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Factors Influencing Provision of Antibiotics without a Prescription at Pharmacies in Inner City of Hanoi, Vietnam 2024

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Abstract

The sale of antibiotics without a prescription is a serious issue in Vietnam, particularly in the inner city of Hanoi, where this practice remains prevalent despite strict regulations. This has significant negative impacts on public health, including the issue of antimicrobial resistance. This study aims to evaluate the factors influencing the sale of antibiotics without a prescription at retail pharmacies in the inner city of Hanoi, focusing on the districts of Bac Tu Liem and Nam Tu Liem. A cross-sectional study was conducted from July to December 2024, targeting pharmacy staff at pharmacies meeting GPP (Good Pharmacy Practice) standards. Data were collected through questionnaires and analyzed using exploratory factor analysis (EFA) and linear regression. Three main factors influencing the sale of antibiotics without a prescription were identified: (1) Belief in benefits ($\beta = 0.273$), (2) Ability to perform and control behavior ($\beta = 0.480$), and (3) External influencing factors ($\beta = 0.473$). The regression model explained 52.9% of the variance in the willingness to sell antibiotics without a prescription. The findings suggest the need to strengthen training and raise awareness among pharmacy staff about the harms of selling antibiotics without a prescription while also improving policies for controlling and monitoring the sale of antibiotics to reduce this issue.

Keywords: sale of antibiotics without a prescription, antimicrobial resistance, influencing factors, pharmacy staff, Vietnam

Introduction

The sale of antibiotics without a prescription is a serious issue in many countries, including Vietnam, with negative impacts on public health and the increasing problem of antimicrobial resistance (Bordier et al., 2018). In Vietnam, particularly in Hanoi, the sale of antibiotics without a prescription remains prevalent in retail pharmacies despite strict regulations (McKinn et al., 2021; Nam, 2020; Torumkuney et al., 2022). Pharmacies in the inner city, where the population density is high and the demand for medications is large, play a crucial role in providing antibiotics to the community. However, the willingness of pharmacy

staff to sell antibiotics without a prescription is influenced by various factors, including personal factors, the legal environment, and external factors such as pressure from patients and customer habits (Guinovart et al., 2015)

This study aims to investigate and evaluate the factors influencing the sale of antibiotics without a prescription at retail pharmacies in the inner city of Hanoi, focusing on the districts of Bac Tu Liem and Nam Tu Liem. The research seeks to provide a deeper understanding of the motivations and factors influencing the behavior of pharmacy staff in dispensing antibiotics without a prescription, thereby contributing to the development of targeted intervention strategies to reduce the prevalence of this issue.

Literature Review

Factors Influencing the Sale of Antibiotics Without a Prescription by Pharmacy Staff

Belief in the Benefits of Selling Antibiotics Without a Prescription: Many pharmacy staff believe that selling antibiotics without a prescription helps pharmacies cope with economic pressures and maintain profitability, especially in a highly competitive environment (Elong Ekambi et al., 2019). They argue that dispensing antibiotics without a prescription helps retain customers and prevents them from switching to nearby pharmacies. Some pharmacy owners in other countries, such as India, view the sale of antibiotics as a duty to low-income patients, considering it a public service (Kotwani et al., 2021). However, research also indicates that belief in the therapeutic efficacy of antibiotics significantly influences the intention to sell antibiotics without a prescription, even though pharmacists may not always fully understand the long-term harm of this practice (McKinn et al., 2021).

Ability to Perform and Unobstructed Control Over Behavior: Pharmacy staff often feel confident in dispensing antibiotics without a prescription if they believe they possess sufficient knowledge and experience. This is reflected in a study conducted in Saudi Arabia, where some pharmacy staff believed they had the ability to diagnose and treat bacterial infections and thus felt justified in dispensing antibiotics without a prescription (Hadi, 2016). However, in environments like Hanoi, despite the existence of regulations regarding the sale of antibiotics, the enforcement is lax, resulting in the continued prevalence of selling antibiotics without a prescription (Torumkuney et al., 2022)

