جـــامـعـــة الـــشـرق الأوسـط
MIDDLE EAST UNIVERSITY
Amman - Jordan

Community Pharmacists' Knowledge, Attitude, and Practices Toward the Use of Topical Corticosteroids: A Cross-Sectional Study in Saudi Arabia (Al-Jouf)

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A Thesis Submitted In Partial Fulfillment Of The Requirements For The Master's Degree In Pharmaceutical Sciences

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جـــامـعـــة الـــشـرق الأوسـط
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معرفة وموقف وممارسات صيادلة المجتمع تجاه استخدام الكورتيكوستيرويدات الموضعية: دراسة مقطعية في المملكة العربية السعودية(الجوف)

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قُدمت هذه الرسالة استكمالاً لمتطلبات الحصول على درجة الماجستير في العلوم الصيدلانية

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Thesis Committee Decision

This thesis, titled **"Community Pharmacists' Knowledge, Attitude, and Practices Toward the Use of Topical Corticosteroids: A Cross-Sectional Study in Saudi Arabia (Al-Jouf)"** by researcher **Sadun Fahad Alzarea** and was successfully defended and approved on 19/01/2026.

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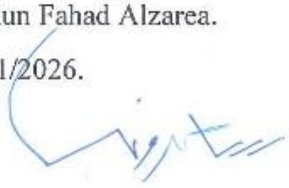
Signature: 

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بسم الله الرحمن الرحيم

﴿وَآخِرُ دَعْوَاهُمْ أَنِ الْحَمْدُ لِلَّهِ رَبِّ الْعَالَمِينَ﴾ سورة: يونس ، آية: 10

الحمدُ لله شُكرًا وامتنانًا، فمَا تمَّ سعي ولا خُتم دربٌ إلا بفضلِه، أتقدَّم بخالصِ الشُّكر والتَّقدير إلى من أودَعت فينَا بذرة العِلم، فأتت اليَوم أُكلَها الدكتورة: سهى أبو دولة، كمَا يطِيبُ لي أن أخُصَّ بالشُّكر و وافِر التَّقدير لمن قبِلت بالإشرافِ على هَذا الإنجَاز فبرأيهَا رُسمت البدايَة وبتوجيههَا لُوِّنت النِّهاية الدكتورة: إيناس الخضر والشُّكر موصُول لكافّة أعضَاء هيئةِ التَّدريس بِكليّة الصَّيدلة بجَامعَة الشَّرق الأوسّط.

Sadun Fahad Alzarea

Dedication

إلى من حفّني بِعنايَتهِ وأسبَغ عليَ من جزيلِ دُعاءه

لأصِل إلى ما وصلتُ إليه: والديّ العزيزين.

إلى من شدَّ الله به أزْرِي وشَاركنِي همَي: إخوتي.

إلى مُشكاة العلم ونورُ المعرِفة: أسَاتذِتي.

إلى الذي نشَأتُ فيهِ صبيًّا، وترَعرَعتُ به يافِعًا فرجلاً: وطني (المملكة العربية السعوديّة).

Sadun Fahad Alzarea

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List of Abbreviations

Abbreviation	Full term
KAP	Knowledge, Attitudes, and Practices
SFDA	Saudi Food and Drug Authority
TCs	Topical corticosteroids
WHO	World Healthy Organization

Community Pharmacists' Knowledge, Attitude, and Practices Toward the Use of Topical Corticosteroids: A Cross-Sectional Study in Saudi Arabia (Al-Jouf)

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Abstract

Topical corticosteroids are widely used for skin conditions and are commonly dispensed in community pharmacies, making pharmacists' knowledge, attitudes, and practices essential for safe use. This descriptive analytical cross-sectional study was conducted in Al-Jouf, Saudi Arabia, using a structured online questionnaire distributed via social media to licensed community pharmacists. The region includes approximately 94 community pharmacies employing around 250 pharmacists; 175 valid responses were obtained (response rate = 71%). Overall, participants demonstrated high general knowledge regarding topical corticosteroids. However, gaps were evident in practical application, particularly in correctly classifying the potency/efficacy of common preparations, suggesting that theoretical knowledge does not always translate into accurate daily decision-making. Variations were also noted in attitudes toward patient counseling and in reported practices related to rational use. A significant association was found between prior training and higher knowledge levels (χ^2 test, $p < 0.05$), indicating the value of structured education. The study recommends strengthening continuing professional development focusing on practical potency classification, indications/contraindications, safe duration of use, and effective counseling skills. It also emphasizes reinforcing adherence to regulations—especially for high-potency products through standardized dispensing/counseling procedures and decision-support tools.

Keywords: Pharmacists, Topical Corticosteroids, Saudi Arabia, Skin Diseases

معرفة وموقف وممارسات صيادلة المجتمع تجاه استخدام الكورتيكوستيرويدات الموضعية: دراسة مقطعية في المملكة العربية السعودية(الجوف)

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الملخص

تُستخدم الكورتيكوستيرويدات الموضعية على نطاق واسع لعلاج الأمراض الجلدية، وتُصرف عادةً في الصيدليات المجتمعية، مما يجعل معرفة الصيادلة ومواقفهم وممارساتهم أساسيةً للاستخدام الآمن. أُجريت هذه الدراسة الوصفية التحليلية المقطعية في منطقة الجوف بالمملكة العربية السعودية، باستخدام استبيان إلكتروني مُنظّم وُزّع عبر وسائل التواصل الاجتماعي على الصيادلة المجتمعيين المرخصين. تضم المنطقة حوالي 94 صيدلية مجتمعية يعمل بها نحو 250 صيدليًا؛ وقد تم الحصول على 175 استجابة صالحة (معدل الاستجابة = 71%). بشكل عام، أظهر المشاركون معرفة عامة جيدة بالكورتيكوستيرويدات الموضعية. ومع ذلك، ظهرت فجوات واضحة في التطبيق العملي، لا سيما في التصنيف الصحيح لفعالية المستحضرات الشائعة، مما يشير إلى أن المعرفة النظرية لا تُترجم دائمًا إلى قرارات يومية دقيقة. كما لوحظت اختلافات في المواقف تجاه تقديم المشورة للمرضى وفي الممارسات المُبلغ عنها المتعلقة بالاستخدام الرشيد. وُجد ارتباطٌ ذو دلالة إحصائية بين التدريب السابق وارتفاع مستويات المعرفة (اختبار χ^2، $p < 0.05$)، مما يدل على أهمية التعليم المُنظّم. توصي الدراسة بتعزيز التطوير المهني المستمر الذي يركز على التصنيف العملي للفعالية، ودواعي الاستعمال وموانع الاستعمال، ومدة الاستخدام الآمنة، ومهارات الإرشاد الفعالة. كما تؤكد على ضرورة تعزيز الالتزام باللوائح – لا سيما فيما يتعلق بالمنتجات عالية الفعالية – من خلال إجراءات صرف/إرشاد موحدة وأدوات دعم القرار.

الكلمات المفتاحية: الصيادلة، الكورتيكوستيرويدات الموضعية، المملكة العربية السعودية، الأمراض الجلدية

Chapter One
Background and Problem Statement

1.1 Introduction

Topical corticosteroids are among the most widely used therapies in dermatological practice due to their effectiveness in controlling inflammation and managing a wide range of skin disorders (Stacey & McEleney, 2021). Their extensive use highlights the importance of rational application to maximize therapeutic benefits while minimizing potential risks. Despite their clinical value, inappropriate use of topical corticosteroids remains a significant concern, particularly in community settings where patients may access these medications without adequate guidance.

Misuse of topical corticosteroids may occur due to improper prescribing, dispensing, or self-medication, which can compromise patient safety (Nathan et al., 2022). These concerns underscore the need for increased awareness among both healthcare professionals and the public regarding safe and appropriate use. Community pharmacists play a particularly important role in this context, as they are often the first point of contact for patients seeking treatment for dermatological conditions, and their knowledge, attitudes, and practices can influence medication use behaviors (Marripalli & Ganachari, 2023).

Evidence indicates that inadequate training and limited awareness among pharmacists may contribute to inappropriate dispensing, especially in contexts where enforcement of prescription-only regulations is suboptimal (Kumar et al., 2020; Shrestha *et al.,* 2021). In addition, public reliance on non-professional advice may further increase the risk of misuse (Qutob *et al.*, 2023). In Saudi Arabia, recent studies have reported gaps in public and professional awareness regarding corticosteroid use, emphasizing the need for improved medication safety and counseling practices (Makeen *et al.,* 2024).

National regulatory authorities, including the Saudi Food and Drug Authority (SFDA), play a central role in promoting medication safety and regulating pharmaceutical products (Saudi Food and Drug Authority, 2025). However, inappropriate practices continue to be reported at the community level, suggesting a need to better understand factors influencing pharmacists' behavior, including education, experience, and adherence to professional guidelines (Sheth and Nair, 2021).

Given the growing demand for dermatological products and the widespread use of topical corticosteroids, it is essential to assess how community pharmacists manage these medicines in daily practice. In particular, limited evidence is available regarding pharmacists' knowledge, attitudes, and practices in the Al-Jouf region, which has distinctive demographic and healthcare characteristics (Al Doghaither *et al.,* 2021). Therefore, this study aims to address this gap by evaluating the knowledge, attitudes, and practices of community pharmacists in Al-Jouf regarding topical corticosteroids, to inform targeted interventions that enhance the quality and safety of pharmaceutical care (Hijazi *et al*., 2023).

1.2 Problem Statement

The rising popularity of topical corticosteroids has been paralleled by an increasing prevalence of inappropriate use. This pattern appears to be reinforced by the rapid dissemination of health-related information on social media, including content generated by AI tools and recommendations circulated by influencers. Consequently, some consumers may initiate treatment without professional consultation, select unsuitable products, apply incorrect doses, extend use beyond recommended durations, or discontinue therapy prematurely. Moreover, potential short- and long-term adverse effects may be underestimated or overlooked. Conversely, growing "steroid phobia" may also contribute to nonadherence, ultimately compromising treatment outcomes. Accordingly, the research question to be addressed is:

What is the knowledge, attitudes and practice concerning the use of corticosteroids by community pharmacists in the Kingdom of Saudi Arabia?

1.3. Aim of the Study

The aim of this study is to assess the knowledge, attitudes, and practices of community pharmacists in the Al-Jouf region of Saudi Arabia regarding the use of topical corticosteroids and to identify demographic and professional factors influencing these practices.

1.4. Research Questions

1. What is the current level of knowledge among community pharmacists in Al-Jouf regarding the clinical indications, safety, and risks of topical corticosteroids?
2. What are the attitudes of community pharmacists toward counseling and dispensing topical corticosteroids without prescriptions?
3. What are the practices of community pharmacists concerning the provision, monitoring, and regulation of topical corticosteroids?
4. What demographic and professional factors influence pharmacists' knowledge, attitudes, and practices?

1.5. Objectives of the Study

The objectives of this study are:

- **General Objective:**

  To assess the knowledge, attitudes, and practices of community pharmacists in Al-Jouf, Saudi Arabia, regarding the use of topical corticosteroids.

- **Specific Objectives:**
  1. To evaluate pharmacists' knowledge of therapeutic uses, contraindications, and adverse effects of topical corticosteroids.
  2. To explore pharmacists' attitudes toward ethical and safe dispensing of topical corticosteroids.
  3. To examine pharmacists' dispensing practices, including prescription requirements and patient counseling.
  4. To identify demographic and professional variables associated with variations in KAP levels.
  5. To propose evidence-informed recommendations aimed at improving the rational use of topical corticosteroids in community pharmacies, based on the findings of the present study.

1.6. Significance of the Study

Topical corticosteroids are among the most commonly used therapies for inflammatory dermatological conditions. Despite their well-established effectiveness, inappropriate use and easy access can contribute to avoidable local and systemic adverse effects and may worsen dermatological complications that increase the need for additional treatments, including antimicrobials, thereby indirectly contributing to broader concerns such as antimicrobial resistance (Al-Harbi *et al.*, 2020). Existing literature has examined inappropriate dispensing and misuse of topical corticosteroids globally and within Saudi Arabia (Alomi *et al.*, 2019; Alrashidi *et al.*, 2021). However, evidence remains limited regarding how community pharmacists' knowledge, attitudes, and practices may vary across specific regions and how these factors may influence dispensing and counseling behaviors in routine practice.

In this context, the present study provides region-specific evidence by evaluating community pharmacists' knowledge, attitudes, and practices in Al-Jouf, Saudi Arabia, thereby helping to identify local strengths and gaps relevant to rational topical corticosteroid use (Abdelaziz *et al.*, 2020). In addition, the study examines the relationship between prior training/continuing professional development and pharmacists' reported practices, which may inform educational planning and support decision-making by academic institutions and regulatory stakeholders (Haque *et al.*, 2019). By generating locally grounded findings, the study may also facilitate constructive collaboration between academia and policymakers aimed at strengthening professional development, standardizing counseling approaches, and promoting safer dispensing practices. Moreover, the results add to the scientific literature on the role of community pharmacists in dermatological care and medication safety, particularly in guiding patients toward appropriate topical corticosteroid use (Al-Arifi *et al.*, 2015).

Overall, this study seeks to support efforts to enhance the safe and effective use of topical corticosteroids in community settings while reducing misuse-related risks and associated complications.

1.7 Conceptual & Operational Definitions

Conceptual Definitions

Corticosteroids are a class of steroid hormones characterized by anti-inflammatory and immunosuppressive properties. Topical corticosteroids are pharmaceutical formulations designed for local application to the skin and are commonly used in the management of inflammatory dermatological conditions such as eczema, psoriasis, and allergic dermatitis (Stacey & McEleney, 2021; Axon *et al.,* 2021).

Knowledge, Attitudes, and Practices (KAP) constitute a conceptual framework used to describe individuals' level of understanding of a specific subject (knowledge), their perceptions, beliefs, and value judgments related to it (attitudes), and their observable actions or behaviors in real-world settings (practices) (Davis *et al.,* 2024).

Operational Definitions

In the present study, knowledge was operationalized as the number of correct responses to questionnaire items assessing pharmacists' understanding of topical corticosteroid indications, contraindications, potency classification, and potential adverse effects.

Attitude was operationally defined as participants' responses to questionnaire items reflecting their perceptions, ethical considerations, and willingness to provide appropriate patient counseling regarding the use of topical corticosteroids.

Practice was operationalized as pharmacists' self-reported behaviors related to the dispensing of topical corticosteroids, including adherence to prescription requirements, provision of patient counseling, and management of medication-related inquiries. All operational definitions were measured using responses to a structured questionnaire administered to participating pharmacists.

Chapter Two
Theoretical Framework and Previous Studies

2. Literature Review

This chapter reviews key theoretical and contextual evidence related to community pharmacists' knowledge, attitudes, and practices (KAP) regarding topical corticosteroids, with particular relevance to the Saudi Arabian context and the Al-Jouf region. It synthesizes pharmacological foundations, rational use principles, and community pharmacy responsibilities to clarify the research gap addressed by this study.

2.1 Introduction

Topical corticosteroids (TCs) are widely used in the management of inflammatory dermatoses such as eczema and psoriasis, providing relatively rapid relief of symptoms including erythema, pruritus, and inflammation (Charman *et al.*, 2000). Despite their clinical effectiveness, inappropriate use may lead to adverse outcomes and reduced treatment adherence, making rational prescribing, dispensing, and counseling essential for safe and effective care (Buchman, 2001).

Community pharmacists play a central role in patient education and medication counseling. They can guide correct dosing, duration, and application methods, and can identify potential misuse or inappropriate requests (Kang *et al.*, 2020; Kurdi *et al*., 2024). Pharmacists' professional ethics and communication quality are also critical, as they influence patient trust, adherence, and safety (Woodford *et al.*, 2011). Moreover, experience and continuing professional development may shape pharmacists' cautiousness and confidence in counseling and dispensing decisions (Makeen *et al*., 2024).

Dispensing practices are influenced by multiple factors, including prescription status, time constraints, commercial pressures, and patient demand for rapid symptomatic relief (Alafnan *et al*., 2018; Chhabra *et al*., 2021). These realities highlight the importance of structured guidelines, training, and regulatory enforcement to reduce misuse and improve pharmaceutical care (Alsukait *et al.*, 2017; Gray *et al.*, 2011; Qutob *et al*., 2023).

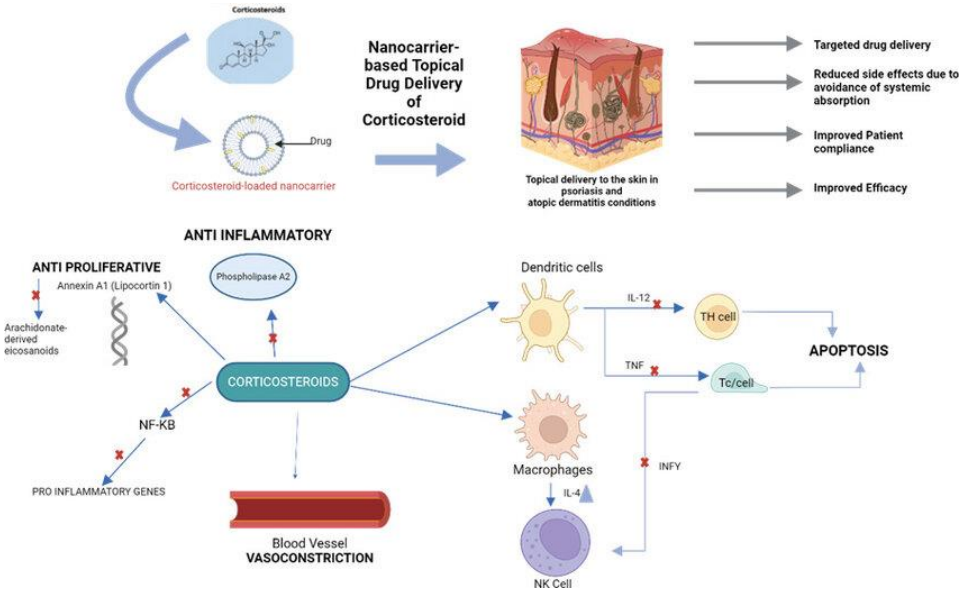
2.2 Overview and Classification of Topical Corticosteroids

Corticosteroids are synthetic analogues of cortisol and are used to reduce inflammation, pruritus, and irritation in inflammatory skin conditions (Sheth and Nair, 2021). Topical formulations are preferred for localized dermatoses because they deliver medication directly to the affected area while generally limiting systemic exposure. Topical corticosteroids vary in potency (e.g., mild hydrocortisone; moderate betamethasone; very potent clobetasol), and potency selection depends on diagnosis, anatomical site, patient age, and duration of therapy (Ahmed *et al.,* 2021; Qutob *et al.,* 2023). Appropriate selection requires clinical judgment and patient-specific counseling to balance benefits and risks (Alhumam *et al.,* 2023).

