

Factors Influencing Wound Care Management in Indonesian Community Pharmacies: A Cross-Sectional Study

Lusy Noviani^{1*}, Dwi Arymbhi Sanjaya², Ni Kadek Refi Mariska³, Pretty Falena Atmanda Kambira¹

Artikel Penelitian

¹Departement of Pharmacy,
School of Medicine and
Health Sciences, Atma Jaya
Catholic University of
Indonesia, Jakarta, 14440,
Indonesia

²Department of Pharmacology
and Clinical Pharmacy,
Faculty of Pharmacy,
Universitas Mahasaraswati
Denpasar, Denpasar-Bali,
80233, Indonesia

³Faculty of Pharmacy,
Universitas Mahasaraswati
Denpasar, Denpasar-Bali,
80233, Indonesia

Korespondensi:

Lusy Noviani
lusy.noviani@atmajaya.ac.id



Abstract: Wound care remains a major public health problem, particularly in low- and middle-income countries (LMICs) such as Indonesia. Pharmacists practicing in community-based primary care settings are often the first point of contact for patients with minor wounds, yet evidence describing their wound care practices in routine care remains limited. This study aimed to describe wound care practices among pharmacists in community-based primary care settings in Indonesia and to examine factors associated with wound care product selection, product availability, and patient education. A cross-sectional online survey was conducted among pharmacists practicing in community-based primary care settings in Indonesia. The study used a non-probability convenience sampling approach, with recruitment through online pharmacist communication networks and professional social media platforms. A structured questionnaire was used to collect data on respondent characteristics, factors influencing wound care product selection, product availability, and patient education practices. Descriptive statistics were used to summarize the data, and associations between categorical variables were analyzed using the Fisher's Exact test. A total of 303 pharmacists were included in the analysis. The median age of respondents was 33 years (range: 23–74 years). Most respondents practiced in community pharmacies (83.5%). Across all experience groups, wound type and severity were the most commonly considered factors in wound care product selection. Other clinical considerations and product availability varied by years of practice and practice setting. Most respondents reported routinely providing patient education during wound care consultations. These findings describe variation in wound care practices among pharmacists in community-based primary care settings in Indonesia.

Keywords: community pharmacist, pharmacist practices, wound care, wound training

Abstrak: Perawatan luka tetap menjadi masalah kesehatan masyarakat utama, khususnya di negara-negara berpenghasilan rendah dan menengah (LMICs) seperti Indonesia. Apoteker yang berpraktik di layanan kesehatan primer berbasis komunitas seringkali menjadi titik kontak pertama bagi pasien dengan luka ringan, namun bukti yang menggambarkan praktik perawatan luka dalam perawatan rutin masih terbatas. Studi ini bertujuan untuk menggambarkan praktik perawatan luka di kalangan apoteker di layanan kesehatan primer berbasis komunitas di Indonesia dan untuk meneliti faktor-faktor yang terkait dengan pemilihan produk perawatan luka, ketersediaan produk, dan edukasi pasien. Survei daring lintas sektoral dilakukan di antara apoteker yang berpraktik di layanan kesehatan primer berbasis komunitas di Indonesia. Studi ini menggunakan pendekatan pengambilan sampel kenyamanan daring non-probabilitas, dengan perekrutan melalui jaringan komunikasi apoteker daring dan platform media sosial profesional. Kuesioner terstruktur digunakan untuk mengumpulkan data tentang karakteristik responden, faktor-faktor yang memengaruhi pemilihan produk perawatan luka, ketersediaan produk, dan praktik edukasi pasien. Statistik deskriptif digunakan untuk meringkas data, dan hubungan antar variabel kategorikal dianalisis menggunakan uji Fisher's Exact. Sebanyak 303 apoteker dimasukkan dalam analisis. Usia rata-rata

responden adalah 33 tahun (rentang: 23–74 tahun). Sebagian besar responden berpraktik di apotek komunitas (83,5%). Di semua kelompok pengalaman, jenis dan tingkat keparahan luka merupakan faktor yang paling sering dipertimbangkan dalam pemilihan produk perawatan luka. Pertimbangan klinis lainnya dan ketersediaan produk bervariasi berdasarkan tahun praktik dan lingkungan praktik. Sebagian besar responden melaporkan secara rutin memberikan edukasi pasien selama konsultasi perawatan luka. Temuan ini menggambarkan variasi praktik perawatan luka di kalangan apoteker di lingkungan perawatan primer berbasis komunitas di Indonesia.