External Influencing Factors: Pressure from customers and competition between pharmacies are also significant factors driving the sale of antibiotics without a prescription. Customers often avoid visiting doctors and instead rely on old prescriptions or request antibiotics based on personal experience or advice from others. This poses a major challenge for pharmacy staff in adhering to regulations on the sale of antibiotics(Kotwani et al., 2021). Additionally, pressure from competing pharmacies is another factor that leads pharmacy staff to be willing to dispense antibiotics without a prescription in order to retain customers (Chen et al., 2020)

Based on a review of the existing literature, a three-factor model has been developed to explore the factors influencing the sale of antibiotics without a prescription by retail pharmacy

staff: Belief in Benefits (A), Ability to Perform and Control Behavior (B), and External Influencing Factors (C). This model helps elucidate the key factors in dispensing antibiotics without a prescription, thereby providing additional data on the motivations, perceptions, and factors influencing the decision by pharmacy staff in Vietnam to sell antibiotics without a prescription.

Research Method

A cross-sectional study investigated the factors influencing the sale of antibiotics without a prescription at retail pharmacies in the inner city of Hanoi, focusing on the districts of Bac Tu Liem and Nam Tu Liem from July to December 2024. The study population consisted of retail pharmacy staff working at pharmacies meeting Good Pharmacy Practice (GPP) standards in this area, ensuring that all participants were directly involved in the dispensing process at the pharmacy. Inclusion criteria included retail pharmacy staff present at pharmacies during the survey period. Exclusion criteria included retail pharmacy staff who refused to participate in the study and pharmacy interns. To achieve this objective, a cross-sectional study design was implemented with the following specific steps:

Development of the Questionnaire: This study aims to identify the factors influencing first-year students' decision to choose the pharmaceutical field, focusing on three main factors: Belief in Benefits (A), Ability to Perform and Control Behavior (B), and External Influencing Factors (C). The data collection tool was a questionnaire developed based on previous studies with similar objectives (Chen et al., 2020) (Erku & Aberra, 2018) (Kotwani et al., 2017) (Kotwani et al., 2017) (Vân & Hà, 2024) , and adjusted to fit the context of the study in the two districts of Hanoi. This adjustment process ensured the research content's relevance and reliability, while facilitating accurate and valuable data collection to better understand the factors influencing the decision to sell antibiotics without a prescription by retail pharmacy staff in the study area.

A 5-point Likert scale was used to assess the degree of agreement of respondents with each item influencing their choices (ranging from 1, "strongly disagree," to 5, "strongly agree"). Based on this, a preliminary survey questionnaire was developed.
To ensure the validity of the questionnaire, the preliminary version was created and sent to five experts in the field of pharmacy for evaluation. The experts reviewed the clarity, structure of the questions, and the appropriateness of the terminology used in the research context. Based on their feedback, three questions were modified to simplify and improve their clarity for respondents.
Subsequently, the questionnaire was pre-tested on eight retail pharmacy staff who met the inclusion criteria, to check the clarity and relevance of the questions. This process also helped assess the logic, structure, and time required to complete the survey, ensuring that the questionnaire was neither too long nor complex for the respondents. The pharmacy staff who participated in the pre-test were not selected for the main study to maintain the objectivity of the data. The pre-test results indicated that the items in the questionnaire were clear, easy to understand, and required no further modifications, confirming the validity of the survey tool

before it was used in the main study. The official questionnaire was designed in the form of a direct survey and was distributed directly to retail pharmacy staff. The questionnaire consisted of two main sections: (i) The first section focused on the demographic characteristics of the participants. The second section included 19 questions measuring the factors influencing the sale of antibiotics without a prescription by retail pharmacy staff. Additionally, one general question was added to assess the willingness of pharmacy staff to sell antibiotics without a prescription.

Data Collection

Data were collected through a questionnaire distributed directly to retail pharmacy staff that the research team was able to access in the districts of Nam Tu Liem and Bac Tu Liem, Hanoi, Vietnam. The convenience sampling method was applied in this study to optimize data collection within a specific time and space. Specifically, the study population consisted of retail pharmacy staff working at pharmacies meeting Good Pharmacy Practice (GPP) standards in the Bac Tu Liem and Nam Tu Liem districts of Hanoi, areas where the research team could easily access and gather information. The use of convenience sampling helped save costs, time, and ensured feasibility in collecting the required sample size to meet the research objectives. Furthermore, this method allowed the research team to quickly approach available subjects in the study area, thus enhancing the effectiveness of the survey process and minimizing potential confounding factors. Therefore, convenience sampling was an appropriate choice in this research context, ensuring the feasibility and efficiency of data collection.