2.2.1 Mechanism of Action of Topical Corticosteroids

TCs reduce cutaneous inflammation by modulating immune responses and inflammatory mediators. They bind to intracellular glucocorticoid receptors and influence gene transcription, decreasing the activity of pro-inflammatory cytokines and mediators, thereby reducing erythema, swelling, and pruritus (Qutob *et al.,* 2023). Their clinical effects also depend on potency, frequency, duration, and absorption differences across anatomical sites, with thin or sensitive skin (e.g., face) typically more susceptible to adverse effects (Khalifeh *et al.,* 2018).

The Figures (1) illustrates the mechanism of action of topical corticosteroids in reducing inflammation. These drugs suppress the immune response through several pathways. They inhibit the production of inflammatory mediators such as prostaglandins and leukotrienes by blocking phospholipase A2 and the transcription factor NF-κB, and they reduce the release of pro-inflammatory cytokines including TNF, IL-12, and IFN-γ. In addition, topical corticosteroids decrease the activity of various immune cells such as T lymphocytes, dendritic cells, and natural killer cells, and they suppress phagocytosis. They also increase the production of lipocortin-1, which further inhibits arachidonic acid–derived inflammatory mediators, and cause vasoconstriction, leading to reduced redness and swelling. Overall, these effects result in effective control of inflammation and associated symptoms (Sreeraj *et al.,* 2024).



Figures (1) Mechanism of Action of Topical Corticosteroids *(Obtained from Chaudhary* et al., 2024)

2.2.2 Clinical Indications in Inflammatory Dermatoses

TCs are commonly used to manage eczema and other eczematous dermatoses, where they reduce inflammation and itching and help prevent flare escalation (Charman *et al.*, 2000). They are also used in psoriasis to reduce inflammatory activity and improve lesion appearance (Chhabra *et al.*, 2021). In allergic and irritant contact dermatitis, topical corticosteroids can alleviate erythema and discomfort when used appropriately (Alafnan *et al*., 2018). However, inappropriate use may worsen symptoms or increase adverse effects, reinforcing the need for correct selection and patient counseling (Alanzi *et al.*, 2018).

2.2.3 Topical Corticosteroids Compared with Systemic Corticosteroids

TCs act locally and typically carry lower systemic risk than oral or injectable corticosteroids, which circulate systemically and may cause broader adverse effects (Charman *et al.*, 2000). Nevertheless, topical misuse—particularly prolonged use, high potency, occlusion, or application over large areas—may still lead to clinically significant local adverse effects and occasional systemic effects (Alafnan *et al*., 2018; Alanzi *et al*., 2018).

Link to KAP: Understanding classification, indications, and local-versus-systemic risk directly informs pharmacists' knowledge of appropriate product selection and underpins safe counseling and dispensing practices.

2.3 Therapeutic Benefits and Rational Use of Topical Corticosteroids

TCs provide substantial clinical benefits in inflammatory dermatoses by improving symptoms such as pruritus and erythema, often leading to improved quality of life (Alkhaja *et al.*, 2007). Rational use requires selecting an appropriate potency, limiting duration, and applying correct quantities to reduce preventable adverse effects (Beattie and Lewis-Jones, 2003). Gradual tapering may be needed after extended use to reduce rebound symptoms and support adherence (Beattie and Lewis-Jones, 2003). Effective education and clear instructions are therefore essential components of safe use (Bewley, 2008).

2.3.1 Potential Short- and Long-Term Adverse Effects

TCs may cause short-term local reactions such as irritation, stinging, or transient erythema, which can affect adherence if not anticipated and explained (Buchman, 2001). With prolonged or inappropriate use, adverse effects may include skin atrophy, telangiectasia, and pigmentary changes, particularly on thin skin areas (Charman *et al.*, 2000). In rare cases, extensive application or occlusion can contribute to systemic absorption and endocrine effects, emphasizing the importance of monitoring in higher-risk scenarios (Ericson-Neilsen and Kaye, 2014).

2.3.2 Consequences of Misuse or Overuse

Misuse includes unnecessary high-potency use, excessive frequency, prolonged duration, use without monitoring, or abrupt discontinuation (Dey, 2014). Such patterns may cause local complications (e.g., steroid-induced acne/rosacea) and may contribute to systemic effects in higher-risk contexts (Dhalimi and Aljawahiry, 2006; Coondoo, 2014). Children and older adults are more vulnerable because of thinner skin and higher absorption risk (Eichenfield *et al.*, 2014).

2.3.3 Determinants of Risk

Risk is influenced by potency, concentration, duration, frequency, anatomical site, and application technique (Chaudhary *et al.*, 2019; Ladda & Doiron, 2021). Using standard dosing communication tools such as the fingertip unit can support safer application (Charman *et al.*, 2000).

Link to KAP: Evidence on benefits and harms highlights where pharmacists' knowledge gaps (potency/duration), attitudes (e.g., fear versus complacency), and

practice behaviors (counseling, tapering advice, and monitoring) can directly affect patient safety.

2.4 Community Pharmacists' Knowledge and Professional Responsibilities

Community pharmacists are positioned to promote safe use of topical corticosteroids by clarifying dosing instructions, advising on duration and application, and addressing misconceptions that may lead to misuse or nonadherence (Kang *et al.*, 2020; Kurdi *et al.*, 2024). Pharmacists also contribute to public health education through in-pharmacy guidance and community awareness activities (Kang *et al.*, 2020). Identifying early warning signs of misuse and referring patients when necessary are additional responsibilities supporting safer outcomes (Grennan & Wang, 2019).

2.4.1 Pharmacists' Scientific Knowledge of Topical Corticosteroids

Strong pharmacological knowledge supports appropriate product selection and counseling, including risk mitigation for high-potency agents on sensitive sites (Nakamura *et al.*, 2017). Familiarity with guidelines and counseling standards can reduce inappropriate dispensing and improve patient outcomes (Saudi Food and Drug Authority, 2025).

2.4.2 Impact of Specialization and Training

Pharmacists with dermatology-focused training may be more confident in potency selection, counseling, and long-term risk communication than generalists, who may focus primarily on immediate symptom control (Lu *et al.*, 2010; Nakamura *et al.*, 2017). Continuing education and structured training can reduce variability in counseling quality and improve consistency in practice (Smith *et al.*, 2015; Kurdi *et al.*, 2024).

2.4.3 Regulatory Framework in Saudi Arabia

Saudi regulations classify many topical corticosteroids as prescription-only medicines, aiming to reduce uncontrolled use and associated harms (Saudi Food and Drug Authority, 2025). Pharmacists are expected to provide counseling on duration, application amount, frequency, and safe discontinuation, and to inform patients about potential adverse effects and referral indicators (Kurdi *et al.*, 2024). Regulatory inspection and enforcement further shape dispensing behavior and accountability (Saudi Food and Drug Authority, 2025).

Link to KAP: The evidence clarifies how pharmacists' knowledge of guidelines and potency, their attitudes toward ethical dispensing, and their real-world practices (counseling and compliance) determine safe community use.

2.5 Pharmacists' Attitudes Toward Topical Corticosteroid Use

Pharmacists' attitudes influence whether they provide comprehensive counseling, prioritize patient safety over commercial considerations, and follow ethical standards when responding to inappropriate requests (Uva *et al.*, 2012). Patient-centered counseling that explains risks, benefits, and referral needs supports trust and adherence (Woodford *et al.*, 2011; Williams, 2018).

2.5.1 Determinants of Attitudes

Experience can increase pharmacists' ability to recognize misuse and provide more cautious, evidence-based advice (Makeen *et al.*, 2024). Participation in continuing professional development may strengthen confidence and improve consistency with updated guidance (Ahmed *et al.*, 2021). However, commercial pressures can negatively influence decision-making and reduce counseling quality, creating ethical dilemmas (Zahr Allayali, 2022).

2.5.2 Role of Training and Awareness Campaigns

Awareness campaigns and structured training can improve pharmacists' confidence and consistency in counseling, reduce misconceptions, and support balanced risk communication (Sheth and Nair, 2021; Qutob *et al.*, 2023). These interventions may also counter extremes such as unjustified steroid fear or unsafe complacency.

Link to KAP: Attitude-related factors (ethics, confidence, and pressure) help explain variability in pharmacists' dispensing and counseling practices, and indicate where targeted interventions could improve KAP outcomes.

2.6 Pharmacists' Dispensing and Counseling Practices

Dispensing practices range from prescription-based supply with structured counseling to non-prescription provision driven by patient demand or weak enforcement (Chhabra *et al.*, 2021; Alafnan *et al.*, 2018). Limited consultation time and insufficient follow-up may increase the likelihood of misuse, particularly when pharmacists do not assess symptom severity or provide clear instructions (Alanzi *et al.*, 2018). Practice quality is often influenced by training, professional experience, and the local regulatory environment (Alsukait *et al.*, 2017).

2.6.1 Monitoring and Misuse Prevention

Monitoring includes advising on dose schedules, recognizing early signs of overuse, and recommending gradual discontinuation when appropriate (Charman *et al*., 2000; Chhabra *et al.*, 2021). Follow-up may reduce inappropriate escalation and supports patient engagement and safer long-term outcomes (Howell & Allen, 2019).

2.6.2 Practical Barriers

Common barriers include commercial pressure, patient insistence on rapid solutions, limited patient awareness, and incomplete histories of prior corticosteroid use, all of which can compromise counseling and safe dispensing (Gray *et al.*, 2011; Khalifeh *et al.*, 2018).

2.6.3 Strategies to Reduce Errors

Effective strategies include clear written and verbal instructions, structured follow-up for long-term users, and collaboration with prescribers to improve adherence and detect misuse early (Chhabra *et al.*, 2021; Gray *et al.*, 2011). Continuing education focused on counseling techniques and risk reduction supports safer routine practice (Khalifeh *et al.*, 2018).

Link to KAP: Observed practice patterns demonstrate where gaps in pharmacists' knowledge (e.g., potency/duration), attitudes (ethical decisions under pressure), and practices (assessment, counseling, follow-up) may contribute to inappropriate community use.

2.7 Summary and Research Gap

The literature confirms that topical corticosteroids are effective for inflammatory dermatoses but require rational use to prevent avoidable adverse effects and misuse. Evidence also indicates that community pharmacists can substantially influence patient safety through appropriate dispensing, counseling, monitoring, and adherence to regulations. However, dispensing decisions and counseling quality may vary due to differences in training, experience, attitudes, commercial pressures, and regulatory enforcement. These findings highlight the need for region-specific assessment of pharmacists' KAP to identify modifiable gaps and inform targeted interventions. Accordingly, this study examines community pharmacists' knowledge, attitudes, and practices regarding topical corticosteroids in the Al-Jouf region.

Chapter Three
Methodology (Methods and Procedures)

3. Study Methods

3.1. Introduction

This chapter discusses the methodological framework that was adhered to in order to address the main objective of the research, which is to determine the knowledge, attitude, and practices of community pharmacists in terms of using topical corticosteroids in Saudi Arabia (Al-Jouf). This chapter outlines the methods that were used to gather and scientifically and systematically analyze data in order to answer the study questions. It also entails the study design structure, its population, and its size together with methods of sampling. In addition, it discusses the research tool, which was employed in the collection of data, its testing on validity and reliability, statistical procedures in the analysis of the data and ethical issues followed by the researcher. This chapter can be considered as one of the most crucial chapters of the study because its quality, its scientific and methodological rigor are important indicators of the credibility of the results and the potential of their extrapolation to the community where the study was conducted in and other communities. Moreover, it offers a chance to make the conclusions, which will be supported by the reliable, objective, and evidence-based backgrounds. Establishing the validity of the study data will eventually increase the validity and accuracy of the findings, and therefore the present study and its findings will provide a valid scientific foundation that can be trusted by relevant authorities in making the correct decisions based on sound scientific findings. (Creswell & Creswell, 2018).

3.2. Study Design

The data were gathered in Al-Jouf, Saudi Arabia, through a structured electronic questionnaire, where pharmacists in the community pharmacies were the sample population in a cross-sectional descriptive analytical study. By the help of this design, researchers are able to examine a particular problem as it is in the course of a given duration of time without interfering or manipulating any variable. It can also be used to collect data faster and at a lower cost, as well as in the review of clinical practices where no form of experiment needs to be performed (Politt & Beck, 2021).

3.3. Study Settings

The present research took place in Al-Jouf, Saudi Arabia. Pharmacies are very common in the community and they cater to the population in the region. This gives a complete database of the attitudes and practices of pharmacists in dispensing topical corticosteroids. Independent and chain pharmacies are also numerous in the region, which allows comparing them. Pharmacists in this area offer superb community services; hence they are able to offer advice and counsel their patients.

3.4. Study Population and Sampling

3.4.1. Study Population

The target population is the licensed community pharmacists employed in community pharmacies located in Al-Jouf in Saudi Arabia. According to the reports released by the Saudi Ministry of Health, the population size is approximately 94 and 250 community pharmacies and community pharmacists, respectively.

3.4.2. Sample Size

The research tool was created in the form of a questionnaire developed by the use of Google and distributed among the target population through social media channels. In total, 175 responses were collected. Response rate was 70% which is considered as acceptable rate in social studied (Hair *et al.*, 2019).

3.4.3. Sampling Technique

A non-probability convenience sampling approach was used. The electronic questionnaire link was distributed to community pharmacists in Al-Jouf through direct contact and professional/social media channels, and participation was voluntary. Therefore, the sample represents respondents who agreed to participate rather than a randomly selected probability sample (Nikolopoulou, 2022).

3.4.4. Participant Recruitment

Inclusion Criteria:

- The participant must be a pharmacist licensed by the Saudi Commission For Health Specialties to work in community pharmacies.

- Currently working in a community pharmacy in the Al-Jouf region of Saudi Arabia.
- Voluntary consent to participate in this study.

Exclusion Criteria:

- Pharmacists working in hospitals or hospital-affiliated pharmacies
- Trainee pharmacists
- Pharmacists who declined to participate in this study

3.5. Study Instrument

A structured survey was used as a research tool to collect data from the target sample in the current study. Based on previous studies and relevant literature, the survey items were developed using several studies where questions that are relevant to the Saudi population were selected (Alsukait *et al.,* 2017; Ashique *et al.,* 2018; Kurdi *et al.,* 2024; Shrestha *et al.,* 2021) The instrument included five main sections, with questions of varying nature, such as multiple choice and assessment of the response according to a Likert scale. The following is a detailed presentation of the sections of the final draft of the survey:

- **Section One: Participant demographic information:** included age, gender, education level, type of community pharmacy, years of experience, training in adverse drug events, monthly dispensed prescriptions of topical steroids, monthly dispensed non-prescriptions of topical steroids.
- **Section Two: Knowledge about topical corticosteroids:** It included 10 items to assess knowledge about topical corticosteroids. Items (1-3 & 6-9) measured pharmacists' knowledge of the pharmacological effect of topical corticosteroids and their direct choice depending on the severity of the disease and the skin area. Questions 4 and 5 were designed to measure the level of awareness of pharmacists on the side effects associated with the use of topical corticosteroids, whereas question 10 measured the level of awareness in pharmacists about the appropriate therapeutic indications of using topical corticosteroids. These questions were of three-point nominal type (Yes, no, don’t know) and multiple choice.
- **Section Three: Awareness about the adverse effects of topical corticosteroids:** A total of (8) questions were used to evaluate the level of awareness among pharmacists

about the side effects of topical corticosteroids. The first item dealt with overall skin impacts of using such products. Items (2-6) were assigned to measure the awareness of particular side effects which included skin thinning, hypopigmentation, hyperpigmentation, undesirable hair growth and skin infection. Questions 7 and 8 dealt with the preventative aspect of the pharmacist. These are nominal items (Yes, no, don't know) which are three-point nominal type.

- **Section Four: Pharmacist's attitudes toward their potential role in rational use of TC:** There were seven items designed to evaluate the attitude of the pharmacists towards their involvement in the creation of awareness about rational utilization of topical corticosteroids. Items (1 and 3) measured the attitudes of pharmacists towards their involvement in creating awareness of the risks and the significance of rational use. Questions (2 and 5) were aimed to determine the attitude of the pharmacists towards taking part in the reduction of TCs misuse. The aim of item 4 was to determine the willingness of pharmacists to track the side effects following the use. Items (6 and 7) were employed to determine the attitudes of pharmacists towards responsible pharmacy education and following laws and guidelines. These are five-point Likert-scale items (Strongly disagree to Strongly agree).
- **Section Five: Practice of pharmacists among patients who come to buy steroid creams:** The objective of this section is to assess the practice by pharmacists whenever handling patients with TCs creams. It includes four items; The first one is used to determine the number of patients who reported having skin issues due to the use of steroid creams. The second one is an evaluation of the recommendations by pharmacists regarding patients who present with issues. The third one is about the attitude of the patients towards the recommendation of the pharmacists and the fourth question is about the causes of not visiting dermatologists. The questions in this part are in a form of multiple choice.

3.5.1. Validity of Study Instrument

The face validity of the survey was checked, the first version was given to the sample of (10) specialists and experts in the sphere of pharmacy, pharmacists working in hospitals and community pharmacies (University of Jordan Hospital, Nahdi Pharmacy - Al-Jouf, Aldawa Pharmacy). The purpose of this was to offer their recommendations and corrections to

establish the items on the survey that would be representative of the section that it belongs to and serve the intended purpose and to make it linguistically and scientifically sound. In addition, face validity was used to ensure that the appearance/ alignment of the survey, the font and font size, the size of check-boxes of the survey are user-friendly. The relevant amendments were provided by the reviewers such as the alteration of certain paragraphs and the removal of some irrelevant and unnecessary ones. Amendments were applied to the survey draft and the final version of the survey was obtained.

3.5.2. Reliability of Study Instrument

To check the reliability of the study instrument, the researcher first used the study instrument on 30 pharmacists of the community pharmacies from study population from outside the actual sample. Internal consistency coefficient Cronbach's alpha was computed using SPSS version 26. Cronbach's alpha range were (0.795-0.869) which is indicated that the study instrument was reliable (Cronbach's alpha value > 0.70).

3.6. Data Collection Procedure

The survey was made in electronic format so that it could be easily distributed to the target sample and save time and effort. The researcher visited the pharmacies personally or called using phone or social media to send them the survey link after getting the approvals. The data collection process was about one month (July 14 to August 15, 2025), the researcher persisted in distributing the link, increase the field visits, and reminder messages to obtain the statistically required number of responses.

3.7. Ethical Consideration

Upon getting the required approvals of the ethical committees in Middle East University (2025/2024 -1667) and Saudi Ministry of health, the researcher promised to make sure that the participation will be voluntary and that the participants who will be willing to take part in the study will be free to withdraw at any given time without consequences. Participants consented electronically to their participation. Moreover, the researcher has observed the ethics of scientific research and ensured that the data obtained would be handled with utmost confidentiality, stored in the laptop of the researcher, a password would be applied to it and the data would only be used in this scientific research.