Kata kunci: apoteker komunitas, pelatihan perawatan luka, perawatan luka, praktik apoteker

Introduction

Wound care is a priority issue in global public health and a significant burden on healthcare services worldwide. This burden may be particularly relevant in low- and middle-income countries (LMICs), where access to timely care, trained health professionals, and appropriate wound care products may be more limited, and where standardized wound management practices may not be consistently implemented (1,2). In LMICs, these challenges are especially relevant because many wounds are initially managed in primary care or community settings before referral, making accessible frontline providers an important part of early wound care management. Wound healing itself is a complex biological process involving inflammatory, proliferative, and remodelling phases. When wound management is delayed or suboptimal, complications such as infection, delayed healing, and prolonged recovery may occur (2–4).

To date, community pharmacies remain a vital and accessible frontline for public health. They are also among the most accessible and frequently visited healthcare facilities. Consequently, pharmacists are among the first-line healthcare providers for people seeking information and treatment for minor acute injuries, including abrasions, lacerations, and burns, as well as for the ongoing care of chronic wounds. The role of community pharmacists has shifted from product-oriented to broader responsibilities that include patient assessment, self-care counselling, and support for chronic disease management (3,5).

This extended role is necessary to be effective, particularly in wound care, as initial treatment

can affect healing times and help prevent complications, including infections. Successful wound care is an intricate balance of knowledge about wound aetiology and the healing cycle, together with knowing how and when to apply the right product - from the simple antiseptic and plaster to complex interactive dressings, such as hydrocolloids or foams (4,6). A clinical evaluation of the wound and patient-related factors should preferably inform the pharmacist's product selection. However, this decision-making process could be influenced by several factors, including the pharmacist's knowledge, years of experience, training or education in wound care, and non-clinical factors such as product availability and cost in the pharmacy (7).

However, despite the growing involvement of pharmacists in wound care, dedicated postgraduate or continuing professional education in wound care remains limited in many settings. While pharmacists receive formal training in pharmacotherapy, undergraduate curricula may provide limited emphasis on practical wound assessment and topical wound management, which may contribute to variation in practice (8–10). The role of pharmacists in frontline wound care is growing, yet evidence describing wound care practices in Indonesia remains limited, especially at the national level. To our knowledge, no national study has comprehensively examined how pharmacists in community-based primary healthcare settings in Indonesia select wound care products, what products are available in their practice settings, and how patient education is routinely provided. Given the diversity of practice settings and the critical role of pharmacists as accessible first-line

providers for minor wounds, a national assessment is needed to better understand current practice patterns and identify areas for professional development. Therefore, this study aimed to describe wound care practices among pharmacists in community-based primary healthcare settings in Indonesia and to examine factors associated with wound care product selection, product availability, and patient education.

MATERIALS AND METHODS

Material

There was no validated Indonesian questionnaire specifically addressing community pharmacists' wound care management was identified during the study planning phase, the authors developed a structured questionnaire based on the study objectives and a review of the relevant literature on community pharmacy wound care practice, pharmacist counseling, and product selection (7–10). The questionnaire was designed in Indonesian to improve clarity and response accuracy for the target population.

The final questionnaire consisted of five sections: (1) electronic informed consent (1 item), (2) demographic and professional characteristics (5 items), (3) factors influencing wound care product selection (6 items) assessing the clinical and non-clinical factors usually considered when selecting or recommending wound care products, (4) availability of wound care products at the practice site (2 matrix-style items covering topical formulations and dressings), and (5) patient education practices (2 items on frequency and educational materials). Most items were closed-ended and optional, except for eligibility screening, informed consent, and core demographic questions, which were necessary to determine respondent inclusion and enable descriptive analysis.

To support content validity, the draft questionnaire underwent expert review by two pharmacists: one academic pharmacist with expertise in clinical/community pharmacy research and one practicing community pharmacist with over 10 years of experience. Revisions were made to improve wording clarity, display relevance, and contextual

appropriateness of the listed wound care products in the Indonesian context. A pilot test was then conducted with 15 community pharmacists not included in the final analysis to assess comprehension, feasibility, and completion time.

Reliability testing was performed for the applicable multi-item sections of the questionnaire that assessed related practice domains, particularly the items on factors influencing product selection and patient education practices. The resulting Cronbach's alpha was 0.78, indicating acceptable internal consistency for these analytic sections. Because the questionnaire also included descriptive demographic and checklist-style availability items, Cronbach's alpha was not intended to represent the reliability of the entire instrument.

Methods

Study Design and Setting

A descriptive cross-sectional study was conducted using a structured online questionnaire. The study was designed to assess wound care management practices, influencing factors, and product availability among community pharmacists in Indonesia. The study protocol was reviewed and approved by the Institutional Ethical Committee (No. 638/KE/VII/2025).

Participants and Sampling

The study population comprised licensed pharmacists practicing in community-based settings in Indonesia, including community pharmacies (apotek), primary care/community health centers, and private outpatient clinics. Hospital pharmacists, pharmacists working exclusively in industry, academia, or regulatory sectors were excluded.