During the data collection process, a total of 173 participants responded to the survey. After validation, 14 invalid responses (e.g., identical or incomplete answers for all questions) were excluded, leaving 159 valid responses for analysis. This sample size fully meets the requirements for conducting Exploratory Factor Analysis (EFA). All retail pharmacy staff participants voluntarily took part in the study after being fully informed about the purpose and content of the research.

Data Analysis

The data collected from the survey forms were cleaned, coded, and entered into SPSS 27.0 software. Descriptive statistics were used to calculate the frequency and percentage of demographic variables to provide basic characteristics of the study sample. In addition, the mean values and standard deviations of the survey responses were calculated. The reliability and validity of the questionnaire, constructed according to the measurement scale, were assessed using Cronbach's Alpha (CA) and Exploratory Factor Analysis (EFA). Variables with inter-item correlation coefficients less than 0.3 were considered redundant and were removed from the scale. The scale was considered acceptable if the Cronbach's Alpha coefficient met the required threshold (> 0.6). Factor analysis was conducted using EFA, Principal Component Extraction, and Varimax Rotation. Factors were considered acceptable if the factor loading was greater than 0.5; the eigenvalue was greater than 1; the extracted variance was above 50%; the Kaiser-Meyer-Olkin (KMO) value was greater than 0.5; and Bartlett's Test of Sphericity was significant ($p < 0.05$). Linear regression analysis was performed to determine the influence of each factor on the practice of retail pharmacy staff selling antibiotics without a prescription.

The dependent variable was the willingness to sell antibiotics without a prescription (measured on a 5-point Likert scale), while the independent variables represented the factors identified in the factor analysis (continuous variables).

Research Ethics

All retail pharmacy staff participants were informed and clearly explained about the purpose and content of the study, ensuring voluntary participation. The information collected was coded and kept confidential to protect the privacy of the study participants.

Result

Characteristics of Study Participants

The study results presented in Table 1 indicate that the proportion of female pharmacy retailers (82.4%) is significantly higher than that of males (17.6%). Most participants were under 30 (56.6%), followed by those aged 30–50 (34.6%), and only 8.8% were over 50. Regarding educational qualifications, most participants held college or vocational degrees (62.3%), while only 15% had a university degree or higher. Notably, 93.1% of participants admitted to having sold antibiotics without a prescription, highlighting the widespread prevalence of this practice.

Table 1: Characteristics of Study Participants

	Characteristic	**Frequency (%)**
Gender	Male	28 (17.6%)
	Female	131 (82.4%)
Age	<30 years	90 (56.6%)
	30 – 50 years	55 (34.6%)
	> 50 years	14 (8.8%)
Work experience in pharmacies	<3 years	29 (18.3%)
	3-5 years	70 (44%)
	>5 years	60 (37.7%)
Pharmaceutical education level	Postgraduate	12 (7.5%)
	University	12 (7.5%)
	College/Vocational training	99 (62.3%)
Position in pharmacy	Head pharmacist	32 (20.1%)
	Staff	127 (79.9%)
Selling antibiotics without a prescription	Yes	148 (93.1%)
	No	11 (6.9%)

Exploratory Factor Analysis (EFA)

Reliability Testing of the Scale: Before performing Exploratory Factor Analysis (EFA), the reliability of the scale was assessed using Cronbach's Alpha (CA) coefficient. The reliability test results showed that with the initial 19 observed variables, after checking the CA coefficient, all variables met the following conditions: (1) the CA coefficients ranged from

0.843 to 0.925, meeting the reliability requirement (>0.6); (2) the inter-item correlation coefficients for the observed variables in the scale were all greater than 0.3, thus meeting the reliability criteria; (3) the CA coefficient of the scale would decrease if any observed variable were excluded. (Hoàng Trọng Chu, 2008)

Exploratory Factor Analysis Results

The Exploratory Factor Analysis (EFA) results indicate that the research data met the necessary conditions to conduct the EFA. Specifically, the Kaiser-Meyer-Olkin (KMO) index was 0.898, within the acceptable range of 0.5 to 1, indicating a very high suitability of the data for factor analysis. Additionally, Bartlett's Test of Sphericity was statistically significant (Sig. = 0.000 < 0.005), proving that the observed variables were significantly correlated, and thus EFA was appropriate.