3.8. Data Analysis

The collected data were analyzed using Statistical Package to the Social Sciences (SPSS) version 26. Both descriptive and inferential statistics were utilized by the researcher and this was in compliance with the questions of the study. The level of significance was established to be $p < 0.05$.

3.8.1. Descriptive Analysis:

Descriptive statistics (frequencies, means, standard deviations, percentages) have been used to determine the distribution of the participants in terms of the demographic variables, as well as the level of community pharmacists' knowledge, attitude, and practices towards the use of topical corticosteroids.

- Knowledge score = number of correct answers (0–10). The level of knowledge score was classified according the following table:

Table 3.1 Knowledge Score Classification.

Level	%	Scoring
Good Knowledge	80 - 100%	8-10
Moderate Knowledge	60 % - 79%	6-7
Poor Knowledge	Less than 60%	0-5

- Awareness score= each correct answer was assigned 1 point, while incorrect or "I don't know" responses received 0 points.

Table 3.2 Awareness Score Classification.

Level	%	Scoring
Good Awareness	80 - 100%	6-8
Moderate Awareness	60 % - 79%	4-5
Poor Awareness	Less than 60%	0-4

- Attitude score = sum/mean of Likert items (1–5).

3.8.2. Inferential Analysis:

Chi square test were designed to determine demographic variables that were related to differences in the levels of KAP among pharmacists.

Chapter Four

Results of the Study

4. Results

In this chapter, the findings of the analysis of the acquired data after a field study implemented to the community pharmacists within Saudi Arabia (Al-Jouf) to measure their knowledge, attitudes, and practices in regards to the use of the topical corticosteroids with the help of the structured questionnaire. This chapter consists of the presentation of the demographic information of the pharmacists and outcome of the descriptive and inferential analysis in terms of the knowledge, attitudes, and practices levels, regarding the use of topical corticosteroids.

4.1. Participants' Demographic Information

This section presents the demographic data of the participants. Table 4.1 shows the frequencies and percentages of the participants' demographic characteristics.

Table 4.1 Participants' Demographic Information.

Demographic	Categories	Freq.	%
Age	<25 years	51	29.1
	26-35 years	66	37.7
	36-45 years	48	27.4
	>45 years	10	5.7
Gender	Male	81	46.3
	Female	94	53.7
Educational Level	Diploma	29	16.6
	Bachelor's degree	96	54.9
	Postgraduate degree	50	28.6
Community pharmacy type	Chain	72	41.1
	Independent pharmacy	103	58.9
Experience in years	<5	93	53.1
	6-15	68	38.9
	16-25	15	8.6
Receiving training in adverse drug events	Yes	144	82.3
	No	31	17.7
Monthly dispensed prescriptions of topical steroids	< 15	109	62.3
	15-30	49	28.0
	30-45	11	6.3
	>45	6	3.4
Monthly dispensed non-prescriptions of topical steroids	< 15	141	80.6
	15-30	23	13.1
	30-45	7	4.0
	>45	4	2.3
Total		**175**	**100%**

The present study included 175 pharmacists that work in community pharmacies in Al-Jouf, Saudi Arabia. Table 4.1 indicates that the most represented age group was between 26-35 years having 37.7 percent of the participants, then those who are below 25 years old (29.1 percent) and who are above 45 years old (5.7 percent). As far as gender is concerned, 53.7 percent of the respondents were female, and 46.3 percent were males. Regarding the level of education, 54.9 percent of the respondents had a bachelor's degree, 28.6 percent had a graduate degree and 16.6 percent held a diploma. In addition, the findings on the type of pharmacy revealed that 58.9 percent of the respondents served in independent pharmacies, as opposed to 41.1 percent in pharmacy chains. In terms of the years of experience, one can single out approximately 53.1% of respondents who had less than 5 years of experience, which is the most common one. This was then followed by participants whose experience went to 6-15 years that forms 38.9 percent of participants. The infrequent part was the participants who had 16-25 years of experience (8.6%). The findings also established that 82.3% of pharmacists had attended training program on adverse drug events, whereas 17.7% had not attended any training. On the issue of monthly prescriptions of topical corticosteroids, it was found that 62.3% prescribed fewer than 15 prescriptions per month, whereas 3.4% of the pharmacists prescribed more than 45 prescriptions a month. In addition, the findings demonstrated that 80.6 percent of the respondents who filled less than 15 prescriptions per month did not make any prescription, whereas 2.3 percent of the pharmacists filled more than 45 prescriptions.

4.2. Instrument Reliability

Cronbach's alpha reliability coefficient was used to determine the reliability of the questionnaire.

Table 4.2 Cronbach's alpha reliability coefficients.

Domain	Cronbach's alpha
Knowledge	0.788
Awareness	0.749
Attitude	0.826
Practice	0.813

The obtained results revealed that the reliability coefficients lay within (0.749-0.826), which implies that the instrument is reliable based on the statistical guidelines on

reliability requirement as established by Tavakol and Dennick, (2011) where the acceptable level is at least 0.70.

4.3. Participants' Knowledge about Topical Corticosteroids

This section presents the results of the descriptive analysis of participants' knowledge about TCs. Table 4.3 presents the results of the frequencies and percentages of participants' responses.

Table 4.3. Participants' Knowledge about Topical Corticosteroids (n=175).

No#	Items		Yes	No	Don't know
1	Topical steroid creams are available in different potencies	Freq.	169	1	5
		%	96.6	0.6	2.9
2	Topical steroid creams are used depending on their potencies	Freq.	167	5	3
		%	95.4	2.9	1.7
3	Different potency of steroid creams are used in different parts of the body	Freq.	166	2	7
		%	94.9	1.1	4
4	Use of steroid creams can aggravate some skin problems	Freq.	168	3	4
		%	96	1.7	2.3
5	Steroid creams have adverse effects	Freq.	164	5	6
		%	93.7	2.9	3.4

Table 4.3 results indicate that 96.6% answered that topical steroid creams exist in various potencies, and 2.9% answered that they are not aware of it. In addition, 95.4% of the involved pharmacists stated that topical steroid creams are used based on their potency and 1.7% stated that they were unsure. It was also revealed that 94.9% of the participants had properly comprehended the fact that various potencies of steroid creams are applied differently on various body parts. Another outcome indicated that 96 percent of the respondents know that the use of steroids creams can aggravate skin issues. It further indicated that 93.7 percent of them acknowledge that steroid creams cause side effects. This shows that pharmacists are conversant with clinical guidelines on usage of such products.

4.3.1. Corticosteroids Categorized as Low Potency Corticosteroids

Table 4.4 presents the results of the frequencies and percentages of participants' responses about corticosteroid categorized as low potency corticosteroids.

Table 4.4 Participants' Knowledge about Corticosteroids Categorized as Low Potency Corticosteroids (n=175).

No#	Corticosteroids	Freq.	%
1	Hydrocortisone acetate 1% cream	167	95.4
2	Mometasone furoate 0.1% cream	19	10.9
3	Betamethasone 0.1% cream	18	10.3
4	Clobetasol propionate 0.05% cream	15	8.6

According to the results illustrated in table 4.4, 95.4% of the respondents stated that hydrocortisone acetate 1% cream is regarded as a low-potency corticosteroid and this reflects the awareness of pharmacists on the pharmacological potencies of the preparations they dispense in their day-to-day practice. 10.9% of the respondents stated that mometasone furoate 0.1% was a low-potency corticosteroid, and 10.3% reported that Betamethasone is a low potent TCs. Finally, only 8.6% of the respondents stated that clobetasol propionate 0.05% cream is a low potent TCs.

4.3.2 Corticosteroids Categorized as Mid- Potency Corticosteroids

Table 4.5 presents the results of the frequencies and percentages of participants' responses about corticosteroid categorized as mid potency corticosteroids.

Table 4.5 Participants' Knowledge about Corticosteroid Categorized as Mid-Potency Corticosteroids (n=175).

No#	Corticosteroids	Freq.	%
1	Hydrocortisone acetate 1% cream	142	81.1
2	Mometasone furoate 0.1% cream	36	20.6
3	Betamethasone 0.1% cream	158	90.3
4	Clobetasol propionate 0.05% cream	16	9.1

The results of table 4.5 indicate that 90.3% of participants reported that betamethasone 0.1% is a mid- potency corticosteroid, indicating that there was confusion in the classification of commonly used preparations. In contrast, 9.1% reported that Clobetasol propionate 0.05% was a mid- potency corticosteroid, indicating that this group did not know how potent this cream is, even though it was classified a high-potency corticosteroid.

4.3.3. Corticosteroids Categorized as High- Potency Corticosteroids

Table 4.6 presents the results of the frequencies and percentages of participants' responses about corticosteroid categorized as high- potency corticosteroids.

Table 4.6 Participants' Knowledge about Corticosteroid Categorized as a High Potency Corticosteroids (n=175).

No#	Corticosteroids	Freq.	%
1	Hydrocortisone acetate 1% cream	14	8.0
2	Mometasone furoate 0.1% cream	153	87.4
3	Betamethasone 0.1% cream	156	89.1
4	Clobetasol propionate 0.05% cream	157	89.7

The results of table 4.6 revealed that community pharmacists had good knowledge of topical corticosteroids, with most (Mometasone furoate 0.1% cream, Betamethasone 0.1% cream, Clobetasol propionate 0.05% cream) rating them as highly potency (87.4%, 89.1%, 89.7%) respectively. However, small group (8 percent) classified hydrocortisone 1% cream as a high potent one.

4.3.4 Corticosteroids Categorized as Super High-Potency Corticosteroids

Table 4.6 presents the results of the frequencies and percentages of participants' responses about corticosteroids categorized as super high-potency corticosteroids.

Table 4.7 Participants' Knowledge about Corticosteroids Categorized as Super High Potency Corticosteroids (n=175).

No#	Corticosteroids	Freq.	%
1	Hydrocortisone acetate 1% cream	19	10.9
2	Mometasone furoate 0.1% cream	16	9.1
3	Betamethasone 0.1% cream	15	8.6
4	Clobetasol propionate 0.05% cream	164	93.7

As 93.7% of the participants answered that clobetasol propionate 0.05% is categorized as super high potency, meaning that pharmacists are aware of the danger of such a preparation and that they should not dispense it carelessly and without medical advice to avoid its side effects, whereas 10.9% of the participants responded that hydrocortisone acetate 1% is categorized as super high potency, and 8.6% and 9.1% of

the participants thought that betamethasone 0.1% cream and mometasone furoate 0.1% are super-high potency TCs, respectively.

4.3.5 Indications of Using Topical Corticosteroids

Table 4.8 presents the results of the frequencies and percentages of participants' responses about purpose of using TCs.

Table 4.8 Participants' Knowledge about Purposes of Using TCs (n=175).

No#	Purpose of using TCs	Freq.	%
1	All skin rashes	24	13.7
2	Psoriasis	167	95.4
3	Atopic dermatitis	170	97.1
4	Rosacea	18	10.3
5	alopecia areata	157	89.7
6	Shingles	22	12.6
7	Athlete's foot	15	8.6
8	Warts	18	10.3

Table 4.8 results show that 97.1 and 95.4 percent of pharmacists replied that Atopic dermatitis and psoriasis are treated with corticosteroids, respectively. These results indicate that they had knowledge of the use of TCs in these skin conditions. In addition, approximately 13.7% said that they TCs are used for all skin rashes. This is a false answer that calls for educational interventions to differentiate between skin rashes conditions and which requires the use of TCs. On the other hand, 12.6, 10.3 and 10.3 percent pointed out that such preparations could be useful in the treatment of shingles, rosacea and warts, respectively. The provided answers indicate improper knowledge regarding the application of TCs in these skin conditions where the treatment would be ineffective.

Table 4.9 Participants' total Knowledge score (n=175).

Total Knowledge score	Freq.	%
Good Knowledge	163	93.1
Moderate Knowledge	8	4.6
Poor Knowledge	4	2.3

The results showed 93.1% of participants have a good knowledge, while 4.6% of them have a moderate knowledge, and 2.3% of them have a poor knowledge.

4.4 Participants' Awareness about the Adverse Effects of Topical Corticosteroids

This section presents the results of the descriptive analysis of participants' awareness about the adverse effects of corticosteroids. Table 4.10 presents the results of the frequencies and percentages of participants' responses.

Table 4.10 Participants' Awareness about the Adverse Effects of Corticosteroids (n=175).

No#	Items		Yes	No	Don't know
1	Topical corticosteroids can be associated with significant cutaneous adverse effects	Freq.	166	3	6
		%	94.9	1.7	3.4
2	Topical corticosteroids are associated with atrophy as a specific adverse effect	Freq.	158	1	16
		%	90.3	0.6	9.1
3	Topical corticosteroids are associated with hypopigmentation as a specific adverse effect	Freq.	160	7	8
		%	91.4	4.0	4.6
4	Topical corticosteroids are associated with hyperpigmentation as a specific adverse effect	Freq.	160	10	5
		%	91.4	5.7	2.9
5	Topical corticosteroids are associated with hypertrichosis as a specific adverse effect	Freq.	153	10	12
		%	87.4	5.7	6.9
6	Topical corticosteroids are associated with infections as a specific adverse effect	Freq.	156	10	9
		%	89.1	5.7	5.1
7	Pharmacist's role in preventing topical corticosteroid abuse	Freq.	170	1	4
		%	97.1	0.6	2.3
8	Steroids should be dispensed only under prescription	Freq.	162	7	6
		%	92.6	4.0	3.4

Table 4.8 results revealed that pharmacists who took part in the present study had a good understanding of side effects of topical corticosteroids. The findings indicated that 94.9 percent of the respondents were aware that the utilization of TCs might result in skin undesirable cutaneous. Regarding the effects of corticosteroids use, 90.3 percent stated that the application of corticosteroids may result in atrophy of the skin, 91.4 percent reported that the use of corticosteroids might result in hypo- or hyperpigmentation. Moreover, 87.4% of respondents said that TCs could cause excessive hair growth, and 89.1% of them agreed that they could cause secondary infections. These findings are a sign that pharmacists are conscious of the most common side effects, however, a minor proportion of the surveyed pharmacist's responses alarms for educational interventions in terms of TCs side effects. Also, the findings revealed that 97.1% of pharmacists agree that pharmacists have an influential role in preventing the abuse of corticosteroids, and 92.6% of them affirmed that dispensing TCs should be done based on a prescription,

which denotes that pharmacist are also inclined to regulatory restrictions and conscious of professional accountability.

Table 4.11 Participants' total awareness score (n=175).

Total Awareness score	Freq.	%
Good Awareness	156	89.1
Moderate Awareness	12	6.9
Poor Awareness	7	4.0

The results showed 89.1% of participants have a good awareness, while 6.9% of them have a moderate awareness, and 4.0% of them have a poor awareness.

4.5.Pharmacist's Attitudes Toward their Potential Role in the Rational Use of Topical Corticosteroids

This section presents the results of the descriptive analysis of pharmacist's attitudes toward their potential role in rational use of TC. Table 4.12 presents the results of the frequencies, percentages, mean and standard deviation of participants' responses.

Table 4.12 Pharmacist's Attitudes Toward their Potential Role in the Rational Use of TC (n=175).

No#	Items		Level of Agreement					Mean	SD
			SD	D	N	A	SA		
1	Pharmacists could ensure that relevant safety problems are discussed with the patients	Freq.	1	1	48	33	92	4.22	0.91
		%	0.6	0.6	27.4	18.9	52.6		
2	Pharmacists could contribute significantly in preventing TCs misuse	Freq.	1	1	22	79	72	4.26	0.74
		%	0.6	0.6	12.6	45.1	41.1		
3	Pharmacists could counsel and educate patients regarding rational use of TCs	Freq.	2	3	6	68	96	4.45	0.75
		%	1.1	1.7	3.4	38.9	54.9		
4	Pharmacists could help patients in monitoring the occurrence of TC adverse effects	Freq.	3	1	5	64	102	4.49	0.74
		%	1.7	0.6	2.9	36.6	58.3		
5	Pharmacists could help in limiting over-the-counter prescriptions of TCs	Freq.	2	2	6	17	148	4.75	0.68
		%	1.1	1.1	3.4	9.7	84.6		
6	Pharmacists should provide education on the proper use of TC	Freq.	2	1	3	13	156	4.83	0.59
		%	1.1	0.6	1.7	7.4	89.1		
7	Pharmacists should refuse to dispense TCs without a valid prescription	Freq.	1	2	5	21	146	4.77	0.61
		%	0.6	1.1	2.9	12.0	83.4		
Overall								**4.54**	**0.49**

SA= Strongly agree, Agree= A, Neutral= N, Disagree= D, Strongly disagree=SD

As illustrated in Table 4.12, the responses in this study were promising in regards to the attitude on the rational use of TCs. Almost three-quarters (71.5%) of the participants responded that they contribute to the process of making sure that pertinent matters of safety are negotiated with the patients, and 86.2 percent responded positively to the question that they can play a significant role in preventing inappropriate use. The majority of the respondents (93.8%) concerning patient education on rational use expressed their views by indicating that they believed that pharmacists are significant in this matter. Furthermore, 94.9 percent of participants expressed that pharmacist can help patients in keeping track of the incidence of the TCs side effects. Moreover, 94.3 percent of the participants confirmed that the help of pharmacists can decrease over-the-counter prescription of TCs. In the same context, 96.5 percent of the subjects believed that pharmacists can educate users on the proper use of corticosteroids, and 95.4 percent stated that pharmacists must refuse to dispense TCs when they do not have an appropriate prescription. According to Table 4.9 results, arithmetic mean of items in this section was between (4.22-4.83), indicating a strong positive tendency among the participants in the study in matters of promoting the right use of TCs, their knowledge of the value of discussing safety issues with patients and their significant role in decreasing cases of misuse, their education of the importance of giving the necessary education and commitment of not dispensing medications without a prescription.

4.6. Practice of Pharmacists Among Patients Who Come to Buy Steroid Creams

This section presents the results of the descriptive analysis of practice of pharmacists among patients who come to buy steroid creams.

4.6.1 Number of Patients per Day who Complain of Recurrence of Skin Problems after Stopping Application of the Steroidal Topical Formulations

Table 4.10 presents the results of the frequencies and percentages of participants' responses about the number of patients per day who complain of recurrence of skin problem after stopping applications of the topical steroidal formulations.

Table 4.13 Participants' Responses about the Number of Patients per Day who Complain of Recurrence of Skin Problems after Stopping the Application of the Topical Steroidal Formulations (n=175).

No#	Number of patients per day	Freq.	%
1	None	66	37.7
2	1-5	100	57.1
3	>5	9	5.1

Table 4.13 shows that 57.1 percent of participants receive, on average, 1-5 daily complaints about recurring skin problems after stopping the use of topical steroidal creams, whereas 37.7 percent of them reported that they did not receive any complaints, and 5.1 percent of participants received more than 5 cases daily.

