnaire was constructed in Norwegian, the legal language of Norway. Moreover, by participating in the questionnaire, respondents consented to voluntarily participate in the study and share their anonymous responses. The questionnaire was constructed using "Nettskjema" (91), a user-friendly platform that facilitated ease of response. Respondents could participate in the questionnaire simply by clicking on the shared link, making the process straightforward and accessible. Approximations showed that around 12 minutes were sufficient for completing the questionnaire.

2.2 Study Population:

In line with the specific focus of the thesis, the targeted population was defined as pharmacists working in either chain or private community pharmacies in Norway, with the additional requirement of being a registered pharmacist in Norway. These inclusion criteria defined the eligible participants. This specific demographic focus was also clearly stated in the questionnaire´s description to ensure the relevance and precision of data collection.

2.3 Construction of the Questionnaire:

Since there was no pre-existing standardized and validated questionnaire available for the purpose of this study, a new questionnaire was constructed. The development of the questionnaire involved a systematic, step-by-step process in close collaboration with the supervisor (***Figure 1***).

2.3.1 Literature Search:

The questionnaire was designed based on the available knowledge and inspiration obtained from the existing literature. A systematic literature search, carried out in close coordination with the supervisor, involved a comprehensive review of existing literature to ensure that the questions were based on current knowledge and relevant to the study´s aim. It also enabled us to identify gaps in the relevant field, highlighting areas that were not known or under-explored. Furthermore, by identifying studies that employed methods similar to ours, we found valuable sources of inspiration and insight for constructing our questionnaire. The details of the systematic literature search process, including the databases searched, keywords used, the criteria for inclusion and exclusion of literature, as well as summaries of the most relevant and selected articles, are comprehensively described in ***Appendix 1***.

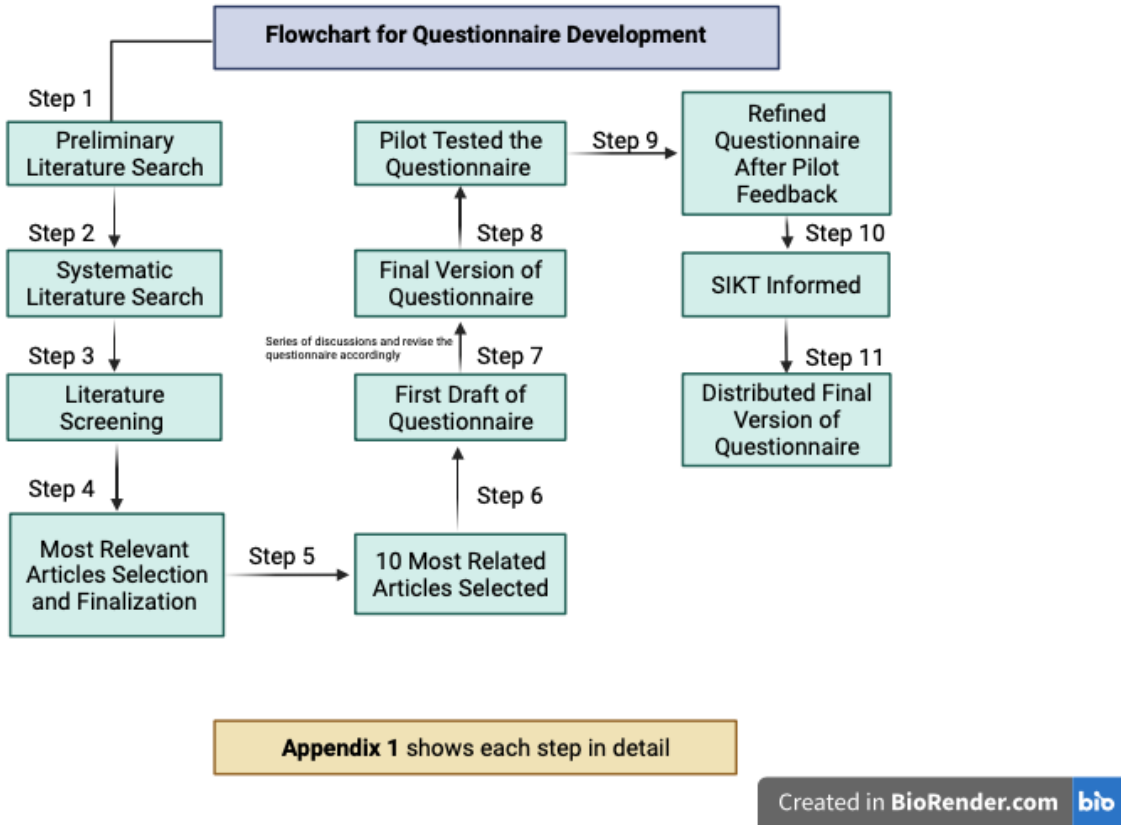

Figure 1: The process undertaken for the development of the questionnaire. A detailed discussion of each step is provided in Appendix 1.

2.3.2 Questionnaire Form and Content:

The questionnaire included a short greeting part in which the purpose of the study was briefly presented, and anonymity and voluntary participation were presented. By clicking on the participation, the participants automatically agreed or consented to give permission for the use of the collected data for academic purposes (writing the master thesis and scientific publication). An estimation of the time required to answer the questions was also provided. This part ended with thanking participation.

The questionnaire itself was structured into four distinct sections; each section was designed to capture a specific set of information from community pharmacists who participated. It was designed to incorporate both open-ended and close-ended questions (92).

Section 1: Sociodemographic Data

The first section played a vital role in providing a contextual background for each participant. It focused on gathering sociodemographic data, such as gender, age, years of work experience, level of education, and the geographic location of respondents´ workplaces in Norway. This section comprised several questions, each aimed at specific aspects of the pharmacists´ backgrounds, and was structured to be closed-ended, offering predefined choices for the respondents to select from.

Section one of the questionnaire comprised seven questions in total. It began by asking respondents to specify their gender, offering options such as male, female, or other, and an additional option for those who preferred not to answer.

The next question categorized participants into age groups: 21-26 years, 27-32 years, and over 32 years. Participants were required to select the one option that best described their age.

Work experience was another key aspect explored in this section, and the participants were asked about their work experience as pharmacists. The options included being a newly graduated pharmacist, having less than 5 years, 5-10 years, or more than 10 years of work experience.

The next question inquired about the education level of the participants. Options included in this question were having a Bachelor´s degree in pharmacy, a Master´s degree in pharmacy, or other educational qualifications.

Furthermore, participants were then asked about their work location within Norway, with options indicating various regions such as the Northern, Central, Eastern, Western, or Southern regions.

A key question in this section was regarding training in pain management. Respondents were asked if they had received such training in pain management, with options including “Yes”, “No”, or “Do not remember”. For those who responded with “Yes”, a follow-up question asked them to specify the source of this training.

The final question in this section was about the origin of their pharmacy degree, inquiring whether it was obtained in Norway or from another country, and required them to specify the country if the degree was obtained outside Norway.

Each question in this section was designed to gather detailed demographic and professional information, which was important for understanding the respondents´ perspectives in the context of their professional and educational backgrounds.

Section 2: Knowledge, Skills, and Competencies:

Section two of the questionnaire was designed to assess the knowledge, skills, and competencies of community pharmacists regarding pain management and the use of analgesics. This section included ten questions, focusing on both non-opioid and opioid analgesics used for pain management.

The format of the questionnaire in this section utilized a 5-point Likert scale for responses, ranging from "Strongly Disagree" to "Strongly Agree" (92). This scale enabled an effective measurement of the pharmacists´ level of agreement or disagreement with various statements related to pain management.

All the questions in this section were of a closed-ended nature, which facilitated a structured and quantifiable assessment of pharmacists' perspectives. These questions explored various aspects of pain management knowledge among the respondents such as pain management protocols for children, perception of pain in infants, selection of pain medication, use of Cognitive-Behavioral Therapy (CBT) in treating chronic pain, the effectiveness of analgesics and adjuvant analgesics, the risk associated with nonsteroidal anti-inflammatory drugs (NSAIDs), the role of antidepressants in pain management and the combination of different analgesics for better pain control.

Section 3: Self-reported Competence:

Section three of the questionnaire presented registered community pharmacists with 14 questions related to their self-reported competence in pain management (92). These questions were primarily closed-ended, with a few allowing for open-ended responses. The main content of this section covered diverse aspects, including questions on patient counseling on over-the-counter (OTC) analgesics, non-pharmacological approaches to pain management, potential drug interactions, and knowledge of specific guidelines, regulations, and recommendations concerning analgesics and pain management. Further questions explored

their familiarity with clinical guidelines, self-assessed knowledge about controlled substances and pain management, and their views on the need for further training in pain management.

In this section, the response formats varied to suit the nature of each question: four questions continued to use a 5-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree". Six questions were designed to assess the frequency of specific practices or experiences, with a response scale ranging from "Low" to "Very High" and numerically from "1" to "5". Two questions offered a three-option format: one with "Yes", "No", "Do Not Know", and another with "Yes", "No", "Do Not Remember", while an additional question expanded this to a four-option format by combining all these options. Additionally, there was a "sub-question" that required respondents to specify the reasons where applicable for a more detailed response. This approach in the questionnaire design aimed to capture a comprehensive understanding of pharmacists' capabilities and experiences in pain management.

Section 4: Facilitators and Barriers:

The last section, Section Four of the questionnaire, consisted of 15 questions and was designed to thoroughly explore the various factors that both facilitated and hindered the role of community pharmacists in pain management and treatment. The questions in this section featured a mix of closed and open-ended types. It began by asking pharmacists about the unique challenges they faced when dealing with patients suffering from chronic pain compared to other patients. The options provided included a range of potential barriers, such as a lack of knowledge about pain management, communication difficulties, concerns about opioid dispensing, and discomfort in advising specific demographic groups such as pregnant women, children, or the elderly. Additionally, pharmacists were given the opportunity to mention any other challenges not listed in the predefined options, allowing for a more comprehensive understanding of their experiences.

The section then progressed to evaluate the specific differences pharmacists encountered with chronic pain patients, such as more frequent use of pain medication, higher instances of anxiety or depression, and the need for specialized pain management. This part of the questionnaire allowed pharmacists to highlight any social challenges or changes in life quality that they observed in chronic pain patients.

Furthermore, the questionnaire assessed the need for additional training among pharmacists in pain management to effectively meet patient needs. Responses ranged from a definite “Yes” to “Unsure”, also gauging their interest in participating in various types of training or courses to enhance their pain management skills.

A significant aspect of this section was understanding how pharmacists perceived their collaboration with other health professionals in improving care for chronic pain patients. They were asked to rate the effectiveness of such collaboration and the frequency of their participation in related discussions, offering insights into the multidisciplinary approach to pain management in a pharmacy setting.

Community pharmacists were also questioned about the impact of pharmacy workflow and time constraints on their ability to offer comprehensive pain management advice. This included evaluating the sufficiency of staffing levels in their pharmacies to handle pain management needs and the significance of clear guidelines and protocols in their practice.

Additionally, community pharmacists were queried about how often they provided patient education to address misconceptions about pain medication and their self-assessed capability in assisting patients to improve or alleviate their pain.

In one of the final questions, community pharmacists were asked about the impact of limited sales of pain medication on their role in pain management, offering a range of responses from “Strong disagreement” to “Strong agreement.” This section concluded by inviting community pharmacists to specify factors that they believed would facilitate effective pain management in a community pharmacy.

Overall Section 4 was structured to capture a comprehensive understanding of the challenges, needs, and contributions of community pharmacists in the field of pain management, thereby providing valuable insights into potential areas for improvement and development in this domain.

2.4 Pilot Testing of the Questionnaire:

Following the construction of the draft questionnaire, it underwent an internal pilot test (93, 94) from November 9, 2023, to November 13, 2023, to gather initial feedback and ensure its effectiveness. The pilot test was distributed to a small, diverse group of individuals, including

both pharmacists and non-pharmacists, to gather a wide range of perspectives. The primary purpose of this pilot testing was to identify any necessary corrections related to the formulation of the questions, the options provided, the clarity of the text, and most importantly, the time taken to complete the questionnaire. The pilot test was sent to a group of 10 individuals who were asked to provide feedback along with suggestions for any changes, additions, or deletions for the final questionnaire. Based on the feedback received from this initial testing, certain questions and their corresponding options were revised, and some questions were deleted to ensure that the questionnaire could be completed within 10-12 minutes. These revisions aimed to better align the questionnaire with the respondent's perspectives and understanding, thereby ensuring that the final questionnaire would be more effective in capturing accurate and relevant data.

2.5 Questionnaire Distribution and Data Collection:

The final version of the questionnaire was then prepared after the implementation of comments and suggestions obtained from the piloting. It was then distributed online in a closed social media group named “Farmasi” (95), specifically serving Norwegian pharmacists and had a total of 5,800 members. The questionnaire was available for a period of seven weeks, from November 29, 2023, to January 12, 2024. This extended duration was chosen to ensure sufficient time for pharmacists to participate and provide comprehensive responses. Two reminders were sent, each spaced a two-week gap, following its initial posting on social media. All the data collected from the respondents were automatically compiled into an Excel sheet format, facilitated by the Nettskjema platform (91).

2.6 Ethical Approval:

Regarding ethical considerations, the questionnaire was designed to maintain anonymity and voluntariness, with no collection of personal or sensitive data. Given these parameters, the study did not necessitate formal ethical approval from the Regional Committee for Medical and Health Research Ethics (REC) or the Norwegian Data Protection Agency. However, as a measure of due diligence and transparency, the questionnaire was submitted to the Norwegian Agency for Shared Services in Education and Research (SIKT) for informational purposes and to seek any additional input. Once confirmation was received from Shared Services in

Education and Research (SIKT) (***Appendix 2***), indicating no sensitive and personal data collection, the questionnaire was then distributed via social media platform (95) to reach the intended audience of community pharmacists.

2.7 Data Handling and Statistical Analysis:

Upon completion of the questionnaire by respondents, all responses were automatically complied and organized into an Excel sheet. This ensured efficient data collection and provided an overview of all data in a single file. For the analysis, the data were then imported into the Statistics Package for Social Sciences (SPSS) statistics software version 29.0.1.0 (IBM® SPSS® Statistics). This advanced statistical tool was used to perform descriptive statistics in alignment with the research aim.

Initially, all the variables were categorized according to their nature and type, as shown in Table 4.

Independent Variables and Their Types:

Demographic variables such as gender, age, work experience, education level, work location in Norway, ever received training in pain management, the source of pain management training, completion of pharmacy education in Norway, and if not, the name of the country where education was obtained, were served as independent variables. Variables such as gender, age, work location, pain management training, and its source, and the completion of pharmacy education in Norway or other countries were classified as categorical variables. In contrast, variables such as work experience and education level were classified as continuous variables.

Dependent Variables and Their Types:

The dependent variables included the respondent´s knowledge, skills, and competence in pain management, their professional practices, and the challenges they faced. Furthermore, attitudes and beliefs towards pain management, as well as barriers and facilitators in pain management, were considered. Additionally, all open-ended responses related to pain management were included. Each of these variables was classified as categorical.

Table 4: Type And Nature of Variables

Independent Variables	**Types of Independent Variables**	**Dependent Variables**	**Types of Dependent Variables**	**Analysis Methods**
Gender	Categorical (Nominal)	Knowledge, Skills, and Competence in Pain Management	Categorical Ordinal (Likert scale)	Numbers and Percentages
Age	Categorical (Ordinal)	Professional Practice and Challenges	Categorical Ordinal (Likert scale)	Numbers and Percentages
Work Experience	Continuous	Attitudes and Beliefs towards Pain Management	Categorical Ordinal (Likert scale)	Numbers and Percentages
Education Level	Continuous	Barriers and Facilitators in Pain Management	Categorical Ordinal (Likert scale)	Numbers and Percentages
Work location in Norway	Categorical (Nominal)	Open-ended responses on Pain Management		Numbers and Percentages
Ever received training in Pain Management	Categorical (Dichotomous)			Numbers and Percentages

Source of Pain Management training	Categorical (Nominal)			Numbers and Percentages
Pharmacy education completed in Norway	Categorical (Dichotomous)			Numbers and Percentages
If not "name of the country from where pharmacy education was taken"	Categorical (Nominal)			Numbers and Percentages

The findings from the analysis are systematically presented in the subsequent part of the thesis, including the use of tables, pie charts, and bar charts to illustrate the results clearly and effectively. The demographic data are presented in a table along with numbers and percentages, while bar charts and pie charts are used to illustrate the remaining data. Table 5 provides detailed information about the null hypotheses and the statistical tests used to assess them. When both the dependent and independent variables are categorical, the chi-square test is employed to determine the significant association between these variables. If the dependent variable is categorical, and the independent variable is continuous, ordinal regression analysis is used, and pseudo-R^2 values are used to assess the goodness-of-fit and effectiveness of the model (96). The null hypothesis is rejected if the P-value is less than 0.05 (significance level α), indicating that there is a significant association between the dependent and independent variables. If the P-value is greater than 0.05, the null hypothesis is accepted, indicating that there is no significant association between the variables. In this study, multiple analyses were carried out on the same dataset, resulting in an increased risk of a Type 1 error- the false rejection of a true null hypothesis. To address this and minimize the error rate, a Bonferroni correction was applied (97, 98), adjusting the significance level, thus ensuring more stringent criteria for determining significant associations between the variables.

Table 5: List of Null Hypothesis And Statistical Tests

Null Hypothesis	**Independent Variable**	**Type of Independent Variable**	**Dependent Variable**	**Type of Dependent Variable**	**Statistical Test**
There is no significant association between gender and self-reported knowledge of pain management	Gender	Categorical Nominal	Self-reported Knowledge of Pain Management	Categorical Ordinal	Chi-Square Test
There is no significant association between gender/work experience and how often they coordinate with other health care professionals (Multidisciplinary collaboration)	Gender /Work Experience	Categorical Nominal / Continuous	Multidisciplinary Collaboration	Categorical Ordinal	Chi-Square Test/ Ordinal Regression
There is no significant association between the work experience of the respondents and their confidence in advising on non-pharmacological pain management strategies	Work Experience	Continuous	Advising on Non-Pharmacological Pain Management Strategies	Categorical Ordinal	Ordinal Regression
There is no significant association between work experience and counseling about the appropriate use of painkillers without prescription.	Work Experience	Continuous	Counseling about the appropriate use of painkillers without prescription.	Categorical Ordinal	Ordinal Regression
There is no significant association between a pharmacist's work experience and their self-rated knowledge of pain management.	Work Experience	Continuous	Self-rated Knowledge of Pain Management	Categorical Ordinal	Ordinal Regression

There is no significant association between a pharmacist's education level and their self-rated knowledge of pain management.	Education Level	Continuous	Self-rated Knowledge of Pain Management.	Categorical Ordinal	Ordinal Regression
There is no significant association between pharmacists' work experience and their views on the impact of restricted sales of pain medication.	Work Experience	Continuous	Views on the impact of restricted sales of pain medication	Categorical Ordinal	Ordinal Regression
The is no significant association between the level of education of pharmacists and their self-rated knowledge of laws and regulations related to controlled substances/narcotics	Education Level	Continuous	Self-rated knowledge of Laws and Regulations related to Controlled substances/ Narcotics	Categorical Nominal	Ordinal Regression

3 Results

3.1 Response Rate:

We designed our questionnaire with the expectation of receiving at least 5 responses per question, aiming for a total of 235 responses. However, we ultimately received 71 responses, yielding a response rate of 30.2%. It is notable that response rates for questionnaires typically range between 30% to 50% and recent studies have indicated that the average response rate for online questionnaires stands at approximately 44.1% (99).

3.2 Socio-Demographic Characteristics:

The sociodemographic information of the 71 respondents is shown in Table 6. The data are categorized into several demographic variables, each with different response options, and corresponding percentages.

The majority of the questionnaire's respondents were female (42 out of 71, accounting for 59.2%), followed by males (29 out of 71, 40.8%).

In terms of age, almost half were those aged over 32 years (33/71 respondents, 46.5%), followed by the 27-32 age group (27/71 respondents, 38%) and finally, the 21-26 age group (11/71 respondents, 15.5%).

Regarding work experience, a varied range was observed. The most common category was respondents with less than 5 years of work experience (29/71, accounting for 40.8%), followed by those with more than 10 years (21/71, 29.6%), those with 5-10 years were 13, 18.3%, and recent graduates were the smallest group (8, 11.3%).

When it came to education level, the majority held a Bachelor´s degree in pharmacy (43/71, 60.6%), followed by a Master´s degree in pharmacy (25/71, 35.2%). Other educational levels were less common (3, 4.2%), which included Pharm-D (Doctor of Pharmacy) and Master´s in Clinical Pharmacy.

The respondents were also categorized by their work location in Norway. The Eastern region had the highest representation (35/71, 49.3%), followed by the Central region (14/71, 19.7%),

Northern region (9/71, 12.7%), Southern region (7/71, 9.9%) and Western region (6/71, 8.5%).

In terms of training in pain management, a majority of the respondents (45, 63.4%) had received a relevant type of training. Those who had not received training constituted 17 (23.9%), and 9 (12.7%) did not remember if they had received training. For those who had received training, the primary sources were training at the pharmacy (23, 46%) and during university studies (22, 44%), with other sources (for details, see Table 6) being less common (5, 10%).

Of the respondents, 70.4% (50 respondents) had completed their pharmacy degree in Norway. For those who had not completed their degree in Norway (21, 29.6%), the majority had completed in Pakistan (15, 71%), with the remainder from Egypt, Ethiopia, Iran, Serbia, and two respondents who did not mention the country of education.

Table 6: Socio-Demographic Characteristics of the Respondents

Information	**Total number of respondents (n)**	**Options**	**Number**	**Percentage (%)**
Gender	71	Male	29	40.8
		Female	42	59.2
		Other	0	0
		Do not wish to answer	0	0
Age (years)	71	21-26	11	15.5
		27-32	27	38
		>32	33	46.5
Work Experience (years)	71	Recent graduate	8	11.3
		<5 years	29	40.8
		5-10 years	13	18.3
		>10 years	21	29.6
Education Level	71	Bachelor´s in pharmacy	43	60.6
		Master´s in pharmacy	25	35.2
		Other	3	4.2
Other Education Level	3	Pharm-D (Doctor of Pharmacy)	2	67

		Master´s in Clinical Pharmacy	1	33
Work Location in Norway	71	Northern Region	9	12.7
		Eastern Region	35	49.3
		Central Region	14	19.7
		Southern Region	7	9.9
		Western Region	6	8.5
Ever received training in Pain Management	71	Yes	45	63.4
		No	17	23.9
		Do not remember	9	12.7
If "Yes", source of training received	50	At Pharmacy	23	46
		At University during studies	22	44
		Other	5	10
If "other", describe source of training	5	Both at university and at a pharmacy	1	20
		Other education program	1	20
		Pharmacy training program (Apokus)	1	20
		Had lecture on pain during studies in bachelor program, but not direct training	1	20
		Also during studies	1	20
Pharmacy degree completed in Norway	71	Yes	50	70.4
		No	21	29.6
If "NO", mention the name of the country from where the degree of pharmacy was completed	21	Pakistan	15	71
		Egypt	1	4.8
		Ethiopia	1	4.8
		Iran	1	4.8
		Serbia	1	4.8
		Had not mentioned the name of the country	2	9.5

3.3 Knowledge, Skills, and Competence in Pain and Pain Management:

This section offers valuable insights into perceptions of pain management strategies. In Figure 2 (statement 2a), the data show that 62% agree, and 21.1% strongly agree that the selection of painkillers/ analgesics should depend on pain intensity, indicating a preference for tailored pain management. Statement 2b (see Figure 2) presents the respondents´ attitudes towards Cognitive Behavioral Therapy (CBT) in treating chronic pain. Here, 53.5% agree, and 18.3% strongly agree and acknowledge the high efficacy of CBT, suggesting a strong validation for incorporating CBT early in treatment plans. In terms of treating chronic pain solely with analgesics and adjuvant analgesics as shown in Figure 2 (statement 2c), opinions are more diverse. However, 38% of respondents agree that analgesic and adjuvant analgesics are effective for the treatment of chronic pain in most patients.

As demonstrated in Figure 2 (statement 2d), the role of antidepressants in chronic pain management is also viewed positively, with a majority (56.3% agree) believing in their effectiveness for symptom relief and functional improvement. The concept of combining analgesics that work through different mechanisms for better pain control and fewer side effects attracts substantial support (47.9% agree) as shown in Figure 2 (statement 2e). Finally, statement 2f (in Figure 2) illustrates that there is a strong consensus (66.2% agree, 25.4% strongly agree) among respondents on the need for individualized dosing of opioid analgesics, emphasizing personalized care in response to pain in individual patients.