A non-probability convenience sampling approach was used. As the study used a non-probability convenience sampling strategy, the sample was not intended to be statistically representative of all pharmacists practicing in community-based settings in Indonesia. The questionnaire was created using Google Forms and distributed electronically through WhatsApp

groups, Telegram groups, and other social media-based pharmacist communication networks. No financial or material incentives were offered for participation.

Eligibility was assessed through self-report at the beginning of the online questionnaire. Before accessing the main questionnaire, respondents were required to confirm that they: (1) held an Indonesian pharmacist qualification and valid practice eligibility, (2) were currently practicing in a community-based setting, and (3) agreed to participate by providing electronic informed consent. Because recruitment was conducted online and anonymously, these criteria could not be independently verified; therefore, eligibility relied on respondent self-declaration

Sample Size Calculation

The minimum sample size was calculated for a cross-sectional study. Since no previous national data were available, a proportion of 50% was used. Using a 95% confidence level and a margin of error of 5.7%, the minimum sample size was around 300 respondents. A total of 303 pharmacists completed the survey and were included in the study.

Data Collection

Data were collected using Google Forms between July-August 2025. The survey followed key reporting elements recommended by the CHERRIES (Checklist for Reporting Results of Internet E-Surveys) guidance. The first page contained study information and electronic informed consent. Participation was voluntary, and respondents could discontinue the survey at any point before submission. No personally identifying information was intentionally collected. Potentially duplicate or clearly incomplete responses were screened prior to analysis where possible.

Study Variable

The main variables examined in this study included pharmacists' demographic and professional characteristics, factors influencing wound care product selection, availability of wound care products in practice settings, history of wound care training, and frequency of patient education.

Years of pharmacist practice were categorized into three predefined groups (1–3 years, 4–6 years, and >6 years) for descriptive and comparative analysis. These categories were used as analytic groupings within this study to facilitate comparison of practice patterns across different levels of professional experience.

For product selection, variables included clinical considerations such as wound type and severity, signs of infection, allergy or drug interaction history, and medical history, as well as non-clinical factors such as product availability and cost. Product availability was assessed for both topical wound care formulations and wound dressings. Patient education was categorized as always, sometimes, or never.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics for Windows, version 26.0. Descriptive statistics were used to describe respondent characteristics and study variables. Age and years of practice were described using medians and ranges, while categorical variables were presented as frequencies and percentages.

Associations between categorical variables were analyzed using the Fisher's Exact test, depending on the distribution of the data. These analyses were used to examine relationships between years of pharmacist practice, wound care training, product selection factors, product availability, and patient education practices. A p-value of less than 0.05 was considered statistically significant.

Result and Discussion

Demographic and Professional Characteristics of Participants

A total of 303 community pharmacists participated in this study. Demographic and professional characteristics of respondents are presented in Table 1. The median age of participants was 33 years (range: 23–74 years), and most respondents were in the 25–35 years age group (60.4%, $n = 183$). All respondents were pharmacists by profession, as this was an inclusion criterion. Therefore, the educational variable should be interpreted as the highest reported academic qualification among

participating pharmacists. Most respondents reported either a professional pharmacist qualification as their highest credential (49.17%) or an additional master's degree (48.51%), while a small proportion reported a doctoral degree (2.31%). Most respondents worked in pharmacies (83.50%, $n = 253$), followed by

community health centers (9.24%, $n = 28$) and private clinics (7.26%, $n = 22$). The median duration of pharmacist practice was 5 years (range: 1–10 years). Only 12.54% ($n = 38$) reported having received formal wound care training.

Table 1. Demographic characteristics of participant

Variable	Category	n (%)	Md (SD)	Range
Age (years)	25-35	183 (60.40)	33.00 (9.17)	23-74
	36-45	88 (29.04)		
	45-75	32 (10.56)		
	Professional Pharmacist Program	149 (49.17)		
Education level	Master degree	147 (48.51)	5.00 (2.86)	1-10
	Doctoral degree	7 (2.31)		
	Community pharmacies (apotek)	253 (83.50)		
Pharmacy practice site	Community Health Centre	28 (9.24)	5.00 (2.86)	1-10
	Clinic	22 (7.26)		
Years of pharmacist practice	1-3	128 (42.24)	5.00 (2.86)	1-10
	4-6	34 (11.22)		
	>6	141 (46.53)		
Wound care training	No	265 (87.46)	5.00 (2.86)	1-10
	Yes	38 (12.54)		

In this study sample, wound care-related consultations were primarily reported by relatively young and early- to mid-career pharmacists. Because the study used convenience sampling, this pattern should be interpreted as a description of the respondents included rather than as a definitive national workforce profile. This is important because community pharmacists are often the first healthcare professionals approached for minor wounds. Although the respondents were generally well qualified in terms of formal education, the low proportion of pharmacists with specific wound care training suggests that practical competency in wound management may still depend more on work experience than on structured professional training. This pattern is consistent with previous studies showing that pharmacists are increasingly involved in frontline wound care, but often without dedicated postgraduate training in this area settings (8,9).