4.6.2 Suggestions Provided to Patients who Complain of Recurrence of Skin Problems after Stopping the Application of Steroidal Formulations

Table 4.14 presents the results of the frequencies and percentages of participants' responses about suggestion to patients who complain of recurrence of skin problem after stopping the application of the topical steroidal formulations.

Table 4.14 Participants' responses about Suggestion Provided to Patients who Complain of Recurrence of Skin Problems after Stopping the Application of the Steroidal Formulations (n=175).

No#	Suggestion to patients	Freq.	%
1	Change the cream	56	32.0
2	Add an oral medicine to topical medicine	81	46.3
3	Consult a general physician	5	2.9
4	Consult a dermatologist	33	18.9

Table 4.14 depicts that pharmacist provide various suggestions for patients who experience skin problems after stopping the use of creams. 46.3 percent of pharmacists suggest the possibility of adding an oral medicine to the topical formulation, whereas 32 percent resolve the issue by changing the cream. Moreover,18.9 percent expressed their opinion of consulting a dermatologist, while only 2.9% suggested consulting a general physician.

4.6.3 Response of the Majority of Patients after Suggesting to consult the Dermatologist

Table 4.15 presents the results of the frequencies and percentages of participants' responses about response of the majority of patients after suggesting to meet the dermatologist.

Table 4.15 Participants' responses about the Response of the Majority of Patients after Suggesting to Meet the Dermatologist (n=175).

No#	Response of the majority of patients after suggestion to meet the dermatologist	Freq.	%
1	Agree to consult a dermatologist	101	57.7
2	Disagree to consult a dermatologist and ask for over the counter cream	74	42.3

The results of Table 4.15 show that 57.7% of participants reported that patients agreed to their suggestion of seeing a dermatologist, while 42.3% of pharmacists indicated that patients refused and requested an over-the-counter topical formulation.

4.6.4 Reasons for Not Agreeing to Meet the Dermatologist

Table 4.16 presents the results of the frequencies and percentages of participants' responses about reasons for not agreeing to meet the dermatologist.

Table 4.16 Participants' Responses About Reasons for not Agreeing to Meet the Dermatologist (n=175).

No#	Reasons for not agreeing to meet the dermatologist	Freq.	%
1	Thinks that skin problem is minor	81	46.3
2	Absence of dermatologist nearby	30	17.1
3	Long waiting period during consultations	17	9.7
4	High consultation charges	47	26.9

The results of Table 4.16 show that 46.3 percent of pharmacists believe that the reason for a patient’s refusal to consult a dermatologist is that they believe that the issue they are facing is not serious. 26.9 percent of pharmacists think that their response is attributed to the high consultation costs, while 17.1 percent of them believe that the reason is due to the absence of a nearby dermatology clinic. Lastly, 9.7 percent of participants indicated that the reason is the long waiting period during consultations.

4.7. Demographic and Professional Factors Impact on Pharmacists' KAP towards Topical Corticosteroids

This section examines the impact of various demographic and professional factors including gender, years of experience, type of pharmacy, and previous training on Pharmacists KAP towards TCs.

4.7.1 Differences Between Participants' Knowledge about Topical Corticosteroids According to Gender

Table 4.17 presents the impact of gender on knowledge about TCs.

Table 4.17 Differences Between Participants' Knowledge about topical corticosteroids According to Gender (n=175).

Items		Yes	No	Don't know	Chi2	P-value
Topical steroid creams are available in different potencies	Male	81 (46.3%)	0 (0.0%)	0 (0.0%)	5.354	0.069
	Female	88 (50.3%)	1 (0.6%)	5 (2.9%)		
Topical steroid creams are used depending on their potencies	Male	78 (44.6%)	3 (1.7%)	0 (0.0%)	2.975	0.226
	Female	89 (50.9%)	2 (1.1%)	3 (1.7%)		
Different potency of steroid creams are used in different parts of the body	Male	77 (44.0%)	1 (0.6%)	3 (1.7%)	0.045	0.978
	Female	89 (50.9%)	1 (0.6%)	4 (2.3%)		
Use of steroid creams can aggravate some skin problems	Male	80 (45.7%)	1 (0.6%)	0 (0.0%)	3.769	0.152
	Female	88 (50.3%)	2 (1.1%)	4 (2.3%)		
Steroid creams have adverse effects	Male	78 (44.6%)	2 (1.1%)	1 (0.6%)	2.304	0.316
	Female	86 (49.1%)	3 (1.7%)	5 (2.9%)		

It is evident from the results of table 4.17 that there are no statistical differences in the responses of males and females regarding the items on knowledge about TCs, according to the Chi^2 values (5.354, 2.975, 0.045, 3.769, 2.304) at P-values above 0.05. These results indicate that the level of knowledge was similar among males and females, as both had good knowledge of the properties and uses of topical steroid creams.

4.7.2 Differences Between Participants' Awareness about the Adverse Effects of TCs According to Gender

Table 4.18 illustrates the differences between the participants' awareness about the adverse effects of TCs according to gender.

Table 4.18 Differences Between Participants' Awareness about the Adverse Effects of TCs According to Gender (n=175).

Items		Yes	No	Don't know	Chi2	P-value
Topical corticosteroids can be associated with significant cutaneous adverse effects	Male	79 (45.1%)	1 (0.6%)	1 (0.6%)	2.433	0.296
	Female	87 (49.7%)	2 (1.1%)	5 (2.9%)		
Topical corticosteroids are associated with atrophy as a specific adverse effect	Male	77 (44.0%)	0 (0.0%)	4 (2.3%)	4.158	0.125
	Female	81 (46.3%)	1 (0.6%)	12 (6.9%)		
Topical corticosteroids are associated with hypopigmentation as a specific adverse effect	Male	77 (44.0%)	2 (1.1%)	2 (1.1%)	2.559	0.278
	Female	83 (47.4%)	5 (2.9%)	6 (3.4%)		
Topical corticosteroids are associated with hyperpigmentation as a specific adverse effect	Male	76 (43.4%)	4 (2.3%)	1 (0.6%)	1.643	0.440
	Female	84 (48.0%)	6 (3.4%)	4 (2.3%)		
Topical corticosteroids are associated with hypertrichosis as a specific adverse effect	Male	75 (42.9%)	3 (1.7%)	3 (1.7%)	3.714	0.156
	Female	78 (44.6%)	7 (4.0%)	9 (5.1%)		
Topical corticosteroids are associated with infections as a specific adverse effect	Male	78 (44.6%)	2 (1.1%)	1 (0.6%)	8.124	0.017*
	Female	78 (44.6%)	8 (4.6%)	8 (4.6%)		
Pharmacist's role in preventing topical corticosteroid abuse	Male	80 (45.7%)	1 (0.6%)	0 (0.0%)	4.648	0.098
	Female	90 (51.4%)	0 (0.0%)	4 (2.3%)		
Steroids should be dispensed only under prescription	Male	76 (43.4%)	3 (1.7%)	2 (1.1%)	0.464	0.793
	Female	86 (49.1%)	4 (2.3%)	4 (2.3%)		

The results of Table 4.18 showed that there are no differences between males and females regarding the awareness of the side effects of topical corticosteroids and the role of pharmacists in preventing misuse, as the Chi^2 values for the majority of items at p-value were higher than 0.05, with the exception of item " Topical corticosteroids are associated with infections as a specific adverse effect" (Chi^2= 8.124; p-value=

0.017<0.05). The results also show that males showed more accurate awareness compared to females, as the percentage of "I don't know" among females was higher (4.6% compared to 0.6% among males), which made it statistically significant.

4.7.3 Differences Between Pharmacist's Attitudes toward their Potential role in the Rational Use of TCs According to Gender

The influence of gender on the attitudes toward the pharmacist's potential role in the rationale use of TCs was tested and the results are illustrated in table 4.19

Table 4.19 Differences Between Pharmacist's Attitudes toward their the Potential Role in the Rational Use of TCs According to Gender (n=175).

Items		Level of Agreement					Chi2	P-value
		SD	D	N	A	SA		
Pharmacists could ensure that relevant safety problems are discussed with the patients	Male	0 (0.0%)	0 (0.0%)	24 (13.7%)	17 (9.7%)	40 (22.9%)	2.644	0.619
	Female	1 (0.6%)	1 (0.6%)	24 (13.7%)	16 (9.1%)	52 (29.7%)		
Pharmacists could contribute significantly in preventing TCs misuse	Male	0 (0.0%)	0 (0.0%)	10 (5.7%)	34 (19.4%)	37 (21.1%)	2.819	0.589
	Female	1 (0.6%)	1 (0.6%)	12 (6.9%)	45 (25.7%)	35 (20.0%)		
Pharmacists could counsel and educate patients regarding rational use of TCs	Male	0 (0.0%)	1 (0.6%)	3 (1.7%)	31 (17.7%)	46 (26.3%)	2.075	0.722
	Female	2 (1.1%)	2 (1.1%)	3 (1.7%)	37 (21.1%)	50 (28.6%)		
Pharmacists could help patients in monitoring the occurrence of TC adverse effects	Male	0 (0.0%)	0 (0.0%)	1 (0.6%)	33 (18.9%)	47 (26.9%)	5.555	0.235
	Female	3 (1.7%)	1 (0.6%)	4 (2.3%)	31 (17.7%)	55 (31.4%)		
Pharmacists could help in limiting over-the-counter	Male	0 (0.0%)	0 (0.0%)	2 (1.1%)	8 (4.6%)	71 (40.6%)	4.025	0.403
	Female	2 (1.1%)	2 (1.1%)	4 (2.3%)	9 (5.1%)	77 (44.0%)		

Items		Level of Agreement					Chi2	P-value
		SD	D	N	A	SA		
prescriptions of TCs								
Pharmacists should provide education on the proper use of TC	Male	0 (0.0%)	0 (0.0%)	1 (0.6%)	5 (2.9%)	75 (42.9%)	3.309	0.508
	Female	2 (1.1%)	1 (0.6%)	2 (1.1%)	8 (4.6%)	81 (46.3%)		
Pharmacists should refuse to dispense TCs without a valid prescription	Male	0 (0.0%)	0 (0.0%)	1 (0.6%)	7 (4.0%)	73 (41.7%)	6.202	0.185
	Female	1 (0.6%)	2 (1.1%)	4 (2.3%)	14 (8.0%)	73 (41.7%)		

SA= Strongly agree, Agree= A, Neutral= N, Disagree= D, Strongly disagree=SD

It is evident from the results of table 4.19 that there are no statistical differences in the responses of males and females regarding the items on pharmacist's attitudes toward their potential role in the rational use of TC, according to the Chi^2 values (2.644, 2.189, 2.075, 5.555, 4.025, 3.309, 6.202) at P-values above 0.05. These results indicate that the level of attitudes toward their potential role in rational use of TC was similar among male and female, as both had a positive attitude toward their potential role in rational use of TC.

4.7.4 Differences Between Participants' Practice of Pharmacists among Patients who Come to Buy Topical Steroidal Formulations According to Gender

Table 4.20 displays the impact of gender on pharmacists' practices among patients who come to buy TCs formulations.

Table 4.20 Differences Between Participants' Practice of Pharmacists among Patients who Come to Buy Topical Steroidal Formulations According to Gender (n=175).

Items		Male	Female	Chi2	P-value
Number of patients per day who complain of recurrence of skin problem after stopping application of the cream	None	33 (18.9%)	33 (18.9%)	4.866	0.088
	1-5	47 (26.9%)	53 (30.3%)		
	>5	1 (0.6%)	8 (4.6%)		
Suggestion to patients who complain of recurrence of skin problem after stopping	Change the cream	28 (16.0%)	28 (16.0%)	6.100	0.107
	Add an oral medicine to topical medicine	42 (24.0%)	39 (22.3%)		

Items		Male	Female	Chi2	P-value
application of the cream	Consult a general physician	1 (0.6%)	4 (2.3%)		
	Consult a dermatologist	10 (5.7%)	23 (13.1%)		
Response of a majority of patient after suggestion to meet the dermatologist	Agree to consult a dermatologist	47 (26.9%)	54 (30.9%)	0.006	0.938
	Disagree to consult a dermatologist and ask for over the counter cream	34 (19.4%)	40 (22.9%)		
Reasons for not agreeing to meet the dermatologist	Thinks that skin problem is minor	41 (23.4%)	40 (22.9%)	2.947	0.400
	Absence of dermatologist nearby	10 (5.7%)	20 (11.4%)		
	Long waiting period during consultations	7 (4.0%)	10 (5.7%)		
	High consultation charges	23 (13.1%)	24 (13.7%)		

Table 4.20 showed that there are no statistical differences in the responses of males and females regarding the items on participants' practice of pharmacists among patients who come to buy steroid creams, according to the Chi^2 values (4.866, 6.100, 0.006, 2.947) at P-values above 0.05. These results indicate that the level of participants' practice of pharmacists among patients who come to buy steroid creams was similar among male and female.

4.7.5 Differences Between Participants' Knowledge about Topical Corticosteroids According to Experience in Years

The influence of years of experience on the pharmacists' knowledge about TCs in terms of potencies, their site of applications, and side effects were tested and the results are displayed in table 4.21.

Table 4.21 Differences Between Participants' Knowledge about Topical Corticosteroids According to Experience in Years (n=175).

Items		Yes	No	Don't know	Chi2	P-value
Topical steroid creams are available in different potencies	<5	87 (49.7%)	1 (0.6%)	5 (2.9%)	5.478	0.242
	6-15	68 (38.9%)	0 (0.0%)	0 (0.0%)		
	16-25	14(8.0%)	0 (0.0%)	0 (0.0%)		
Topical steroid creams are used depending on their potencies	<5	85 (48.6%)	5 (2.9%)	3 (1.7%)	7.392	0.117
	6-15	68 (38.9%)	0 (0.0%)	0 (0.0%)		
	16-25	14(8.0%)	0 (0.0%)	0 (0.0%)		
	<5	86 (49.1%)	1 (0.6%)	6 (3.4%)	3.402	0.493
	6-15	66 (37.7%)	1 (0.6%)	1 (0.6%)		

Items		Yes	No	Don't know	Chi2	P-value
Different potency of steroid creams are used in different parts of the body	16-25	14(8.0%)	0 (0.0%)	0 (0.0%)		
Use of steroid creams can aggravate some skin problems	<5	87 (49.7%)	2 (1.1%)	4 (2.3%)	4.021	0.403
	6-15	67 (38.3%)	1 (0.6%)	0 (0.0%)		
	16-25	14(8.0%)	0 (0.0%)	0 (0.0%)		
Steroid creams have adverse effects	<5	86 (49.1%)	3 (1.7%)	4 (2.3%)	1.255	0.869
	6-15	64 (36.6%)	2 (1.1%)	2 (1.1%)		
	16-25	14(8.0%)	0 (0.0%)	0 (0.0%)		

It is evident from the results of Table 4.21 that there are no statistical differences in the responses of participants regarding the items on knowledge about topical corticosteroids items according to experience years, based on Chi^2 values (5.478, 7.392, 3.402, 4.021, 1.255) at P-values above 0.05. These results indicate that the level of knowledge was similar among participants.

4.7.6 Differences Between Participants' Awareness about Adverse Effects of Topical Corticosteroids According to Experience in Years

Table 4.22 summarizes the differences between participants' awareness about the adverse effects of TCs according to years of experience.

Table 4.22 Differences Between Participants' Awareness about the Adverse Effects of Topical Corticosteroids According to Experience in Years (n=175).

Items		Yes	No	Don't know	Chi2	P-value
Topical corticosteroids can be associated with significant cutaneous adverse effects	<5	87 (49.7%)	3 (1.7%)	3 (1.7%)	3.388	0.495
	6-15	65 (37.1%)	0 (0%)	3 (1.7%)		
	16-25	14(8.0%)	0 (0%)	0 (0%)		
Topical corticosteroids are associated with atrophy as a specific adverse effect	<5	80 (45.7%)	1 (0.6%)	12 (6.9%)	4.835	0.305
	6-15	64 (36.6%)	0 (0%)	4 (2.3%)		
	16-25	14(8.0%)	0 (0%)	0 (0%)		
Topical corticosteroids are associated with hypopigmentation as a specific adverse effect	<5	81 (46.3%)	6 (3.4%)	6 (3.4%)	5.232	0.264
	6-15	65 (37.1%)	1 (0.6%)	2 (1.1%)		
	16-25	14(8.0%)	0 (0%)	0 (0%)		
Topical corticosteroids are associated with hyperpigmentation as a specific adverse effect	<5	83 (47.4%)	6 (3.4%)	4 (2.3%)	2.600	0.627
	6-15	63 (36.0%)	4 (2.3%)	1 (0.6%)		
	16-25	14(8.0%)	0 (0%)	0 (0%)		

Items		Yes	No	Don't know	Chi2	P-value
Topical corticosteroids are associated with hypertrichosis as a specific adverse effect	<5	75 (42.9%)	8 (4.6%)	10 (5.7%)	8.702	0.069
	6-15	64 (36.6%)	2 (1.1%)	2 (1.1%)		
	16-25	14(8.0%)	0 (0%)	0 (0%)		
Topical corticosteroids are associated with infections as a specific adverse effect	<5	79 (45.1%)	7 (4.0%)	7 (4.0%)	4.388	0.356
	6-15	63 (36.0%)	3 (1.7%)	2 (1.1%)		
	16-25	14(8.0%)	0 (0%)	0 (0%)		
Pharmacist's role in preventing topical corticosteroid abuse	<5	89 (50.9%)	1 (0.6%)	3 (1.7%)	1.804	0.772
	6-15	67 (38.3%)	0 (0%)	1 (0.6%)		
	16-25	14(8.0%)	0 (0%)	0 (0%)		
Steroids should be dispensed only under prescription	<5	84 (48.0%)	4 (2.3%)	5 (2.9%)	3.031	0.553
	6-15	64 (36.6%)	3 (1.7%)	1 (0.6%)		
	16-25	14(8.0%)	0 (0%)	0 (0%)		

The results of Table 4.22 showed that there are no differences between participants regarding awareness of the side effects of topical corticosteroids and the role of pharmacists in preventing misuse according to experience, as the Chi^2 values for the majority of items at p-value were above 0.05.

4.7.7 Differences Between Pharmacist's Attitudes toward their Potential Role in the Rational Use of TCs According to Experience in Years

Table 4.23 provides the analyzed data in terms of the influence of the years of experience on the attitudes of community pharmacists toward their potential role in the rational use of TCs.

Table 4.23 Differences Between Pharmacist's Attitudes toward their Potential Role in the Rational Use of TCs According to Experience in Years (n=175).