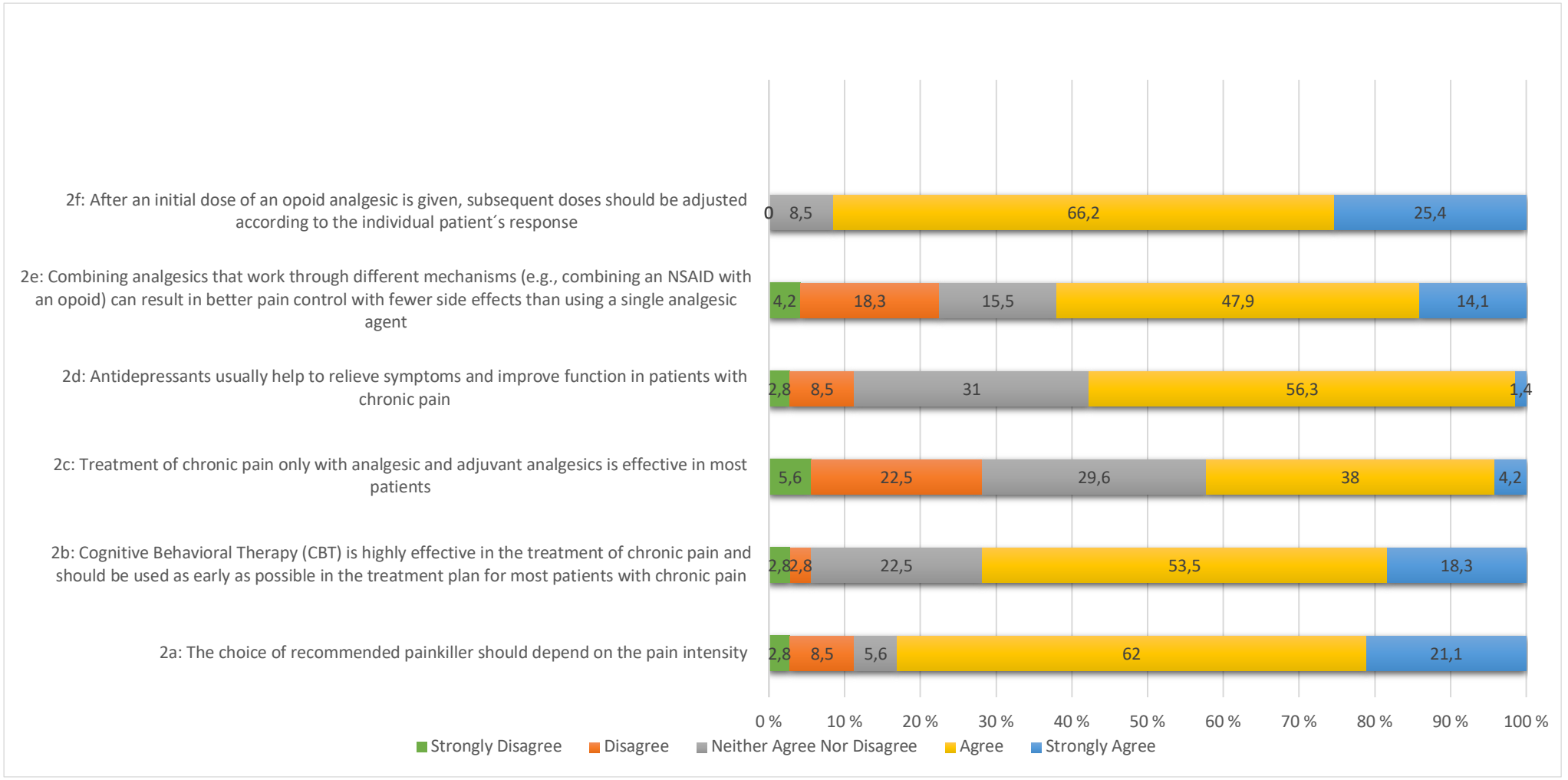

Figure 2: The Degree of Agreement And Disagreement Among the Respondents Regarding Various Aspects of Pain Management

3.4 Self-reported Competence in Pain Management:

This section provides valuable insights into the perceptions and self-assessed competencies of individuals regarding pain management. As shown in Figure 3, the knowledge of laws and regulations related to controlled substances and pain management was rated by most respondents as medium to high, while 8.5% rated their knowledge as low.

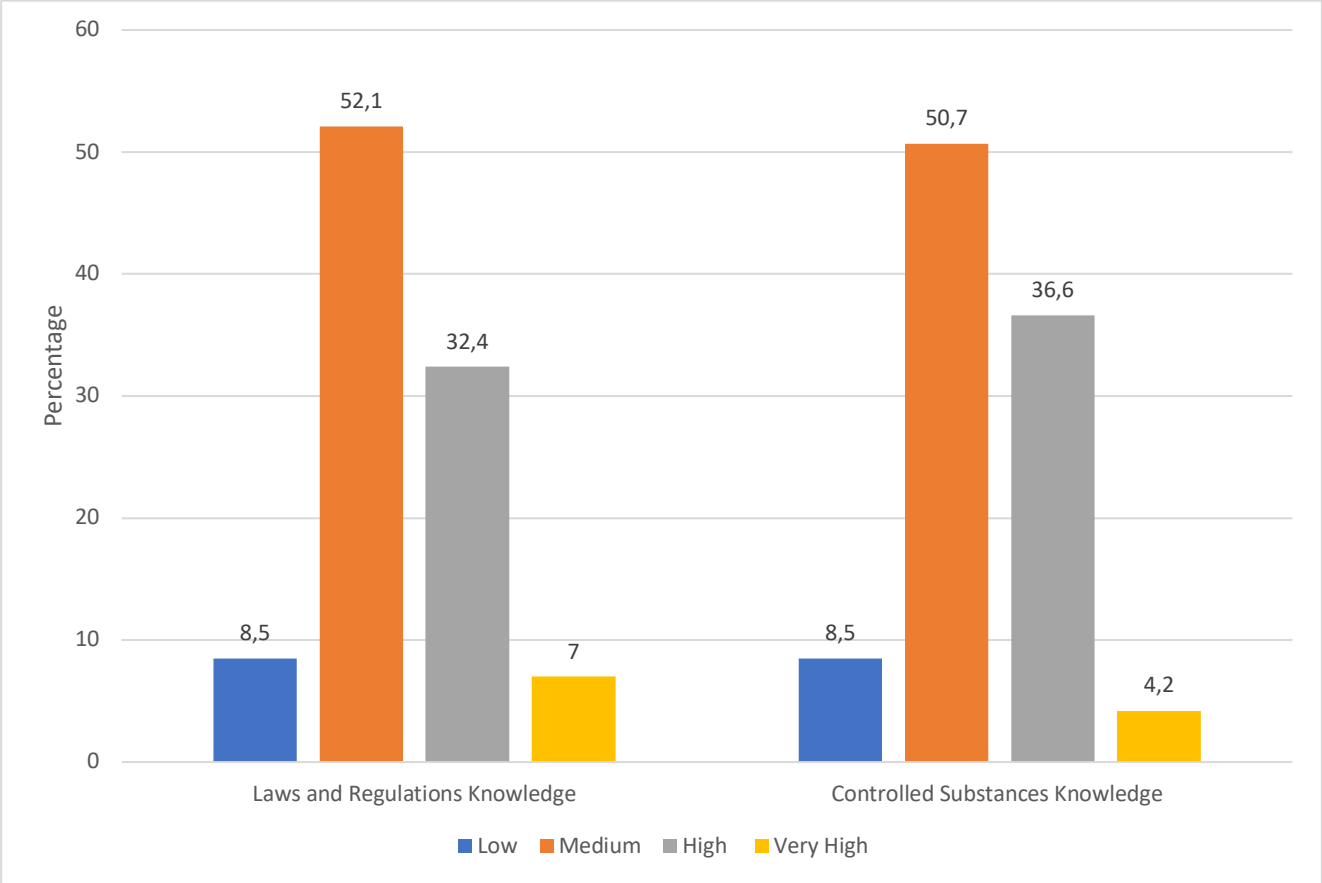

Figure 3: Self-Reported Knowledge of Laws, Regulations, and Controlled Substances

As detailed in Table 7, a majority of respondents reported a high level of comfort when advising on over-the-counter (OTC) analgesics, with 52.1% indicating they were comfortable and 29.6% asserting they were very comfortable with this aspect of patient care. In terms of non-pharmacological strategies, the confidence to counsel on these alternatives also appeared to be relatively high. Nearly half of the respondents (45.1%) felt confident, and an additional 11.3% felt very confident in guiding /recommending these strategies (for details see Table 7). Self-assessment of knowledge in pain management further supported this trend, with over half of the respondents (54.9%) rating their knowledge as high, and 5.6% considering it very high, as depicted in Table 7.

Table 7: Comfort in Advising, Confidence in Non-Pharmacological Strategies, and Self-Rated Knowledge (n=71)

Statement	**Rating Scale**	**Number**	**Percentage (%)**
Comfort in advising on OTC analgesics	1	0	0
	2	1	1.4
	3	12	16.9
	4	37	52.1
	5	21	29.6
Confidence level regarding counseling on non-pharmacological strategies	1	2	2.8
	2	8	11.3
	3	21	29.6
	4	32	45.1
	5	8	11.3
Self-rating of knowledge in pain management	1	1	1.4
	2	4	5.6
	3	23	32.4
	4	39	54.9
	5	4	5.6

Furthermore, as shown in Figure 4, a majority of respondents (88.7%) reported encountering patients seeking advice on non-pharmacological pain management strategies, such as cold and hot patches, non-medicated gels, etc. When discussing OTC analgesics, 78.9% of respondents routinely considered potential interactions with the patient's other medication or existing health conditions. 59.2% of the respondents were familiar with the guidelines for OTC analgesics for pain management in Norway (Figure 4).

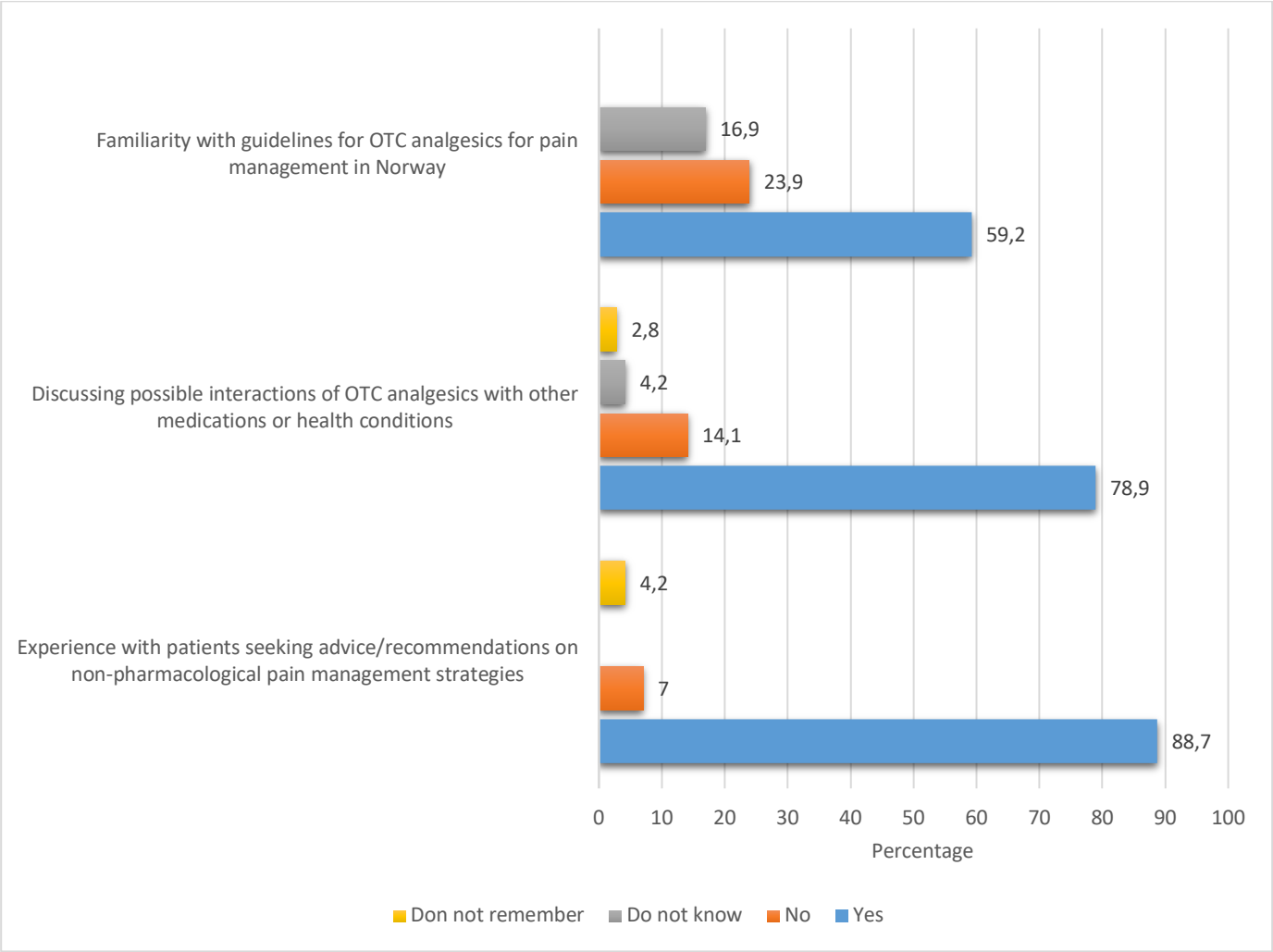

Figure 4: Patient Advice, Drug Interactions, and Guideline Awareness

50.7% of the respondents agreed and 29.6% strongly agreed, as depicted in Figure 5 (statement 5a), that they could benefit from some training in pain management. Moreover, the majority of the respondents expressed a belief in the utility and importance of clinical guidelines in pain management. As illustrated in Figure 5 (statements 5b and 5c), respectively, 59.2% agreed that clinical guidelines are useful, and a combined total of 76.1% (66.2% agree, 9.9% strongly agree) concurred that adhering to these guidelines is important in pain management.

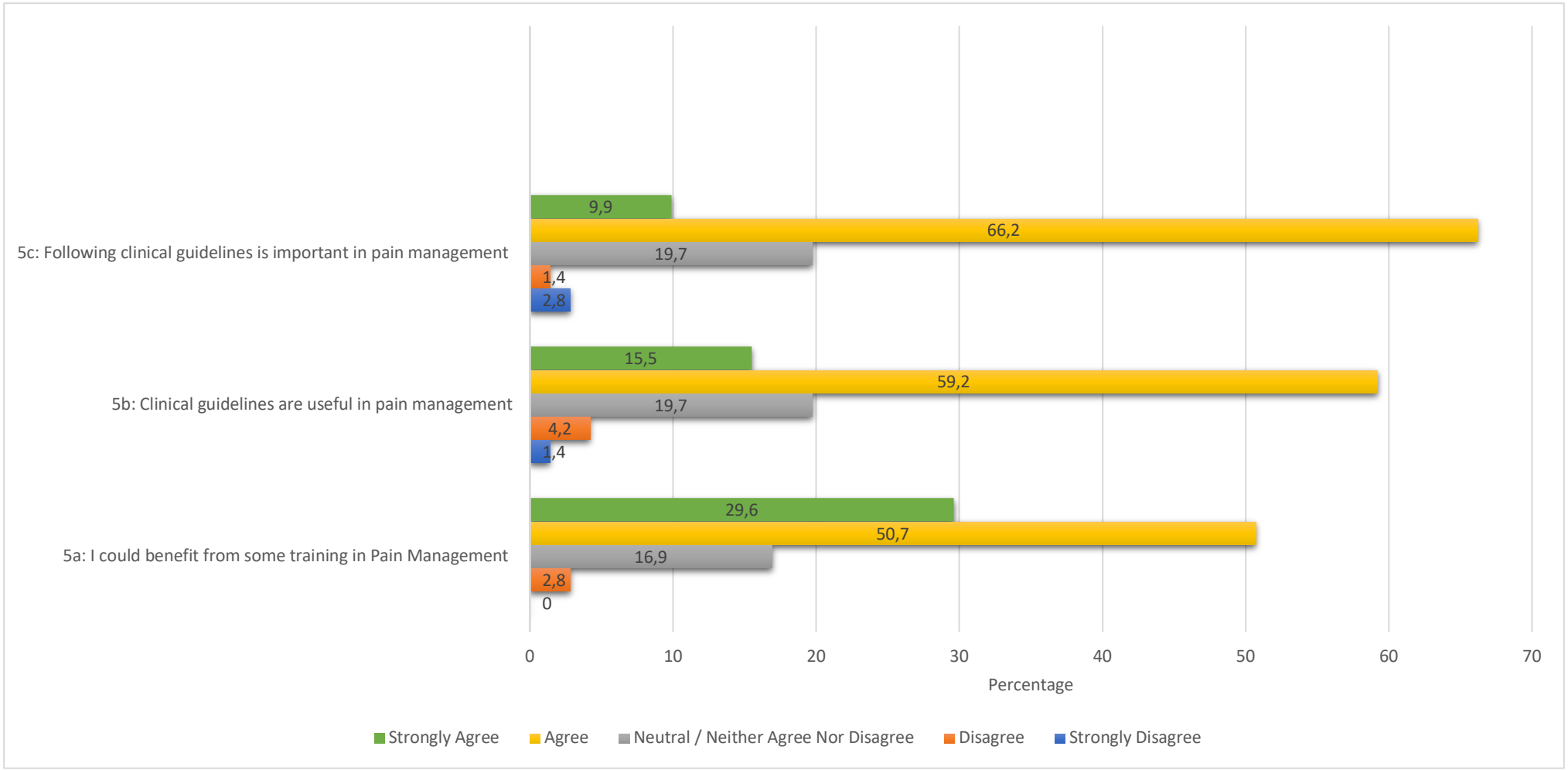

Figure 5: Community Pharmacists´ Perceptions on Pain Management Training and Clinical Guideline Utilization

Regarding the question about preferring Paracetamol over Ibuprofen, 56.3% of respondents agreed, and 28.2% strongly agreed and expressed a preference for recommending Paracetamol. The primary reasons cited for this preference included Paracetamol´s lower risk profile, particularly regarding side effects such as gastrointestinal problems and interactions with other medications. Many respondents noted Paracetamol as the safer option, especially in conditions like pregnancy or gastrointestinal problems. The preference was also based on its minimal interaction with other drugs and food, making it a safer and more reliable first choice in pain management. However, some responses indicated that the choice depended on the patient´s condition, with a few noting Ibuprofen´s effectiveness in certain scenarios. Overall, the preference for Paracetamol appeared to be driven by its perceived safety profile and lower risk of adverse effects compared to Ibuprofen.

3.5 Facilitators and Barriers of Effective Pain Management at Community Pharmacy: Insights from Pharmacists' Experiences and Perspectives:

This section provides insights into the barriers, facilitators, and perspectives on training and collaboration in pain management. The data presented in Table 8, highlights several key barriers faced by the community pharmacists. 33.8% of respondents indicated a lack of knowledge about pain management as a major barrier. Communication difficulties were also noted by 23.9% of the respondents, highlighting the complexity of engaging with choric pain patients. Concerns about the dispensing of opioids and safety issues were identified by 19.7% and 21.1% of the respondents, respectively. Additionally, 29.6% felt uncomfortable advising specific groups such as pregnant women, children, or the elderly with chronic pain. A notable 22.5% reported no specific challenges, while 9.9% mentioned other challenges. These additional challenges include high costs associated with obtaining pain medication, especially narcotics, for patients. Some pharmacists also noted difficulties in advising patients who feel they are experts in managing their own pain or who are mainly focused on ensuring a sufficient supply of tablets. Concerns about false prescriptions, the restrictive prescribing practices of some doctors, and the technical difficulties related to prescriptions and approvals of the prescriptions were also mentioned. Lastly, the challenge of assisting patients who have

already tried many different medications and the issue of drug misuse were highlighted, indicating the complicated nature of pain management in a community pharmacy.

66.2% of respondents identified limited time for counseling, high workload (57.7%), and lack of staffing (62%) as major challenges (Table 8). The respondents elaborated on other challenges, including a lack of updated training and information, difficulties in gaining trust from patients for counseling at pharmacies, and challenges in communicating about long-term pain conditions. Some pharmacists pointed out the complexities of dealing with patients who use multiple pharmacies, leading to gaps in knowledge about the patient´s medication history. Operational hours of pharmacies compared to doctors' offices were also noted as a constraint. Furthermore, respondents expressed concerns about relying heavily on less experienced staff, such as students and part-time workers, which affects the quality of guidance provided to patients. The reluctance of patients to discuss their pain, and the lack of specialized services such as medicine start program for analgesics were also mentioned.

Concerns related to the pharmacy workflow and time availability affect their ability to provide comprehensive pain management advice. The findings detailed in Table 8, show that 25.4% of respondents reported that their ability to offer comprehensive advice on pain management was significantly affected by concerns related to pharmacy workflow and time availability. While, 54.9%, reported that their ability to provide comprehensive pain management advice was somewhat affected. Notably, respondents had the option to select multiple barriers.

Table 8: Assessment of Barriers to Effective Pain Management in Community Pharmacies (n=71)

Barriers	**Number**	**Percentage (%)**
Lack of knowledge about pain management	24	33.8
Communication difficulties	17	23.9
Fear of opioid dispensing	14	19.7
Safety concerns	15	21.1
Uncomfortable during advising to pregnant women, children, or the elderly with chronic pain	21	29.6
Workflow and time availability concerns SIGNIFICANTLY affect the ability to provide comprehensive advice	18	25.4
Workflow and time availability concerns SOMEWHAT affect the ability to provide comprehensive advice	39	54.9
Limited time for counseling	47	66.2
High workload	41	57.7
Lack of staffing	44	62

As shown in Figure 6, the issue of staffing was further elaborated, with 53.5% indicating that current staffing levels at their pharmacy impact their ability to advise on pain management.

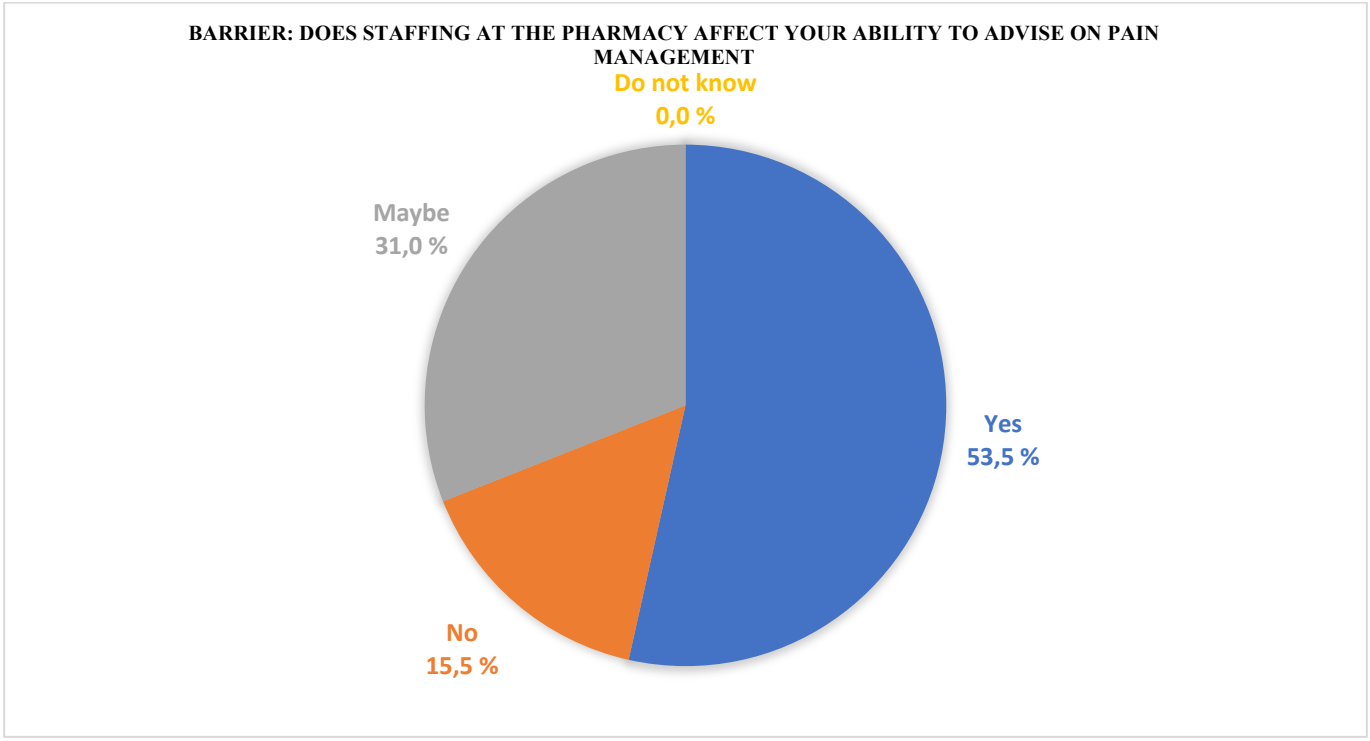

Figure 6: Impact of Staffing Levels on Community Pharmacists´Capacity to Provide Pain Management Advice

While 38% of the respondents (as shown in Figure 7) reported that their pharmacy´s staffing levels are barely sufficient to handle patients' pain management needs. However, 18.3% reported that the staffing level was not at all sufficient, suggesting a considerable gap in some pharmacies that could affect the quality of pain management advice and service.

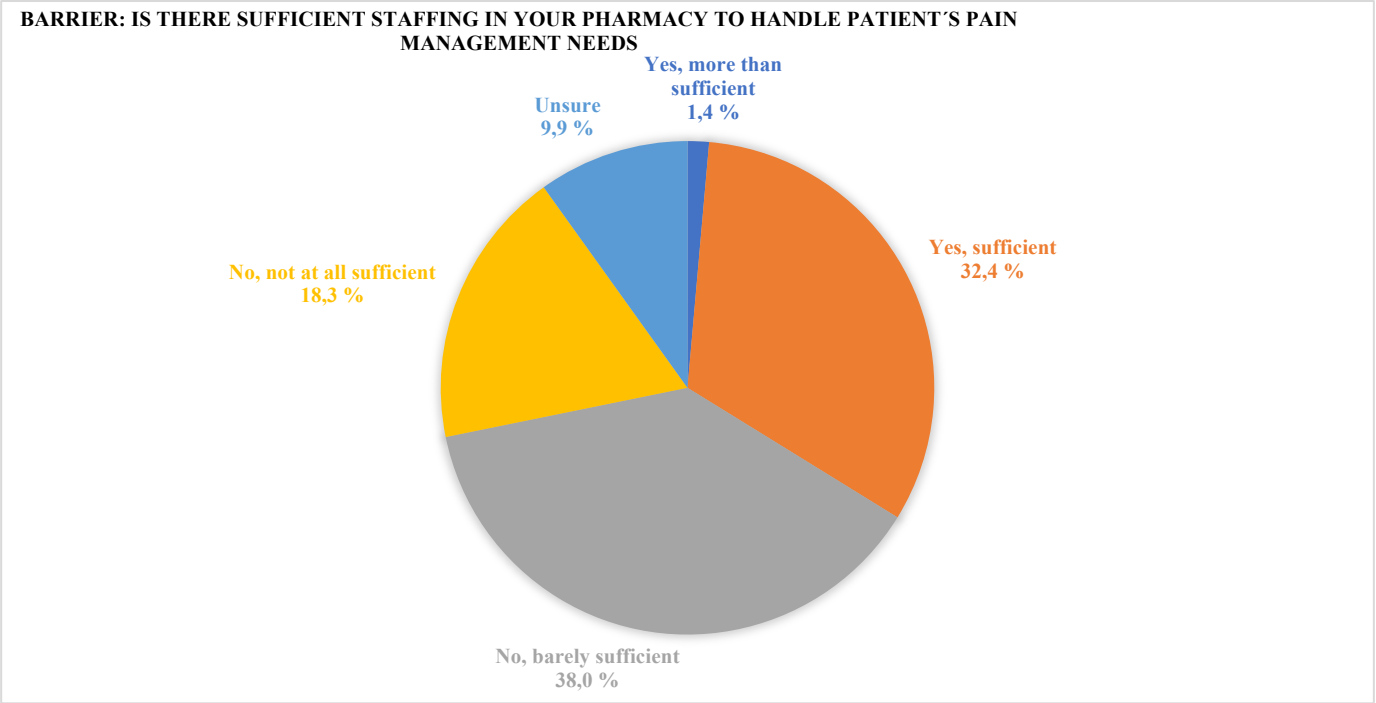

Figure 7: Community Pharmacists´Assessment of Staffing Adequacy for Pain Management Services

In contrast, facilitators for effective pain management are detailed in Figures 8, 9, 10, and Figure 11. As illustrated in Figure 8, clear guidelines and protocols revealed a predominantly positive view among respondents. Nearly half 47.9% of the respondents, were seen these guidelines as helpful. Furthermore, 22.5% of the respondents rated the guidelines as very helpful, while 22.5% remained neutral.