Factors Influencing Product Selection for Wound Care

Factors influencing product selection for wound care are shown in Table 2. Across all experience groups, wound type and severity were the most reported considerations, with proportions ranging from 74.22% to 80.85%. This suggests that basic wound assessment remains a commonly reported basis for product selection among the respondents. This finding is consistent with international wound care guidance, in which wound assessment is considered an important component of clinical decision-making (4,11). The consistency of this pattern across experience groups may indicate that wound type and severity are widely recognized as relevant clinical considerations in routine practice; however, the study was not designed to determine whether this reflects formal education, professional experience, or other sources of knowledge. However, differences were observed in other

clinical considerations across experience groups, suggesting that pharmacists with different levels of practice experience may emphasize different factors when selecting wound care products. Interestingly, respondents with 1–3 years of practice more frequently reported considering the presence of infection than those with >6 years of practice (8.59% vs. 1.42%, $p = 0.001$). This may be a manifestation of clinical hyper-vigilance

among young healthcare providers, a phenomenon fuelled by anxiety to overlook serious disease. This cautious approach to management has its roots in undergraduate teaching, where emphasis may be placed on recognition of infection (12,13).

Table 2. Factors Influencing Product Selection for Wound Care by Years of Pharmacist Practice and Wound Care Training

Factors Influencing Product Selection for Wound Care	Years of Pharmacist Practice				Wound Care Training		
	1-3 (n=128)	4-6 (n=34)	>6 (n=141)	Fisher's Exact Test	Yes (n=38)	No (n=265)	Fisher's Exact Test
	n (%)	n (%)	n (%)	p value	n (%)	n (%)	p value
Clinical Factors							
Wound type and severity	95 (74.22)	25 (73.53)	114 (80.85)	0.372	26 (68.42)	208 (78.49)	0.166
Presence of infection	11 (8.59)	0 (0.00)	2 (1.42)	0.001*	4 (10.53)	9 (3.40)	0.043*
Medical history	1 (0.78)	0 (0.00)	10 (7.09)	0.001*	1 (2.63)	10 (3.77)	1.000
Comprehensive assessment ¹	0 (0.00)	9 (26.47)	1 (0.71)	0.001*	2 (5.26)	8 (3.02)	0.621
Non-Clinical Factors							
Product Availability	11 (8.59)	0 (0.00)	3 (2.13)	0.001*	3 (7.89)	11 (4.15)	0.391
Cost	10 (7.81)	0 (0.00)	2 (1.42)	0.001*	2 (5.26)	10 (3.77)	0.649
Not sure	0 (0.00)	0 (0.00)	9 (6.38)	0.001*	0 (0.00)	9 (3.40)	0.607

¹Comprehensive assessment: Includes wound type/severity, allergy/drug interaction history, presence of infection, and medical history

*Significant ($p < 0.05$)

Furthermore, respondents with >6 years of practice more frequently reported considering medical history than those with 1–3 years of practice (7.09% vs. 0.78%, $p = 0.001$), showing a progression to more holistic and patient-focused care. This development is echoed by results from pharmaceutical care literature, which found experienced pharmacists more likely to consider psychosocial factors, comorbidities, and medication history in their clinical decisions. The

capacity to interpret wound care within the context of larger patient stories indicates an advancing level of clinical reasoning that moves away from reliance on checklists (14–17). Respondents with 4–6 years of practice showed the highest proportion reporting a comprehensive assessment approach (26.47%, $p = 0.001$), which is the consideration of wound severity, the presence or absence of infection, personal history of allergy, and medical

background. This peak might indicate a transitioning stage of professional development, at which pharmacists consciously utilize a structured framework before these ways of thinking become automatized with further experience. It is indicative that this cohort is a key group for fostering clinical reasoning through mentorship and further education. Teaching wound care was not associated with clinical decision variables despite the clinical focus. This observation contributes to the discussion on how well preparation programs train their students or participants, suggesting that these teachings may focus too much on products rather than clinical thinking and patient assessment. It also highlights the complexity of the decision-making process and the value of training sessions involving case-based learning as an interdisciplinary approach to increasing decision-making competence (18–20).