Exploratory Factor Analysis (EFA) was performed in three rounds of factor rotation to eliminate variables that did not meet the criteria. In the first rotation, variable *B9, "I have sufficient knowledge to independently advise and provide antibiotics to customers without a prescription when necessary"* was excluded as it converged on both factors. In the second rotation, variable *A8, "If I refuse to sell antibiotics to a customer without a prescription, the pharmacy is afraid of losing customers"* was further removed because it did not converge into any factor group. After the third rotation, the final model retained 17 observed variables, all meeting the factor loading criteria (> 0.5), and these were grouped into three main factor categories based on the degree of convergence of the variables within each group.

The first-factor group is "**Belief in Benefits (A)"**, consisting of 7 variables: A1, A2, A3, A4, A5, A6, A7. This group focuses on factors reflecting the belief of pharmacy staff in the economic and therapeutic benefits of selling antibiotics without a prescription. The second factor group is "**Ability to Perform and Control Behavior (B)"**, comprising 5 variables: B10, B11, B12, B13, B14. This group emphasizes factors related to the level of confidence and control over behavior when selling antibiotics without a prescription. The third factor group is "**External Influencing Factors (C)"**, consisting of 5 variables: C15, C16, C17, C18, C19. This group relates to external factors that influence the decision to sell antibiotics without a prescription.

Thus, after three rounds of Varimax rotation, with a cumulative variance of 61.521%, it is evident that these factors provide a good explanation for the research data. This is an indication that the factor analysis model has achieved a sufficient and reasonable level of explanation for the data.

Table 2: Results of the Third Round of Exploratory Factor Analysis

Rotated Component Matrix[a]				
	Component			Mean (SD)
	1	2	3	
A5 Pharmacies struggle to sustain operations if they must wait for prescriptions to sell antibiotics.	,803			2.96(0.72)
A6 Without antibiotics, the disease/symptoms of patients will not improve.	,726			3.13(0.65)

A7 If I refuse to sell antibiotics without a prescription, other pharmacies will sell them.	,691			3.04(0.7)
A3 Using antibiotics results in rapid treatment effectiveness, allowing patients to recover quickly.	,642			3.28(0.71)
A4 Selling antibiotics without a prescription helps customers save time and costs.	,582			3.5(0.74)
A2 Providing antibiotics without a prescription improves patients' conditions and symptoms.	,568			3.2(0.66)
A1 Selling antibiotics without a prescription increases pharmacy revenue and profits.	,566			3.07(0.49)
C18 Pressure from patients who want to recover quickly.		,839		3.66(0.62)
C17 Some doctors prescribe and sell antibiotics themselves, leading to a lack of prescriptions for pharmacies.		,837		3.61(0.65)
C16 Patients have a habit of avoiding doctor visits.		,804		3.75(0.71)
C19 Customers lack awareness about the necessity of prescriptions for antibiotic purchases.		,735		3.48(0.79)
C15 The majority of customers purchase antibiotics without a prescription.		,682		3.38(0.77)
B14 The penalty (5-10 million VND) for selling antibiotics without a prescription is acceptable.			,858	3.28(0.8)
B11 Pharmacies have proactively advised and successfully treated many customers with similar symptoms using antibiotics.			,768	3.34(0.74)
B13 I do not fear being penalized for selling antibiotics without a prescription.			**,762**	3.01(0.88)
B12 No one strongly opposes me selling antibiotics without a prescription.			**,739**	3.36(0.73)
B10 The antibiotics provided by the pharmacy without a prescription are safe for most patients.			**,654**	3.47(0.68)
Overall				3.43(0.66)
Eigenvalues	**7,137574**	**1,787856**	**1,533076**	
% of variance	**41,985727**	**10,516798**	**9,018095**	

Multivariate Regression Analysis

Multivariate regression analysis was performed to assess the influence of the factors (A) Belief in Benefits, (C) External Influencing Factors, and (B) Ability to Perform and Control Behavior on the willingness of retail pharmacy staff to sell antibiotics without a prescription.