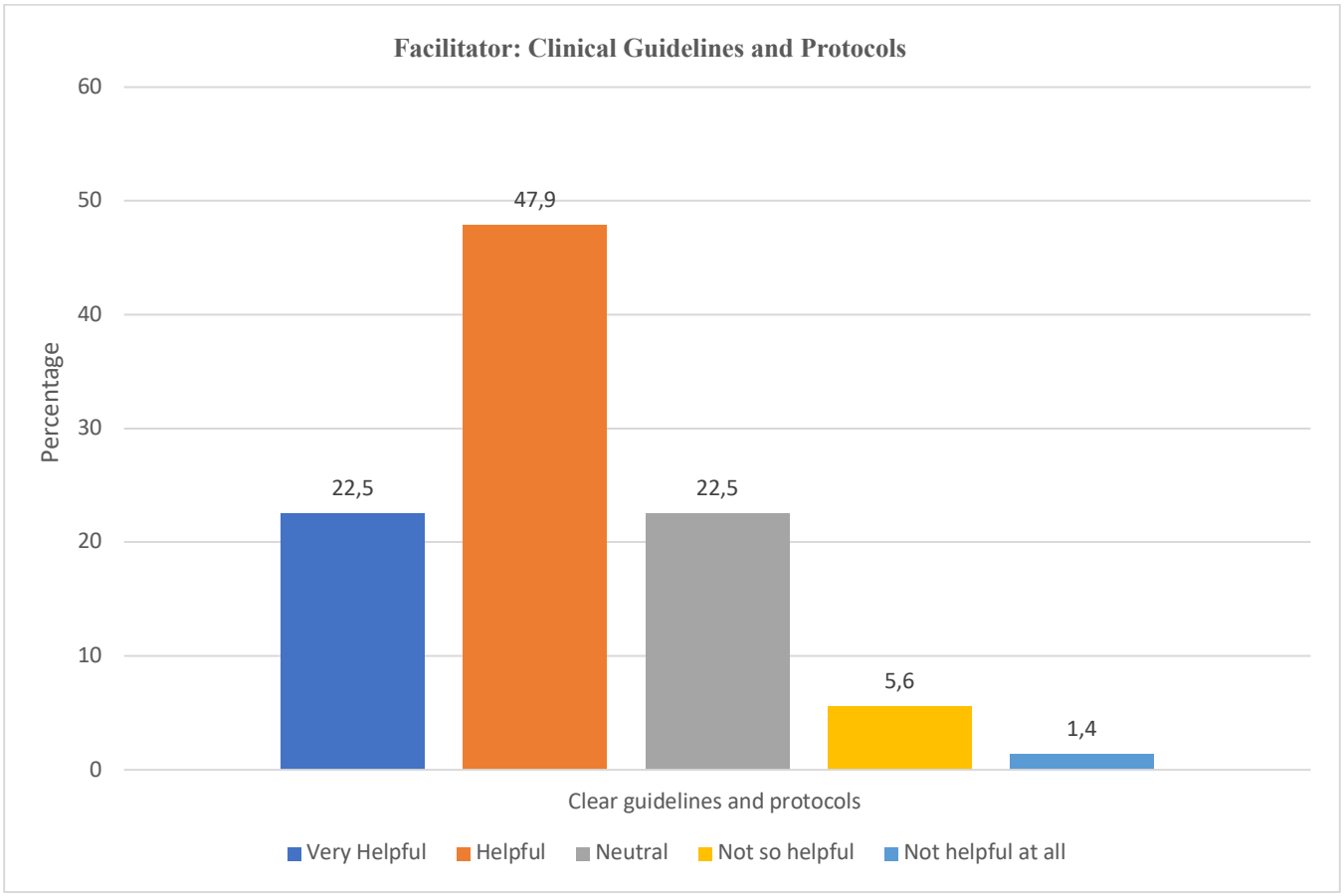

Figure 8: Perceived Helpfulness of Clinical Guidelines and Protocols Among Community Pharmacists in Norway

Figure 9 highlights the frequency at which community pharmacists engage in patients' education and advice regarding pain medications. 42.3% of respondents reported that they often provide patient education, and another 42.3% indicated that they sometimes engage in such educational activities to alleviate concerns and misunderstandings about pain medications. This indicates that the majority of community pharmacists acknowledge the importance of patient education in pain management and actively participate in this aspect of patient care.

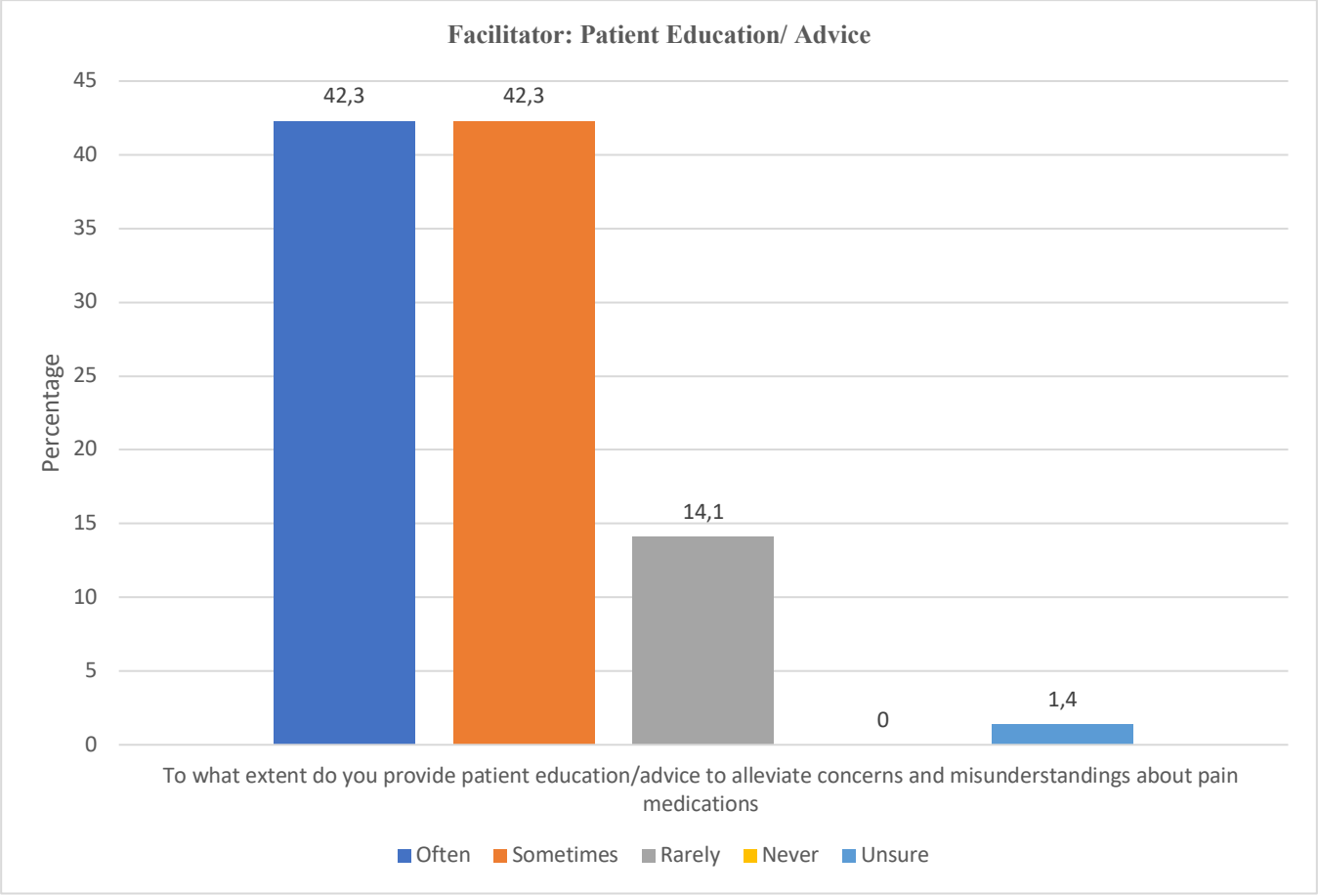

Figure 9: Frequency of Providing Patient Education and Advice on Pain Medications

Figure 10 provides insights into the self-perceived efficacy of community pharmacists in providing help to patients in pain management. 52.1 % of respondents believed that they could help patients with pain to a large extent, while 2.8% believed that they could help to a very large extent. Additionally, 35.2% of respondents believed that they could provide such assistance to neither a small nor a large extent, suggesting a moderate level of belief and confidence in providing help to patients in pain management.

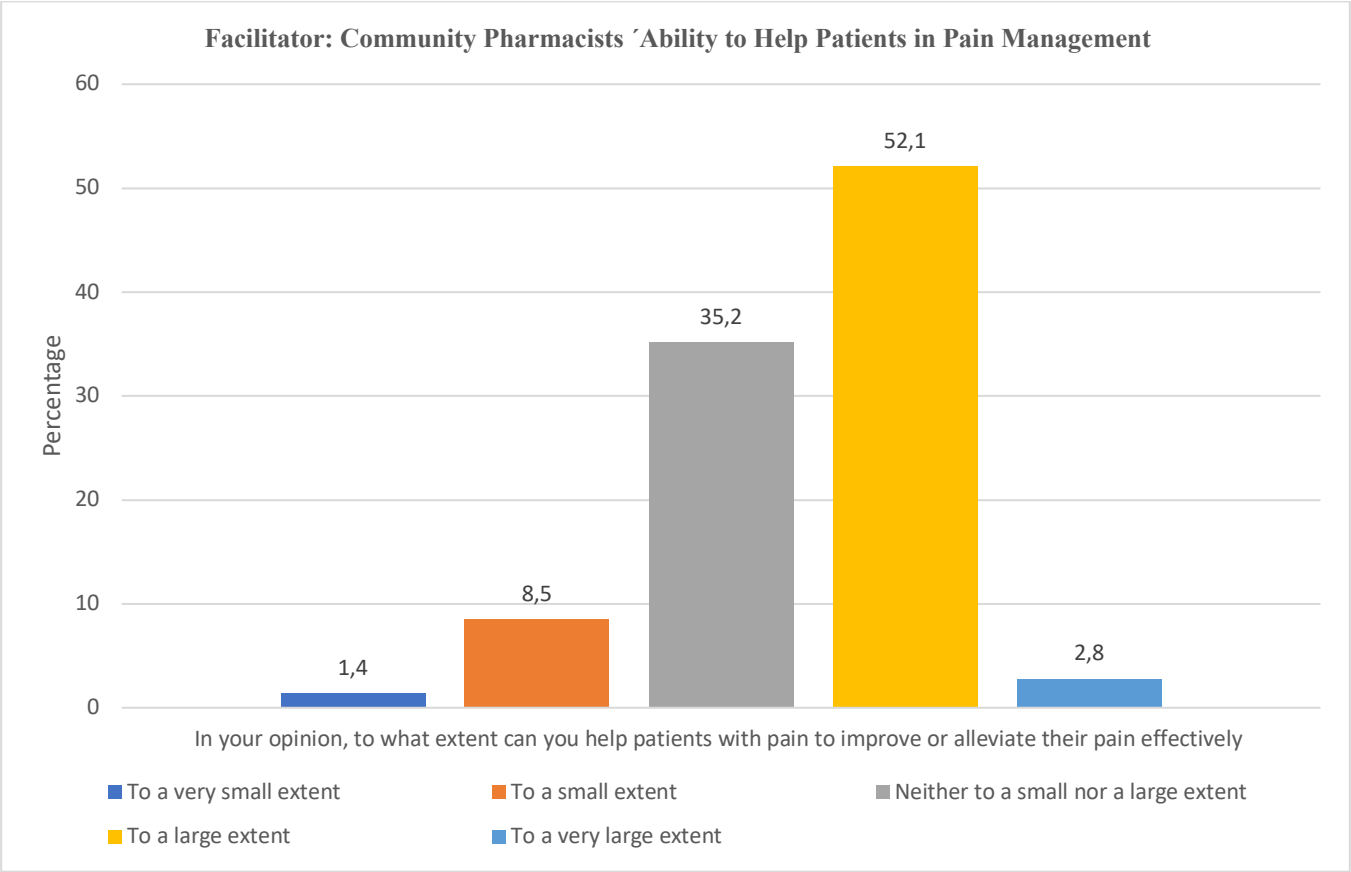

Figure 10: Community Pharmacists´ Self-Assessment of Their Ability to Help Patients in Pain Management.

Figure 11 presents community pharmacists´ opinions on the impact of limited analgesic sales on their role in pain management. 40.8% of respondents were neutral, neither agreeing nor disagreeing that limited sales of analgesics facilitate the role of pharmacists in pain management. Meanwhile, 22.5% of the respondents agreed that limiting the sale of analgesics positively influences the pharmacist´s role in managing pain.

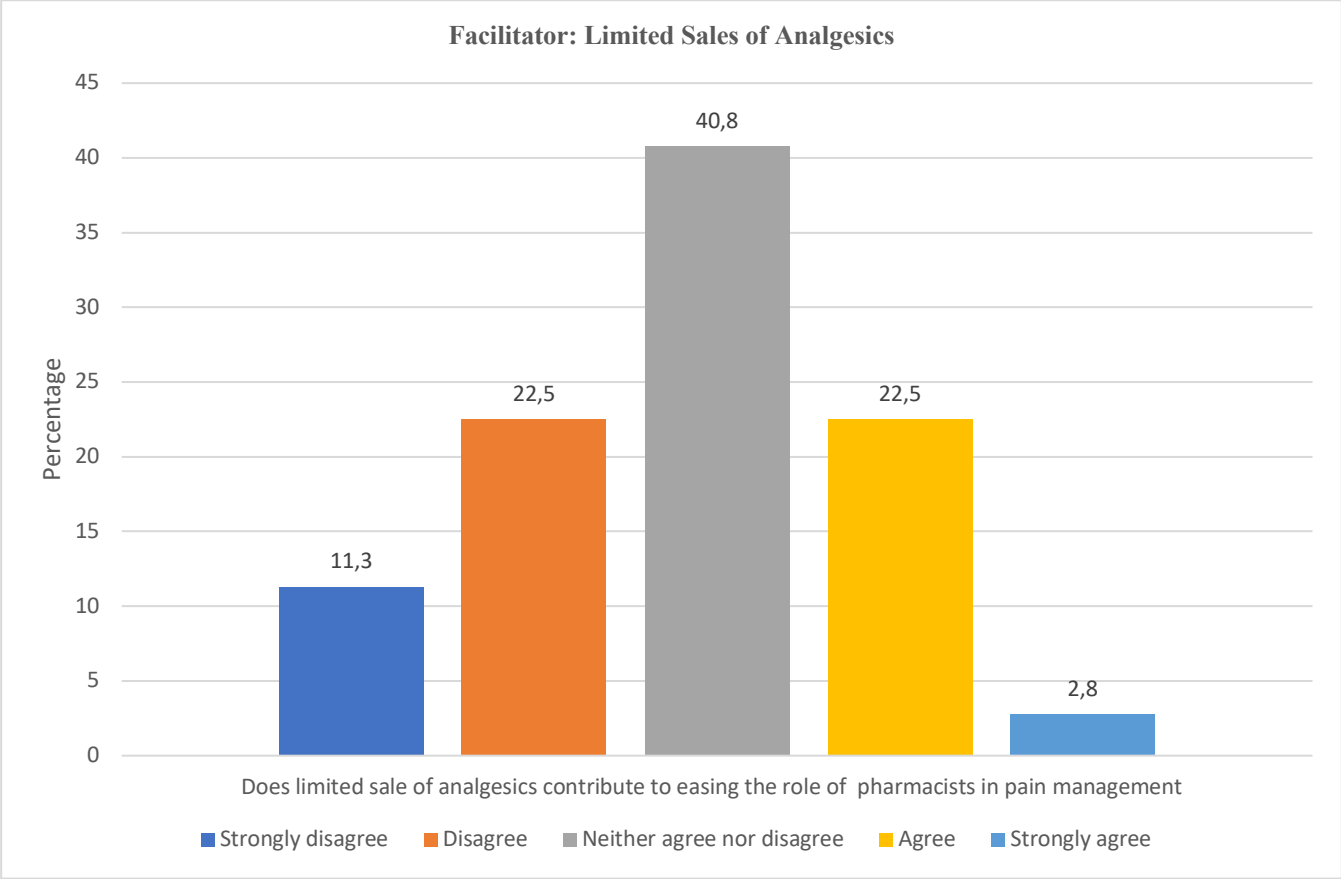

Figure 11: Impact of Limited Analgesic Sales on Pharmacists´ Pain Management Role

Furthermore, when the respondents were asked to briefly describe the factors that facilitate effective pain management in pharmacies, a wide range of factors were described. Key elements identified include the need for qualified staff with knowledge of pain management and various medications, emphasizing the importance of a skilled workforce in providing quality guidance to patients/customers. A personalized approach tailored to each patient´s specific pain issues and overall health status was also seen as crucial for effective counseling and recommendations. Respondents highlighted the importance and access to information and training, and the provision of follow-up services to monitor treatment responses and address any concerns. Collaboration with healthcare professionals to ensure consistency with the patient´s overall treatment plan was also mentioned as a significant factor. Other notable facilitators included patient compliance, sufficient staffing levels, encouraging the use of topical analgesics, and effective patient counseling. Communication skills, both with customers and within the pharmacy team, were frequently mentioned, along with the need for continued professional development through training and experience. Some responses also suggested the need for better resourcing, such as more time for patient/customer interactions, better staffing, and clearer guidelines, all aimed at enhancing the role of pharmacists in pain management.

Figure 12 depicts the pharmacists´ perceptions regarding the necessity of additional training in pain management. 59.2% of the respondents believed that more training was needed to meet patients´ needs. An even larger percentage, 80.3%, expressed a desire to participate in training or courses to enhance their knowledge, skills, and competence in pain management at a pharmacy, suggesting a strong willingness to improve their professional capabilities. Notably, no respondents had been completely unsure, with no percentages reflecting a "Do not know" response, implying that pharmacists had a clear stance on their educational needs concerning pain management.

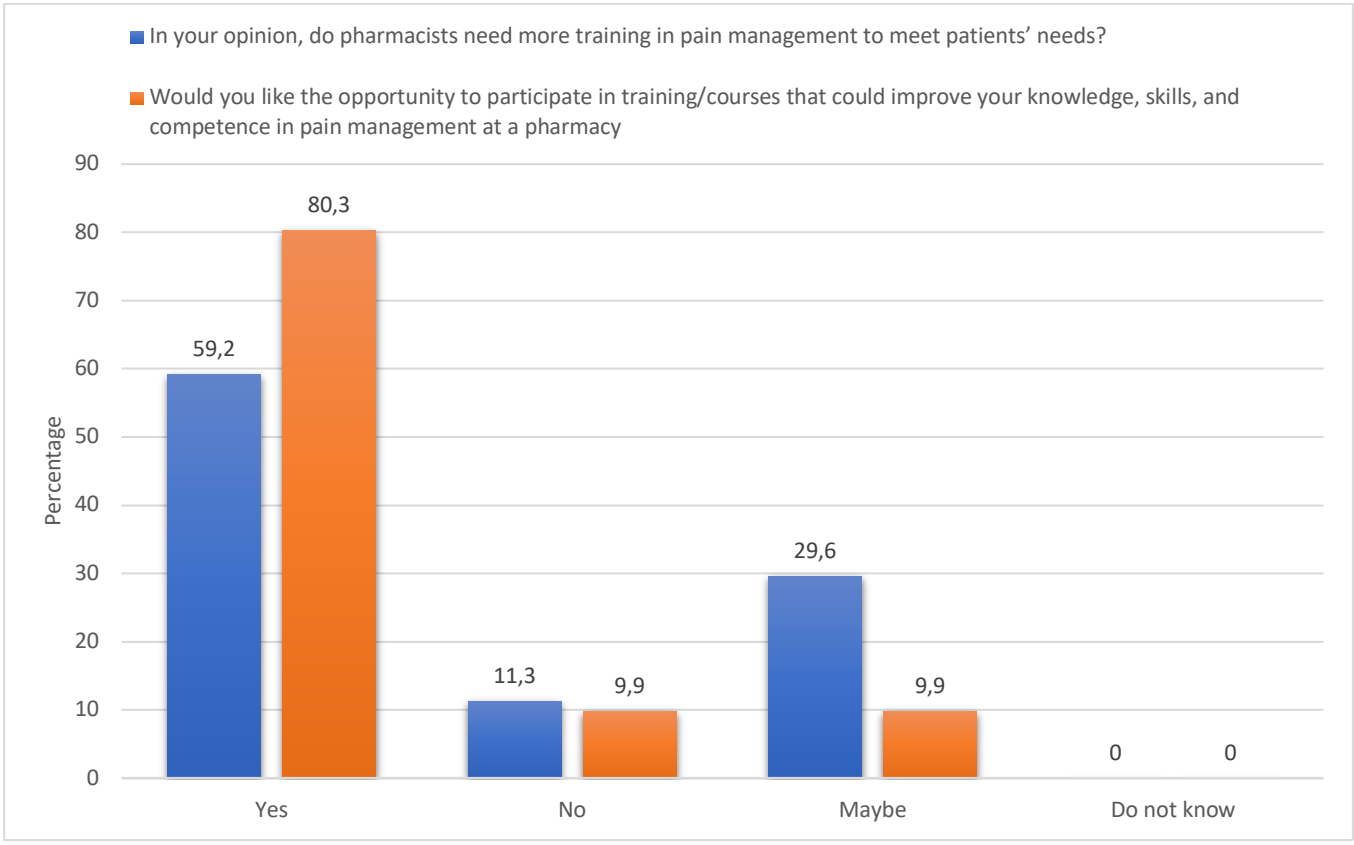

Figure 12: Community Pharmacists´ Perceptions of the Need for Additional Training in Pain Management

Figure 13 provides a clear breakdown of the preferred types of training among 64 respondents. Half of the respondents, 50% preferred online training, while seminars were the next most popular option, with 32.8% of community pharmacists favoring this form of learning. However, 15.6% of the respondents preferred theme evenings as a form of training.

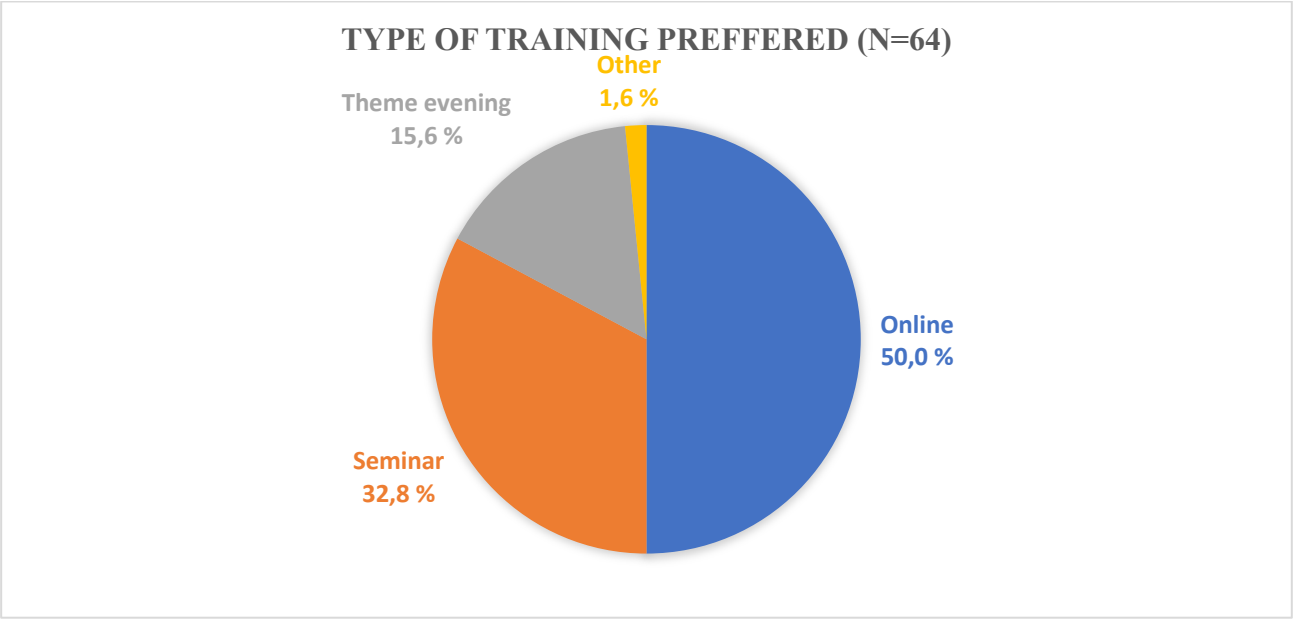

Figure 13: Preferred Training Formats Among Community Pharmacists for Pain Management Education

Figure 14 illustrates that 39.4% of the respondents believed that collaboration between community pharmacists and other healthcare professionals in managing chronic pain is effective, while a slightly lower percentage, 33.8% consider it to be very effective. This indicates a strong consensus on the positive impact of multidisciplinary collaboration on the care of patients with chronic pain.