Items		Level of Agreement					Chi2	P-value
		SD	D	N	A	SA		
Pharmacists could ensure that relevant safety problems are discussed with the patients	<5	1 (0.6%)	1 (0.6%)	13 (7.4%)	16 (9.1%)	62 (35.4%)	23.494	0.003*
	6-15	0 (0%)	0 (0%)	30 (17.1%)	13 (7.4%)	25 (14.3%)		
	16-25	0 (0%)	0 (0%)	5 (2.9%)	4 (2.3%)	5 (2.9%)		
Pharmacists could contribute significantly in	<5	1 (0.6%)	1 (0.6%)	8 (4.6%)	41 (23.4%)	42 (24.0%)	8.098	0.424
	6-15	0 (0%)	0 (0%)	12 (6.9%)	34 (19.4%)	22 (12.6%)		

Items		Level of Agreement					Chi2	P-value
		SD	D	N	A	SA		
preventing TCs misuse	16-25	0 (0%)	0 (0%)	2 (1.1%)	4 (2.3%)	8 (4.6%)		
Pharmacists could counsel and educate patients regarding rational use of TCs	<5	2 (1.1%)	3 (1.7%)	3 (1.7%)	32 (18.3%)	53 (30.3%)	10.563	0.228
	6-15	0 (0%)	0 (0%)	3 (1.7%)	33 (18.9%)	32 (18.3%)		
	16-25	0 (0%)	0 (0%)	0 (0%)	3 (1.7%)	11 (6.3%)		
Pharmacists could help patients in monitoring the occurrence of TC adverse effects	<5	2 (1.1%)	1 (0.6%)	4 (2.3%)	30 (17.1%)	56 (32.0%)	4.268	0.832
	6-15	1 (0.6%)	0 (0%)	1 (0.6%)	29 (16.6%)	37 (21.1%)		
	16-25	0 (0%)	0 (0%)	0 (0%)	5 (2.9%)	9 (5.1%)		
Pharmacists could help in limiting over-the-counter prescriptions of TCs	<5	1 (0.6%)	2 (1.1%)	6 (3.4%)	11 (6.3%)	73 (41.7%)	9.971	0.267
	6-15	1 (0.6%)	0 (0%)	0 (0%)	4 (2.3%)	63 (36.0%)		
	16-25	0 (0%)	0 (0%)	0 (0%)	2 (1.1%)	12 (6.9%)		
Pharmacists should provide education on the proper use of TC	<5	2 (1.1%)	1 (0.6%)	3 (1.7%)	8 (4.6%)	79 (45.1%)	6.077	0.639
	6-15	0 (0%)	0 (0%)	0 (0%)	4 (2.3%)	64 (36.6%)		
	16-25	0 (0%)	0 (0%)	0 (0%)	1 (0.6%)	13 (7.4%)		
Pharmacists should refuse to dispense TCs without a valid prescription	<5	1 (0.6%)	2 (1.1%)	3 (1.7%)	14 (8.0%)	73 (41.7%)	5.700	0.681
	6-15	0 (0%)	0 (0%)	2 (1.1%)	5 (2.9%)	61 (34.9%)		
	16-25	0 (0%)	0 (0%)	0 (0%)	2 (1.1%)	12 (6.9%)		

SA= Strongly agree, Agree= A, Neutral= N, Disagree= D, Strongly disagree=SD

The results of Table 4.23 showed that there are no significant differences between participants regarding pharmacist's attitudes toward their potential role in rational use of TCs according to experience in years, as the Chi^2 values for the majority of items at p-value were higher than 0.05, with the exception of the item " Pharmacists could ensure that relevant safety problems are discussed with the patients" (Chi^2= 25.307; p-value= 0.013<0.05). It is clear that the number of pharmacists with less than 5 years of experience showed the highest percentage of strong agreement (35.4%).

4.7.8 Differences Between Participants' Practice of Pharmacists among Patients who Come to Buy Topical Steroidal Creams According to Experience in Years

The contribution of the experience in years on the pharmacists' practices among patients who come to buy TCs was tested and highlighted in table 4.24.

Table 4.24 Differences Between Participants' Participants' Practice of Pharmacists among Patients who Come to Buy Topical Steroidal Creams According to Experience in Years (n=175).

Items		<5	6-15	16-25	Chi2	P-value
Number of patients per day who complain of recurrence of skin problem after stopping application of the cream	None	39 (22.3%)	23 (13.1%)	4 (2.3%)	2.766	0.598
	1-5	46 (28.0%)	41 (23.4%)	10 (5.7%)		
	>5	5 (2.9%)	4 (2.3%)	0 (0)		
Suggestion to patients who complain of recurrence of skin problem after stopping application of the cream	Change the cream	35 (20.0%)	15 (8.6%)	6 (3.4%)	11.850	0.065
	Add an oral medicine to topical medicine	34 (19.4%)	42 (24.0%)	5 (2.9%0		
	Consult a general physician	4 (2.3%)	1 (0.6%)	0 (0)		
	Consult a dermatologist	20 (11.4%)	10 (5.7%)	3 (1.7%)		
Response of a majority of patient after suggestion to meet the dermatologist	Agree to consult a dermatologist	59 (33.7%)	34 (19.4%)	8 (4.6%)	2.910	0.233
	Disagree to consult a dermatologist and ask for over the counter cream	34 (19.4%)	34 (19.4%)	6 (3.4%)		
Reasons for not agreeing to meet the dermatologist	Thinks that skin problem is minor	46 (26.3%)	29 (16.6%)	6 (3.4%)	7.155	0.307
	Absence of dermatologist nearby	11 (6.3%)	14 (8.0%)	5 (2.9%)		
	Long waiting period during consultations	11 (6.3%)	5 (2.9%)	1 (0.6%)		
	High consultation charges	25 (14.3%)	20 (11.4%)	2 (1.1%)		

The results of Table 4.24 showed that there are no differences between participants regarding practice of pharmacists among patients who come to buy topical steroidal

formulations according to years of experience, as the Chi^2 values for all of items at p-value were above 0.05.

4.7.9 Differences Between Participants' Knowledge about Topical Corticosteroids According to the Type of Pharmacy

Table 4.25 outlines the impact of the type of pharmacy (chain or independent pharmacies) on the pharmacist's knowledge about TCs

Table 4.25 Differences Between Participants' Knowledge about Topical Corticosteroids According to the Type of Pharmacy (n=175).

Items		Yes	No	Don't know	Chi2	P-value
Topical steroid creams are available in different potencies	Chain	70 (40.0%)	0 (0.0%)	2 (1.1%)	0.707	0.702
	Independent	99 (56.6%)	1 (0.6%)	3 (1.7%)		
Topical steroid creams are used depending on their potencies	Chain	69 (39.4%)	2 (1.1%)	1 (0.6%)	0.08	0.961
	Independent	98 (56.0%)	3 (1.7%)	2 (1.1%)		
Different potency of steroid creams are used in different parts of the body	Chain	68 (38.9%)	1 (0.6%)	3 (1.7%)	0.075	0.963
	Independent	98 (56.0%)	1 (0.6%)	4 (2.3%)		
Use of steroid creams can aggravate some skin problems	Chain	71 (40.6%)	0 (0.0%)	1 (0.6%)	2.614	0.271
	Independent	97 (55.4%)	3 (1.7%)	3 (1.7%)		
Steroid creams have adverse effects	Chain	68 (38.9%)	2 (1.1%)	2 (1.1%)	0.161	0.923
	Independent	96 (54.9%)	3 (1.7%)	4 (2.3%)		

It is evident from the results of Table 4.25 that there are no statistical differences in the responses of participants regarding the items on knowledge about topical corticosteroids according to the pharmacy type, based on the Chi^2 values (0.707, 0.080, 0.075, 2.614, 0.161) at P-values above 0.05.

4.7.10 Differences Between Participants' Awareness about Topical Corticosteroids According to Pharmacy Type

The author tested the influence of the pharmacy type on the awareness of pharmacists about the adverse effects of TCs and depicted the results in table 4.26.

Table 4.26 Differences Between Participants' Awareness about the Adverse Effects of Topical Corticosteroids According to Pharmacy Type (n=175).

Items		Yes	No	Don't know	Chi2	P-value
Topical corticosteroids can be associated with significant cutaneous adverse effects	Chain	66 (37.7%)	2 (1.1%)	4 (2.3%)	2.553	0.279
	Independent	100 (57.1%)	1 (0.6%)	2 (1.1%)		
Topical corticosteroids are associated with atrophy as a specific adverse effect	Chain	61 (34.9%)	1 (0.6%)	10 (5.7%)	4.864	0.088
	Independent	97 (55.4%)	0 (0.0%)	6 (3.4%)		
Topical corticosteroids are associated with hypopigmentation as a specific adverse effect	Chain	63 (36.0%)	4 (2.3%)	5 (2.9%)	2.453	0.293
	Independent	97 (55.4%)	3 (1.7%)	3 (1.7%)		
Topical corticosteroids are associated with hyperpigmentation as a specific adverse effect	Chain	63 (36.0%)	6 (3.4%)	3 (1.7%)	2.409	0.300
	Independent	97 (55.4%)	4 (2.3%)	2 (1.1%)		
Topical corticosteroids are associated with hypertrichosis as a specific adverse effect	Chain	62 (35.4%)	4 (2.3%)	6 (3.4%)	0.418	0.811
	Independent	91 (52.0%)	6 (3.4%)	6 (3.4%)		
Topical corticosteroids are associated with infections as a specific adverse effect	Chain	61 (34.9%)	6 (3.4%)	5 (2.9%)	2.509	0.285
	Independent	95 (54.3%)	4 (2.3%)	4 (2.3%)		
Pharmacist's role in preventing topical corticosteroid abuse	Chain	69 (39.4%)	0 (0.0%)	3 (1.7%)	2.614	0.271
	Independent	101 (57.7%)	1 (0.6%)	1 (0.6%)		
Steroids should be dispensed only under prescription	Chain	62 (35.4%)	7 (4.0%)	3 (1.7%)	10.76	0.005*
	Independent	100 (57.1%)	0 (0.0%)	3 (1.7%)		

The results of Table 4.26 showed that there are no differences between participants regarding awareness of the side effects of topical corticosteroids and the role of pharmacists in preventing misuse according to pharmacy type, as the Chi$^{\wedge 2}$ values for the majority of items at p-value were above 0.05, with the exception of item " Steroids should be dispensed only under prescription " (Chi$^{\wedge 2}$= 10.760; p-value= 0.005<0.05). The results

also show that pharmacists who work in independent pharmacy have (57.1%) compare to chain pharmacy (35.4%).

4.7.11 Differences Between Pharmacist's Attitudes toward their Potential Role in the Rational use of TCs According to Pharmacy Type

The contribution of the pharmacy type on the attitudes of pharmacists toward their potential role in the rational use of TCs is detailed in table 4.27.

Table 4.27 Differences Between Pharmacist's Attitudes toward their Potential Role in the Rational use of TC According to Pharmacy Type (n=175).

Items		Level of Agreement					Chi^2	P-value
		SD	D	N	A	SA		
Pharmacists could ensure that relevant safety problems are discussed with the patients	Chain	1 (0.6%)	0 (0.0%)	11 (6.3%)	12 (6.9%)	48 (27.4%)	13.649	0.009*
	Independent	0 (0.0%)	1 (0.6%)	37 (21.1%)	21 (12.0%)	44 (25.1%)		
Pharmacists could contribute significantly in preventing TCs misuse	Chain	1 (0.6%)	0 (0.0%)	8 (4.6%)	30 (17.1%)	33 (18.9%)	3.319	0.506
	Independent	0 (0.0%)	1 (0.6%)	14 (8.0%)	49 (28.0%)	39 (22.3%)		
Pharmacists could counsel and educate patients regarding rational use of TCs	Chain	1 (0.6%)	0 (0.0%)	3 (1.7%)	28 (16.0%)	40 (22.9%)	2.367	0.669
	Independent	1 (0.6%)	3 (1.7%)	3 (1.7%)	40 (22.9%)	56 (32.0%)		
Pharmacists could help patients in monitoring the	Chain	1 (0.6%)	0 (0.0%)	1 (0.6%)	22 (12.6%)	48 (27.4%)	4.382	0.357
	Independent	2 (1.1%)	1 (0.6%)	4 (2.3%)	42 (24.0%)	54 (30.9%)		

Items		Level of Agreement					Chi^2	P-value
		SD	D	N	A	SA		
occurrence of TC adverse effects								
Pharmacists could help in limiting over-the-counter prescriptions of TCs	Chain	2 (1.1%)	0 (0.0%)	2 (1.1%)	8 (4.6%)	60 (34.3%)	4.678	0.322
	Independent	0 (0.0%)	2 (1.1%)	4 (2.3%)	9 (5.1%)	88 (50.3%)		
Pharmacists should provide education on the proper use of TC	Chain	1 (0.6%)	0 (0.0%)	0 (0.0%)	3 (1.7%)	68 (38.9%)	4.999	0.287
	Independent	1 (0.6%)	1 (0.6%)	3 (1.7%)	10 (5.7%)	88 (50.3%)		
Pharmacists should refuse to dispense TCs without a valid prescription	Chain	0 (0.0%)	1 (0.6%)	1 (0.6%)	9 (5.1%)	61 (34.9%)	1.737	0.784
	Independent	1 (0.6%)	1 (0.6%)	4 (2.3%)	12 (6.9%)	85 (48.6%)		

SA= Strongly agree, Agree= A, Neutral= N, Disagree= D, Strongly disagree=SD

The results of Table 4.27 showed that there are no differences between participants regarding pharmacist's attitudes toward their potential role in the rational use of TCs according to the pharmacy type, as the Chi^^2 values for the majority of items at p-value were above 0.05, with the exception of item " Pharmacists could ensure that relevant safety problems are discussed with the patients " (Chi^^2= 13.649; p-value= 0.009<0.05). The results also showed that pharmacists who work in independent pharmacy have agreement percentage (37.1%) compare to chain pharmacy (34.3%).

4.7.12 Differences Between Practice of Pharmacists among Patients who Come to Buy Topical Steroidal Formulations According to Pharmacy Type

Table 4.28 depicts the impact of the pharmacy type the pharmacist is working on, in the type, number, and attitude of patients who visit the pharmacy asking for TCs in specific.

Table 4.28 Differences Between Practice of Pharmacists among Patients who Come to Buy Topical Steroidal Formulations According to Pharmacy Type (n=175).

Items		Chain	Independent	Chi2	P-value
Number of patients per day who complain of recurrence of skin problem after stopping application of the cream	None	36 (20.6%)	30 (17.1%)	8.388	0.015*
	1-5	32 (18.3%)	68 (38.9%)		
	>5	4 (2.3%)	5 (2.9%)		
Suggestion to patients who complain of recurrence of skin problem after stopping application of the cream	Change the cream	25 (14.3%)	31 (17.7%)	6.201	0.102
	Add an oral medicine to topical medicine	26 (14.9%)	55 (31.4%)		
	Consult a general physician	3 (1.7%)	2 (1.1%)		
	Consult a dermatologist	18 (10.3%)	15 (8.6%)		
Response of a majority of patient after suggestion to meet the dermatologist	Agree to consult a dermatologist	45 (25.7%)	56 (32.0%)	1.148	0.284
	Disagree to consult a dermatologist and ask for over the counter cream	27 (15.4%)	47 (26.9%)		
Reasons for not agreeing to meet the dermatologist	Thinks that skin problem is minor	38 (21.7%)	43 (24.6%)	2.341	0.505
	Absence of dermatologist nearby	11 (6.3%)	19 (10.9%)		
	Long waiting period during consultations	7 (4.0%)	10 (5.7%)		
	High consultation charges	16 (9.1%)	31 (17.7%)		

Table 4.28 showed that there are no significant statistical differences between participants regarding the attitude and number of patients visiting the pharmacy asking for TCs in particular, in addition to the pharmacists attitudes toward such requests, this was confirmed by the Chi^2 values for the majority of items at p-value as they were higher than 0.05, with the exception of item " Number of patients per day who complain of recurrence of skin problem after stopping application of the cream " ($Chi^{\wedge 2}$= 8.338; p-value= 0.015<0.05). The results also show that (38.9%) of pharmacists who work in independent pharmacy handle 1-5 complaints compared to chain pharmacy (18.3%%).

4.7.13 Differences Between Participants' Knowledge about Topical Corticosteroids According to Previous Training

Due to the immense believe in the importance of continuous education and training for pharmacists in health and medicines aspects in general, and TCs related aspects in particular. The author studied the impact of previous training on the pharmacists' knowledge about TCs and summarized the results in table 4.29.

Table 4.29 Differences Between Participants' Knowledge about Topical Corticosteroids According to Previous Training (n=175).

Items	Previous training	Yes	No	Don't know	Chi^2	P-value
Topical steroid creams are available in different potencies	Yes	144 (82.3%)	0	0	28.860	0.000*
	No	25 (14.3%)	1 (0.6%)	5 (2.9%)		
Topical steroid creams are used depending on their potencies	Yes	140 (80.0%)	4 (2.3%)	0	14.227	0.001*
	No	27 (15.4%)	1 (0.6%)	3 (1.7%)		
Different potency of steroid creams is used in different parts of the body	Yes	139 (79.4%)	2 (1.1%)	3 (1.7%)	8.135	0.017*
	No	27 (15.4%)	0	4 (2.3%)		
Use of steroid creams can aggravate some skin problems	Yes	142 (81.1%)	2 (1.1%)	0	19.660	0.000*
	No	26 (14.9%)	1 (0.6%)	4 (2.3%)		
Steroid creams have adverse effects	Yes	139 (79.4%)	3 (1.7%)	2 (1.1%)	12.254	0.002*
	No	25 (14.3%)	2 (1.1%)	4 (2.3%)		

It is evident from the results of Table 4.29 that there are significant statistical differences in the responses of participants regarding the items on knowledge about topical corticosteroids items according to previous training, based on the Chi^2 values at P-values less than 0.05. The results were directly related to the exposure to previous training where it is obvious from the obtained results that pharmacists who received training showed more accurate and correct knowledge about TCs in terms of potencies, uses, site of application, and their potential side effects.

4.7.14 Differences Between Participants' Awareness about the Adverse Effects of Topical Corticosteroids According to Previous Training

As training does not contribute in knowledge, it also fosters positive awareness in regard to medicines use, abuse, and potential adverse effects. Thus, the author studied the impact of previous training on the awareness about the adverse effects of TCs and illustrated the outcomes in table 4.30.

Table 4.30 Differences Between Participants' Awareness about the Adverse Effects of Topical Corticosteroids According to Previous Training (n=175).