The regression results showed that the model was statistically significant ($F = 58.030$; $p = 0.000$) and explained 52.0% of the variance in the willingness to sell antibiotics without a prescription ($R^2 = 0.529$; Adjusted $R^2 = 0.520$). Meanwhile, factors outside the model or random error explained the remaining 47.1% of the variance.

Among the factors, (B) Ability to Perform and Control Behavior had the largest impact on the willingness to sell antibiotics without a prescription, with the highest standardized Beta coefficient ($\beta = 0.480$; $p = 0.000$). The next most influential factor was (C) External Influencing

Factors, with a standardized Beta coefficient (β = 0.473; p = 0.000), followed by (A) Belief in Benefits with a standardized Beta coefficient (β = 0.273; p = 0.000).

Table 3: Results of the Linear Regression Analysis

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3,428	,036		94,447	,000
	(A) Belief in Benefits	,180	,036	,273	4,951	,000
	(C) External Influencing Factors	,312	,036	,473	8,579	,000
	(B) Ability to Perform and Control Behavior	,317	,036	,480	8,716	,000
F-test value				58.030; Sig = 0.000		
Durbin-Watson test value				1,850		
R-squared coefficient				0,529		
Adjusted R-squared coefficient				0,520		

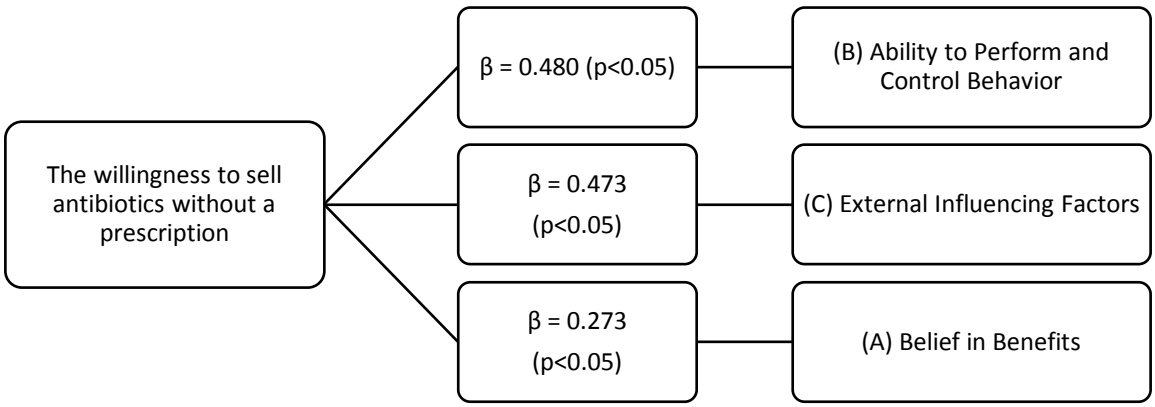

Figure 1: The impact of each factor on the willingness to sell antibiotics without a prescription

Thus, the multivariate regression model meets the conditions for drawing research conclusions. The standardized regression equation shows the factors influencing the willingness of retail pharmacy staff to sell antibiotics without a prescription are determined as follows:

Willingness to sell antibiotics without a prescription = 0.480 * (B) Ability to perform and control behavior + 0.473 * (C) External influencing factors + 0.273 * (A) Belief in benefits

The results of the multivariate regression analysis reveal the strength of the independent factors that impact the willingness of retail pharmacy staff to sell antibiotics without a prescription. All the factors have a positive impact on this decision. Among them, the factor **"Ability to perform and control behavior" (B)** has the strongest influence, followed by the factor **"External influencing factors" (C)**, and finally, the factor **"Belief in benefits" (A)** has the weakest impact on the willingness to sell antibiotics without a prescription by retail pharmacy staff.

Discussion

Characteristics of Study Participants

Gender and Age of Retail Pharmacy Staff: The research results show that the proportion of female retail pharmacy staff (82.4%) is significantly higher than that of males (17.6%). This reflects the general characteristic of the workforce in the pharmaceutical sector in Vietnam, where women often dominate roles related to healthcare and medication counseling. This trend is consistent with previous studies, such as the one by Nguyễn Thị Phương Thúy et al. (2020), which recorded a higher proportion of women in the pharmaceutical industry due to the nature of the work, which requires meticulousness, patience, and strong communication skills with customers.