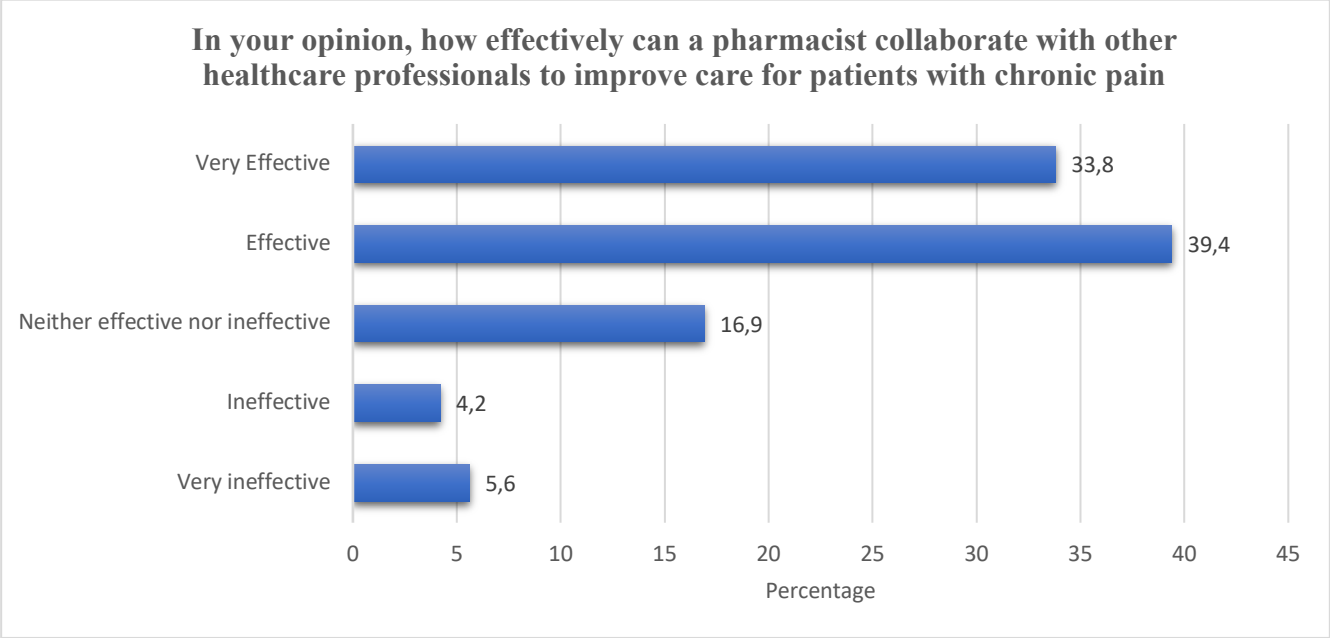

Figure 14: Community Pharmacists´ Views on the Effectiveness of Multidisciplinary Collaboration in Chronic Pain Management

Figure 15 indicates the varying frequency of community pharmacists´ participation in collaborative discussions on pain management with other healthcare professionals. 53.5% reported that they participate less frequently in these discussions. Additionally, 22.5% of the community pharmacists had never taken part in such discussions. However, 15.5% of the respondents engaged in these collaborative discussions on a monthly basis.

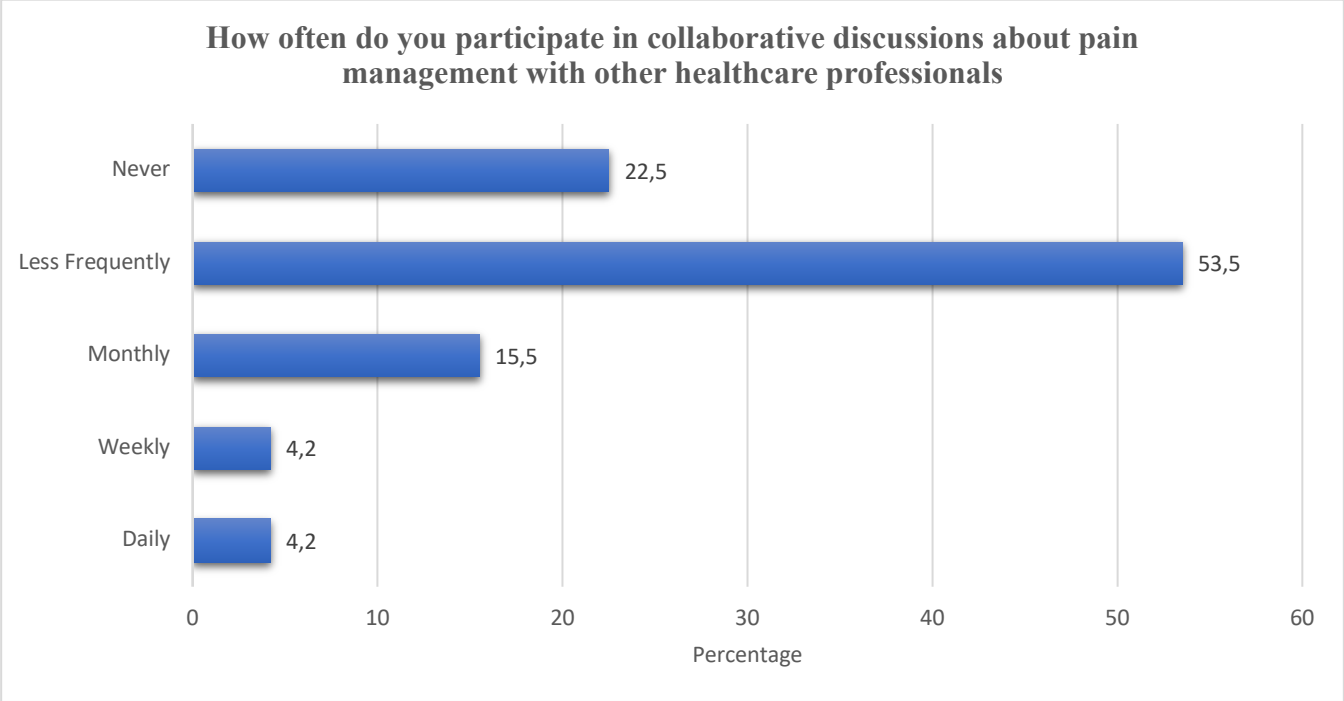

Figure 15: Frequency of Community Pharmacists´ Participation in Multidisciplinary Pain Management Discussions

Table 9 provides a summary of the facilitators, barriers, and respective strategies for improvement, aiming to enhance pain management practices within community pharmacies.

Table 9: Strategies for Enhancing Pain Management in Community Pharmacies: Addressing Facilitators and Barriers

Facilitators	**Barriers**	**Strategies for Improvement**
Regular training sessions and workshops on pain management guidelines	Knowledge gaps in pain management	Continuing education and specialized training programs
Structured patient education programs and training in counseling techniques	Communication difficulties with patients suffering from chronic pain	Organizing workshops focusing on empathy, active listening, and patient-centered care
Utilizing digital tools and resources for patient education	Concerns about opioid dispensing and safety issues	Implementing guidelines and employing decision-support tools
Mentorship programs and continuing education opportunities	Limited time, high workload, and inadequate staffing	Workforce planning and pharmacy workflow optimization
Engagement in policy discussions and decision-making	Discomfort advising vulnerable groups on pain management	Targeted training and resources for advising vulnerable groups
Formal channels and protocols for multidisciplinary collaboration	Variance in the perceived helpfulness of guidelines	Ensuring guidelines are accessible, relevant, and tailored

3.6 Association and Impact of Gender, Work Experience, and Education Level on Pharmacists' Knowledge and Practices in Pain Management:

The analysis of various ordinal regression and Chi-Square tests concerning pharmacists' knowledge and practices revealed some notable trends and associations. As shown in Table 10, gender, as an independent variable, showed no significant impact on pharmacists´ self-reported knowledge of pain management or their participation in multidisciplinary collaboration, indicating that gender did not differentiate these aspects within the profession.

When considering work experience, interestingly, the results pointed towards a significant negative association with confidence in advising on non-pharmacological pain management strategies. This association indicated that pharmacists with more experience may have reported lower confidence in this area, leading to the rejection of the null hypothesis and underscoring a significant association between work experience and confidence in providing non-pharmacological pain management advice. Furthermore, work experience is significantly and negatively associated with the frequency of counseling/ advising about the use of analgesics without a prescription. Consequently, the null hypothesis is rejected, showing a significant association between work experience and counseling about the appropriate use of analgesics without prescription.

Education level, on the other hand, did not show a significant association with pharmacists´self-rated knowledge of pain management or their understanding of laws and regulations related to controlled substances/narcotics. Hence, the null hypothesis is accepted, indicating no significant association between the pharmacist's education level and these specific areas of expertise.

Likewise, no significant associations were observed between work experience and various other factors, such as multidisciplinary collaboration, self-rated knowledge of pain management, and perceptions regarding the impact of restricted sales of pain medications. These findings resulted in the acceptance of the null hypothesis, underscoring no significant associations.

It is important to highlight that the Bonferroni correction was employed to adjust the p-values $p < 0.0055$ for a result to be considered statistically significant, leading to the rejection of some null hypotheses, and highlighting a significant association (for details see Table 10).

Overall, while certain null hypotheses were rejected, indicating significant associations, many were accepted, suggesting that factors like gender and education level do not have the expected associations with the dependent variables studied.

Table 10: Results of Association Analysis of Factors Influencing Community Pharmacists' Pain Management Practices

Null Hypothesis	Independent Variable	Type of Independent Variable	Dependent Variable	Type of Dependent Variable	Statistical Test	Adjusted P-value (after Bonferroni correction)	H0 Rejected/Accepted (With Bonferroni Correction)
There is no significant association between gender and self-reported knowledge of pain management	Gender	Categorical Nominal	Self-reported Knowledge of Pain Management	Categorical Ordinal	Chi-Square Test	0.735	Accepted
There is no significant association between gender/work experience and how often they coordinate with other health care professionals (Multidisciplinary collaboration)	Gender / Work Experience	Categorical Nominal / Continuous	Multidisciplinary Collaboration	Categorical Ordinal	Chi-Square Test/ Ordinal Regression	0.171/ 0.771	Accepted / Accepted
There is no significant association between the work experience of the respondents and their confidence in advising on non-pharmacological pain management strategies	Work Experience	Continuous	Advising on Non-Pharmacological Pain Management Strategies	Categorical Ordinal	Ordinal Regression	<.001	Rejected
There is no significant association between work experience and counseling about the appropriate use of painkillers without prescription.	Work Experience	Continuous	Counseling about the appropriate use of painkillers without prescription.	Categorical Ordinal	Ordinal Regression	.003	Rejected

There is no significant association between a pharmacist's work experience and their self-rated knowledge of pain management.	Work Experience	Continuous	Self-rated Knowledge of Pain Management	Categorical Ordinal	Ordinal Regression	.021	Accepted
There is no significant association between a pharmacist's education level and their self-rated knowledge of pain management.	Education Level	Continuous	Self-rated Knowledge of Pain Management.	Categorical Ordinal	Ordinal Regression	.550	Accepted
There is no significant association between pharmacists' work experience and their views on the impact of restricted sales of pain medication.	Work Experience	Continuous	Views on the impact of restricted sales of pain medication	Categorical Ordinal	Ordinal Regression	.422	Accepted
The is no significant association between the level of education of pharmacists and their self-rated knowledge of laws and regulations related to controlled substances/narcotics	Education Level	Continuous	Self-rated knowledge of Laws and Regulations related to Controlled Substances/ Narcotics	Categorical Nominal	Ordinal Regression	.447	Accepted

Note: Rejected means p-value < Bonferroni correction (Adjusted P value of 0.0055)

Table 11 summarizes the data which represents respondents' knowledge in various areas related to pain management and controlled substances, with a scoring based on the answers given. Based on the data and the scoring applied, 59.2% of the respondents were familiar with guidelines or recommendations (for example Guidelines for Pain Relief/Treatment 2009 (Den Norske Legeforening, 2009), Norwegian Drug Handbook (Smerter, 2023) for the use of OTC analgesics for pain management in Norway, indicating a relatively high level of knowledge in this area. Knowledge of laws and regulations related to controlled substances/narcotics and pain management was mostly rated as medium to high, suggesting a moderate to high level of knowledge overall. Knowledge about controlled substances was predominantly rated as medium to high among respondents. For the self-assessment of pain management knowledge, the average score was 3.58 with a median of 4, which favored a higher level of self-rated knowledge.

Overall, considering the percentages and the scores, the respondents appeared to have a moderately high level of knowledge regarding OTC analgesics, laws and regulations on controlled substances, and pain management. The data suggested that the level of knowledge was moderate to high among the respondents.

Table 11: Community Pharmacist's Self-assessment of Knowledge in Pain Management and Controlled Substances Regulations in Norway

Statement	**Response**	**Number**	**Percentage (%)**	**Knowledge Score (Lowest 1, Highest 5)**
Are you familiar with specific guidelines or recommendations related to the use of OTC analgesics for pain management in Norway?	Yes	42	59.2	5
	No	17	23.9	1
	Do not know	12	16.9	3
Your knowledge of laws and regulations related to controlled	Low	6	8.5	1
	Medium	37	52.1	3
	High	23	32.4	4

substances/narcotics and pain management	Very High	5	7	5
Your knowledge of controlled substances/ Narcotics	Low	6	8.5	1
	Medium	36	50.7	3
	High	26	36.6	4
	Very High	3	4.2	5
How would you rate your knowledge of pain management on a scale from 1 to 5?	1	1	1.4	1
	2	4	5.6	2
	3	23	32.4	3
	4	39	54.9	4
	5	4	5.6	5

4 Discussion

To the best of our knowledge, this was the first study that evaluated the knowledge, skills, and competence of community pharmacists in Norway in the field of pain management. This study also determined the potential facilitators and barriers that could eventually influence their roles in this regard. By examining these elements, the study intended to shed light on the factors influencing pharmacists´ practices and the potential improvements that could be made in pain management strategies in a community pharmacy setting. By exploring these aspects, the study also sought to provide insights that could enhance the role of community pharmacists in pain management. The significance of this study was rooted in the pivotal role community pharmacists play within the primary healthcare system. Often being one of the first points of contact for patients and clients, pharmacists in community pharmacy settings are uniquely positioned and accessible, highlighting their critical role in healthcare delivery (85, 100). This accessibility to pharmacists underscores the need for their recognition and readiness to fulfill their responsibilities effectively. With a wide range of analgesic preparations available over the counter at community pharmacies, patients and clients frequently seek pharmacists´ advice on selecting appropriate medications. Community pharmacists are ideally positioned to provide guidance on the proper and rational use of these medications or to suggest alternative strategies. To perform this role effectively, pharmacists must possess knowledge, competence, and confidence, to ensure positive outcomes (88, 101, 102).

The following sections discuss the methods applied in conducting this study, explaining and reflecting on their strengths and limitations to enhance the understanding of the study´s findings. This approach will facilitate a better understanding of the interpretation of the results, which will be presented next, in light of these methodological considerations.

4.1 Methodological Considerations:

The research employed a quantitative methodology with a cross-sectional design, utilizing a questionnaire to gather data from the target population. The target group for this study comprised Norwegian community pharmacists, due to their vital role in the healthcare system, particularly in pain management. To ensure the collected data was both relevant and applicable to the field, inclusion criteria were established. These criteria were designed to

include only those community pharmacists who had authorization from the Norwegian Directorate of Health and were registered community pharmacists working either in a chain or private pharmacy in Norway. This approach not only aimed to gather meaningful and specialized knowledge from the community pharmacists directly involved in patient care but also to ensure that the study´s outcomes would be directly relevant to the development and improvement of pain management strategies in community pharmacies.

4.1.1 Strategic Rational for Selecting a Cross-Sectional Study Design:

The decision to adopt a cross-sectional study design was informed by several strategic considerations:

a) The cross-sectional study design was selected to explore the current knowledge, perspectives, and self-reported competencies of Norwegian community pharmacists in pain management. This design provided an overview of pharmacists´ roles and experiences at a specific point in time (90), offering valuable insights into their practices, challenges, and training needs.

Strengths and Limitations of Cross-sectional Study Design:

Cross-sectional studies are advantageous due to their time efficiency and cost-effectiveness compared to longitudinal studies, making them highly suitable for evaluating the current state of knowledge and practices. This study design provides valuable views at specific points in time and allows for the exploration of various variables and their associations. The use of questionnaires enhances participation and the representativeness of data, improving the study´s validity (90).

Specifically, in our research, these advantages facilitated a comprehensive assessment of Norwegian community pharmacists´ roles, experiences, and training needs in pain management, enabling the identification of critical trends and associations within the collected data. The efficient data collection through questionnaires likely ensured broad pharmacist engagement, enhancing the study´s overall insights into current practices and educational gaps at present.

One of the major limitations of cross-sectional studies is their inability to establish causality or longitudinal (over time) effects. While they can identify associations between variables at a time window, they cannot determine which variable precedes or causes the others. The reliance on self-reported data through questionnaires can introduce selection bias, where individuals who choose to respond may differ significantly from those who do not, for example, based on inner desire, altruistic personality, etc, potentially skewing the results. Respondents may also not accurately remember or may misinterpret their experiences or competencies, leading to inaccuracies in the data collected, thus increasing the potential for recall bias (90).

Additionally, respondents who were particularly interested or disinterested in pain management might be more likely to participate, and their responses might not accurately reflect their true competencies or experiences. There was also a risk of interpretive bias/ information bias (90), where the cross-sectional data might be over-interpreted to suggest trends or effectiveness of interventions without sufficient evidence. The inability to ascertain changes over time or the effectiveness of any interventions implemented based on the study´s findings is a significant limitation. This restricts the study´s utility in informing long-term policy or educational changes.

Future research might benefit from either longitudinal or qualitative study designs to gain a better understanding, determine the causality, and understand changes over time (103). A longitudinal approach would enable the examination of changes in pharmacists' knowledge, attitudes, and practices over time, especially in response to interventions or changes in healthcare policy. On the other hand, qualitative designs, such as target group interviews, could provide deeper insights into the complexities of pharmacists' role in pain management, exploring their experiences, motivations, and barriers in more detail. These approaches could complement the findings of the current study by adding depth and dynamic perspectives to our understanding of community pharmacists in pain management. However, these designs require significant time and resources, including full approvals from The Regional Committees for Medical and Health Research Ethics (REC) and The Norwegian Agency for Shared Services in Education and Research (SIKT), compensation for time used for interviews for

participants, and in some cases compensation for their travel, which can be a constraint for many research projects (104).

b) The cross-sectional study was also chosen due to the constrained timeline and the limited duration available for the master's project since this research was conducted as part of the master's thesis. Longitudinal studies or qualitative study designs such as focused group interviews often require a longer duration than cross-sectional questionnaire-based studies (105).

4.1.2 Systematic Literature Search Methodology and Opportunities for Enhancement of the Methodology:

The systematic literature search methodology used in our study demonstrates a structured and systematic approach to identifying the relevant literature and reporting in a structured, qualified, and transparent manner. While the strategy likely provided a solid foundation for the research, there are opportunities for enhancement, as highlighted in the following sections.

Strengths of the Systematic Literature Search:

The systematic literature search methodology utilized in our study employed a structured and comprehensive approach, utilizing the PICO framework (106) to ensure the literature search was focused and aligned with the research question. This approach likely contributed to a comprehensive retrieval of relevant literature, supported by well-defined inclusion and exclusion criteria that enhanced the overall quality and relevance of the search results. This approach minimizes the inclusion of irrelevant studies, thereby enhancing the overall quality. The decision to search across major databases such as PubMed and Embase expanded the reach of our search, thereby increasing the likelihood of identifying all relevant literature. Focusing on articles published within the last ten years allowed our study to focus on the most current evidence, a critical aspect for fields that experience rapid evolution in knowledge and practices. Additionally, the employment of Rayyan for managing search results likely improved the efficiency and effectiveness of the screening process (107).

Areas for Improvement:

There are aspects where our literature search methodology could be improved. The limitation of the search to the English language articles may have introduced language bias, excluding relevant studies published in other languages, notably Norwegian. Expanding the search to include the Norwegian language could enhance the evidence base. Including additional databases such as Google Scholar, the Cochrane Library or Web of Science might also capture a more extensive range of literature, potentially uncovering significant studies that were missed. Expanding the search terms to include a broader range of synonyms and related concepts could further enhance the comprehensiveness of our search, ensuring that we collect a more extensive collection of relevant literature. Additionally, incorporating manual searches of reference lists from included studies or relevant reviews could identify additional valuable studies that were not captured through database searches. The structured and focused literature search methodology employed, facilitated by the PICO framework (106), ensured the retrieval of a relevant and comprehensive set of articles for our study. However, the potential for language bias and the limited database range could have restricted the scope of literature retrieved. Addressing these areas for improvement could uncover additional relevant studies, potentially enriching the analysis and research outcomes. Future studies could benefit from addressing the identified gaps and employing a broader database and language scope to further strengthen the research outcomes.

4.1.3 Rationale and Development of the Questionnaire:

The decision to utilize a questionnaire for data collection was influenced by their efficiency in terms of time, effort, and financial resources, making them especially beneficial for extensive studies across large geographical areas. This approach allowed for broad coverage of the target group, reaching a widely dispersed population effectively. The method´s rapid data collection capability, without the need for personal visits, enabled the gathering of necessary data within a short timeframe, aligning with our project´s objectives (108). A key benefit of questionnaires is the anonymity they offer to respondents, encouraging more accurate and honest responses, which was crucial for the integrity of our research (92). Additionally, the digital distribution of questionnaires enhanced their accessibility and flexibility, further supporting our research methodology (109).

However, it is important to acknowledge the challenges encountered, such as the potential for respondents to misinterpret questions and the possibility of lower response rates than expected (92). The structured nature of the questionnaire can limit respondents' ability to fully express their opinions or experiences, especially if the provided options do not accurately reflect their views. These issues highlight the need for careful questionnaire design and strategic engagement efforts to ensure comprehensive and representative data collection. Looking ahead, alternative data collection methods, including interviews and observations, could be considered to enhance future research efforts, offering richer insights and overcoming some of the limitations essential to questionnaires.

The decision to develop a new questionnaire arose because of the absence of any existing standard or validated questionnaire tailored to our research objectives. This necessity led to conducting a systematic literature search, a critical step that ensured the questionnaire was both related and comprehensive. The systematic literature search approach allowed for the inclusion of specific aspects of pain management relevant to community pharmacists and their role in pain management, ensuring that the questionnaire accurately captured the information needed to achieve the study´s objectives.

The questionnaire was formulated to cover all relevant aspects of community pharmacists´ knowledge, perspectives, and competencies in pain management. It included both closed and open-ended questions to gather comprehensive data. The questionnaire was presented in Norwegian to prevent misinterpretation and ensure the questions were easily understandable. Additionally, using the Norwegian language for the questionnaire was a requirement, facilitating clear communication and enhancing the accuracy of responses. Even though this approach was the most feasible action in this thesis, we are aware of the requirement for the development and validation of new questionnaires (110) to become available for widespread use and standard questionnaires.

4.1.4 Impact on Study Validity:

Validity in a research study indicates how accurately the outcomes observed among participants reflect the actual outcomes among comparable individuals who were not part of the study (111). Considering this aspect of validity, as well as the accessibility and convenience of the target group, and aiming to maximize response rates while ensuring a broad representation of the target group, the questionnaire was distributed online through a

closed social media group (95), resulting in a response rate of 30.2%. While this rate might appear modest, it is important to recognize the essential benefits of this approach. The use of questionnaires, particularly in a digital format, offers advantages such as anonymity for respondents, which can encourage more honest and open responses. Additionally, this method is fast and cost-efficient, allowing for the rapid collection of data across wide geographical areas without substantial expenses (92, 108). These strengths highlight the value of questionnaires as a data collection tool, despite the challenges in achieving higher response rates.

The limited response rate persisted despite the questionnaire being available for approximately two months and the issuance of two reminders, underlining it as a notable concern. The distribution of the questionnaire to a diverse group of pharmacists, including those working in hospitals, industry, clinical pharmacy, and other fields, might have affected the response rate. A more targeted platform, specifically focusing on community pharmacists, could have led to a higher response rate.

Additionally, the extensive nature of the questionnaire, comprising 47 compulsory questions in total, might have contributed to the low response rate. The visibility of the survey invitation and reminders, along with the survey topic´s perceived relevance to the members, and the overall level of activity of members within the group, might have played significant roles. Other contributing factors could include survey fatigue (112), as this social media closed group of pharmacists is very common, and different students from the same or other universities share their questionnaire on the same platform, so it might be, that the potential participants were overwhelmed by the number of questionnaires they were requested to complete.

In anticipation of future research, strategies to enhance response rates could involve direct collaboration with pharmacy professional bodies, associations, and chain pharmacies. Engaging these entities to distribute the questionnaire through their internal channels could more accurately target community pharmacists, potentially improving response rates.

While the low response rate is a limitation, it is also crucial to point out that the sample, despite its size, captures a wide range of participants. These findings still offer valuable insights into the role of community pharmacists in pain management in Norway, highlighting areas for future research and intervention to enhance pharmacists´ role in pain management.