Items	Previous training	Yes	No	Don't know	Chi^2	P-value
Topical corticosteroids can be associated with significant cutaneous adverse effects	Yes	138 (78.9%)	2 (1.1%)	4 (2.3%)	1.588	0.452
	No	28 (16.0%)	1 (0.6%)	2 (1.1%)		
Topical corticosteroids are associated with atrophy as a specific adverse effect	Yes	134 (76.6%)	1 (0.6%)	9 (5.1%)	8.347	0.015*
	No	24 (13.7%)	0	7 (4.0%)		
Topical corticosteroids are associated with hypopigmentation as a specific adverse effect	Yes	135 (77.1%)	4 (2.3%)	5 (2.9%)	5.664	0.059
	No	25 (14.3%)	3 (1.7%)	3 (1.7%)		
Topical corticosteroids are associated with hyperpigmentation as a specific adverse effect	Yes	136 (77.7%)	7 (4.0%)	1 (0.6%)	15.152	0.001*
	No	24 (13.7%)	3 (1.7%)	4 (2.3%)		
Topical corticosteroids are associated with hypertrichosis as a specific adverse effect	Yes	130 (74.3%)	7 (4.0%)	7 (4.0%)	6.513	0.039*
	No	23 (13.1%)	3 (1.7%)	5 (2.9%)		

Items	Previous training	Yes	No	Don't know	Chi²	P-value
Topical corticosteroids are associated with infections as a specific adverse effect	Yes	131 (74.9%)	8 (4.6%)	5 (2.9%)	4.753	0.093
	No	25 (14.3%)	2 (1.1%)	4 (2.3%)		
Pharmacist's role in preventing topical corticosteroid abuse	Yes	142 (81.1%)	1 (0.6%)	1 (0.6%)	9.401	0.009*
	No	28 (16.0%)	0	3 (1.7%)		
Steroids should be dispensed only under prescription	Yes	136 (77.7%)	5 (2.9%)	3 (1.7%)	5.165	0.076
	No	26 (14.9%)	2 (1.1%)	3 (1.7%)		

The results showed that prior training influenced participants' knowledge about some of the side effects of topical corticosteroids. Approximately 78.9 percent of pharmacists who had received prior training had deeper understanding that topical corticosteroids have significant dermatological effects, compared to 16.0 percent of those who had not received training. The results also revealed differences regarding specific effects, such as skin atrophy, with 76.6 percent of pharmacists who had received training showing greater knowledge in this regard compared to 13.7 percent of those who had not ($Chi^2=8.347$, $p=0.015$). 77.7 percent of pharmacists who received trainee training showed a greater understanding of the pharmacist's role in preventing steroidal misuse compared to those who did not ($Chi^2=9.401$, $p=0.009$). On the other hand, the results did not show a statistically significant difference regarding topical corticosteroid-associated infections according to the prior training variable ($Chi^2=4.753$, $p=0.093$) or knowledge that steroids should be dispensed by prescription ($Chi^2=5.165$, $p=0.076$).

4.7.15 Differences Between Pharmacist's Attitudes Toward their Potential Role in the Rational Use of TCs According to Previous Training

Table 4.31 depicts the impact of previous training on the attitude of community pharmacists toward their potential role in the rationale use of TCs.

Table 4.31 Differences Between Pharmacist's Attitudes Toward their Potential Role in the Rational Use of TCs According to Previous Training (n=175).

Items	previous training	Level of Agreement					Chi^2	P-value
		SD	D	N	A	SA		
Pharmacists could ensure that relevant safety problems are discussed with the patients	Yes	1 (0.6%)	0 (0.0%)	46 (26.3%)	23 (13.1%)	74 (42.3%)	14.708	0.005*
	No	0 (0.0%)	1 (0.6%)	2 (1.1%)	10 (5.7%)	18 (10.3%)		
Pharmacists could contribute significantly in preventing TCs misuse	Yes	1 (0.6%)	0 (0.0%)	18 (10.3%)	68 (38.9%)	57 (32.6%)	6.123	0.19
	No	0 (0.0%)	1 (0.6%)	4 (2.3%)	11 (6.3%)	15 (8.6%)		
Pharmacists could counsel and educate patients regarding rational use of TCs	Yes	2 (1.1%)	0 (0.0%)	6 (3.4%)	58 (33.1%)	78 (44.6%)	16.151	0.003*
	No	0 (0.0%)	3 (1.7%)	0 (0.0%)	10 (5.7%)	18 (10.3%)		
Pharmacists could help patients in monitoring the occurrence of TC adverse effects	Yes	3 (1.7%)	0 (0.0%)	3 (1.7%)	55 (31.4%)	83 (47.4%)	7.638	0.106
	No	0 (0.0%)	1 (0.6%)	2 (1.1%)	9 (5.1%)	19 (10.9%)		
Pharmacists could help in limiting over-the-counter prescriptions of TCs	Yes	2 (1.1%)	1 (0.6%)	2 (1.1%)	12 (6.9%)	127 (72.6%)	14.582	0.006*
	No	0 (0.0%)	1 (0.6%)	4 (2.3%)	5 (2.9%)	21 (12.0%)		
Pharmacists should provide education on	Yes	2 (1.1%)	0 (0.0%)	2 (1.1%)	7 (4.0%)	133 (76.0%)	13.736	0.008*
	No	0 (0.0%)	1 (0.6%)	1 (0.6%)	6 (3.4%)	23 (13.1%)		

Items	previous training	Level of Agreement					Chi^2	P-value
		SD	D	N	A	SA		
the proper use of TC								
Pharmacists should refuse to dispense TCs without a valid prescription	Yes	0 (0.0%)	1 (0.6%)	4 (2.3%)	16 (9.1%)	123 (70.3%)	7.014	0.135
	No	1 (0.6%)	1 (0.6%)	1 (0.6%)	5 (2.9%)	23 (13.1%)		

SA= Strongly agree, Agree= A, Neutral= N, Disagree= D, Strongly disagree=SD

The results revealed significant statistical differences in pharmacists' attitudes toward their role in the rational use of TCs based on prior training. Pharmacists who had received training demonstrated higher level of agreement regarding their ability to discuss safety issues with patients (82.3% vs. 17.7% of non-trainees, chi^2 = 14.708, p = 0.005). Furthermore, 77.7 percent of trained pharmacists reported their ability to provide education and counseling to patients on the rational use of these medications, compared to 15.9 percent of pharmacists who did not receive prior training (chi^2 = 16.151, p = 0.003). Moreover, trained pharmacists appeared to agree (79.5%) with their role in reducing the dispensing of over-the-counter topical steroids (chi^2 = 14.582, p = 0.006), and 80 percent were willing to provide education on the proper use of these medications (chi^2 = 13.736, p = 0.008). However, the results showed that there are no significant statistical differences between trained and untrained pharmacists in terms of contributing significantly in preventing TCs misuse or helping patients monitor side effects or refusing to dispense over-the-counter steroids (p>0.05).

4.7.16 Differences Between Participants' Practice among Patients who Come to Buy Topical Steroidal Formulations According to Previous Training

Pharmacists' practices towards patients who request specific medications in general, and TCs in particular is a crucial matter. Thus, the author tested the impact of previous training on the pharmacists' practice toward patients who come to buy TCs formulations and illustrated the results in table 4.32.

Table 4.32 Differences Between Participants' Practice among Patients who Come to Buy Topical Steroidal Formulations According to Previous Training (n=175).

Items		Yes	No	Chi²	P-value
Number of patients per day who complain of recurrence of skin problem after stopping application of the cream	None	55 (31.4%)	11 (6.3%)	1.591	0.451
	1-5	83 (47.4%)	17 (9.7%)		
	>5	6 (3.4%)	3 (1.7%)		
Suggestion to patients who complain of recurrence of skin problem after stopping application of the cream	Change the cream	42 (24.0%)	14 (8.0%)	17.643	0.001*
	Add an oral medicine to topical medicine	76 (43.4%)	5 (2.9%)		
	Consult a general physician	2 (1.1%)	3 (1.7%)		
	Consult a dermatologist	24 (13.7%)	9 (5.1%)		
Response of a majority of patient after suggestion to meet the dermatologist	Agree to consult a dermatologist	81 (46.3%)	20 (11.4%)	0.714	0.398
	Disagree to consult a dermatologist and ask for over the counter cream	63 (36.0%)	11 (6.3%)		
Reasons for not agreeing to meet the dermatologist	Thinks that skin problem is minor	67 (38.3%)	14 (8.0%)	8.067	0.045*
	Absence of dermatologist nearby	25 (14.3%)	5 (2.9%)		
	Long waiting period during consultations	10 (5.7%)	7 (4.0%)		
	High consultation charges	42 (24.0%)	5 (2.9%)		

The results showed significant statistical differences regarding the number of complaints pharmacists monitored from patients regarding the severity of the skin problems after discontinuing the TCs formulations. 31.4 percent of trained pharmacists reported no cases, compared to 6.3 percent of untrained pharmacists ($Chi^2 = 1.591$, $P = 0.451$). The results also related to recommendations given to patients experiencing recurrence of the skin problem. 43.4 percent of trained pharmacists recommended combining an oral medication with the TCs formulations or changing the currently used TCs formulations (24.0%), compared to 2.9 percent and 8.0 percent of untrained pharmacists behavior, respectively ($Chi^2 = 17.643$, $P = 0.001$). Regarding patients'

response to the recommendation to consult a dermatologist, there were no statistically significant differences (Chi^2 = 0.714, P = 0.398) between trained and untrained pharmacists. Eighty-one trained pharmacists agreed to encourage consultation with a dermatologist, compared to 20 non-trained pharmacists (11.4%). The results also indicated statistically significant differences between trained and non-trained pharmacists (chi^2 = 8.067, p = 0.045) regarding the reasons why patients refused to see a dermatologist. Trained pharmacists indicated that patients believed their skin condition was minor (38.3%) or due to the lack of a dermatologist in their area (14.3%).

4.7.17 Differences Between Participants' Knowledge about Topical Corticosteroids According to Educational Level

Another important factor is the educational level of the pharmacists (Diploma, Bachelors, Masters, or doctorate degrees) influence on their knowledge, attitudes, and practices. Hence, the author tested the impact of education level on pharmacists' knowledge about TCs and summarized the results in table 4.33.

Table 4.33 Differences Between Participants' Knowledge about Topical Corticosteroids According to Educational Level (n=175).

Items		Yes	No	Don't know	Chi^2	P-value
Topical steroid creams are available in different potencies	Diploma	29 (16.6%)	0 (0.0%)	0 (0.0%)	5.113	0.276
	Bachelor's degree	90 (51.4%)	1 (0.6%)	5 (2.9%)		
	Postgraduate degree	50 (28.6%)	0 (0.0%)	0 (0.0%)		
Topical steroid creams are used depending on their potencies	Diploma	29 (16.6%)	0 (0.0%)	0 (0.0%)	6.899	0.141
	Bachelor's degree	88 (50.3%)	5 (2.9%)	3 (1.7%)		
	Postgraduate degree	50 (28.6%)	0 (0.0%)	0 (0.0%)		
Different potency of steroid creams are used in different parts of the body	Diploma	29 (16.6%)	0 (0.0%)	0 (0.0%)	4.757	0.313
	Bachelor's degree	88 (50.3%)	2 (1.1%)	6 (3.4%)		
	Postgraduate degree	49 (28.0%)	0 (0.0%)	1 (0.6%)		
	Diploma	29 (16.6%)	0 (0.0%)	0 (0.0%)	4.009	0.405

Items		Yes	No	Don't know	Chi^2	P-value
Use of steroid creams can aggravate some skin problems	Bachelor's degree	90 (51.4%)	2 (1.1%)	4 (2.3%)		
	Postgraduate degree	49 (28.0%)	1 (0.6%)	0 (0.0%)		
Steroid creams have adverse effects	Diploma	29 (16.6%)	0 (0.0%)	0 (0.0%)	3.960	0.411
	Bachelor's degree	87 (49.7%)	4 (2.3%)	5 (2.9%)		
	Postgraduate degree	48 (27.4%)	1 (0.6%)	1 (0.6%)		

It is evident from the results of Table 4.33 that there are no significant statistical differences in the responses of participants regarding the items on knowledge about topical corticosteroids items of study according to educational level, based on Chi^2 values (5.113, 6.899, 4.757, 4.009, 3.960) at P-values above 0.05. These results indicate that the level of knowledge was similar among participants.

4.7.18 Differences Between Participants' Awareness about the Adverse Effects of Topical Corticosteroids According to Educational level

The contribution of the education level on the pharmacist's awareness about the adverse effects of TCs was tested and the results are highlighted in table 4.34.

Table 4.34 Differences Between Participants' Awareness about the Adverse Effects of Topical Corticosteroids According to Educational Level (n=175).

Items		Yes	No	Don't know	Chi^2	P-value
1) Topical corticosteroids can be associated with significant cutaneous adverse effects	Diploma	29 (16.6%)	0 (0.0%)	0 (0.0%)	4.884	0.299
	Bachelor's degree	88 (50.3%)	3 (1.7%)	5 (2.9%)		
	Postgraduate degree	49 (28.0%)	0 (0.0%)	1 (0.6%)		
2) Topical corticosteroids are associated with atrophy as a specific adverse effect	Diploma	29 (16.6%)	0 (0.0%)	0 (0.0%)	15.495	0.004*
	Bachelor's degree	79 (45.1%)	1 (0.6%)	16 (9.1%)		
	Postgraduate degree	50 (28.6%)	0 (0.0%)	0 (0.0%)		
3) Topical corticosteroids are	Diploma	29 (16.6%)	0 (0.0%)	0 (0.0%)	10.307	0.036*

Items		Yes	No	Don't know	Chi^2	P-value
associated with hypopigmentation as a specific adverse effect	Bachelor's degree	82 (46.9%)	6 (3.4%)	8 (4.6%)		
	Postgraduate degree	49 (28.0%)	1 (0.6%)	0 (0.0%)		
4) Topical corticosteroids are associated with hyperpigmentation as a specific adverse effect	Diploma	29 (16.6%)	0 (0.0%)	0 (0.0%)	13.501	0.009*
	Bachelor's degree	81 (46.3%)	10 (5.7%)	5 (2.9%)		
	Postgraduate degree	50 (28.6%)	0 (0.0%)	0 (0.0%)		
5) Topical corticosteroids are associated with hypertrichosis as a specific adverse effect	Diploma	29 (16.6%)	0 (0.0%)	0 (0.0%)	20.707	0.000*
	Bachelor's degree	74 (42.3%)	10 (5.7%)	12 (6.9%)		
	Postgraduate degree	50 (28.6%)	0 (0.0%)	0 (0.0%)		
6) Topical corticosteroids are associated with infections as a specific adverse effect	Diploma	29 (16.6%)	0 (0.0%)	0 (0.0%)	17.54	0.002*
	Bachelor's degree	77 (44.0%)	10 (5.7%)	9 (5.1%)		
	Postgraduate degree	50 (28.6%)	0 (0.0%)	0 (0.0%)		
7) Pharmacist's role in preventing topical corticosteroid abuse	Diploma	29 (16.6%)	0 (0.0%)	0 (0.0%)	4.236	0.375
	Bachelor's degree	91 (52.0%)	1 (0.6%)	4 (2.3%)		
	Postgraduate degree	50 (28.6%)	0 (0.0%)	0 (0.0%)		
8) Steroids should be dispensed only under prescription	Diploma	29 (16.6%)	0 (0.0%)	0 (0.0%)	11.556	0.021*
	Bachelor's degree	83 (47.4%)	7 (4.0%)	6 (3.4%)		
	Postgraduate degree	50 (28.6%)	0 (0.0%)	0 (0.0%)		

The results of Table 4.34 showed that there are statistically significant differences between participants regarding items (2,3,4,5,6,8) according to educational level, as the Chi^2 values for the majority of items at p-value were less than 0.05. The differences favored participants with a bachelor's degree (they achieved higher percentages) in answering "yes". Regarding to Items 1 and 7, there are no statistically significant differences between participants according to educational level, as the Chi^2 values for the majority of items at p-value were above 0.05.

4.7.19 Differences Between Pharmacist's Attitudes toward their Potential Role in the Rational Use of TCs According to Educational Level

Table 4.35 illustrates the differences between pharmacist's attitudes toward their potential role in the rationale use of TCs according to education level.

Table 4.35 Differences Between Pharmacist's Attitudes toward their Potential Role in the Rational Use of TCs According to Educational Level (n=175).

Items		Level of Agreement					Chi^2	P-value
		SD	D	N	A	SA		
Pharmacists could ensure that relevant safety problems are discussed with the patients	Diploma	0 (0.0%)	0 (0.0%)	7 (4.0%)	5 (2.9%)	17 (9.7%)	14.321	0.074
	Bachelor's degree	1 (0.6%)	1 (0.6%)	18 (10.3%)	22 (12.6%)	54 (30.9%)		
	Postgraduate degree	0 (0.0%)	0 (0.0%)	23 (13.1%)	6 (3.4%)	21 (12.0%)		
Pharmacists could contribute significantly in preventing TCs misuse	Diploma	0 (0.0%)	0 (0.0%)	4 (2.3%)	12 (6.9%)	13 (7.4%)	7.596	0.474
	Bachelor's degree	1 (0.6%)	1 (0.6%)	13 (7.4%)	37 (21.1%)	44 (25.1%)		
	Postgraduate degree	0 (0.0%)	0 (0.0%)	5 (2.9%)	30 (17.1%)	15 (8.6%)		
Pharmacists could counsel and educate patients regarding rational use of TCs	Diploma	0 (0.0%)	0 (0.0%)	1 (0.6%)	9 (5.1%)	19 (10.9%)	6.029	0.644
	Bachelor's degree	2 (1.1%)	3 (1.7%)	4 (2.3%)	38 (21.7%)	49 (28.0%)		
	Postgraduate degree	0 (0.0%)	0 (0.0%)	1 (0.6%)	21 (12.0%)	28 (16.0%)		
Pharmacists could help patients in monitoring the occurrence of TC adverse effects	Diploma	0 (0.0%)	0 (0.0%)	0 (0.0%)	12 (6.9%)	17 (9.7%)	6.155	0.63
	Bachelor's degree	2 (1.1%)	1 (0.6%)	5 (2.9%)	32 (18.3%)	56 (32.0%)		
	Postgraduate degree	1 (0.6%)	0 (0.0%)	0 (0.0%)	20 (11.4%)	29 (16.6%)		
Pharmacists could help in	Diploma	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.6%)	28 (16.0%)	18.754	0.016*

Items		Level of Agreement					Chi^2	P-value
		SD	D	N	A	SA		
limiting over-the-counter prescriptions of TCs	Bachelor's degree	2 (1.1%)	2 (1.1%)	6 (3.4%)	15 (8.6%)	71 (40.6%)		
	Postgraduate degree	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.6%)	49 (28.0%)		
Pharmacists should provide education on the proper use of TC	Diploma	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	29 (16.6%)	11.134	0.194
	Bachelor's degree	2 (1.1%)	1 (0.6%)	3 (1.7%)	11 (6.3%)	79 (45.1%)		
	Postgraduate degree	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (1.1%)	48 (27.4%)		
Pharmacists should refuse to dispense TCs without a valid prescription	Diploma	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	29 (16.6%)	21.329	0.006*
	Bachelor's degree	1 (0.6%)	2 (1.1%)	4 (2.3%)	20 (11.4%)	69 (39.4%)		
	Postgraduate degree	0 (0.0%)	0 (0.0%)	1 (0.6%)	1 (0.6%)	48 (27.4%)		

SA= Strongly agree, Agree= A, Neutral= N, Disagree= D, Strongly disagree=SD

The results of Table 4.35 showed that there are no significant statistical differences between participants regarding pharmacist's attitudes toward their potential role in the rational use of TCs items according to educational level, as the Chi^2 values for the majority of items at p-value were higher than 0.05, with the exception of item " Pharmacists could help in limiting over-the-counter prescriptions of TCs " (Chi^2= 18.754; p-value= 0.016<0.05), and item " Pharmacists should refuse to dispense TCs without a valid prescription " (Chi2= 21.329; p-value= 0.006<0.05 . It is clear that the number of Bachelor's degree holder showed the highest percentage of strong agreement.