Availability of Topical Formulations and Wound Dressings

The availability of wound care products in community pharmacy settings is shown in Table 3. Differences were observed in both wound dressings and topical formulations when the data were compared by years of pharmacist practice and years of pharmacy operation. Availability of basic items, such as regular plasters, was negatively correlated ($p = 0.001$) with pharmacist experience (51.56% of pharmacies in the group with 1–3 years of experience and only 0.71% of those with >6 years of experience). On the contrary, more sophisticated dressings (hydrocolloid and/or foam) were none from the group with 1–3 years of experience group (0%) and 44.68% of the >6 years of experience group ($p=0.001$).

This difference identifies a substantial “practice gap,” in which patient care differs profoundly depending on which community pharmacy the patient attends. Among the reasons for this difference are that experienced pharmacists are more likely to be knowledgeable about advanced wound care products, have better contacts with medical distributors, be more

comfortable recommending more expensive products, and have more power in inventory decisions (8,21,22). In addition, these findings suggest a meaningful variation in wound care product availability across the practice settings represented in this study. More advanced dressings such as hydrocolloid and/or foam dressings were more commonly reported in settings associated with more experienced pharmacists. This variation may influence the range of wound care options that pharmacists can offer during routine consultations. However, because the study did not collect data on pharmacy ownership, purchasing authority, geographic location, or local socioeconomic context, the reasons for these differences cannot be determined from the present data (8,21–24).

Relationship Between Educational Level, Wound Care Training, and Patient Education

The relationship between educational level, wound care training, and the frequency of patient education is presented in Table 4. Most respondents (76.90%, $n = 233$) reported always providing patient education during wound care consultations, while 22.10% ($n = 67$) reported doing so sometimes and 1.00% ($n = 3$) reported never providing education. This suggests that patient counselling is already a routine part of wound care services in many community pharmacy settings.

A significant association was found between educational level and the frequency of patient education ($p = 0.007$). All respondents with a doctoral degree reported always providing patient education (100.00%). The proportion was also high among pharmacists with a professional pharmacist qualification (81.90%), while a lower proportion was seen among those with a master's degree (70.70%). Although the number of respondents with doctoral qualifications was small, the overall finding suggests that educational background may influence the consistency with which pharmacists provide counselling during wound care services.

Table 3. Availability of Topical Formulations and Wound Dressings in Pharmacies

Type of Topical Formulations and Dressings	Years of Pharmacist Practice				Years of Pharmacy Operation				Wound Care Training		
	1-3	4-6	>6	Fisher's Exact Test	1-3	4-6	>6	Fisher's Exact Test	Yes	No	Fisher's Exact Test
	n (%)	n (%)	n (%)	p value	n (%)	n (%)	n (%)	p value	n (%)	n (%)	p value
Wound Dressings											
Regular plaster	66 (51.56)	2 (5.88)	1 (0.71)	0.001*	47 (47.47)	0 (0.00)	3 (1.84)	0.001*	59 (22.26)	10 (26.32)	0.542
Waterproof plaster	0 (0.00)	0 (0.00)	12 (8.51)	0.001*	0 (0.00)	0 (0.00)	12 (7.36)	0.001*	10 (3.77)	2 (5.26)	0.651
Regular and waterproof plaster	59 (46.09)	7 (20.59)	39 (27.66)	0.003*	46 (46.46)	1 (2.44)	58 (35.58)	0.001*	88 (33.21)	17 (44.74)	0.155
Combination (regular/waterproof plaster) with sterile gauze	3 (2.34)	19 (55.88)	26 (18.44)	0.001*	0 (0.00)	20 (48.78)	27 (16.56)	0.001*	45 (16.98)	3 (7.89)	0.043*
Contains Hydrocolloid and/or Foam dressing	0 (0.00)	6 (17.65)	63 (44.68)	0.001*	6 (6.06)	20 (48.78)	63 (38.56)	0.001*	63 (23.77)	6 (15.79)	0.392
Total	128 (100)	34 (100)	141 (100)		99 (100)	41 (100)	163 (100)		265 (100)	38 (100)	
Topical Formulations											
Antibiotic ointment and antiseptic ointment	37 (28.91)	31 (91.18)	33 (23.40)	0.001*	28 (28.28)	39 (95.12)	35 (21.47)	0.001*	89 (33.58)	13 (34.21)	0.942
Antibiotic ointment	19 (14.84)	0 (0.00)	2 (1.42)	0.001*	18 (18.18)	0 (0.00)	3 (1.84)	0.001*	15 (5.66)	6 (15.76)	0.016*
Antiseptic ointment	1 (0.78)	0 (0.00)	20 (14.18)	0.001*	0 (0.00)	1 (2.44)	20 (12.27)	0.001*	20 (7.55)	1 (2.63)	0.265
Comprehensive combination ¹	8 (6.25)	0 (0.00)	49 (34.75)	0.001*	7 (7.07)	0 (0.00)	46 (28.22)	0.001*	11 (4.15)	5 (13.16)	0.016*
Combination with hydrogel/spray ²	63 (49.22)	3 (8.82)	37 (26.24)	0.001*	46 (46.46)	1 (2.44)	59 (36.20)	0.001*	130 (49.06)	13 (34.21)	0.078
Total	128 (100)	34 (100)	141 (100)		99 (100)	41 (100)	163 (100)		265 (100)	38 (100)	

¹Comprehensive combination: Antibiotic ointment, antiseptic ointment, wound healing gel (e.g., hydrogel), antiseptic spray, and herbal ointment.