Statistical tests were carefully selected based on the nature of the data collected and the research question being addressed. Descriptive statistics were used to summarize the demographic information, knowledge, skills, self-reported competencies, and facilitators and barriers. Inferential statistics, such as chi-square tests and ordinal regression analysis were employed to examine the associations among variables. Potential sources of bias were identified early in the study design phase, including selection bias, response bias, and measurement bias. To mitigate these biases, the questionnaire was designed to be neutral and non-leading to minimize response bias. Additionally, a pilot test was conducted to identify and correct any issues that could lead to measurement bias. To ensure reliability and reproducibility, the questionnaire underwent rigorous pilot testing with a small group of a diverse population to assess its reliability, with adjustments made based on feedback. The study´s methodology, including the statistical tests and sampling strategy, was documented in detail to allow for reproducibility.

4.2 Discussion of Results:

4.2.1 Discussion of Demographic Characteristics:

Gender Distribution in the Healthcare Workforce:

The gender distribution within our survey indicates a predominant representation of female respondents over males, mirroring wider trends observed across the healthcare sector, notably within the pharmacy and nursing sectors (113). According to the International Pharmaceutical Federation, the global pharmacy workforce is expected to consist of over 70% women by 2030 (114). Our study also finds a predominance of female professionals working in the pharmacy. Given the cross-sectional nature of our research, it is important to clarify that while we observe a higher representation of females compared to males at this specific time point, we cannot assert an increasing trend of female dominance in the field. This demographic shift encourages a deeper exploration of how dynamics influence healthcare delivery, including pain management.

Gender differences can significantly impact various aspects of healthcare, including patient care, communication, empathy, and decision-making processes. In pain management, these differences could manifest in several ways:

- Patient Care and Empathy: Female healthcare professionals are often perceived as more empathetic (115, 116), a quality that can be particularly beneficial in managing patients with chronic pain conditions (117). Given that pharmacists are recognized as the most readily accessible healthcare professionals (85, 100), research has indicated that pharmacists who engage in empathetic communication with patients not only establish stronger relationships but also significantly enhance patient outcomes (100).
- Communication Styles: Gender can influence communication styles, with female healthcare providers potentially offering more patient-centered communication (118). This approach can lead to better patient outcomes in pain management, as it encourages a more comprehensive understanding of the patient´s experience and needs. The success of therapeutic outcomes heavily relies on the quality of communication between pharmacists and their patients (119).

In addition to these aspects, there may be differences in how male and female community pharmacists approach pain management, including treatment decisions and the consideration of non-pharmacological interventions. Understanding and exploring these differences can inform more tailored and effective pain management strategies. Although our study has not directly explored the association between gender and confidence in advising non-pharmacological pain management strategies, work experience has shown a significant association with confidence in these strategies.

The skewness towards female representation in certain healthcare professions can have both advantageous and challenging implications for pain management. On one hand, it can enhance empathetic and patient-centered care; on the other hand, it might introduce challenges if it results in a workforce that lacks diversity in perspectives and approaches. To address the gender gap and its implications for pain management, a comprehensive strategy is necessary. This strategy could include promoting gender diversity, advancing research and education, and implementing changes in policy and practice. Encouraging more men to enter professions traditionally dominated by women, such as nursing and pharmacy, can help balance the gender distribution. This, in turn, leads to a more diverse range of perspectives and approaches in pain management. Further research is essential to fully understand the impact of gender dynamics on pain management outcomes. Additionally, education and training programs should integrate modules on gender sensitivity and its implications for healthcare delivery. It is crucial to ensure that pain management practices are equitable and effective for all patients, regardless of the gender of the healthcare provider. Interestingly, it has been reported that in the emergency department, the gender of the healthcare provider, rather than that of the patient, plays a significant role in decisions related to pain management (120).

Age Profile of Respondents and its Implications:

The age distribution of community pharmacists in our survey indicates a relatively young workforce, with more than half of the respondents being under 32 years old. This demographic profile suggests a workforce that is not only at the early stages of their career but also likely to be more receptive to new knowledge and innovations in pain management practices. This receptiveness can be advantageous for the implementation of innovative pain management strategies, which may include the application of advanced pharmacological

treatments and the adoption of multidisciplinary approaches to pain management. The skewness towards a younger workforce emphasizes the importance of continuous professional development and education in pain management. It is crucial to ensure that community pharmacists, regardless of age, have access to the latest evidence-based practices and guidelines. This could involve structured programs on effective pain management in community pharmacies, continuing training workshops, and the inclusion of pain management modules into healthcare education curricula. Facilitating knowledge exchange between younger and more experienced pharmacists can also help in bridging the gap in practical experience while promoting a culture of continuous learning. The impact of demographic factors, such as age, on pain management outcomes warrants further exploration. Policymakers and healthcare institutions should consider these dynamics when developing strategies for workforce development, education, and patient care protocols. Tailoring pain management training to meet the needs and preferences of a younger workforce, while ensuring that the wisdom of experienced pharmacists is not lost, could be key to advancing pain management practices.

Work Experience and its Impact:

The work experience data further supports this, showing a significant portion of the workforce with less than 5 years of experience. This indicates that most of the respondents in our study were relatively new to the field, which has implications for continuing education and training needs in pain management. The impact of work experience on community pharmacists´ competence in pain management is a complicated issue that can significantly influence patient care outcomes. A study conducted among community pharmacists in Saudia Arabia found that the level of pain-related knowledge and attitudes was generally inadequate, highlighting the necessity for enhanced educational efforts. Work experience was identified as a significant factor affecting pharmacists' overall knowledge and attitude toward pain, suggesting that more experienced pharmacists might possess a better understanding and approach to pain management (121). Addressing the work experience gap and enhancing pharmacists' competencies in pain management can involve several strategies. This includes implementing additional academic courses and continuous professional development programs focused on pain management. Such educational interventions can improve pharmacists´ awareness, knowledge, and attitudes toward pain management, ultimately benefiting patient care. Moreover, promoting an environment that encourages practical learning and mentoring

between more experienced and less experienced pharmacists could help bridge the knowledge gap.

4.2.2 Integration of Survey Findings on Knowledge, Skills, and Competence in Pain Management with Current Practices:

Aligning Analgesic Selection with Pain Intensity: Insights from Survey Outcome:

Our findings show that the majority of the respondents either agreed or strongly agreed that the choice of analgesic should be dependent on the intensity of the patient´s pain. These findings are consistent with current practices in pain management, which support a stepwise approach to analgesic selection based on pain severity. The World Health Organization´s (WHO) modified pain ladder demonstrates this strategy, particularly in the context of chronic non-cancer pain. The modified WHO pain ladder recommends initiating treatment with non-opioid and adjuvant analgesics for mild pain, adding weak opioids for moderate pain, and considering stronger opioids for severe pain. Notably, before considering stronger opioids, interventional therapies are advised as an option in the third step (35). This recommendation supports the survey´s implication that the choice of analgesic should indeed be guided by pain intensity. This approach not only supports the cautious use of analgesics, particularly opioids but also highlights the critical role of non-pharmacological interventions in managing pain.

From a clinical perspective, these findings underscore the importance of continued education and training. Platforms such as Kompetansebroen (122) and Apokus (123) in Norway exemplify resources that can provide such education. Furthermore, the findings also suggest that healthcare professionals should be knowledgeable in both pharmacological and non-pharmacological pain management strategies to offer a comprehensive, multidisciplinary approach to pain relief.

For patient care, aligning analgesic selection with pain intensity ensures that patients receive the most appropriate and effective treatment for their pain level. This tailored approach can lead to better pain control, improved patient satisfaction, and potentially lower the risk of analgesic misuse or dependence. Furthermore, it highlights the importance of patient-centered

care, where treatment decisions are made in collaboration with the patient, taking into account their preferences, experiences, and overall health status (124).

Advocating for Early Integration of Cognitive Behavioral Therapy in Chronic Pain Management:

The findings from our survey show that approximately 80% of respondents supported the early integration of Cognitive Behavioral Therapy (CBT) into the treatment plans for patients suffering from chronic pain. This perspective is further validated by findings from the meta-analyses, which confirm CBT´s effectiveness across various chronic pain conditions, particularly for chronic low back pain (125). The early incorporation of CBT in treatment plans can lead to improved outcomes for patients with chronic pain. By addressing the psychological aspects of pain, CBT can help patients reduce pain perceptions and improve their quality of life (126). This approach ensures that pain management is not just about controlling symptoms but also about enhancing overall well-being. The early integration of CBT can also act as a preventive strategy, which helps to prevent the development of negative psychological conditions such as depression and anxiety (126). Furthermore, the integration of CBT early in the treatment process can lead to cost savings for the healthcare systems (127). By potentially reducing the need for long-term pharmacological treatments and preventing pain escalation, CBT can decrease healthcare utilization and costs associated with chronic pain management.

CBT empowers patients by giving them control over their pain management. This empowerment is crucial for chronic conditions, where patient engagement and self-management strategies are key components of successful outcomes (128). By learning and applying CBT techniques, patients can actively participate in their personal care, leading to better adherence to treatment plans and improved health behaviors.

The confirmed effectiveness of CBT for chronic pain management highlights the importance of ongoing research and development in psychological therapies (129). Advocating for the early integration of CBT in chronic pain management is about acknowledging the complex nature of chronic pain and the necessity of addressing both its physical and psychological dimensions. This approach promises a more effective, patient-centered, and sustainable strategy for managing chronic pain, with profound benefits for individuals and healthcare systems alike.

Diverse Perspectives on Analgesic Use and the Role of Antidepressants in Chronic Pain Management:

Opinions on the effectiveness of treating chronic pain solely with analgesic and adjuvant analgesics, our findings reflect a diversity of opinions. More than 40% of respondents believed that this approach is effective for most patients. The findings advocate for the development of personalized treatment plans that consider the unique needs, conditions, and responses of each patient. Recognizing the diverse opinions on treatment effectiveness supports the use of individualized assessments to guide the selection of analgesics, antidepressants, and other treatment modalities. However, studies suggest the implication of a multimodal approach such as incorporating pharmacological and non-pharmacological strategies for effective pain management (130). This integrated approach aims to address not just the physical symptoms but also the psychological and social aspects of chronic pain.

Additionally, our finding indicates that more than half of the respondents believed that antidepressants generally help alleviate symptoms and improve functionality in patients with chronic pain. This perspective aligns with the existing literature that supports the use of antidepressants in chronic pain management, especially for neuropathic pain (50). These insights underscore the complexity of chronic pain management and highlight the importance of integrating various therapeutic strategies to address the complicated nature of pain. The findings also highlight the importance of educating pharmacists about the diverse approaches to pain management. Training programs and continuing education courses should emphasize the benefits of integrating antidepressants and other non-pharmacological options into treatment plans. These insights can also be used to inform patients about the variety of treatment options available and the potential benefits of incorporating antidepressants into their pain management strategies. However, the diversity of opinions and the recognition of the role of antidepressants in pain management underscores the need for ongoing research. This includes exploring new therapeutic targets and innovating new approaches to address the multifaceted nature of chronic pain. A new network meta-analysis shows that investigating 25 different antidepressants in the included studies, the only antidepressant for the treatment of chronic pain was duloxetine which was moderately efficacious across all outcomes at standard dose. In addition, promising evidence was found for milnacipran but all other antidepressants appeared to be with low certainty for efficiency in chronic pain (131).

Enhancing Patient Safety Through Personalized Opioid Prescribing: A Global Perspective

The 2017 Canadian Guideline for Opioids for Chronic Non-Cancer Pain (132), along with the recommendations from the American Society of Interventional Pain Physicians (ASIPP) (133, 134) and the European Pain Federation (135), emphasizes a cautious and evidence-based approach to opioid prescribing. These guidelines recommend a careful, individualized approach to opioid prescribing, prioritizing patient safety and minimizing risks associated with opioid use. Similarly, the 2022 guidelines from the Centers for Disease Control and Prevention (CDC) on prescribing opioids for pain detail the recommendations for individualizing opioid doses for each patient (136). This approach is also reflected in our study´s finding, where more than 90% of the respondents believed that subsequent doses of an opioid analgesic should be adjusted based on the individual patient´s response. This consensus underscores the critical role of personalized medicine in opioid use, aiming for a careful balance between effective pain relief and ensuring patient safety.

The implications of these findings are profound, offering a pathway to enhance patient safety, optimize pain management, and mitigate the risks associated with opioid therapy. By individualizing opioid doses, healthcare professionals can minimize the risks of overdose and dependence, addressing public health concerns related to opioid misuse. The emphasis on personalized opioid dosing necessitates open, ongoing communication between patients and healthcare professionals. This approach promotes a therapeutic partnership, where patient feedback on pain relief and side effects informs dosing adjustments, leading to more effective and responsive pain management strategies. Additionally, educating patients about the rationale behind personalized opioid dosing, the importance of adherence to prescribed regimens, and the potential risks of opioids empowers them to be active participants in their pain management. This includes understanding their role in reporting pain relief and any side effects, as well as the importance of adhering to non-opioid pain management strategies.

Furthermore, the Norwegian guidelines on opioid prescription for pain management also emphasize cautious and individualized prescribing, especially for non-cancer chronic pain. They recommend limiting opioid use to strong, acute pain conditions and postoperative pain, with careful consideration for potential dependence and the risks associated with long-term use. The Norwegian guidelines also highlight the importance of alternative treatments and the need for a comprehensive evaluation of pain management strategies beyond opioids (137,

138). These approaches align with international guidelines from the CDC, ASIPP, and Canadian guidelines, which also advocate for careful prescribing to reduce opioid misuse risks.

However, achieving a harmonized international consensus remains a challenge. Efforts should focus on creating inclusive, harmonized guidelines for global use by pharmacists all around the world, aiming for dynamic, patient-specific, and safety-oriented pain management. This approach not only enhances the efficacy of pain management strategies but also contributes to the broader goal of reducing the public health impact of opioid misuse and addiction, marking a critical step forward in the intersection of public health policy, clinical practice, and patient care.

4.2.3 Discussion on Self-Reported Competence in Pain Management:

Bridging the Gap: Enhancing Community Pharmacists´ Confidence in Non-Pharmacological Pain Management Strategies:

Our findings show a high level of comfort among community pharmacists in advising on the use of over-the-counter (OTC) analgesics, with more than 80% of respondents indicating a high comfort level. This high comfort level could be attributed to the practical, hands-on experience pharmacists accumulate over time. Daily interactions with patients seeking advice on pain management allow pharmacists to improve their counseling skills, deepen their understanding of patient's needs, and become more familiar with common pain management scenarios. This exposure is invaluable in building confidence and comfort in their advisory role.

However, those with less experience or who encounter pain management scenarios less frequently might report lower comfort levels, indicating a potential gap in experiential learning. This suggests that a portion of the pharmacist's population could benefit from additional education or resources. Enhancing their comfort level would enable them to provide the most accurate and beneficial advice to those in need. Additionally, our study uncovered a significant patient interest in non-pharmacological pain management options, as evidenced by the majority of respondents who reported receiving inquiries about such strategies. This trend indicates a growing patient interest in exploring non-pharmacological approaches to pain management, highlighting the importance for pharmacists to be well-informed in a variety of pain management strategies, including non-pharmacological options, to effectively guide their patients.

Half of the respondents however had a low to moderate level of confidence when it came to offering advice on non-pharmacological pain management strategies. There appears to be a gap between patients´ interest in and community pharmacists´ confidence in non-pharmacological pain management advice, as seen by the majority of community pharmacists who have encountered patients seeking guidance on non-pharmacological strategies. The need for educational interventions particularly on non-pharmacological pain management is evident since approximately half of the community pharmacists expressed a low to moderate level of confidence in their ability to provide advice on these alternatives. Enhancing community pharmacists´ knowledge and skills in non-pharmacological pain management

involves adopting a variety of educational and practical strategies. These strategies aim to provide comprehensive care that addresses the complex nature of pain, incorporating evidence-based non-pharmacological options alongside traditional pharmacological treatments. Organizing workshops and seminars designed to cover a range of non-pharmacological pain management techniques, such as physical therapy, cognitive-behavioral therapy (CBT), mindfulness, and dietary approaches. These sessions can provide in-depth knowledge and practical experience, allowing pharmacists to directly engage with experts in the field. Workshops and seminars led by educators in the field of pharmacy can be highly interactive, providing pharmacists with a deep understanding of these strategies. However, organizing these events can be time-consuming and costly. Attendance may also be challenging and limiting the reach and effectiveness of this approach.

Developing online modules and courses focusing on non-pharmacological pain management, which pharmacists can complete at their own pace. Online courses offer flexibility, making it easier for pharmacists to fit training into their schedules. They can also be cost-effective to produce and update as new information becomes available. However, the lack of face-to-face interaction may reduce the effectiveness of learning for some individuals. There is also the challenge of ensuring the quality and engagement of online content.

Facilitating interdisciplinary learning opportunities, where pharmacists can learn alongside physical therapists, psychologists, and other professionals involved in pain management. This approach promotes a better understanding of pain management and encourages the development of a comprehensive network for patient referrals. It highlights the collaborative nature of healthcare and provides diverse perspectives on patient care. However, coordinating such interdisciplinary sessions can be logistically complex. Differences in professional schedules and priorities may limit participation.

Utilizing digital platforms to provide easily digestible information on non-pharmacological pain management strategies could also be beneficial. Digital tools can offer immediate access to information, making it convenient for pharmacists to learn quickly. These platforms can also incorporate interactive elements, such as quizzes on pain management and related topics, to enhance learning. The drawbacks associated with digital platforms are that the effectiveness of digital learning tools can vary depending on the user´s learning style. Additionally, there may be straightforward costs associated with developing high-quality digital resources.

Establishing peer-led discussion groups or forums where pharmacists can share experiences, challenges, and success stories related to non-pharmacological pain management can also be beneficial to enhancing their knowledge and skills. Peer-led groups can provide a supportive environment for learning and sharing practical advice. They can be relatively easy and cost-effective to organize.

While each of these approaches has its benefits, a combination might be the most effective way to address the diverse learning needs and preferences of community pharmacists. For instance, blending online courses with occasional workshops or seminars could provide both the flexibility of self-paced learning and the depth of interactive, practical experience. Collaborative learning with other healthcare professionals, supplemented by digital and mobile learning tools, could offer a comprehensive and engaging learning experience.

However, implementing these strategies requires careful consideration of resources, accessibility, and the specific needs of community pharmacists such as Apokus in Norway (123). It is crucial to involve pharmacists in the planning process to ensure that the educational interventions are relevant and appealing. While cost and time are significant considerations, the investment in enhancing pharmacists´ confidence and competence in advising on non-pharmacological pain management is essential for improving patient care and outcomes in the field of pain management. Ensuring that pharmacists are knowledgeable in various pain management techniques will better position them to address the varied needs of their patients, thereby enhancing patient care and support within the community pharmacy setting (88).

Community Pharmacists´ Preferences versus Evidence on Paracetamol Risks:

The finding from our data reveals that a majority of community pharmacists proactively engaged in discussions about potential interactions between over-the-counter (OTC) analgesics and patients´ current medications or health conditions. This indicates a high level of professional commitment to patient safety among community pharmacists in Norway.

Despite this, when the community pharmacists were asked about their general preference for recommending Paracetamol over Ibuprofen, our findings show that more than 80% of the respondents preferred recommending Paracetamol. The predominant reasons provided by a majority of the respondents included paracetamol´s perceived safety profile, fewer side effects, lower risk for gastrointestinal problems, fewer drug interactions, and better tolerance.

However, contrasting these perceptions, a systematic review assessing the adverse event profile of paracetamol, which analyzed eight cohort studies in their analysis concluded that higher doses of paracetamol are associated with an increased risk of mortality, cardiovascular events, gastrointestinal complications, and renal impairment or failure (139). The distinction between the community pharmacists´ preference for paracetamol, largely due to its perceived safety, and the evidence from the systematic review highlights a critical gap in awareness about the potential risks associated with higher doses of paracetamol. This highlights that it is important for community pharmacists to stay informed and updated about the latest evidence, ensuring a careful evaluation of the benefits and risks of analgesic recommendations. In addition, the use of paracetamol in pregnancy has been debated recently (140). Interestingly, a general belief among the public and many community pharmacists has led to the use of acetaminophen in pregnancy as a safe choice for subsiding pain. However, recent studies suggest caution, indicating potential risks. For instance, prolonged use of paracetamol has been linked to an increased risk of ADHD in children, as reported by a study conducted in Norway (141). Other investigations have explored connections to development disorders and possible impacts on fetal development (142-144). The updated investigations are important to be integrated into education or after education for community pharmacists to guide safer medication practices during pregnancy.

Another important example is cannabis use and the regulation for its accessibility and use have been changed in various countries and many are using it for pain. In Norway, the application of cannabis for medical purposes is considered beneficial for a selected group of patients, though its use remains relatively limited. As of 2020, approximately a thousand individuals received prescriptions for a cannabis-based extract known as Sativex, according to the Norwegian Institute of Public Health (145). Moreover, only a limited number of patients have been granted permission to use cannabis products that are not registered in Norway for medicinal purposes. To import these products from the Netherlands, the pharmacy wholesalers must first obtain an import permit from the Norwegian Medical Products Agency (NOMA). Subsequently, community pharmacies can dispense these products to the patients (146). This underscores the critical role of pharmacists in being knowledgeable about the latest cannabis-related regulations and therapeutic options. The community pharmacists being a reliable source of information for clients seeking guidance on cannabis use reflects the need for pharmacists to stay informed about cannabis-related laws, products, and therapeutic effects to offer reliable advice to their clients. Such expertise is essential for pharmacists to

effectively manage the complexities of cannabis dispensing and counseling, ensuring clients receive accurate and responsible information (147, 148). This highlights the importance of continuous education and awareness in the pharmacy profession to meet the needs of the community effectively.

Awareness of Pain Management Guidelines Among Norwegian Community Pharmacists:

The findings of our study indicate that more than half of the respondents were familiar with guidelines or recommendations related to the use of over-the-counter (OTC) analgesics in managing pain in Norway. Although it is unclear which specific guidelines the respondents were referring to, possibilities include the "Guidelines for Pain Relief/Treatment 2009" (Den Norske Legeforening, 2009), and the "Norwegian Drug Handbook" (Smerter, 2023). This level of awareness among respondents underscored the significance of being familiar with these guidelines for safe and effective pain management.

However, the fact that nearly half of the respondents were either unaware or unsure about these guidelines or recommendations indicates a knowledge gap that needs to be addressed. The presence of pharmacists who were unaware or unsure about pain management guidelines represents an opportunity for targeted educational initiatives. Enhancing awareness and understanding of these guidelines is crucial for ensuring that all pharmacists can confidently and effectively contribute to patient care. It also highlights the need for accessible, continuing professional opportunities that keep pharmacists up-to-date with the latest guidelines and recommendations.

Developing and promoting continuing education programs that focus on pain management guidelines can significantly bridge the knowledge gap. These programs could include workshops, seminars, and online courses, like those offered by the European Pain Federation (EFIC) for a variety of healthcare professionals, with a curriculum for pharmacists expected to be available on the EFIC website soon (149). These educational activities would provide updates on the latest guidelines and best practices in pain management. Professional pharmacy organizations can also play a key role in spreading information about pain management guidelines. Regular updates through newsletters, meetings, and professional forums can keep pharmacists informed about new developments. Developing accessible, user-friendly resources that summarize key points from the pain management guidelines can aid

pharmacists in quickly referencing the information they need. This could include mobile apps and online databases.

By addressing these needs, pharmacists are not only capable of providing high-quality care but also become active contributors in the effort to manage pain safely and effectively within the community setting. Furthermore, enhancing pharmacists´ familiarity with these guidelines can lead to improved patient outcomes, a reduced risk associated with over-the-counter (OTC) analgesic use, and an overall improvement in the quality of pain management services provided in community pharmacies.

Knowledge Levels of Controlled Substances, Laws, and Regulations Among Community Pharmacists in Norway:

Our findings indicate that community pharmacists in Norway reported a medium to a high level of knowledge concerning laws and regulations related to controlled substances and pain treatment, with more than half of the respondents indicating medium knowledge and more than 30% reporting high knowledge. Similarly, their knowledge of controlled substances themselves was rated as medium by half of the respondents and high by approximately 40%. This suggests that Norwegian community pharmacists were well-prepared to manage and dispense controlled substances responsibly, highlighting their crucial role in preventing drug abuse and medication errors. A study on community pharmacists´ skills and practices in dispensing substances with potential for abuse, such as tramadol, highlighted the essential role pharmacists played in minimizing drug abuse and medication errors through competent dispensing practices. Evidence supported that the competence and experience of pharmacists were crucial for providing high-quality medical care, especially in the context of dispensing medications that contained controlled substances (150).

The reported levels of knowledge could guide the development of targeted educational programs aimed at areas where knowledge was found to be lacking. This could include more in-depth training on controlled substances and the legal framework surrounding their dispensing. Emphasize the importance of continuous professional development for pharmacists, particularly in the fast-evolving area of controlled substances. Regular updates and training could help maintain high levels of knowledge and competence.

Inadequate knowledge about controlled substances can lead to medication errors, inappropriate dispensing practices, and increased risk of drug abuse among patients. This not only affects individual health outcomes but can also have broader public health implications. Medication errors and drug abuse linked to controlled substances can lead to increased healthcare costs, including hospital admissions, treatment of adverse drug reactions, and rehabilitation for drug dependence (151, 152).

In light of the critical need for accessible, up-to-date healthcare information in Norway, particularly regarding controlled substances and pain management, the development of a comprehensive mobile app for community pharmacists presents a promising opportunity. Currently, resources like the Felleskatalogen mobile app offer updated information on medicines (153), and The Norwegian Drug Handbook (154) website provides valuable information on various diseases and their treatments. However, a gap remains for a single app that combines these features with guidelines, laws, and therapeutic effects of drugs, especially regarding pain and pain management.