4.7.20 Differences Between Participants' Practice of Pharmacists Among Patients Who Come to Buy Topical Steroidal Creams According to Educational Level

The effect of educational level on the community pharmacists' practices among patients asking for TCs is illustrated in table 4.36.

Table 4.36 Differences Between Participants' Practice of Pharmacists among Patients who Come to Buy Topical Steroidal Formulation According to Educational Level(n=175).

Items		Diploma	Bachelor's degree	Postgraduate degree	Chi^2	P-value
Number of patients per day who complain of recurrence of skin problem after stopping application of the cream	None	20 (11.4%)	26 (14.9%)	20 (11.4%)	22.081	0.000*
	1-5	9 (5.1%)	61 (34.9%)	30 (17.1%)		
	>5	0 (0.0%)	9 (5.1%)	0 (0.0%)		
Suggestion to patients who complain of recurrence of skin problem after stopping application of the cream	Change the cream	15 (8.6%)	29 (16.6%)	12 (6.9%)	35.986	0.000*
	Add an oral medicine to topical medicine	14 (8.0%)	32 (18.3%)	35 (20.0%)		
	Consult a general physician	0 (0.0%)	5 (2.9%)	0 (0.0%)		
	Consult a dermatologist	0 (0.0%)	30 (17.1%)	3 (1.7%)		
Response of a majority of patient after suggestion to meet the dermatologist	Agree to consult a dermatologist	19 (10.9%)	56 (32.0%)	26 (14.9%)	1.408	0.495
	Disagree to consult a dermatologist and ask for over the counter cream	10 (5.7%)	40 (22.9%)	24 (13.7%)		
Reasons for not agreeing to meet the dermatologist	Thinks that skin problem is minor	18 (10.3%)	38 (21.7%)	25 (14.3%)	13.646	0.034*
	Absence of dermatologist nearby	4 (2.3%)	20 (11.4%)	6 (3.4%)		
	Long waiting period during consultations	0 (0.0%)	15 (8.6%)	2 (1.1%)		
	High consultation charges	7 (4.0%)	23 (13.1%)	17 (9.7%)		

The results of Table 4.36 showed that there are no statistically significant differences between participants regarding response of a majority of patients after suggesting to meet the dermatologist according to the educational level, as the Chi^2 values for the majority of items at p-value were above 0.05. While the results showed that there are statistically significant differences regarding the suggestion to patients who complain of recurrence of skin problem after stopping application of the cream and reasons for not agreeing to meet the dermatologist according to educational level, as the Chi^2 values for the items at p-value were less than 0.05. It is clear that the number of Bachelor's degree holder showed the highest percentage.

4.8 Relation Between Participants Socio-Demographic and Professional Characteristics with Knowledge, Awareness and Attitude Score

To investigate relation between participants socio-demographic and professional characteristics with Knowledge, awareness and attitude score, ANOVA test was conducted. Table 4.37 show the results.

Table 4.37 Relation between participants socio-demographic and professional characteristics with knowledge, attitudes, practices and adherence score.

Variables	Knowledge Mean (± SD)	P-value	Awareness Mean (± SD)	P-value	Attitude Mean (± SD)	P-value
Gender						
Male	8.85 (0.63)	0.284	7.63 (0.95)	0.023	4.61 (0.33)	0.078
Female	8.66 (1.50)		7.10 (1.89)		4.48 90.59)	
Years of experience						
<5	8.65 (1.53)	0.459	7.08 (1.73)	0.032	4.53 (0.61)	0.707
6-15	8.85 (0.61)		7.57 (1.36)		4.53 (0.33)	
16-25	8.93 (0.27)		8.00 (0.00)		4.64 (0.19)	
Pharmacy Type						
Chain	8.78 (1.06)	0.785	7.04 (1.89)	0.031	4.61 (0.52)	0.091
Independent pharmacy	8.73 (1.26)		7.55 (1.22)		4.49 (0.46)	
Receiving training						
Yes	8.92 (0.60)	0.000	7.51 (1.28)	0.001	4.55 (0.45)	0.398
No	7.97 (2.37)		6.55 (2.31)		4.47 (0.66)	
Educational level						
Diploma	9.00 (0.00)	0.186	8.00 (0.00)	0.000	4.69 (0.26)	0.073
Bachelor’s degree	8.60 (1.55)		6.82 (1.94)		4.47 (0.61)	
Postgraduate degree	8.88 (0.48)		7.96 (0.28)		4.59 (0.25)	

Table 4.37 indicated that:

Gender:

There is no statistically significant difference in knowledge and attitude scores between males and females according to $p< 0.05$. Besides, there are a significant difference were found in awareness scores between males and females ($p = 0.023$), descriptive results show that male had higher awareness score ($M = 4.63$) compared to female ($M=7.10$).

Years of Experience:

The results showed that years of experience had statistically significant association with awareness ($p = 0.032$). Participants who had experience between (16-25) years scored the highest mean awareness score ($M =8.00$). While, participants who had experience less than 5 years scored the lowest awareness score ($M = 7.08$). While years of experience was not significantly associated with knowledge and attitude ($p>0.05$).

Pharmacy Type

The results showed that pharmacy type had statistically significant association with awareness ($p = 0.031$). Participants who work at independent pharmacy scored the highest mean awareness score ($M =7.55$). While, participants who work at chain pharmacies scored the lowest awareness score ($M = 7.04$). While pharmacy type was not significantly associated with knowledge and attitude ($p>0.05$).

Receiving training

The results showed that receiving training had statistically significant association with knowledge ($p = 0.000$) and awareness ($p = 0.00$), while was not significantly associated with attitude ($p> 0.05$). Participants who having training scored the highest mean knowledge score ($M = 8.92$) and awareness score ($M= 7.51$).

Educational level

The results showed that educational level had statistically significant association with awareness ($p = 0.000$). Participants who had diploma degree scored the highest mean awareness score ($M =8.00$). While educational level was not significantly associated with knowledge and attitude ($p>0.05$).

4.9 Relationship Between Knowledge, Awareness and Attitude

Pearson's correlation coefficients between knowledge, awareness, and attitudes were calculated; Table (4.38) shows results.

Table 4.38 Pearson's correlation coefficients between knowledge, awareness, and attitudes.

		knowledge	awareness	attitude
knowledge	Pearson Correlation	1		
	Sig. (2-tailed)			
awareness	Pearson Correlation	.484**	1	
	Sig. (2-tailed)	0.000		
attitude	Pearson Correlation	.305**	.403**	1
	Sig. (2-tailed)	0.000	0.000	

** Correlation is significant at the 0.01 level (2-tailed).

Table 4.38 shows the results of Pearson's correlation analysis between knowledge, awareness, and attitudes. All relationships between the three variables were positive and statistically significant ($p = 0.000$), indicating that increased knowledge among participants was associated with increased awareness and positive attitudes. The strongest relationship was between knowledge and awareness ($r = 0.484$), suggesting that knowledge plays a significant role in raising awareness. The relationship between awareness and attitudes was moderate ($r = 0.403$), while the relationship between knowledge and attitudes was relatively weak ($r = 0.305$), indicating that attitudes are more influenced by awareness than by the direct influence of knowledge.

Chapter Five
Discussion of Findings and Recommendation

5.1 Introduction

This chapter discusses the findings of the previous chapter, which identified the community pharmacists' knowledge, attitude, and practices toward the use of topical corticosteroids in Al-Jouf, Saudi Arabia. This chapter focuses on presenting the study findings in the context of previous studies, interpreting their significance and consistency with the results of similar studies, and presenting a set of recommendations based on the findings.

5.2 Discussion

5.2.1 Demographic Information

The current study sample consisted of 175 pharmacists working in community pharmacies in the Al-Jouf region of the Kingdom of Saudi Arabia. The results showed that 37.7% of the pharmacists' age were between 26 and 35 years, while pharmacists over the age of 45 constituted 5.7% of the participants. These results indicate that the majority of participants were from the younger age group, and the researcher attributes this result to the increase in the number of pharmacy graduates in recent years which could be contributed to the increased interest in perusing higher education and the increase in student scholarships. Moreover, the keenness of the Saudi Ministry of Health to attract young and qualified human resources to develop health services and enhance their quality. According to the General Organization for Social Insurance in Saudi Arabia, the statutory retirement age in Saudi Arabia ranges between 60–65 years, which means that the low number of pharmacists over the age of 45 is not related to the retirement age, but rather indicates that community pharmacies may attract young groups at the beginning of their professional careers.

In terms of gender, the results indicate that females consisted of 53.7% of participants versus 46.3% of males. This result shows that females constitute a notable proportion of human resources in the health sector, as the General Authority for Statistics in the Kingdom of Saudi Arabia indicated that Saudi femal's participation in the labor sector increased in 2024 to reach 36.2%. This aligns with Saudi Vision 2030, which accentuate on the vital role of

empowering female in the health field (Suleiman & Ming, 2025). The results also appeared that 54.9% of pharmacists have a bachelor's degree, contrast to 16.6% who hold diploma degree. This means that most pharmacists have gained educational qualifications at par with the qualification of jobs related to pharmacy since they have been enrolled under courses on scientific properties of drugs and how to use them.

Moreover, a larger percentage of 58.9 percent of them are employed in independent pharmacy, with 41.1 percent being employed in pharmacy chains. This is a signal of disparities in workplace and commitment to professional practices. Pharmacy chain is generally more likely to follow uniform policies than independent pharma. In addition, the findings also paint the picture that 53.1% of pharmacists had an experience of less than five years, and 38.9% of the participants had an experience of 6 to 15 years. This implies that there was a high percentage of new entrants to the field. In addition, the findings indicated that 82.3 percent of the respondents were attending special training on drug side effects and 17.7 percent did not acquire training on adverse drug events. This implies that there is a high demand in postgraduate training programs, in this case, in particular. To the question of prescription volume of topical corticosteroids, 62.3 percent of the participants completed less than 15 prescribes monthly without any prescription, 3.4 percent completed over 45 prescribes monthly. These findings demonstrate that the dispensing of such a medication is quite agreeable and it does not form an adverse indicator. In addition, the findings revealed that 80.6 percent of the subjects refilled less than 15 prescriptions in a month without a prescription. It could be explained by the fact that some participants dispensed medications without checking their usage.

5.2.2 Knowledge about Topical Corticosteroids

The research findings demonstrated that the knowledge of the pharmacological properties and application of topical corticosteroids was high among the participants, the percentage of the yes answered items of the items of knowledge about topical corticosteroids were 93.7-96.6. In terms of the characteristics of topical corticosteroids, 96.6% of the participants stated that topical corticosteroids are available in varying degrees of potency, making them aware that an individual health issue would need a drug treatment with an appropriate degree of concentration and high enough potency. This finding indicates that pharmacists are aware and know the pharmacological characteristics of these products and mechanism of action since they are one of the most frequently used topical medications in the routine pharmaceutical practice. The

earlier research has proved this by concluding that pharmacists are very familiar with the classes of corticosteroids and their proper application in clinical practice (Kang *et.al*, 2020, Shrestha Shristi, 2021). The outcomes indicated that there is professional competence among pharmacists to make decisions on treatment with 95.4 percent of pharmacists being aware that topical steroid creams are applied basing on their potencies. Another significant finding that can be drawn about the role of pharmacists in giving the patient the appropriate instructions on how the topical creams can be used. This evidences the knowledge, cognizance as well as dedication by pharmacists to the principle of therapeutic appropriateness, which is one of the pillars of pharmaceutical practice. Such results are corroborated by a few other past researches in the Saudi region that found that orthopedic surgeons and trainees are knowledgeable about corticosteroid use (Alomi *et al*., 2019).

Moreover, it was observed that pharmacists are conscious of using these products in a correct manner as indicated by the fact that 94.9 percent mentioned that the site of treatment is a crucial consideration when it comes to the potency of the cream. There are creams that cannot be applied to thin and highly absorbent skin areas and higher concentration preparations are applied to thicker skin portions. This finding is an outcome of the knowledge of the pharmacists on the local and international health recommendations and guidelines on the use of topical corticosteroid, and also the understanding of the need to balance between potency and safety. This shows the adherence of pharmacists to the local and international clinical guidelines, in line with findings of other similar studies that reported the same, that healthcare providers are well in their knowledge of the correct selection and use of medications (Abdelaziz *et al*., 2020). The authors also found in the study that 96 percent of the respondents know that application of TCs creams could aggravate certain skin issues. Misuse does not solve the problem and instead worsens it proving the knowledge of the participants about the possible hazards of misuse or overuse of these drugs. The awareness of the side effect of topical corticosteroids was also high among the pharmacists at 93.7%. This observation further implies that the awareness of the pharmacists has helped in the process of informing the patient concerning the safe usage of these products including how long it should be taken and how to avoid using them in some regions without medical care. Some past researchers presented their findings (Farrukh *et al.*, 2017; Alghamdi *et al*., 2019)

demonstrating that medical practitioners are competent enough to avoid the abuse of medications and enhance patient outcomes (Alrashidi *et al*., 2021).

5.2.3 Corticosteroids Potency

It was determined that the participants were well informed about the classification of topical corticosteroids based on their potency, but some of the common preparations were confusing. The findings revealed that 95.4 percent of the participating pharmacists rated hydrocortisone acetate 1% as a low-potency corticosteroid, which means that they were familiar with pharmacological properties of corticosteroids creams and could differentiate between corticosteroid creams in relation to their strength (Alghamdi *et al.,* 2019). Since part of the preparations will be low-potency in nature because of their intended use, small percentage (10.3) incorporated small percentage (10.3) of medium potency creams as low-potency preparations which is Betamethasone 0.1% cream. This could be a statement of confusion of the name of the active ingredient and pharmaceutical form or concentration of the active ingredient. 90.3% of participants named betamethasone 0.1% correctly as a medium-potency corticosteroids, although 9.1% identified Clobetasol propionate 0.05% cream as medium-potency preparation and not high-potency cream. This means that this group might not have the correct information on the characteristics, composition and side effects of the preparation, in case of misuse, and this might result in higher probability of medication errors and incidence of unwanted side effects (Almutairi, 2021).

Moreover, the findings validated that out of most subjects were found to have good knowledge on high-potency creams with 87.4, 89.1, and 89.75 percent of participants identifying mometasone furoate 0.1% cream, betamethasone 0.1% Clobetasol propionate 0.05% as a high-potency cream, respectively. This observation suggests that pharmacists understand the chemical structure of corticosteroids and the capability of distinguishing between creams in terms of their strength, which is crucial to guarantee safe use and lead patients to the desired and safe use.

Nevertheless, a low percentage (8) of respondents showed low levels of understanding with hydrocortisone acetate 1% being members of the high-potency cream category. The latter can be explained by a lack of attention to clinical education or the use of practical experience instead of strict scientific literature (Qutob *et al.,* 2023).

Concerning the preparations (Super high potency), the findings reflected the correct knowledge of the participants about these preparations, which means that they are aware of the clinical risks of these creams, and they are aware of the need to use them with medical prescription and supervision since 93.7% of the participants would have replied that clobetasol propionate 0.05% is one of the super high potency preparations. These results are in line with other studies that identified confusion in the categorization of corticosteroids as a result of the absence of training or further professional growth (Abdelaziz *et al*., 2020; Alrashidi *et al*., 2021; Alomi *et al*., 2019).

5.2.4 The Purpose of Using TCs

The statistics revealed that most pharmacists accurately indicated that corticosteroids are used in treatment of atopic dermatitis and psoriasis meaning that they were knowledgeable and aware of the skin conditions treated with the drugs. Conversely, approximately 13.7% gave an answer that topical corticosteroids are used in all forms of skin rashes. It is a misleading reaction, and a factual difference is needed between the circumstances that justify the deployment of such preparations. Furthermore, 12.6, 10.3 and 10.3 percent indicated that usage of such preparations can be effective in eruption of shingles, rosacea and warts. This implies that the participants are well informed on how to use topical corticosteroids, which are ineffective in the treatment of these diseases (Chhabra *et al*., 2021).

In the study, it was found that the respondents were very clinical awareness and scientifically knowledgeable about the common skin conditions where the topical corticosteroids have to be used. The findings revealed that 97.1 percent of the participants said that they use it to treat atopic dermatitis and 95.4 percent said they use it to treat psoriasis. On the guidelines, they are the conditions where topical corticosteroids are the drugs of choice to treat them, as it is capable of reducing itching, inflammation and improving the immune response of the skin (Abdelaziz *et al*., 2020; Alrashidi *et al*., 2021). Nevertheless, 13.7 per cent. of the respondents said that all forms of rashes were treated using topical corticosteroids. This shows the misunderstanding in terms of the rashes and their mode of treatment where not all the rashes need the use of topical corticosteroids. In other instances, they can alleviate and intensify symptoms, which underscores the need to create awareness of skin diseases which demand the application of topical corticosteroids (Abdelaziz *et al.,* 2020). This finding demonstrates that there is

a gap in knowledge about the correct decision of the drug, dose and formulation to use on a given case that leads to dispensing the wrong drug. It, in its turn, causes a delay in treatment or the aggravation of symptoms (Alomi *et al*., 2019). In addition, 12.6 percent of those who were interviewed indicated that topical corticosteroids would be useful in the treatment of shingles, 10.3 percent said that they could be used in the treatment of rosacea and 10.3 percent said that they would be useful in the treatment of warts. These findings indicate that there are members who are aware of the medical cases which entails the use of corticosteroids. Misuse of corticosteroids could worsen the situation. The above results affirm the existence of misconceptions in spite of their good understanding of skin conditions that require corticosteroids (Abdelaziz *et al.*, 2020; Alrashidi *et al.*, 2021).