²Combination with Hydrogel/Spray: Includes the categories: (antibiotic+antiseptic+Gel+Spray) and (antibiotic+antiseptic+Spray).

*Significant (p<0.05)

In contrast, no significant association was found between formal wound care training and the frequency of patient education ($p = 0.824$). The proportion of respondents who reported always providing education was similar between pharmacists with formal wound care training and those without it (78.90% vs. 76.60%). This finding may suggest that general educational background is associated with reported patient education practices; however, this interpretation should be made cautiously because the data were

self-reported and may be influenced by social desirability bias, with respondents potentially overreporting behaviours perceived as good professional practice. These findings nonetheless support the potential value of future wound care training programs that incorporate practice-oriented competencies, including patient communication, counselling techniques, case-based learning, and the use of simple educational tools in routine pharmacy practice.

Table 4. Fisher's Exact Analysis of the Relationship between Education Level, Wound Care Training, and Providing Education to Patients

Providing Education to Patients	Education Level				p value	Wound Care Training			p value
	Professional Pharmacist Program	Master Degree	Doctoral Degree	Total		Yes	No	Total	
	n (%)	n (%)	n (%)	n (%)		n (%)	n (%)	n (%)	
Always providing education	122 (81.90)	104 (70.7)	7 (100.00)	233 (76.90)	0.007*	30 (78.90)	203 (76.60)	233 (76.90)	0.824
Sometimes providing education	27 (18.10)	40 (27.2)	0 (0.00)	67 (22.10)		8 (21.10)	59 (22.3)	67 (22.10)	
Never providing education	0 (0.00)	3 (2.00)	0 (0.00)	3 (1.00)		0 (0.00)	3 (1.10)	3 (1.00)	

*Significant (p<0.05)

From a practice perspective, this is an important finding. In wound care, patient education is often just as important as product selection. Patients need to understand how to clean the wound, how to use the product correctly, how often dressings should be changed, and when they should return or seek further medical attention. Even when an appropriate product is selected, outcomes may still be poor if the patient does not receive clear and practical instructions. The high proportion of pharmacists who reported routinely providing education is therefore a positive finding and reflects the important counseling role of community pharmacists in everyday practice (8,9).

At the same time, the lack of association between formal wound care training and the frequency of education raises questions about the content of current training activities. Some days focus more on product knowledge than on patient communication or counseling techniques. This may explain why training does not appear to influence how often pharmacists provide education, even if it improves knowledge in other areas. For this reason, future wound care training programs may need to place greater emphasis on practical counseling skills, communication strategies, and the use of patient-friendly educational tools (25–27).

Figure 1 shows the types of educational materials used during patient counseling. Based

on the pattern presented, verbal counseling is the most commonly used approach, followed by written or other supporting materials. This is understandable in community pharmacy practice, where time is often limited and verbal explanation is the most immediate form of communication. However, written or visual materials may help reinforce key messages, especially for patients who need to continue wound care at home or who may have difficulty remembering verbal instructions alone. Combining verbal counseling with simple supporting materials helps improve patient understanding and support better wound care practices outside the pharmacy setting (28,29).

Limitations of This Study

This study has several limitations that should be considered when interpreting the findings. First, the study employed a non-probability convenience sampling strategy with online distribution, which may have introduced selection bias and may have overrepresented pharmacists who were more digitally engaged, professionally networked, or particularly interested in wound care. Accordingly, the findings are not intended to be nationally representative. Second, participant eligibility and practice characteristics were based on self-report and could not be independently verified. Third, the study relied on self-reported practices rather than direct observation, which may have

introduced recall bias and social desirability bias, particularly for behaviours perceived as professionally desirable, such as routine patient counselling. Fourth, the cross-sectional design does not allow causal inferences to be made. Fifth, the questionnaire was developed by the authors for this exploratory study and was not a fully psychometrically validated instrument. Finally, several contextual variables that may influence

wound care practice were not collected, including geographic location (e.g., rural vs urban setting), pharmacy ownership model, patient socioeconomic characteristics, and detailed training characteristics. As a result, differences in product availability across practice settings could not be interpreted in relation to geographic or socioeconomic disparities.