A well-designed app could serve as a centralized and harmonized platform, offering detailed information on diseases, up-to-date guidelines and recommendations, and both pharmacological and non-pharmacological treatment options for pain management. For inspiration and to understand the potential impact of digital tools in pharmacy practice, looking at the usage patterns and opinions on mobile medical apps among pharmacists in other regions can be informative. For instance, a study highlighted that a significant portion of hospital pharmacists relied on mobile medical apps for drug information and clinical decision-making, showing a high frequency of app usage and trust in the accuracy of the information provided by these apps (155). This insight underscores the potential benefits of developing a specialized app for Norwegian pharmacists. Such an app should feature updated guidelines and information on drug laws and therapeutic effects, enabling pharmacists to provide informed counseling. Interactive learning modules would enhance pharmacists´ skills in pain management and other areas. Such an app should also have a community forum for pharmacists to share experiences and seek advice from peers, promoting a collaborative professional environment.

Collaboration with healthcare professionals, legal experts, technology developers, and pharmacists themselves during the development process will ensure that the app meets the actual needs and preferences of its intended users. This approach not only aims to bridge the

gap but also contributes to the quality of healthcare services, reflecting the increasing role of technology in enhancing pharmacy practice and patient care in Norway.

Furthermore, the significance of Artificial Intelligence (AI) in the field of pharmacy is undeniable. By utilizing AI, pharmacists can better evaluate medication safety and effectiveness, drug interaction, and the formulation of personalized recommendations for each patient (156-158). Additionally, the use of AI in pain management within pharmacies has shown promising developments. AI-based interventions, including machine learning, data mining, and natural language processing, have been used to enhance pain recognition, assessment, and management. These technologies allow for more efficient analysis of self-reported pain data and help in predicting pain outcomes, potentially leading to more effective chronic pain management for patients (159). However, the reliability of AI-generated information can be compromised if AI systems are not regularly updated with the most recent medical research and guidelines (160). Additionally, the use of AI in handling patient information involves data privacy and security challenges, requiring stringent measures to protect sensitive health information (161-163). Another concern is the potential over-reliance on AI by pharmacists, which could potentially diminish their critical thinking and clinical judgment abilities. Thus, it is crucial for pharmacists to engage in continuing training to enhance their professional knowledge and expertise. While AI can supplement the work of pharmacists, efforts should be made to preserve the human element in patient care, ensuring that patient-pharmacist interactions remain personal and empathetic.

Community Pharmacists Self-Assessed Knowledge in Pain Management and Perceived Need for Further Training:

The findings from our study offer a comprehensive view of the community pharmacists´ self-assessment regarding their knowledge of pain management, revealing both knowledge and a recognition of areas for improvement. Approximately 60% of respondents rated their knowledge above average, indicating that they consider themselves to have a good to excellent understanding of pain management. This is a self-perception and might be biased. Interestingly, a clear acknowledgment was evident among community pharmacists that highlighted further improvement in their knowledge and expertise is needed. On the other hand, about 40% of respondents perceived their knowledge to be below average to average, highlighting a significant portion of community pharmacists who identified clear gaps in their

knowledge. This difference in self-assessment underscores a widespread acknowledgment of the need for further education in pain management, as evidenced by the fact that 80% of respondents, across all levels of self-assessed knowledge, expressed that they could benefit from additional training in pain management. This reflects a strong recognition among community pharmacists of the need to enhance their knowledge in this domain, even among those who consider their knowledge above average. This insight reveals a critical gap between the current levels of knowledge and the perceived need for further education among community pharmacists. The high percentage of pharmacists recognizing the need for additional training, regardless of their current self-assessed knowledge level, indicates a clear demand for more comprehensive education and resources in pain management. To address this need effectively, an integrated approach combining regular education for pharmacy students with continuing professional development for practicing pharmacists is essential. Platforms like Apokus (123) especially through mobile apps, can play a pivotal role in facilitating these educational programs. The curriculum for this training should ideally cover a broad range of topics. This includes advanced pharmacology focusing on pain medications such as opioids, non-opioids, and adjuvant therapies, with a focus on their mechanisms of action, pharmacokinetics, and pharmacodynamics. It should also include training in multimodal pain management strategies, differentiating between chronic and acute pain, managing potential drug-drug interactions, and contraindications to pain management medications, and understanding the regulatory framework of controlled substances. Additionally, the curriculum must emphasize the importance of patient-centered care, including effective patient education, counseling, and communication to effectively engage with patients regarding their pain management plans, adherence, and lifestyle changes. Keeping pharmacists up-to-date with the latest guidelines and recommendations is crucial. Incorporating interactive case studies and clinical scenarios will further enhance pharmacists´ decision-making skills by applying theoretical knowledge in practical situations.

This comprehensive curriculum can be delivered through a platform like Apokus (123) and The European Pain Federation (EFIC) (149), for delivering structured educational content, interactive learning, and certification opportunities. The European Pain Federation (EFIC) also provides a pain curriculum for other primary healthcare professionals such as psychology, physiotherapy, nursing, medicine, and medical students, and is currently developing a specialized curriculum for pharmacists (149). Collaborating with pharmacy professional organizations to provide continuing education credits for pain management

courses and encouraging participation in relevant national and international conferences are additional ways to enhance the learning environment. By integrating these approaches into education and the continuing professional development of community pharmacists, the field can better meet the growing demand for comprehensive pain management knowledge and skills.

Community Pharmacists´ Perception of the Importance of Adherence to Clinical Guidelines in Pain Management:

Regarding the importance and utilization of clinical guidelines in pain management, it was observed that the majority of the respondents either agreed or strongly agreed regarding this, illustrating that these clinical guidelines serve as an essential tool for effective pain management. Similarly, the importance of following these guidelines was further emphasized, with more than 70% of respondents either agreeing or strongly agreeing on this point. Although clinical guidelines are acknowledged as key in guiding healthcare practices, the actual adherence to these guidelines by healthcare practitioners appears to be inconsistent and often falls below the desired levels. Despite considerable efforts to encourage the use of these guidelines, several lines of research have shown that actual compliance, particularly in areas such as pain management, frequently falls short of expectations (164-166). Non-adherence to clinical guidelines can result in suboptimal pain management, where patients may either experience unnecessary pain due to under-treatment or face side effects due to overdose. Optimal pain management is crucial for patient recovery, quality of life, and satisfaction with healthcare services. Clinical guidelines provide evidence-based recommendations that include dosages, drug interactions, side effects, and routes of administration such as Diclofenac tablets or gel (167). Non-adherence to these guidelines increases the risk of medication errors, which can lead to adverse drug reactions, potentially harming the patient.

Inconsistent adherence to guidelines can lead to inefficient use of healthcare resources, increased hospital stays, additional treatments or interventions, and potentially avoidable healthcare encounters, all of which contribute to higher healthcare costs. Additionally, on a broader scale, non-adherence to clinical guidelines in pain management can contribute to public issues, such as the opioid crisis. Overprescribing or inappropriate prescribing of pain medications can lead to increased rates of addiction, overdose, and death.

To address these challenges, there is a need for continuous education and training for healthcare professionals on the importance of adherence to the guidelines, the implementation of systems and tools that make following guidelines easier in clinical practice, and regular audits and feedback mechanisms to monitor adherence levels. Furthermore, engaging patients in their care plans and educating them on the importance of guideline-based treatments can also improve adherence and health outcomes.

4.2.4 Enhancing Pain Management in Community Pharmacies: Barriers, Facilitators, and a Path Forward:

Overcoming Barriers to Effective Pain Management in Community Pharmacies:

Our study identifies several barriers related to effective pain management within community pharmacies. These findings, particularly concerning knowledge gaps, communication difficulties, concerns about opioid dispensing, and staffing issues, offer a comprehensive perspective on the challenges pharmacists face daily. These insights not only reveal the complexities essential in managing chronic pain at the community pharmacy but also underscore the importance of addressing these challenges to enhance patient care.

The indication that over a third of pharmacists in our study felt that they lacked sufficient knowledge about pain management was alarming. This gap not only affects the quality of patient care but also undermines pharmacists´ confidence in their ability to provide effective advice. Continuing education and specialized training programs in pain management are essential to bridge this gap.

Addressing the barrier of communicating effectively with patients suffering from chronic pain is essential for pharmacists, given that nearly a quarter of pharmacists encounter difficulties in this area. The subjective nature of pain necessitates the development of communication skills that are empathetic and patient-centered. Enhancing these skills involves practicing active listening, where pharmacists fully engage with what the patient is saying, acknowledge their feelings, and respond in a way that makes patients feel understood and valued. This approach is crucial for grasping the patients´ experiences, concerns, and needs accurately. Additionally,

adopting a patient-centered communication style, which encourages patients to ask questions and provides them with clear, understandable answers is vital. To support the development of these skills, organizing regular workshops focusing on empathy, active listening, and patient-centered care can equip pharmacists with the necessary tools to improve their interactions with patients. Moreover, encouraging stronger collaborations between pharmacists, and physicians through shared electronic health records ensures that all team members are informed about patients´ pain management plans, enhancing the effectiveness of communication among healthcare providers and with patients. Establishing mechanisms to receive and utilize feedback from patients about their experiences with pharmacy services, including the quality of communication and pain management advice, is critical. This feedback serves as a foundation for continuous improvements in services and training programs, ensuring pharmacists are well-equipped to meet the complex needs of patients with chronic pain. Through these strategies, pharmacists can significantly improve their communication skills, leading to better patient outcomes, increased patient satisfaction, and a more rewarding professional experience in the management of chronic pain.

The concern around dispensing opioids and the associated safety issues point to the broader opioid crisis and the delicate balance pharmacists must maintain between providing necessary pain relief and minimizing the risk of misuse. Implementing and adhering to guidelines and employing decision-support tools can assist in navigating these challenges.

Addressing the barrier of limited time, high workload, and inadequate staffing levels, which a majority of pharmacists reported as significantly impacting their ability to deliver comprehensive pain management advice, necessitates urgent interventions in workforce planning and pharmacy workflow optimization to enhance service quality. These barriers can be minimized by adopting several strategic measures such as hiring additional part-time or temporary staff during peak hours to ensure adequate coverage and reduce the workload on existing staff. Furthermore, maximizing the use of pharmacy technicians by delegating tasks that do not require the pharmacists´ clinical expertise, such as inventory management, and initial patient intake. This allows pharmacists to focus more on critical aspects of patient counseling and care. Additionally, scheduling dedicated times for consultations for patients seeking pain management advice, particularly regarding prescription medications, is another effective strategy. This approach ensures that pharmacists allocate sufficient, uninterrupted time to provide comprehensive advice, thereby enhancing the quality of care without compromising the efficiency of the general workflow.

The discomfort in advising vulnerable groups such as pregnant women, children, and the elderly on pain management points to a need for targeted training and resources to ensure these populations receive safe and effective care.

Enhancing Pain Management Practices: Insights from Community Pharmacists in Norway:

The detailed exploration of facilitators for effective pain management as perceived by community pharmacists in Norway provides a rich foundation for enhancing pain management practices. The acknowledgment of guidelines and protocols as helpful by nearly half of the respondents underscores their critical role in standardizing pain management practices. These tools not only offer a roadmap for pharmacists but also promote confidence in their decision-making processes. The appreciation for guidelines suggests that pharmacists are eager for evidence-based frameworks to guide their practice. However, the variance in perceived helpfulness indicates a gap between the availability of these guidelines and their applicability or awareness among pharmacists. To bridge this gap, it is essential to ensure that guidelines are not only accessible but also relevant and tailored to pain management. Regular training sessions and workshops can enhance familiarity and comfort with these guidelines. Furthermore, involving pharmacists in the development and review of these protocols could ensure they are rational and comprehensive.

The significant engagement in patient education and advice highlights the pharmacist´s role as a pivotal point of contact for patients. This interaction goes beyond the ordinary dispensation of medications to involve critical educational dialogue. While engagement levels are commendable, the uniformity in the frequency of these interactions (often or sometimes) suggests a potential for making patient education a more consistent and integrated part of the pharmacy service. Developing structured patient education programs and training pharmacists in counseling techniques can standardize this aspect of care. Additionally, utilizing digital tools and resources can enhance the reach and effectiveness of educational efforts.

The strong belief in their ability to assist patients with pain management reflects pharmacists´ confidence. However, the presence of a considerable percentage of respondents with moderate confidence indicates room for growth. This finding highlights the importance of self-efficacy in delivering quality patient care. Enhancing this confidence through direct experience and education can lead to more proactive and effective pain management strategies. Implementing mentorship programs, where less experienced pharmacists can learn from other professionals,

and providing opportunities for continuing education in pain management can strengthen self-efficacy.

The mixed responses to the impact of limited analgesic sales on pain management reveal a multifaceted understanding of the issue. It underscores the balance pharmacists must strike between controlling substance abuse and ensuring patient access to necessary medications. The neutrality of many pharmacists on this issue suggests uncertainty or contradiction about the role of policy restrictions in their practice. It highlights a need for clearer communication and guidance on navigating these regulations. Engaging pharmacists in policy discussions and decision-making processes can provide valuable insights into the practical implications of such regulations. Additionally, developing clear guidelines for managing these restrictions while maintaining patient care quality is crucial.

Community Pharmacists´ Perspectives on Training, Preferences for Learning Formats, and The Role of Multidisciplinary Collaboration in Pain Management:

A majority of pharmacists acknowledged the need for further training to meet patients´ needs effectively. This recognition is a crucial first step toward addressing gaps in pain management practices in pharmacies. The overwhelming desire for additional training reflects a proactive stance among pharmacists toward enhancing their professional development. It also underscores an awareness of the complexities of pain management and the limitations of their current knowledge and skills. Pharmacy regulatory bodies and educational institutions should collaborate to develop and offer targeted training programs in pain management. These programs could focus on emerging pain management therapies, patient counseling techniques, and updates on pain medication guidelines. Encouraging participation through accreditation and continuing education credits could further motivate pharmacists to engage in these training opportunities.

Pharmacists showed a clear preference for online training, with seminars also being a popular choice. This preference indicates a desire for flexible and accessible learning opportunities that can fit into their busy schedules. The preference for online training suggests that pharmacists value the ability to learn at their own pace and on their own time. However, the interest in seminars and theme evenings also points to the importance of interactive and community-based learning experiences.

The findings indicate a strong consensus among pharmacists on the value of multidisciplinary collaboration in managing chronic pain, highlighting the potential for improving patient outcomes through cooperative efforts. While the effectiveness of collaboration is acknowledged, the extent of its utilization seems to vary, suggesting potential barriers to consistent implementation. These may include a lack of formal mechanisms for collaboration, time constraints, or a lack of awareness of the roles of different healthcare professionals in pain management. Establishing formal channels and protocols for collaboration between pharmacists and other healthcare professionals can enhance the consistency and quality of chronic pain management. Training programs could also include modules on interdisciplinary communication and teamwork skills, preparing pharmacists to effectively engage in collaborative care models. This increase in multi-collaboration could underscore the potential for improved patient outcomes through a more cohesive approach to pain management.

The varying degrees of participation in collaborative discussions on pain management highlight a gap between the recognized value of such interactions and their actual frequency. The relatively low engagement in regular discussions suggests barriers to participation, such as time constraints, lack of formalized collaboration structures, or possibly a perceived undervaluation of the pharmacist´s role in the multidisciplinary team. Encouraging the integration of pharmacists into healthcare teams and establishing regular interdisciplinary meetings could facilitate more consistent engagement. Additionally, utilizing technology to create virtual collaboration platforms may help overcome logistical barriers, making it easier for pharmacists to participate in discussions and case reviews, even from a distance.

These insights collectively emphasize the critical need for enhanced training and stronger multidisciplinary collaboration in pain management. Addressing these needs requires a combined effort from pharmacy leadership, educational institutions, and healthcare organizations to create structured, accessible, and comprehensive training programs. Simultaneously, establishing formal mechanisms for collaboration and recognizing the vital role of pharmacists in the healthcare team will be essential in utilizing the full potential of interdisciplinary care for patients with chronic pain.

As shown in Table 9, a summary is provided of the facilitators and barriers to effective pain management in community pharmacies, alongside suggested approaches for advancement (for details see Table 9).

4.2.5 Exploring the Associations and Influences of Gender, Work Experience, and Education on Pharmacists´ Pain Management Practices and Knowledge:

The findings of our study concerning the impact of gender, work experience, and education level on pharmacists´ knowledge and practices in pain management provide interesting insights.

Gender Impact:

Our study revealed that gender does not significantly influence pharmacists´ self-reported knowledge of pain management or their participation in multidisciplinary collaboration. Similarly, the study conducted in Saudia Arabia evaluated various factors influencing pharmacists´ knowledge and attitudes but did not single out gender as a significant determinant (121). This finding from our study suggests that gender does not play a crucial role in these specific aspects of the profession, potentially indicating an environment of equal opportunities in the educational and professional sectors of pharmacy, particularly in areas of knowledge-gaining and collaboration practices.

Given these findings, future research could explore other dimensions where gender might have a more pronounced influence. One such area is the examination of gender differences in specialization and continuing education within the domain of pain management. This exploration could investigate how gender impacts the decisions of community pharmacists to pursue a specialization in pain management, engage in continuing education courses related to this field, and access to professional development resources.

Understanding gender differences in these areas could pave the way for the formulation of targeted initiatives aimed at encouraging a more diverse range of pharmacists to seek expertise in pain management. Such efforts would not only promote equitable access to professional development opportunities but also potentially enhance the quality of pain management services provided by community pharmacists. This comprehensive approach could subsequently enhance the overall quality of patient care in the field of pain management.

Impact of Work Experience on Pharmacists´ Confidence in Non-Pharmacological Strategies and Counseling on Analgesic Use:

The findings from our study revealed a notable trend where work experience among community pharmacists was inversely related to their confidence in advising on non-pharmacological pain management strategies and the frequency of counseling about the use of over-the-counter (OTC) analgesics. This suggests that with more years in the field, community pharmacists may become less confident in discussing non-pharmacological approaches to pain management and may also become less proactive in advising patients on the use of over-the-counter analgesics. This could be due to changes in pain management practices over time, where newer approaches might not have been emphasized in the earlier stages of experienced pharmacists´ careers. Additionally, this could also be due to a lack of continued professional development that focused on these important areas.

In contrast, the study conducted in Jeddah, Saudia Arabia, evaluated the prescribing patterns and pharmacological knowledge of analgesics among community pharmacists. It found that while most pharmacists showed adequate knowledge of analgesics and prescribed them correctly, their depth of knowledge and prescribing confidence improved with more than five years of experience. Interestingly, this study also noted an initial weaker knowledge of analgesics among pharmacists with lesser community experience, which strengthens over time (168).

These findings from the Saudia Arabia study might initially appear to contradict our observations by suggesting that more experience leads to better pharmacological knowledge and, presumably, greater confidence in pharmacological practices. However, the observed decrease in confidence in non-pharmacological counseling in our study may indicate a growing reliance on pharmacological knowledge over time, potentially at the expense of exploring and discussing non-pharmacological pain management options with patients. This underscores the need for continuous education that balances pharmacological expertise with the promotion of non-pharmacological strategies.

Additionally, another study underscores the evolving role of pharmacists in self-medication and their critical position in advising patients on the safe and effective use of OTC analgesics (169). This recognition supports the vital role pharmacists play in patient education and in managing self-medication behaviors, emphasizing the importance of their expertise in ensuring the safe use of analgesics.

This evolving recognition necessitates a continuous approach to education and training for pharmacists, ensuring they are equipped with the most current knowledge and practices in pain management. To effectively enhance patient care and ensure pharmacists, regardless of their experience levels, are adequately prepared, it is essential to bridge the existing knowledge gaps related to non-pharmacological pain management strategies and the safe use of over-the-counter analgesics. Moreover, developing a comprehensive competency framework is crucial. Competency extends beyond basic knowledge, encompassing skills, experience, and the ability to apply understanding confidently in practical settings. This development should emphasize behavioral growth, habit formation, and the acquisition of new behaviors among pharmacists.

Additionally, a paradigm shift in the role of community pharmacists, particularly regarding pain management, is imperative. This shift involves equipping pharmacists with the knowledge to advise on the most appropriate routes of administration to overcome the first-pass effect and liver problems and providing guidance on proper and rational use of medications, including considerations for dosage, side effects, drug-drug interactions, and drug-diet interactions. Such competencies become even more critical when dealing with special populations such as children, the elderly, pregnant and nursing women, among others. This highlights the necessity for pharmacists to have a deep understanding of the nuances of pain management across different patient demographics. By fostering a comprehensive competency framework that integrates knowledge, skills, and experience, pharmacists can achieve a higher level of confidence and effectiveness in delivering patient-centered care, making a significant advancement in the role of pharmacists in pain management.

Implementing continuous education and training programs that incorporate the latest practices and research in pain management, including non-pharmacological approaches, is essential. Moreover, enhancing pharmacists' communication skills with patients, with a focus on counseling about over-the-counter medication use, could significantly improve patient safety and care outcomes.

Impact of Work Experience on Community Pharmacists´ Practice and Perceptions:

In our study, no significant associations were observed between work experience and several key factors, including multidisciplinary collaboration, self-rated knowledge of pain management, and perceptions of community pharmacists regarding the impact of restricted

sales of pain medications. These findings indicate that these crucial aspects of pharmacists´ professional practices are not significantly influenced by the duration of their experience in the field. Contrastingly, studies assessing community pharmacists´ knowledge and attitudes toward pain and pain management in Saudia Arabia and Nigeria revealed that variables such as age, work experience, nature of work, and work location significantly influenced pharmacists´ knowledge and attitudes toward pain management, highlighting a widespread inadequacy in pain-related knowledge and attitudes among pharmacists (121, 170). The divergence in findings underscores the complexity of factors influencing pharmacists´ professional development and competencies. It suggests that, rather than the mere passage of time in professional practice, it is the quality of continuous education, specific training, and engagement with diverse healthcare scenarios that enrich pharmacists´ expertise and attitudes toward pain management. This implies that other factors, such as individual interest, motivation, and interest in targeted educational opportunities, might play more critical roles in shaping pharmacists´ abilities to effectively participate in multidisciplinary teams and contribute to policy discussions. Therefore, encouraging pharmacists to engage in multidisciplinary teams and policy discussions early in their careers could foster a broader understanding and proactive approaches to these areas. Workplaces should facilitate opportunities for collaboration and involvement in policy and practice discussions, regardless of an individual´s level of experience, to ensure the development of well-rounded pharmacists capable of addressing the complexities of pain management in their practice.

Impact of Community Pharmacists´ Education Level on Knowledge and Regulation:

The findings from our study revealed that the level of education does not significantly associate with community pharmacists´ self-rated knowledge of pain management or their understanding of laws and regulations regarding controlled substances. This suggests that at least within the scope of our study, the level of education does not significantly influence pharmacists´ perceptions of their knowledge in managing pain or their understanding of relevant laws and regulations. In contrast, a study conducted in Nigeria underscored the significance of additional higher academic qualifications and clinically related degrees in enhancing knowledge scores. Specifically, pharmacists with additional higher academic qualifications and those with clinically related degrees exhibited significantly higher knowledge scores compared to their counterparts with only a primary degree (170).

The outcome of our study may reflect the standardized nature of pharmacy education programs, which are designed to ensure that all pharmacists graduate with a comprehensive understanding of key concepts in pain management and legal requirements. However, it also highlights a potential area for further development in pharmacy education.

To address this, incorporating more specialized or advanced courses focused on pain management and the legal aspects of pharmaceutical practice into pharmacy education programs is recommended. With the constant evolution of pain management strategies and changes in laws and regulations, continuing education programs are crucial in keeping pharmacists up-to-date. Moreover, enhancing the focus on practical skills related to counseling, patient communication, and ethical considerations could better prepare pharmacists for the complexities of managing pain and navigating the legalities of controlled substances.

Future research could explore the impact of specialized training or continuing education programs and pharmacists´ practices in pain management. While the level of education does not appear to significantly impact pharmacists´ self-assessments of their knowledge in key areas, there is still considerable room for enhancing pharmacy education. By focusing on areas for improvement, pharmacy education institutions can ensure that future pharmacists are well-equipped to meet the evolving needs of their profession and the patients they serve.

4.2.6 Enhancing Community Pharmacists´ Knowledge in Pain Management: Insights and Recommendations

Our study´s finding provides valuable insights into the current state of knowledge among community pharmacists in Norway regarding pain management, the use of over-the-counter (OTC) analgesics, and understanding of laws and regulations related to controlled substances (For details see Table 11). The findings suggest a moderately high level of knowledge in these areas, which is a positive indicator of the pharmacists´ ability to provide effective pain management advice and adhere to legal requirements in their practice. However, the variability in responses, particularly the presence of a significant minority with lower knowledge scores, highlights the need for continuing education and training to bridge these gaps. It is essential to address these knowledge gaps to ensure that all pharmacists can provide the highest level of care to patients.

In Norway, certain universities, such as The University of Southeast Norway (USN) in collaboration with Oslo University Hospital (OUS), offer continuing education programs in pain management (171). This program is designed for part-time studies and a combination of both physical and digital studies. While the focus of these programs has traditionally been on doctors, psychologists, nurses, physiotherapists, occupational therapists, and dentists. Given the vital role pharmacists play in pain management, these continuing education programs must be extended to include pharmacists as well. Collaborative efforts between pharmacy associations and the authorities responsible for designing these programs are essential to ensure pharmacists are also included in such programs. Participating in such programs would not only enable pharmacists to interact with healthcare professionals from various fields, promoting multidisciplinary collaboration but also provide pharmacists with a platform to share their practical experiences.

Furthermore, Apokus (123) and Kompetansebroen (122), digital platforms in Norway, offer several additional trainings for healthcare professionals. These platforms could also play a significant role in providing accessible continuing education in pain management.

Moreover, pharmacies themselves often conduct internal training programs. It is recommended that these programs also incorporate modules on pain management, keeping community pharmacists updated on recent studies, guidelines, and management strategies in pain care. This multi-faceted approach to continuing education and training is pivotal in

equipping pharmacists with the knowledge and skills necessary to effectively contribute to pain management and patient care within the community.