5.2.5 Awareness about the Adverse Effects of Topical Corticosteroids

The outcome showed that 94.9 percent of the respondents were correct about the side effects of using TCs. They stated that improper usage may result in skin damage, and 91.4% stated that improper usage may result in hyper-pigmentation, this finding demonstrates that the pharmacists have been aware of the side effects of improper usage of TCs, as excessive use may result in skin atrophy and this is attributed to receiving proper training and education that increased their clinical practice. Further, 90.3% said that it may cause skin atrophy, 89.1% said that its use may result in secondary skin infections, and 87.4% said that excessive hair growth may occur with its use, which proves that they have a high level of awareness about the risks of using such drugs improperly (Alomi *et al*., 2019). This could be explained by the fact that pharmacy curricula in Saudi universities were modernized and the teaching of the topics concerning pharmacological dermatology and drug side effects was increased (Alomi *et al.*, 2019). It is also noteworthy that the KSA healthcare system has been transformed, and pharmacists are considered the direct causal agents of treatment outcomes and take responsibility (Abdelaziz *et al.*, 2020; Alrashidi *et al.*, 2021). This has seen the emergence of greater understanding of the effects of poor usage of topical drugs.

Moreover, the Saudi Food and Drug Authority and the Ministry of Health have implemented campaigns on the abuse of corticosteroids. The findings also showed the commitment of pharmacists to regulatory measures and principles, professional accountability, and the understanding of the need to disperse these preparations under prescription and with medical oversight since the number of cases of irresponsible

dispensing is gradually growing, and a greater number of cases may be avoided (Abdelaziz *et al.*, 2020; Alrashidi *et al*., 2021; Alomi *et al.*, 2019).

5.2.6 Attitudes Toward Pharmacists' Potential Role in the Rational Use of TCs

The results of the analysis showed that the medicine technicians involved in this research were positively disposed towards the correct use of TCs. The findings indicated that pharmacists are professionally conscious of the need to maintain safety and protect patients by educating them on the proper use of these preparations. Notably, 96.5% of respondents (agree, strongly agree) acknowledged the role of pharmacists in educating patients on the correct use of TCs, while 93.8% (agree, strongly agree) supported refusing to dispense TC medications without a valid prescription (Abdelaziz *et al.*, 2020; Alrashidi *et al.*, 2021). These findings are particularly relevant within the Saudi context, where the Saudi Food and Drug Authority (SFDA) enforces strict regulations governing the dispensing, classification, and safe use of medicinal products, including traditional and herbal medicines. Furthermore, 71.5% of participants agreed on their involvement in discussing safety concerns related to TCs with patients, reflecting partial alignment with SFDA guidelines that emphasize patient counseling, pharmacovigilance, and risk communication as core professional responsibilities. This outcome may be attributed to university pharmacy education in Saudi Arabia, which places strong emphasis on professional ethics, patient safety, and compliance with national regulatory requirements, thereby fostering a sense of accountability among pharmacists (Alomi *et al.*, 2019).

In addition, adequate knowledge ensures appropriate drug selection and counseling regarding dosage and duration of use, while positive attitudes promote responsible dispensing practices and help prevent adverse outcomes (Farrukh *et al.*, 2017). Daily professional exposure to cases of misuse may further enhance pharmacists' awareness of safety risks, enabling them to identify inappropriate use and educate patients about potential adverse effects. Importantly, these findings underscore the necessity for continued regulatory oversight by the SFDA, including regular inspections and enforcement actions, to reinforce adherence to professional and legal standards. Overall, the results align with previous studies demonstrating that well-informed pharmacists exhibit more positive attitudes toward safe medication practices, particularly within regulated healthcare systems such as that of Saudi Arabia (Abdelaziz *et al.*, 2020; Alrashidi *et al.*, 2021; Alomi *et al*., 2019).

5.2.7 Practice of Pharmacists Among Patients Who Come to Buy Topical Corticosteroids Formulations

The findings showed that 57.1% of pharmacists reported receiving 1–5 daily complaints from patients regarding the recurrence of skin problems after stopping topical corticosteroid (TC) creams, while 37.3% reported no complaints. This indicates that TCs are frequently used by patients without medical guidance (Abdelaziz *et al.,* 2020; Alrashidi *et al*., 2021). Although patient misuse is evident, pharmacists demonstrated proactive practices by identifying potential therapeutic issues, providing timely counseling, and guiding patients on the safe use of TCs. Specifically, 46.3% of pharmacists suggested adding an oral medicine alongside topical treatment when symptoms recurred, 32% recommended changing medications, and 18.9% advised consulting a dermatologist, while only 2.9% recommended seeing a general practitioner.

Despite these positive interventions, challenges remain, as 42.3% of patients declined pharmacist advice to consult a dermatologist and opted for over-the-counter creams instead. Factors contributing to this behavior include patients perceiving their condition as minor, high consultation costs, limited availability of dermatologists, and long waiting periods. These findings highlight that, while pharmacists strive to promote appropriate TC use, the effectiveness of their practices can be limited by patient behavior and systemic barriers. Previous studies have shown that pharmacist-led education and stewardship programs can improve adherence and counseling practices, supporting more effective dermatological care (Alshammari *et al.,* 2021; Whittaker *et al.,* 2016).

5.2.8 Demographic and Professional Factors Influence on Pharmacists' KAP towards Topical Corticosteroids

The findings indicated no statistically significant differences between male and female pharmacists in terms of overall knowledge, awareness of side effects, attitudes toward professional responsibilities, or daily practices regarding topical corticosteroids ($p > 0.05$). One exception was observed in awareness of the potential for TCs to cause skin infections, where males demonstrated slightly higher knowledge ($p < 0.05$). Overall, both genders exhibited positive attitudes and comparable practices, reflecting a uniform professional culture and access to standardized education and resources (Abdelaziz *et al.,* 2020; Alrashidi *et al.,* 2021; Alomi *et al.,* 2019).

The findings indicated no statistically significant differences were found between pharmacists with different years of experience regarding knowledge, awareness of side effects, attitudes toward professional roles, or daily practices ($p > 0.05$). An exception was noted in the ability to understand patients' reasons for not consulting a dermatologist, where more experienced pharmacists demonstrated slightly higher awareness ($p < 0.05$). These results suggest that experience does not substantially affect knowledge or general practices related to topical corticosteroids (Abdelaziz *et al.*, 2020; Alrashidi e*t al*., 2021).

The findings showed no statistically significant differences were observed in knowledge, awareness of side effects, attitudes, or most daily practices between pharmacists working in independent versus chain pharmacies ($p > 0.05$). One exception was found: independent pharmacies showed better compliance with dispensing corticosteroids only with a prescription ($p < 0.05$), likely due to smaller patient volumes allowing more interaction and supervision (Hengge *et al.*, 2005).

Moreover, the findings indicated that pharmacists who had undergone professional training demonstrated significantly higher knowledge, more positive attitudes toward patient counseling, and better daily practices compared to those without training ($p < 0.05$). This confirms that training plays a crucial role in enhancing professional competence, promoting the rational use of topical corticosteroids, and addressing patient complaints effectively (Al-Arifi, 2015; Abdel-Qader *et al.*, 2018; Saraswat *et al.*, 2011; Whittaker *et al.*, 2016; Alshammari *et al.*, 2021).

5.2.9 Relationship between Knowledge, Awareness, and Attitude

The results of the Pearson correlation analysis indicate that there is a positive and statistically significant relationship between pharmacists' knowledge, awareness, and attitudes regarding the use of topical corticosteroids. Specifically, the strongest correlation was observed between knowledge and awareness ($r = 0.484$, $p = 0.000$), suggesting that pharmacists with higher knowledge about corticosteroids are more aware of their effects, indications, and potential risks. This finding aligns with the theoretical understanding that knowledge forms the foundation for awareness, enabling healthcare professionals to recognize the clinical implications of medications and patient safety concerns (Abdelaziz *et al*., 2020; Alrashidi *et al.*, 2021).

The relationship between awareness and attitudes (r = 0.403, p = 0.000) was moderate, indicating that pharmacists who are more aware of the appropriate use and risks of topical corticosteroids are likely to develop more positive and professional attitudes toward patient counseling and safe dispensing practices. This underscores the importance of awareness as a mediator between knowledge and attitudes, suggesting that simply having knowledge may not be sufficient to shape attitudes unless it is translated into conscious awareness of clinical and patient care considerations.

Interestingly, the correlation between knowledge and attitudes (r = 0.305, p = 0.000) was relatively weak compared to the other relationships. This finding implies that while knowledge is necessary, it alone may not strongly predict attitudes. Attitudes toward professional responsibilities, patient counseling, and rational drug use may be influenced more by experiential factors, ethical training, and the working environment than by knowledge alone. This observation is consistent with previous studies that found that knowledge does not automatically translate into behavioral or attitudinal changes unless it is reinforced by practical experience and awareness programs (Alomi *et al.,* 2019; Alshammari *et al.,* 2021).

Overall, these results highlight the interconnectedness of knowledge, awareness, and attitudes in shaping pharmacists' professional behavior. The findings suggest that interventions aiming to improve pharmacists' attitudes toward safe corticosteroid use should not focus solely on increasing knowledge but also emphasize raising awareness and fostering practical understanding of patient care issues. Educational programs that integrate theoretical knowledge with real-life scenarios, clinical cases, and discussion of adverse effects may therefore be more effective in promoting positive professional attitudes.

5.3 Conclusion

The findings indicated that community pharmacists generally demonstrated a good level of knowledge, awareness, attitudes, and practices regarding the use of topical corticosteroids, although some gaps were identified, particularly in potency classification, indications, and dispensing practices. The results also highlight that pharmacists often serve as the first point of contact for patient guidance on the safe use of topical corticosteroids. While prior training was associated with higher levels of knowledge and more favorable practices compared to other factors such as experience, type of pharmacy,

and gender, these findings should be interpreted as associations rather than causal effects due to the cross-sectional design of the study. The study underscores the continuing need for targeted training and educational programs to support pharmacists in addressing patient needs effectively, promoting rational medication use, and reducing the risk of adverse outcomes.

5.4 Implication

The study results elucidate the importance of understanding the clinical and educational implications that are essential to enhance functional practice for pharmacists and medication safety management, as outlined below:

5.4.1 Clinical Implication

The results of the study suggest the need to develop guidelines and policies regarding the dispensing of topical corticosteroids, which could help support safe medication practices and reduce potential misuse. The findings may also inform health authorities about the importance of national programs aimed at raising awareness of the rational use of dermatological medications, enhancing patient education, and promoting counseling to minimize the reliance on additional treatments and encourage regular dermatological checkups. The study highlights the potential role of pharmacists as health advisors in providing scientific guidance to patients and raising awareness of the risks of overuse, particularly in settings such as independent pharmacies. Moreover, the findings suggest the importance of mechanisms to support pharmacists' adherence to medical prescriptions and promote rational drug use, which may be addressed through broader regulatory measures in the future.

5.4.2 Educational Implication

The findings of this study suggest the importance of ongoing professional education for pharmacists, as higher levels of knowledge, awareness, and practice regarding topical corticosteroids were observed among those who had participated in such programs. The results indicate that educational strategies should prioritize **practical, case-based learning**, including clinical simulations and real-life scenarios, which may enhance pharmacists' ability to counsel patients effectively and improve professional competence. Additionally, the development of supportive educational resources such as instructional

videos, guides, and brochures could help integrate theoretical knowledge into daily pharmacy practice and reinforce safe medication use.

5.5 Recommendation

Using the results of the study, the researcher advises that the following be done**:**

1. Based on the finding that pharmacists with prior training demonstrated higher knowledge, awareness, and better practices regarding topical corticosteroids, it is recommended to conduct targeted training programs for pharmacists focusing on correct usage, side effects, patient counseling, and guidance on proper administration of these medications.
2. In response to observed gaps in adherence to prescription requirements and misclassification of corticosteroid potency, pharmacists should be encouraged to follow existing regulations and professional guidelines regarding the dispensing of topical corticosteroids, with strategies to support rational dispensing practices.
3. Based on the finding that patients sometimes refuse to consult a dermatologist, it is recommended to enhance pharmacists' communication and health education skills, including persuasion and dialogue techniques, to effectively inform patients about potential adverse effects and safe medication use.
4. In response to observed inconsistencies in managing patient complaints, standardized procedures should be developed for handling recurrent or adverse reactions, clarifying the pharmacist's role in patient education and promoting uniform practices across pharmacies.
5. Based on the finding that awareness of corticosteroid side effects is variable among patients, health education programs should be established to provide accessible information such as videos, brochures, and guidance materials to improve patient knowledge, support safe use, and enhance the overall effectiveness of topical corticosteroid therapy.

5.6 Future Studies

The findings of the present study suggest the need for further research in this area. Future studies may explore the following:

1. Based on the observed gaps in pharmacist knowledge and practice across the current sample, similar investigations could be conducted in other regions of the Kingdom of Saudi Arabia to examine whether the findings are generalizable.
2. In response to observed patient behaviors, further research could examine the factors influencing patients' avoidance of doctor consultations and identify effective educational strategies to improve adherence and safe use of topical corticosteroids.
3. Given the differences in work environments, studies could examine variations in clinical practice between pharmacists in independent pharmacies and pharmacy chains.
4. Considering the association between prior training and improved knowledge and practices, pilot studies could be conducted to evaluate how targeted training programs influence pharmacists' practices, attitudes, and understanding of the risks associated with improper corticosteroid use.

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Appendices

Appendices 1 Questionnaire

Community Pharmacists' Knowledge, Attitude, and Practices toward the Use of Topical Corticosteroids: A Cross-Sectional Study in Saudi Arabia (Al-Jouf)
Section A: Demographic information
1. Age
a. <25 years
b. 26-35 years
c. 36-45 years
d. >45 years
2. Gender
a. Male
b. Female
3. Educational level
a. Diploma
b. Bachelor's degree
c. Postgraduate degree
4. Community pharmacy type
a. Chain
b. Independent pharmacy
5. Experience in years
a. <5
b. 6-15
c. 16-25
d. >25
6. Have you ever received training in adverse drug events?
a. Yes
b. No
7. Monthly dispensed prescriptions of topical steroids
a. < 15
b. 15-30
c. 30-45
d. >45
8. Monthly dispensed non-prescriptions of topical steroids
a. < 15
b. 15-30
c. 30-45
d. >45

Section B: Knowledge about topical corticosteroids

1. Topical steroid creams are available in different potencies
a. Yes
b. No
c. Don't know

2. Topical steroid creams are used depending on their potencies
a. Yes
b. No
c. Don't know

3. Different potency of steroid creams are used in different parts of the body
a. Yes
b. No
c. Don't know

4. Use of steroid creams can aggravate some skin problems
a. Yes
b. No
c. Don't know

5. Steroid creams have adverse effects
a. Yes
b. No
c. Don't know

6. The below corticosteroid is categorized as low potency corticosteroids (check all that apply)
a. hydrocortisone acetate 1% cream
b. mometasone furoate 0.1% cream
c. betamethasone 0.1% cream
d. clobetasol propionate 0.05% cream

7. The below corticosteroid is categorized as mid- potency corticosteroids (check all that apply)
a. hydrocortisone acetate 1% cream
b. mometasone furoate 0.1% cream
c. betamethasone 0.1% cream
d. clobetasol propionate 0.05% cream

8. The below corticosteroid is categorized as high potency corticosteroids (check all that apply)
a. hydrocortisone acetate 1% cream
b. mometasone furoate 0.1% cream
c. betamethasone 0.1% cream
d. clobetasol propionate 0.05% cream

9. The below corticosteroid is categorized as super high potency corticosteroids (check all that apply)
a. hydrocortisone acetate 1% cream
b. mometasone furoate 0.1% cream
c. betamethasone 0.1% cream
d. clobetasol propionate 0.05% cream

10. TCs can be used to treat the following disease(s) (check all that apply):
a. All skin rashes
b. Psoriasis

c. Atopic dermatitis
d. Rosacea
e. alopecia areata
f. Shingles
g. Athlete's foot
h. Warts

Section C: Awareness about the adverse effects of corticosteroids

1. Topical corticosteroids can be associated with significant cutaneous adverse effects
a. Yes
b. No
c. Don't know

2. Topical corticosteroids are associated with atrophy as a specific adverse effect
a. Yes
b. No
c. Don't know

3. Topical corticosteroids are associated with hypopigmentation as a specific adverse effect
a. Yes
b. No
c. Don't know

4. Topical corticosteroids are associated with hyperpigmentation as a specific adverse effect
a. Yes
b. No
c. Don't know

5. Topical corticosteroids are associated with hypertrichosis as a specific adverse effect
a. Yes
b. No
c. Don't know

6. Topical corticosteroids are associated with infections as a specific adverse effect
a. Yes
b. No
c. Don't know

7. Pharmacist's role in preventing topical corticosteroid abuse
a. Yes
b. No
c. Don't know

8. Steroids should be dispensed only under prescription
a. Yes
b. No
c. Don't know

Section D: Pharmacist's attitudes toward their potential role in rational use of TC

1. Pharmacists could ensure that relevant safety problems are discussed with the patients
a. Strongly agree
b. Agree
c. Neutral
d. Strongly disagree
e. Disagree

2. Pharmacists could contribute significantly in preventing TCs misuse
a. Strongly agree
b. Agree
c. Neutral
d. Strongly disagree
e. Disagree

3. Pharmacists could counsel and educate patients regarding rational use of TCs
a. Strongly agree
b. Agree
c. Neutral
d. Strongly disagree
e. Disagree

4. Pharmacists could help patients in monitoring the occurrence of TC adverse effects
a. Strongly agree
b. Agree
c. Neutral
d. Strongly disagree
e. Disagree

5. Pharmacists could help in limiting over-the-counter prescriptions of TCs
a. Strongly agree
b. Agree
c. Neutral
d. Strongly disagree
e. Disagree

6. Pharmacists should provide education on the proper use of TC
a. Strongly agree
b. Agree
c. Neutral
d. Strongly disagree
e. Disagree

7. Pharmacists should refuse to dispense TCs without a valid prescription
a. Strongly agree
b. Agree
c. Neutral
d. Strongly disagree
e. Disagree

Section E: Practice of pharmacists among patients who come to buy steroid creams.

1. Number of patients per day who complain of recurrence of skin problem after stopping application of the cream

a. None

b. 1-5

c. >5

2. Suggestion to patients who complain of recurrence of skin problem after stopping application of the cream

a. Change the cream

b. Add an oral medicine to topical medicine

c. Consult a general physician

d. Consult a dermatologist

3. Response of a majority of patient after suggestion to meet the dermatologist

a. Agree to consult a dermatologist

b. Disagree to consult a dermatologist and ask for over the counter cream

4. Reasons for not agreeing to meet the dermatologist

a. Thinks that skin problem is minor

b. Absence of dermatologist nearby

c. Long waiting period during consultations

d. High consultation charges