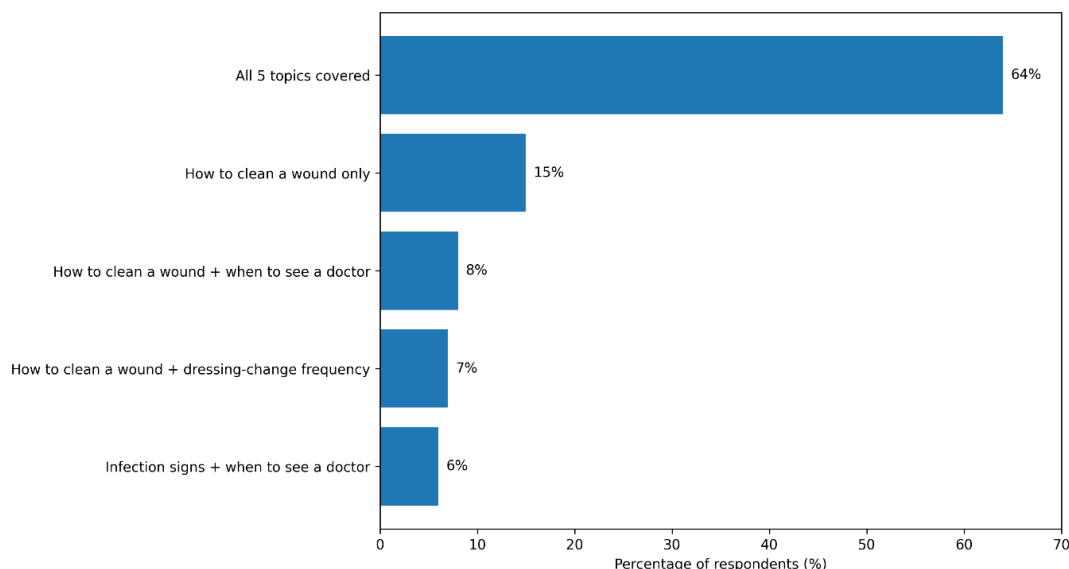


Figure 1. Patient education content reported by pharmacists during wound care consultations. Categories represent combinations of counselling topics reported by respondents. Each bar reflects one response category as recorded in the questionnaire.

*All 5 topics covered” refers to counselling that included: how to clean a wound, frequency of bandage/dressing change, signs of infection to watch for, products that should not be used together, and when to seek medical attention

Conclusion

This study provides a national-level overview of wound care practices among pharmacists in community-based primary care settings in Indonesia, with most respondents working in community pharmacies (apotek). The findings suggest that wound care product selection, product availability, and reported patient education practices vary according to professional experience and practice setting. These results highlight the need for structured, practice-oriented wound care training that strengthens clinical assessment, product selection, and patient counselling skills. They also support efforts to improve more consistent access to appropriate wound care products across frontline pharmacy practice settings in Indonesia.

Acknowledgements

The authors would like to acknowledge all Indonesian pharmacists who contributed to this study. This study was supported by PT. Beiersdorf Indonesia –Hansaplast.

Conflict of Interest

There is no any conflict of interest in this study. The authors declare that this study received funding support from PT Beiersdorf Indonesia-Hansaplast. The sponsor had no role in the study design, data collection, data analysis, interpretation of the results, manuscript preparation, or the decision to submit the manuscript for publication. The authors declare no other competing interests.