4.3 Strengths and Limitations:

Our study on the role of community pharmacists in pain management in Norway presents several notable strengths. It employs a comprehensive and systematic methodology, including a detailed questionnaire that captures insights across various dimensions of pain management, evidencing a robust approach to understanding community pharmacists´ perspectives. The application of descriptive statistics and ordinal regression analysis to assess associations between variables enhances the findings´ depth and reliability. One of the significant contributions of our study is its identification of key facilitators and barriers to effective pain management, offering actionable insights for improvement. Furthermore, linking the findings to concrete recommendations, such as the need for additional training and collaboration among healthcare professionals, our study provides actionable insights that can contribute to enhancing pain management practices in community pharmacies. Additionally, our study explores a relatively under-researched area, highlighting the critical role of community pharmacists in pain management, a topic of growing importance in healthcare. This fills a gap in the existing literature and sets a foundation for future research in pharmacy practice and pain management.

Despite its strengths, and the methodological limitations discussed earlier, our study also encounters these overlap limitations beyond those applied methods. Our findings are primarily based on responses from Norwegian community pharmacists, which may limit the generalizability of the results to regions or countries with different healthcare systems. Moreover, our study focuses predominantly on the pharmacists´ perspectives (which can be further deepened via focused group interviews) without directly incorporating the experiences and feedback of patients receiving pain management services from these pharmacists. Including patient perspectives could offer a more comprehensive view of the effectiveness of community pharmacists in pain management.

Addressing Bias and Recommendations for Mitigation:

In our study, a variety of biases have been introduced, either intentionally or unintentionally. While several of these biases and strategies for mitigating them have been already addressed earlier, additional potential biases and corresponding recommendations to overcome them are discussed below:

One significant source of bias arises from our methodology for disseminating the questionnaire. The questionnaire of our study was distributed through a closed social media group specifically serving Norwegian pharmacists. This approach could lead to sampling bias if this group is not representative of all Norwegian pharmacists (90). This could skew the results if members of the group share specific characteristics or views not widely held among all community pharmacists. To mitigate sampling bias, consider using multiple platforms and channels beyond the closed social media group, including professional organizations and associations for pharmacists across Norway, and direct contact with community pharmacies, ensuring a broader and more representative sample.

5 Conclusion

Our study highlights the crucial role that community pharmacists can play in pain management within Norway´s healthcare system. It provides a comprehensive examination of pharmacists´ knowledge, skills, and competencies in pain management, as well as the facilitators and barriers they encounter in their practice. Through a methodical approach, including a survey distributed among Norweigan community pharmacists, the study highlights the moderately high level of knowledge among pharmacists regarding pain management, the use of over-the-counter analgesics, and an understanding of laws and regulations related to controlled substances for pain control.

The findings reveal a critical need for continuous education and training programs for community pharmacists to enhance their knowledge and skills in pain management. Such programs should be made accessible and should include pharmacists in their design to ensure relevance and applicability. The involvement of pharmacists in continuing education programs, like those offered by the University of Southeast Norway, is recommended to ensure pharmacists are well-resourced to manage pain effectively. Our study also emphasizes the importance of multidisciplinary collaboration in pain management. It suggests that community pharmacists should be included in continuing education programs alongside other healthcare professionals, thereby enhancing the quality of pain management services provided to patients.

In addition to educational advancements, our study highlights the essential role of community pharmacists in patient safety, particularly in managing over-the-counter analgesics, educating clients and customers (or patients) who rely on pharmacists for their choice of over-the-counter (OTC) analgesics, though it identifies a need for greater awareness of the risks associated with certain analgesics, such as high doses of paracetamol. This highlights the importance of staying informed and updated on the latest evidence to carefully evaluate the benefits and risks of analgesic recommendations.

In conclusion, our study illustrates the comprehensive and dynamic role of community pharmacists in pain management, emphasizing the need for continued education, training, and awareness to enhance community pharmacists´ knowledge and skills. By addressing these needs, community pharmacists can significantly contribute to pain management and patient care within the community, ensuring that they are well-equipped to meet the complex needs of patients effectively.

6 Contributions

In the journey of completing my master´s thesis on the role of community pharmacists in pain management in Norway, I had the privilege of being supported by several key individuals and resources. The guidance and expertise of my supervisor, Parisa Gazerani, were invaluable throughout this process. Parisa designed this study and provided me with a solid foundation in both the conceptual and practical aspects of my research. Her mentorship offered critical insights and feedback at every stage, including the design of the methodology, the systematic literature search phase, the development of the questionnaire, the formulation of the research question, the statistical analysis, and the interpretation of the results. The librarians also played a crucial role by assisting in the extensive literature search required for my research. Their expertise in navigating various databases and accessing relevant resources was crucial to my thesis work.

Regarding my contribution to this thesis, I conducted a comprehensive literature search and review, and designed, executed, and distributed a detailed survey to collect data from community pharmacists across the country. I employed quantitative methods for data analysis, interpreted the results, and designed the figures and tables. This work not only demonstrated the significant foundational knowledge that community pharmacists possess regarding pain management but also identified critical areas for enhancement through further education and training. My efforts, supported by the expertise and encouragement of my supervisor, not only contribute to academic knowledge in this field but also suggest practical pathways for advancing the role of community pharmacists in pain management in Norway.

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8 Appendix List

Appendix 1: Systematic Literature Search

Appendix 1 provides a comprehensive literature overview and details the systematic literature search conducted to identify the most relevant articles for inclusion in our questionnaire formulation. This section shows in detail the specific steps and procedures undertaken, along with the outcomes derived from the search process.

This appendix includes the following elements:

Research Question:

The research question is formulated according to the aim of our study. Our aim of the study is to examine the community pharmacists' knowledge about pain management, their opinions and beliefs regarding pain management, and their perceived barriers and facilitators that may contribute to influencing this role. Therefore, our research question was formulated as:

"How do community pharmacists in Norway contribute to pain management, and what factors influence their knowledge, attitudes, and involvement in this area, including barriers and facilitators?"

Based on this research question, we considered a comprehensive search strategy aimed at identifying relevant literature and existing evidence within this field.

Search Strategy:

The search strategy for this study employed the PICO process to describe the parameters for selecting relevant studies. The PICO model assists in clearly defining the target population, intervention, comparison, and outcome (1). While the comparison aspect is not applicable in this study as there is no direct comparison. The target population is very important in our study as we are focusing only on the community pharmacists who are either working in the chain pharmacies or the private pharmacies. The PICO elements are detailed in Table 1.

Table 1: PICO Model for the Study

PICO Element	**Description**
Population (P)	Community pharmacist, Primary care pharmacist, retail pharmacist, and community pharmacy professionals.

Intervention (I)	Knowledge/opinions/beliefs/attitudes/ about pain, use of analgesics, pain management, pain control, pain relief, barriers/facilitators for pain management.
Comparison (C)	Not applicable
Outcome (O)	Affects quality of life/ increased use of analgesics, and fewer hospital admissions.

Inclusion Criteria:

The inclusion criteria were collaboratively established by the student and the supervisor. The following criteria were carefully described to guide a systematic literature search aimed at identifying articles for inclusion in our questionnaire formulation.

- Articles conducted in Norway and worldwide.
- Articles that evaluate the role of community pharmacists in pain management.
- Qualitative and quantitative articles published in English.
- Only full-text published articles.
- Articles published within the last 10 years.

Exclusion Criteria:

The exclusion criteria were determined through a collaborative effort between the supervisor and the student. Articles were excluded from consideration based on the following predefined criteria:

- Articles that do not evaluate the role of community pharmacists in pain management, e.g., clinical pharmacists or hospital pharmacists.
- Articles published in languages other than English.
- Short articles, abstracts, posters, and short conference articles for conference proceedings.

Database:

The databases used to conduct the systemic literature search were:

- PubMed
- Embase (Ovid)

Execution of the Literature Search Based on the Defined Strategy:

Once the procedures and the above-mentioned steps had been carefully outlined and carried out, a thorough literature search strategy was implemented to identify a wide range of relevant articles for the questionnaire. By using this methodological approach, we aim to reduce the possibility of missing important and related articles and increase the potential that our questionnaire will include a wide range of relevant articles. The systematic literature search emphasizes how important it is to follow a methodical strategy to minimize the possibility of missing important articles and maximize the retrieval of relevant articles. Different search words and search strategies were used for the two selected databases, PUBMED and EMBASE (OVID). Table 2 depicts the search strategy used for the PubMed database, while Table 3 outlines the search strategy used for Embase (Ovid). This strategic selection of search terms and methodology was designed to ensure a thorough exploration of the available literature.

Table 2: Search Term Used in PubMed

Database	**Search term**
PubMed	"pain management" OR "pain relief" OR "pain control" AND "Norway"
	"pain management" OR "pain relief" OR "pain control" AND "Community pharmacist "

	"pain management" OR "pain relief" OR "pain control" AND "Primary care pharmacist "
	"Pain manag*" and "community pharmacy"
	"pain manag*" AND "community pharmacy professionals"

Table 3: Search Term Used in Embase (OVID) Database

Database	**Search term**
Embase (OVID)	community pharmacist.mp. or exp community pharmacist/ primary care pharmacist.mp. retail pharmacist.mp. community pharmacy professionals.mp. 1 or 2 or 3 or 4 exp analgesia/ or analgesia.mp. analgesics.mp. or exp analgesic agent/ pain killers.mp. or exp pain/ pain management.mp. pain relief.mp. pain control.mp. pain mana*.mp. 6 or 7 or 8 or 9 or 10 or 11 or 12 5 and 13 limit 14 to (english language and yr="2013 - Current")

The comprehensive search in the PubMed database, conducted on October 19, 2023, utilizing a variety of search terms, identified a total of 430 articles. Subsequently, the search in the Embase (Ovid) database was executed on October 26, 2023, employing the search strategy and terms outlined in the inclusion criteria (see above heading named inclusion criteria). This search in the Embase (Ovid) database identified a total of 456 articles.

An Artificial Intelligence (AI) tool named Rayyan was used to organize and handle this large collection of material. This tool was recommended for its easy-to-use and strong organizing

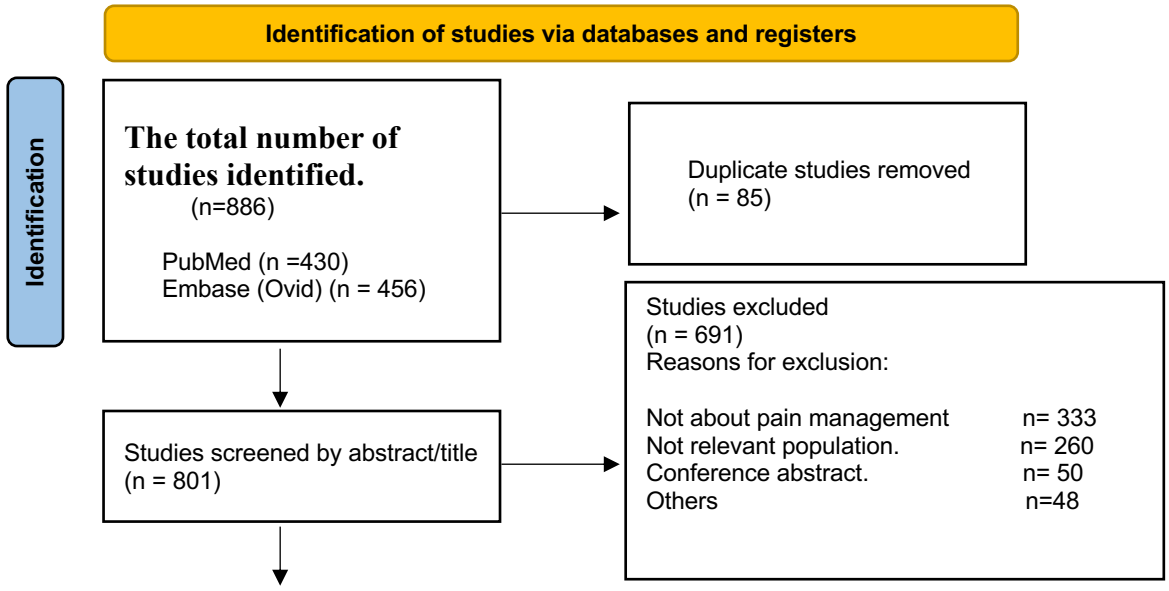
features by both Oslo Metropolitan University (OsloMet) and the librarians at our Faculty of Health Sciences. Rayyan was a great help in organizing and managing the large number of articles, which improved the effectiveness of the literature review procedure (2).

Screening of the Articles:

To facilitate the screening process and eliminate duplicates, the articles obtained from the two databases were imported into the Rayyan (2). Once duplicates were removed, each title and abstract was carefully examined against the established inclusion and exclusion criteria. Both the student and the supervisor independently conducted the screening process for titles and abstracts. This independent review process led to a mutual agreement, after a series of discussions, regarding the selection of the most relevant articles for inclusion in our questionnaire formulation. This approach ensured consistency and accuracy in the identification of the relevant articles.

To further enhance the filtering process, the Rayyan tool´s similarity detection feature was employed. This feature enabled the identification of articles with significant similarities, which were subsequently checked for redundancy. This step ensured that only unique and relevant articles remained for further consideration.

PRISMA Flowchart:



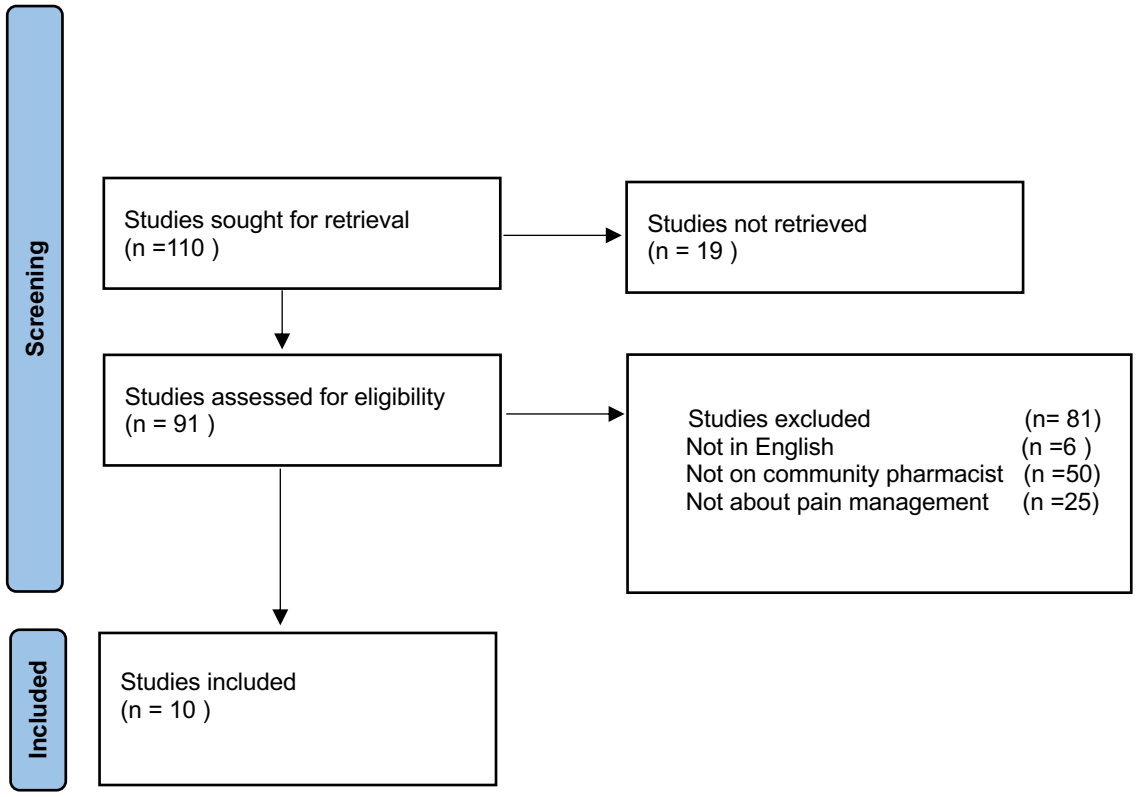


Figure 1 The PRISMA (3) Flowchart for the Included Articles.

Figure 1 precisely illustrates the step-by-step process involved in selecting the articles for the questionnaire. Each stage is comprehensively described in the diagram, and the reasons for excluding articles are also highlighted. A remarkable 886 articles were identified through two databases, and after a detailed selection process, 10 articles were ultimately used in the questionnaire. The thorough screening process ensured that only the most relevant articles were included. This approach ensured that the research objectives were effectively addressed.

Most Related Articles Included for Questionnaire Formulation:

Table 4 presents the articles that served as the source of inspiration for the formulation of the questionnaire. The table includes both qualitative and quantitative studies that were utilized in the questionnaire´s creation. The selection of these articles was based on their relevance to the research topic and the availability of data that could be used to develop questionnaire items.

Table 4: List of Articles Included And Used:

Articles	Research Type	Purpose	Study Design	Target Group	Main Findings	Conclusion
Ogunyinka I, Yusuff K, Erah PO, Oshikoya K, Faponle F, Ungo-Kore H, Oreagba I, Yakasai A, Idoko A, Ileoma S, Umar A. Community Pharmacists' Knowledge and Attitudes Towards Pediatric Pain Management in Nigeria. Risk Manag Health Policy. 2021 Nov 11;14:4595-4607. doi: 10.2147/RMHP.S329387. PMID: 34795543; PMCID: PMC8593593. (4)	Quantitative	The study was conducted with the objective of assessing the knowledge and attitude of community pharmacists in Nigeria regarding the management of pain in pediatric patients.	Cross-sectional descriptive survey	Community pharmacists	Community pharmacists with higher academic qualifications had significantly better knowledge of pediatric pain management. Factors like age, experience, location and prior pain management training also significantly influenced their knowledge.	The study concluded that the level of knowledge and the attitudes of community pharmacists in Nigeria towards managing pediatric pain are not at an optimal level. This finding suggests a significant need for ongoing and targeted educational programs.
Alorfi NM, Ashour AM, Algarni AS, Alsolami FA, Alansari AM, Tobaiqy M. Assessment of the Community Pharmacists' Knowledge and Attitudes Toward Pain and Pain Management in Saudi Arabia. Int J Gen Med. 2022 Dec 7;15:8527-8537. doi: 10.2147/IJGM.S387066.	Quantitative	To evaluate the knowledge and attitudes of community pharmacists in Saudi Arabia regarding pain management, with a focus on understanding their educational needs in this area.	Online cross-sectional survey	Community pharmacists	The study revealed that community pharmacists in Saudi Arabia generally have inadequate knowledge and attitudes toward pain management, influenced by factors like age, work experience, and location.	It is concluded that there is a significant need for enhanced education and training among pharmacists in Saudi Arabia regarding pain management to improve their knowledge and attitudes in this field.

PMID: 36514744; PMCID: PMC9741852. (5)						
Patel T, Chang F, Mohammed HT, Raman-Wilms L, Jurcic J, Khan A, Sproule B. Knowledge, Perceptions and Attitudes toward Chronic Pain and Its Management: A Cross-Sectional Survey of Frontline Pharmacists in Ontario, Canada. PLoS One. 2016 Jun 7;11(6):e0157151. doi: 10.1371/journal.pone.0157151. PMID: 27270723; PMCID: PMC4896448. (6)	Quantitative	To evaluate the knowledge, attitudes and perceptions of pharmacists in Ontario regarding the management of chronic non-cancer pain, focusing on chronic low back pain, chronic headache disorders, and painful diabetic neuropathy.	A cross-sectional survey	Community pharmacists, pharmacists working in community health centers, and family health teams.	Pharmacists showed a moderate level of knowledge about chronic pain management but exhibited gaps, particularly in opioid management and specific aspects of pain conditions.	The study reports that Pharmacists in Ontario need further education in chronic pain management, especially concerning opioids, to enhance their role in effective and safe treatment.
Nasser M Alorfi. "PRESCRIBING PATTERNS AND PHARMACOLOGICAL KNOWLEDGE OF ANALGESICS AMONG COMMUNITY PHARMACISTS IN JEDDAH, SAUDI ARABIA". *Bulletin of Pharmaceutical Sciences Assiut University*, 46, 1,	Quantitative	To assess and highlight the understanding and practices related to prescribing analgesics, identifying areas where pharmacists may need more education.	A cross-sectional survey	Community pharmacists	Community pharmacists generally displayed correct prescribing patterns and adequate knowledge of analgesics, with knowledge improving significantly with more years of experience.	The study underscores the importance of continuous learning and experience in enhancing pharmacists' knowledge, particularly in the field of analgesic drugs, to ensure effective and safe patient care.

2023, 647-657. doi: 10.21608/bfsa.2023.301293. (7)						
Gavaza P, Vickery P. Gaps in the Pharmacist's Pain Management Role. Pract Pain Manag. 2018;18(6). (8)	Quantitative	To evaluate the knowledge and attitudes of pharmacists, identify their opinions and beliefs towards pain management, identify barriers, and understand the pharmacist´s role in dispensing pain medications.	Cross-sectional survey	Community and hospital pharmacists	The majority of pharmacists recognized prescription opioid analgesic abuse as a community problem.	The study found that Pharmacists have gaps in knowledge regarding pain management and controlled substances. More education and research are needed to improve pharmacists' effectiveness in pain management, address regulatory fears, and enhance their participation in pain care.
Mishriky J, Stupans I, Chan V. An investigation of the views and practices of Australian community pharmacists on pain and fever management and clinical guidelines. Pharm Pract (Granada). 2019 Apr-Jun;17(2):1436. doi: 10.18549/PharmPract.2019.2.1436. Epub 2019 Jun 11. PMID: 31275495; PMCID: PMC6594427. (9)	Quantitative	This study aimed to explore Australian community pharmacists 'approaches and perceptions towards managing pain and fever, including their adherence to and views on relevant clinical guidelines.	Cross-sectional study	Community pharmacists.	A significant finding was that the majority of Australian community pharmacist favor paracetamol as their primary recommendation for managing mild to moderate pain and fever, with ibuprofen as a secondary option. Furthermore, most pharmacist consider themselves well-informed about pain and fever management but concurrently express a need for additional training in this field. This highlights a combination of	The study highlighted a generally positive view among pharmacists toward the use of clinical guidelines for pain and fever management. However, it also indicated a need for ongoing education and upskilling in this area. The results suggest a potential gap between the existing guidelines and their practical application, underlining the importance of integrating both guidelines and clinical experience for optimal patient care.

					confidence and perceived gaps in their professional knowledge and practice.	
Lalonde L, Leroux-Lapointe V, Choinière M, Martin E, Lussier D, Berbiche D, Lamarre D, Thiffault R, Jouini G, Perreault S. Knowledge, attitudes and beliefs about chronic noncancer pain in primary care: a Canadian survey of physicians and pharmacists. Pain Res Manag. 2014 Sep-Oct;19(5):241-50. doi: 10.1155/2014/760145. PMID: 25299473; PMCID: PMC4197751. (10)	Quantitative	The objective of the study was to assess and determine the factors influencing primary care physicians 'and pharmacists´ knowledge, attitudes, and beliefs (KAB) regarding chronic noncancer pain (CNCP). Additionally, the research aimed to record clinicians´ preferred content and delivery methods for a continuing education program (CEP).	Cross-sectional survey	Community pharmacists and physicians.	Physicians and pharmacists demonstrated moderate knowledge levels about CNCP, with mean KnownPain-50 scores of 69.3% for physicians and 63.8% for pharmacists.	The research findings emphasized the importance of a continuing education program (CEP) in enhancing the knowledge and skills of primary care providers for effective chronic noncancer pain management. The study underscored the necessity to reduce misconceptions and adjust the attitudes of clinicians toward CNCP. Moreover, it indicated a modest positive link between the time dedicated to CEP and the enhancement of knowledge levels among healthcare professionals.
Tabeefar H, Chang F, Cooke M, Patel T. Community pharmacists and chronic pain: A qualitative study of experience, perception, and challenges. Can J Pain. 2020 Sep 24;4(3):29-39. doi: 10.1080/24740527.2020.1749	Qualitative	This research aimed to explore the experiences, beliefs, and perceptions of pharmacists regarding patients with chronic non-cancer pain (CNCP). It focused on understanding pharmacists 'roles in	The study employed a qualitative exploratory design,	Community pharmacists.	The study revealed pharmacists´ knowledge and empathetic attitudes towards patients with chronic pain, while also highlighting challenges related to financial factors, access to multimodal treatment options, potential harm from opioid use,	The study concluded that community pharmacists play a significant and empathetic role in managing patients with chronic non-cancer pain. It highlighted the importance of effective communication between pharmacists and other healthcare providers, as well as the need for

516. PMID: 33987509; PMCID: PMC7942791. (11)		patients care for CNCP, their views on patients suffering from this condition, and their communication experiences with prescribers in the context of CNCP management.	utilizing one-on-one interviews.		inadequate monitoring, and training gaps.	comprehensive training and support in chronic pain management. The research also underscored the value of diverse perspectives within the research team in developing a balanced approach to understanding pharmacists 'experiences and challenges in this field.
Cid A, Ng A, Ip V. Addressing the Opioid Crisis-The Need for a Pain Management Intervention in Community Pharmacies in Canada: A Narrative Review. Pharmacy (Basel). 2023 Apr 6;11(2):71. doi: 10.3390/pharmacy11020071. PMID: 37104077; PMCID: PMC10144945. (12)	Qualitative	The study focused on evaluating the necessity and potential framework for the community pharmacy-based intervention in pain management within Canada. It aimed to address the growing opioid crisis by enhancing the role of pharmacists as key players in opioid and chronic pain management.	A systematic review was conducted through a literature search in different databases.	Community pharmacists.	The review highlighted the importance of multifaceted interventions for effective pain management, the need for continuous education of pharmacists, and the identification of barriers such as pharmacy workflow and attitudes towards opioids. It also emphasizes the potential of pharmacists to provide more comprehensive opioid and pain management.	The study concluded that enabling pharmacists to offer more comprehensive pain management services could significantly contribute to addressing the opioid crisis in Canada. It suggested developing community-based pharmacist-led interventions to manage chronic pain and opioid use. Such interventions, ideally being multifaceted and well-integrated into the healthcare system, could lead to improved patient outcomes and better utilization of healthcare resources.
Iqbal A, David Knaggs R, Anderson C, Toh LS. Role of pharmacists in optimising	Qualitative	The study focused on assessing how effective pharmacists are in	Systematic review	Community pharmacists.	Pharmacists 'interventions were effective in reducing opioid dosage in some cases	The review underscores the feasibility and benefits of pharmacist interventions in opioid

opioid therapy for chronic non-malignant pain; A systematic review. Res Social Adm Pharm. 2022 Mar;18(3):2352-2366. doi: 10.1016/j.sapharm.2020.11.014. Epub 2020 Nov 24. PMID: 33309322. (13)		leading interventions within outpatients, community pharmacies, and primary care settings to improve the management of opioid treatment for patients suffering from chronic non-malignant pain (CNMP). Additionally, the study aimed to gather perspectives on the pharmacist's role in this context.			and improving patient safety regarding opioid use. The review highlighted the potential of pharmacist in optimizing opioid therapy for CNMP, suggesting further development of their role.	optimization for CNMP patients in outpatients' settings. However, it calls for more research to guide policy and practice development for pharmacists in enhancing opioid safety.