References

1. Nussbaum SR, Carter MJ, Fife CE, DaVanzo J, Haught R, Nusgart M, et al. An economic evaluation of the impact, cost, and medicare policy implications of chronic nonhealing wounds. *Value in Health*. 2018;21(1):27–32.
2. Sen CK. Human wound and its burden: updated 2020 compendium of estimates. *Adv wound care*. 2021;10(5):281–92.
3. Agomo C, Udoh A, Kpokiri E, Osuku-Opio J. Community pharmacists' contribution to public health: assessing the global evidence base. *Clin Pharm*. 2018;10(4).
4. Moura M, Dowsett C, Bain K, Bain M. Advancing practice in holistic wound management: a consensus-based call to action. *Wounds Int*. 2020;11(4):70–5.
5. Strand MA. The role of pharmacy in promoting public health: Pharmacy and public health in 2050. *J Am Pharm Assoc*. 2025;65(1):102272.
6. Bishop A. Wound assessment and dressing selection: an overview. *Br J Nurs*. 2021;30(5):S12–20.
7. Ayyash M, Jaber K, Moghli MA, Mukattash TL, Farha RA. Pharmacists' knowledge and perceptions regarding wound management at the community pharmacies in Jordan. *J Appl Pharm Sci*. 2021;11(8):36–42.
8. Cheung DHK, Schneider CR, Um IS. The role of community pharmacy in wound care: a scoping review. *J Wound Care*. 2023;32(11):728–37.
9. Sheehan L, Dias S, Joseph M, Mungroo S, Pantinople J, Lee K. Primary care wound clinics: A qualitative descriptive study of patient experiences in community pharmacies. *Pharmacy*. 2022;10(4):99.
10. Drahman H, Abd Wahab MS, Mustaffa MF, Suhaimi AM. Barriers and facilitators of wound care services provided by community pharmacists in selangor, malaysia: An exploratory qualitative study. *Thai J Pharm Sci*. 2023;46(6):759–68.
11. Dowsett C, von Hallern B. The Triangle of Wound Assessment: a holistic framework from wound assessment to management goals and treatments. *Wounds Int*. 2017;8(4):34–9.
12. Hughes CA, Breault RR, Schindel TJ. A qualitative case study exploring the implementation of pharmacist care planning services in community pharmacies. *J Am Pharm Assoc*. 2020;60(4):580–8.
13. Esmalipour R, Larijani B, Mehrdad N, Ebadi A, Salari P. The ethical challenges in pharmacy practice in community Pharmacies: A qualitative study. *Saudi Pharm J*. 2021;29(12):1441–8.
14. Smet S, Verhaeghe S, Beeckman D, Fourie A, Beele H. The process of clinical decision-making in chronic wound care: A scenario-based think-aloud study. *J Tissue Viability*. 2024;33(2):231–8.
15. Mallinder A, Martini N. Exploring community pharmacists' clinical decision-making using think aloud and protocol analysis. *Res Soc Adm Pharm*. 2022;18(4):2606–14.
16. Frasier K, Li V, Christoforides S, Daly K, Loperfito A, Stech K, et al. The impact of psychosocial influences on chronic wound healing. *Open J Med Psychol*. 2024;13(3):39–57.
17. Gillespie BM, Chaboyer W, St John W, Morley N, Nieuwenhoven P. Health professionals' decision-making in wound management: A grounded theory. *J Adv Nurs*. 2015;71(6):1238–48.
18. Gray TA, Wilson P, Dumville JC, Cullum NA. What factors influence community wound care in the UK? A focus group study using the Theoretical Domains Framework. *BMJ Open*. 2019;9(7):e024859.
19. Mertens JF, Koster ES, Deneer VHM, Bouvy ML, van Gelder T. Clinical reasoning by pharmacists: a scoping review. *Curr Pharm Teach Learn*. 2022;14(10):1326–36.
20. Rebolledo JA, Rhodes NJ, Valdes AM, Kulekowskis A, Kliethermes MA. Implementation of a clinical pharmacist-driven comprehensive medication

- management program in an outpatient wound healing center. *J Am Pharm Assoc.* 2022;62(2):475–80.
21. Rosenthal M, Carpenter D, Melton TC, Smith M, Ballou JM, Kiser S, et al. Financial threats and opportunities experienced by rural community pharmacies. *J Am Pharm Assoc.* 2025;65(5):102417.
22. Ogbewe EG, Mbata AO, Nwosu NT. Advancing pharmaceutical care in rural and underserved communities: Strategies for improving global healthcare access. *Int J Appl Res Soc Sci.* 2024;6(10):2447–61.
23. Salako A, Ullrich F, Mueller K. Financial issues challenging sustainability of rural pharmacies. *Am J Med Res.* 2017;4(2).
24. Terry DR, Peck B, Phan H, Hills D, Bishop J, Kirschbaum M, et al. Understanding rural pharmacists' perspectives: lived experiences and insights associated with rural recruitment and retention. *Rural Remote Health.* 2024;24(1):1–15.
25. Jin HK, Park SH, Kang JE, Choi KS, Kim HA, Jeon MS, et al. The influence of a patient counseling training session on pharmacy students' self-perceived communication skills, confidence levels, and attitudes about communication skills training. *BMC Med Educ.* 2019;19(1):172.
26. Cheung DHK, Schneider CR, Collins JC, Um IS. Wound Care Knowledge of Community Pharmacists and Pharmacy Staff: A Cross-Sectional Survey. *Int Wound J.* 2025;22(9):e70766.
27. Alshammari A. Wound care practices and training needs among community pharmacists in Saudi Arabia: A cross-sectional study. *Wound Pract Res J Aust Wound Manag Assoc.* 2025;33(3):108–16.
28. Ousey K, Atkin L, Conway B, Gorton H, Laird J, Toner S, et al. Wound Care and Dressing Selection for Pharmacy Teams: Consensus Document. 2021;
29. Hutchinson K. The road to transforming wound care: Empowering clinicians and improving patient outcomes through education. *J Artic.* 2025;21(01).