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7. Alorfi NM. Prescribing patterns and pharmacological knowledge of analgesics among community pharmacists in Jeddah, Saudi Arabia. Bulletin of Pharmaceutical Sciences Assiut. 2023;46(1):647-57.
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Appendix 2: SIKT Conformation

- **Melding fra Lasse Andre Raa (Rådgiver)** 28.11.2023 12:04

  Det fremgår av meldeskjema med vedlegg at det ikke skal behandles opplysninger i prosjektet som kan identifisere enkeltpersoner hverken direkte eller indirekte. Vi legger til grunn at det benyttes en anonym spørreskjemaløsning, det vil si at det ikke skjer kobling mellom IP-adresser og den enkelte besvarelse, samt at det ikke registreres indirekte identifiserende kombinasjoner av bakgrunnsopplysninger. Prosjektet trenger derfor ikke en vurdering fra Personverntjenester. Vi bemerker at det kan være vanskelig å vite på forhånd hva deltakere oppgir i åpne tekstfelt, og anbefaler derfor at dere vurderer behovet for slike felt, slik at prosjektet unngår å registrere identifiserende opplysninger. HVA MÅ DU GJØRE DERSOM DU LIKEVEL SKAL BEHANDLE PERSONOPPLYSNINGER? Dersom prosjektopplegget endres og det likevel blir aktuelt å behandle personopplysninger, må du melde dette til Personverntjenester ved å oppdatere meldeskjemaet. Vent på svar før du setter i gang med behandlingen av personopplysninger. VI AVSLUTTER OPPFØLGING AV PROSJEKTET Siden prosjektet ikke behandler personopplysninger, avslutter vi all videre oppfølging. Lykke til med prosjektet!

Nettskjema

Appendix 3: Questionnaire

Role of community pharmacists in Pain management in Norway

Studien viser at 30% av den voksne befolkningen i Norge lider av kroniske smerter. Mange søker hjelp hos farmasøyter med varierte behov, som inkluderer initiering av smertestillende medisiner, spørsmål angående doseringen og/- eller bivirkninger av analgetika, vurdering av alternative medikamenter, eller å utforske muligheten for å legge til andre medikamenter for å forbedre smertelindringen.
Formålet med vår studie er å kartlegge kunnskapen og holdningene blant apotekfarmasøyter i forhold til smertehåndtering. Spesielt er vi interessert i å evaluere apoteksfarmasøyter kunnskap om smertehåndtering, samt apoteksfarmasøytenes komfortnivå når det gjelder utlevering av smertestillende til pasienter som søker råd eller resept. I tillegg vil vi samle apoteksfarmsøyters meninger og tro på smertehåndtering, samt deres oppfattende hindringer og faktorer som kan bidra til suboptimal funksjon i denne rollen. Gjennom dette ønsker vi å skape større oppmerksomhet rundt dette emnet og øke den praktiske kunnskapen blant apoteksfarmasøyter.

Vi håper derfor at du kan ta deg tid til å gi dine svare. Spørreundersøkelsen vil ta ca 10 minutter å svare på og resultatene fra denne undersøkelsen vil bli brukt i forbindelse med mitt masterprosjekt innen farmasi ved OsloMet, der jeg, Syed Hassan Mujtaba, er masterstudent. Dette prosjektet gjennomføres under veiledning av mitt prosjekt veileder, Parisa Gazerani.
Disclaimer:
Dette er en anonym nettbasert undersøkelse, og SIKT er informert om denne anonyme undersøkelsen. Vi vil ikke samle inn noen av dine personlige eller sensitive opplysninger. For å delta i denne undersøkelsen må du være autorisert farmasøyt og jobber enten i kjedeapotek eller i private apotek. Ved å delta i denne undersøkelsen gir du oss samtykke til å bruke svarene til akademiske formål, forskning og publisering av data i form av en vitenskapelig artikkel.

Er du en autorisert farmasøyt i Norge

- Ja
- Nei

Jobber du i et kjedeapotek eller i et privat apotek

- Ja
- Nei

Takk for din interesse for å delta i undersøkelsen. Dessverre samler vi bare data fra apoteksfarmasøyter som jobber i kjede-eller private apotek.

SPØRRESKJEMA:

Spørreskjemaet for studien besto av **4 deler,** som **sosiodemographi, kunnskap, ferdigheter og kompetanse innen smerte og smertebehandling ved hjelp av smertestillende, selvrapportert kompetanse om smertebehandling,** og den siste delen om faktorer som **fremmer eller hindrer apoteksfarmasøyters rolle i smertehåndtering og smertebehandling.**

DEL 1: Sosiodemografiske kjennetegn ved studiedeltakerne:

1. Kjønn:

- Mann
- Kvinne
- Annet

Ønsker ikke å svare

2. Alder

21-26 år
27-32 år
>32 år

3. Arbeidserfaring

Nyutdannet Farmasøyt
<5 år
5-10 år
>10 år

4. Utdanningsnivå

Bachelor i farmasi
Master i farmasi
Annet

4.1 Hvis annet, vennligst beskriv nedenfor

5. Arbeidssted i Norge

Nordlige region
Sentrale region
Østlige region
Vestlige region
Sørlige region

6. Noen gang fått opplæring i smertehåndtering

Ja
Nei
Husker ikke

6.1 Hvis JA, hvor fikk du opplæring

På apoteket
På skole ved studie
Annet

6.1.1 Hvis annet, vennligst beskrive nedenfor

7. Farmasiutdanning oppnådd i Norge

Ja
Nei

7.1 Dersom svaret er Nei, fra hvilket land tok du farmasiutdanningen din

DEL 2: Kunnskap, ferdigheter og kompetanse innen smerte og smertebehandling ved hjelp av smertestillende:

Nettskjema

1. "WHO-analgesic ladder" for barn inkluderer ikke svake opioider.

Vennligst velg det alternativet som best beskriver din grad av enighet:

- Sterkt uenig
- Uenig
- Verken enig eller uenig
- Enig
- Sterkt enig

2. Føler spedbarn mindre smerte enn voksne i lignende situasjoner?

- Sterkt uenig
- Uenig
- Verken enig eller uenig
- Enig
- Sterkt enig

3. Valg av anbefalt smertestillende bør avhenge av smerteintensitet

- Sterkt uenig
- Uenig
- Verken enig eller uenig
- Enig
- Sterkt enig

4. Kognitiv atferdsterapi (Cognitive behavioural therapy CBT) er svært effektiv i behandling av kroniske smerter og bør brukes så tidlig som mulig i behandlingsplanen for de fleste pasienter med kroniske smerter

- Sterkt uenig
- Uenig
- Verken enig eller uenig
- Enig
- Sterkt enig

5. Behandling av kroniske smerter bare med analgetiske og adjuvante smertestillende* er effektivt hos de fleste pasienter

(*Legemidler som opprinnelig ble utviklet for behandling av andre tilstander, men som også har egenskaper som gjør dem nyttige som smertestillende midler for eksempel antidepressiver, kortikosteroider, antiepileptika, gabapentinnoider osv. (https://sml.snl.no/smertestillende_midler)

- Sterkt uenig
- Uenig
- Verken enig eller uenig
- Enig
- Sterkt enig

6. Bruk av reseptfri Paracetamol er kontraindisert ved astma og lungebetennelse

- Sterkt uenig

Uenig
Verken enig eller uenig
Enig
Sterkt enig

7. NSAIDs (Ikke-steroide antiinflammatoriske midler) kan øke risikoen for hjerte- og karsykdommer, inkludert hjerteinfarkt, hjerneslag, hjertesvikt og atrieflimmer

Sterkt uenig
Uenig
Verken enig eller uenig
Enig
Sterkt enig

8. Antidepressiva vanligvis bidrar til å lindre symptomer og forbedre funksjonen hos pasienter med kroniske smerter

Sterkt uenig
Uenig
Verken enig eller uenig
Enig
Sterkt enig

9. Å kombinere analgetika som virker ved ulike mekanismer (f.eks. å kombinere en NSAID med en opioid) kan resultere i bedre smertekontroll med færre bivirkninger enn å bruke en enkelt analgetisk agent.

Sterkt uenig
Uenig
Verken enig eller uenig
Enig
Sterkt enig

10. Etter at en initial dose av en opioidanalgetikum er gitt, bør påfølgende doser justeres i tråd med den enkelte pasients respons

Sterkt uenig
Uenig
Verken enig eller uenig
Enig
Sterkt enig

DEL 3: Selvrapportert Kompetanse om Smertebehandling:

1. Hvor tilfredsstillende synes du at farmasiutdanningen din har vært når det gjelder narkotika/rusmidler og smertebehandling?

Lav
Moderat
Middels

Høy
Svært høy

2. Hvor ofte gir du råd til pasienter om bruk av reseptfrie smertestillende medisiner?

Svært ofte
Ofte
Av og til
Sjelden
Svært sjelden
Aldri

3. Hvor komfortabel føler du deg med å gi råd om riktig bruk av reseptfrie smertestillende medisiner?

(Skala: 1= Ikke komfortable, 5= Svært komfortabel)

4. Har du opplevd at pasienter søker råd om alternative ikke-farmakologiske strategier for smertebehandling, som kalde og varme omslag/ poser, ikke-medisinske geler og medisiner osv

Ja
Nei
Husker ikke

5. Hvor selvsikker føler du deg når du gir veiledning om alternative ikke-farmakologiske smertebehandlingsstrategier?

(Skala: 1= Ikke selvsikker, 5= Svært selvsikker)

6. Når pasienter spør om reseptfrie smertestillende medisiner, diskuterer du ofte mulige interaksjoner med deres andre medisiner eller eksisterende tilstander?

Ja
Nei
Vet ikke
Husker ikke

7. Min generelle preferanse er å anbefale Paracetamol fremfor ibuprofen.

Sterk uenig
Uenig
Verken enig eller uenig
Enig
Sterkt enig

7.1 Hvorfor? Vennligst beskrive nedenfor.

8. Er du kjent med spesifikke retningslinjer eller anbefalinger knyttet til bruk av reseptfrie smertestillende medisiner for smertebehandling i Norge?

Ja
Nei

Vet ikke

9. Din kunnskap om lover og forskrifter knyttet til controlled substances (Narkotika/rusmidler) og smertebehandling.

Lav
Middels
Høy
Svært høy

10. Din kunnskap om controlled substances (Narkotika/Rusmidler).

Lav
Middels
Høy
Svært høy

11. Jeg kunne ha nytte av noe opplæring når det gjelder Smertebehandling.

Sterkt uenig
Uenig
Nøytral
Enig
Sterkt enig

12. Kliniske retningslinjer er NYTTIGE når det gjelder smertebehandling.

Sterkt uenig
Uenig
Verken enig eller uenig
Enig
Sterkt enig

13. Å følge kliniske retningslinjer er VIKTIG når det gjelder Smertebehandling.

Sterkt uenig
Uenig
Verken enig eller uenig
Enig
Sterkt enig

14. Hvordan vil du vurdere din kunnskap om smertebehandling på en skala fra 1 til 5
(1= Lav, 5=Svært høy)

DEL 4: Fremmende og hemmende faktorer for apoteksfarmasøyters rolle i smertehåndtering og smertebehandling:

1. Sammenlignet med andre pasienter, hvilke barrierer/ utfordringer møter du med pasienter som har kroniske smerter? Vennligst merk alle som gjelder

Mangel på kunnskap om smertebehandling
Kommunikasjonsvansker

Frykt for opioidutlevering
Sikkerhetsspørsmål
Ukomfortabel ved rådgivning til gravide, barn eller eldre med kroniske smerter
Ingen av de nevnte utfordringene
Andre

1.1 Hvis annet, vennligst skriv nedenfor

2. Hva er de spesifikke forskjellene du opplever hos pasienter med kroniske smerter sammenlignet med andre pasienter? Vennligst merk alle som gjelder.

Hyppigere bruk av smertestillende medisiner
Mer angst eller depresjon
Behov for spesialisert smertehåndtering
Endring i daglig funksjon eller livskvalitet
Sosiale utfordringer knyttet til smertetilstand
Andre

2.1 Hvis annet, vennligst skriv nedenfor

3. I din mening, trenger apoteksfarmasøyter mer opplæring når det gjelder smerter for å kunne imøtekomme pasientenes behov?

Ja
Nei
Kanskje
Vet ikke

4. Ønsker du muligheten til å delta på en opplæring/ kurs som kan bidra til å forbedre din kunnskap, ferdigheter og kompetanse innen smertehåndtering på et apotek?

Ja
Nei
Kanskje
Vet ikke

4.1 Dersom du svarer ja, kan du fortelle oss hvilken form for opplæring du foretrekker.

Nettbasert
Seminar
Temakveld
Annet

4.1.1 Hvis annet, vennligst spesifiser nedenfor

5. I din mening, hvor effektivt kan en farmasøyt samarbeide med andre helsepersonell for å forbedre omsorgen for pasienter med kroniske smerter?

Svært lite effektivt

- Lite effektivt
- Verken effektivt eller ineffektivt
- Effektivt
- Svært effektivt

6. Hvor ofte deltar du i samarbeidende diskusjoner om smertehåndtering med andre helsepersonell?

- Daglig
- Ukentlig
- Månedlig
- Sjeldnere
- Aldri

7. Hvordan påvirker bekymringer knyttet til apotekets arbeidsflyt og tilgjengelighet av tid din evne til å gi omfattende råd om smertehåndtering?

- Påvirker i stor grad
- Påvirker noe
- Har ingen påvirkning
- Vet ikke

8. Hva mener du er den mest betydningsfulle utfordringen knyttet til apoteksfarmasøyter rolle når det gjelder å hjelpe pasienter med smertehåndtering? (Flere alternativer er mulige)

- Begrenset tid til rådgivning
- Høyt arbeidsvolum
- Mangel på bemanning
- Ingen av de nevnte utfordringene
- Andre utfordringer

8.1 Hvis annet utfordringer, vennligst spesifiser nedenfor

9. Påvirker bemanningen på apoteket din evne til å gi råd om smertehåndtering?

- Ja
- Nei
- Kanskje
- Vet ikke

10. Et det tilstrekkelig bemanning i ditt apotek for å håndtere pasienters behov for smertehåndtering?

- Ja, mer enn tilstrekkelig
- Ja, tilstrekkelig
- Nei, knapt tilstrekkelig
- Nei, langt fra tilstrekkelig
- Usikker

11. I hvilken grad tror du at klare retningslinjer og protokoller for smertehåndtering kan hjelpe i din praksis som farmasøyt?

- Svært hjelpsomt
- Hjelpsomt
- Nøytralt
- Ikke så hjelpsomt
- Ikke hjelpsomt i det hele tatt

12. I hvilken grad gir du pasientopplæring/ råd for å lette bekymringer og misforståelser om smertestillende medisiner?

- Ofte
- Av og til
- Sjeldnere
- Aldri
- Usikker

13. I din mening, i hvilken grad kan du hjelpe pasienter med smerter med å forbedre eller lindre smertene deres?

- I svært liten grad
- I liten grad
- Verken i liten eller stor grad
- I stor grad
- I svært stor grad

14. Begrenset salg av smertestillende medikamenter bidrar til å lette apotekfarmasøyters rolle i smertehåndtering?

- Sterkt uenig
- Uenig
- Verken uenig eller enig
- Enig
- Sterkt enig

15. Vennligst skriv i boksen nedenfor faktorer som letter effektiv smertehåndtering i et apotek?

Nettskjema

Role of community pharmacists in Pain management in Norway

The study shows that 30% of the adult population in Norway suffer from chronic pain. Many seek help from pharmacists with varied needs, which include initiation of pain medication, questions regarding the dosage and/or side effects of analgesics, consideration of alternative medications, or exploring the possibility of adding other medications to improve pain relief. The purpose of our study is to explore the knowledge and attitudes among community pharmacists in regarding pain management. In particular, we are interested in evaluating community pharmacists' knowledge of pain management, as well as the community pharmacists' comfort level when it comes to dispensing painkillers to patients seeking advice or a prescription. In addition, we will gather community pharmacists' opinions and beliefs about pain management, as well as their perceived barriers and factors that may contribute to suboptimal functioning in this role. Through this, we want to create greater attention to this subject and increase practical knowledge among community pharmacists.

We therefore hope that you can take the time to give your answers. The survey will take about 10 minutes to answer and the results from this survey will be used in connection with my master's project in pharmacy at OsloMet, where I, Syed Hassan Mujtaba, is a master's student. This project is carried out under the guidance of my project supervisor, Parisa Gazerani.

Disclaimer:

This is an anonymous online survey, and SIKT has been informed about this anonymous survey. We will not collect any of your personal or sensitive information. To participate in this survey, you must be an authorized pharmacist and work either in chain pharmacies or in private pharmacies.
By participating in this survey, you give us consent to use the answers for academic purposes, research and publication of data in the form of a scientific article.

Are you an authorized pharmacist in Norway?

Yes

No

Do you work in a chain pharmacy or in a private pharmacy?

Yes

No

Thank you for your interest in participating in the survey. Unfortunately, we only collect data from

Community pharmacists who work in chain or private pharmacies.

Nettskjema

QUESTIONNAIRE:

The questionnaire for the study consisted of **4 parts,** such as **socio-demography, knowledge, skills and competence in pain and pain management using painkillers, self-reported competence about pain management,** and the last part on factors that **promote or hinder the role of community pharmacists in pain management and pain treatment.**

PART 1: Sociodemographic characteristics of the study participants:

1. Gender:

Man

Woman

Other

Don't want to answer

2. Age

21-26 years

27-32 years

>32 years

3. Work experience

Newly graduated Pharmacist

<5 years

5-10 years

>10 years

4. Level of education

Bachelor in Pharmacy

Masters in Pharmacy

Other

4.1 If otherwise, please describe below

5. Workplace in Norway

Northern region

Central region

Eastern region

Western region

Southern region

6. Ever received training in pain management

Yes

No

Do not remember

6.1 If YES, where did you receive your training?

At the pharmacy

At school when studying

Other

6.1.1 If otherwise, please describe below

7. Pharmacy education obtained in Norway

Yes

No

7.1 If the answer is No, from which country did you receive your pharmacy education

PART 2: Knowledge, skills and competence in pain and pain management using painkillers:

1. The "WHO analgesic ladder" for children does not include weak opioids.

Please select the option that best describes your level of agreement:

Strongly disagree

Disagree

Neither agree nor disagree

Agreed

Strongly agree

2. Do infants feel less pain than adults in similar situations?

Strongly disagree

Disagree

Neither agree nor disagree

Agreed

Strongly agree

3. Choice of recommended pain reliever should depend on pain intensity

Strongly disagree

Disagree

Neither agree nor disagree

Agreed

Strongly agree

4. Cognitive behavioral therapy (CBT) is very effective in the treatment of chronic pain and should be used as early as possible in the treatment plan for most patients with chronic pain

Strongly disagree

Disagree

Neither agree nor disagree

Agreed

Strongly agree

5. Treatment of chronic pain only with analgesic and adjuvant painkillers* is effective in most patients

(*Medicines that were originally developed for the treatment of other conditions, but which also have properties that make them useful as painkillers, for example antidepressants, corticosteroids, antiepileptics, gabapentinoids, etc. (https://sml.snl.no/ smertestillende_midler)

Strongly disagree

Disagree

Neither agree nor disagree

Agreed

Strongly agree

6. Use of over-the-counter Paracetamol is contraindicated in asthma and pneumonia

Strongly disagree

Disagree

Neither agree nor disagree

Agreed

Strongly agree

7. NSAIDs (Non-Steroidal Anti-Inflammatory Drugs) may increase the risk of cardiovascular disease, including heart attack, stroke, heart failure and atrial fibrillation

Strongly disagree

Disagree

Neither agree nor disagree

Agreed

Strongly agree

8. Antidepressants usually help relieve symptoms and improve function in patients with chronic pain

Strongly disagree

Disagree

Neither agree nor disagree

Agree

Strongly agree

9. Combining analgesics that act by different mechanisms (eg, combining an NSAID with an opioid) may result in better pain control with fewer side effects than using a single analgesic agent.

Strongly disagree

Disagree

Neither agree nor disagree

Agree

Strongly agree

10. After an initial dose of an opioid analgesic is given, subsequent doses should be adjusted in line with the individual patient's response

Strongly disagree

Disagree

Neither agree nor disagree

Agree

Strongly agree

PART 3: Self-reported Competence on Pain Management:

1. How satisfactory do you think your pharmacy education has been in terms of narcotics and pain management?

Low

Moderate

Medium

High

Very high

2. How often do you advise patients on the use of over-the-counter pain relievers?

Very often

Often

Occasionally

Rare

Very rare

Never

3. How comfortable do you feel giving advice on the appropriate use of over-the-counter pain medications?

(Scale: 1= Not comfortable, 5= Very comfortable)

4. Have you experienced patients seeking advice on alternative non-pharmacological strategies for pain management, such as cold and hot compresses/pouches, non-medicinal gels and medicines, etc.

Yes

No

Do not remember

5. How confident do you feel when giving advice on alternative non-pharmacological pain management strategies?
(Scale: 1= Not confident, 5= Very confident)

6. When patients ask about over-the-counter pain medications, do you often discuss possible interactions with their other medications or existing conditions?

Yes

No

Do not know

Do not remember

7. My general preference is to recommend Paracetamol over Ibuprofen.

Strongly disagree

Disagree

Neither agree nor disagree

Agreed

Strongly agree

7.1 Why? Please describe below.

8. Are you familiar with specific guidelines or recommendations relating to the use of over-the-counter painkillers for pain management in Norway?

Yes

No

Do not know

9. Your knowledge of laws and regulations relating to controlled substances (narcotics) and pain management.

Low

Medium

High

Very high

10. Your knowledge of controlled substances.

Low

Medium

High

Very high

11. I could benefit from some training in Pain Management.

Strongly disagree

Disagree

Neutral

Agreed

Strongly agree

12. Clinical guidelines are USEFUL when it comes to pain management.

Strongly disagree

Disagree

Neither agree nor disagree

Agreed

Strongly agree

13. Following clinical guidelines is IMPORTANT when it comes to Pain Management.

Strongly disagree

Disagree

Neither agree nor disagree

Agreed

Strongly agree

14. How would you rate your knowledge of pain management on a scale from 1 to 5

(1= Low, 5= Very high)

PART 4: Promoting and inhibiting factors for the role of community pharmacists in pain management and pain treatment:

1. Compared to other patients, what barriers/challenges do you encounter with patients who have chronic pain? Please mark all that apply

Lack of knowledge about pain management

Communication difficulties

Fear of opioid dispensing

Security issues

Uncomfortable when counseling pregnant women, children or the elderly with chronic pain

None of the aforementioned challenges

Others

1.1 If otherwise, please write below

2. What are the specific differences you experience in patients with chronic pain compared to other patients? Please mark all that apply.

More frequent use of painkillers

More anxiety or depression

Need for specialized pain management

Change in daily function or quality of life

Social challenges related to the pain condition

Others

2.1 If otherwise, please write below

3. In your opinion, do communtiy pharmacists need more training regarding pain in order to meet patients' needs?

Yes

No

Maybe

Do not know

4. Do you want the opportunity to participate in a training/course that can help improve your knowledge, skills and competence in pain management in a pharmacy?

Yes

No

Maybe

Do not know

4.1 If you answer yes, you can tell us which form of training you prefer.

Web-based

Seminar

Theme evening

Other

4.1.1 If otherwise, please specify below

5. In your opinion, how effectively can a pharmacist collaborate with other healthcare professionals to improve care for patients with chronic pain?

Very ineffective

Little effective

Neither effective nor ineffective

Effectively

Very effective

6. How often do you participate in collaborative discussions about pain management with other healthcare professionals?

Daily

Weekly

Monthly

Less often

Never

7. How do concerns related to pharmacy workflow and time availability affect your ability to provide comprehensive pain management advice?

It affects to a large extent

It affects to a little extent

Has no influence

Do not know

8. What do you think is the most significant challenge related to the role of community pharmacists when it comes to helping patients with pain management? (Several options are possible)

Limited time for advice

High workload

Lack of staffing

None of the aforementioned challenges

Other challenges

8.1 If other challenges, please specify below

9. Does the staffing at the pharmacy affect your ability to give advice on pain management?

Yes

No

Maybe

Do not know

10. Is there sufficient staffing in your pharmacy to handle patients' needs for pain management?

Yes, more than sufficient

Yes, sufficient

No, barely sufficient

No, far from sufficient

Unsure

11. To what extent do you think that clear guidelines and protocols for pain management can help in your practice as a pharmacist?

Very helpful

Helpful

Neutral

Not so helpful

Not helpful at all

12. To what extent do you provide patient education/advice to ease concerns and misunderstandings about painkillers?

Often

Occasionally

Less often

Never

Unsure

13. In your opinion, to what extent can you help patients with pain to improve or relieve their pain?

To a very small extent

To a small extent

Neither to a small nor to a large extent

Largely

To a very large extent

14. Restricted sales of painkillers help to facilitate the role of community pharmacists in pain management?

Strongly disagree

Disagree

Neither disagree nor agree

Agreed

Strongly agree

15. Please write in the box below factors that facilitate effective pain management in a pharmacy?