Regarding age, the majority of retail pharmacy staff are under 30 years old (56.6%), followed by those aged 30-50 years (34.6%), and only 8.8% are over 50 years old. This distribution reflects the trend of a younger workforce in the pharmaceutical industry, especially in urban areas where there is a high demand for the ability to update professional knowledge and use technology in pharmacy management.

Work Experience and Professional Qualifications: The distribution of work experience in pharmacies is relatively even, with the highest proportion (44%) having 3-5 years of experience, followed by those with over 5 years (37.7%), and those with less than 3 years (18.3%). This distribution indicates that a significant portion of the workforce in the pharmaceutical sector has relatively substantial practical experience. However, the proportion of staff with less than 3 years of experience is still notable, which may affect the quality of counseling and the level of compliance with prescription sale regulations. Regarding professional qualifications, the study results show that 62.3% of pharmacy staff only hold a college or vocational diploma, while only 15% have a university degree or higher. The fact that the majority of pharmacy staff have below university-level qualifications may affect compliance with prescription sale regulations, particularly as pharmaceutical management in Vietnam becomes increasingly stringent and rigorous.

Role in Pharmacies and the Sale of Antibiotics Without a Prescription: The study results show that 79.9% of survey participants were pharmacy staff, while only 20.1% were responsible for professional duties. This reflects a common situation at retail pharmacies, where most of the counseling and medication dispensing activities are handled by staff rather than licensed pharmacists. According to the study by Laxminarayan et al. (2013), the

involvement of staff with lower professional qualifications in the dispensing process can increase the sale of antibiotics without a prescription due to a lack of understanding of legal regulations and the impact of antibiotics on public health (Laxminarayan et al., 2013).

Đặc biệt, kết quả nghiên cứu cho thấy 93,1% người bán thuốc thừa nhận đã từng bán kháng sinh không có đơn, trong khi chỉ 6,9% chưa từng bán. Điều này cho thấy tình trạng bán kháng sinh không có đơn vẫn đang diễn ra phổ biến tại Hà Nội, Việt Nam, bất chấp các quy định pháp lý nghiêm ngặt. Việc bán kháng sinh không có đơn có thể dẫn đến tình trạng lạm dụng thuốc, tăng nguy cơ kháng kháng sinh và gây ra những hậu quả nghiêm trọng đối với sức khỏe cộng đồng.

Factors Influencing the Sale of Antibiotics Without a Prescription by Retail Pharmacy Staff

This study has highlighted the factors influencing the sale of antibiotics without a prescription at retail pharmacies in the inner city of Hanoi. The analysis results show that three main factors: **Ability to Perform and Control Behavior (B)**, **External Influencing Factors (C)**, and **Belief in Benefits (A)**, all have a strong and significant impact on the willingness of retail pharmacy staff to sell antibiotics without a prescription.

Among these factors, **Ability to Perform and Control Behavior (B)** has the strongest impact on this decision, with the highest standardized Beta coefficient ($\beta = 0.480$; $p = 0.000$). This result suggests that when confident and able to control their behavior, retail pharmacy staff are more likely to sell antibiotics without a prescription, especially when they do not face significant pressure from legal or social factors. This finding is also consistent with the study by Nguyễn Thị Phương Thúy et al. (2020), which indicated that the sale of antibiotics without a prescription is less strongly opposed in regions with varying income levels and awareness, and that retail pharmacy staff frequently use antibiotics for similar symptoms, which boosts their confidence when making the decision to sell antibiotics without a prescription(Nguyễn Thị Phương Thúy, 2020).

The factor **External Influencing Factors (C)**, with a standardized Beta coefficient ($\beta = 0.473$; $p = 0.000$), ranks second in influencing the willingness to sell antibiotics without a prescription. External factors such as pressure from patients, customer habits, and doctors' behaviour strongly impact the decisions of retail pharmacy staff. This is especially important in the current context where patients desire quick treatment without a prescription, putting pressure on retail pharmacy staff to sell antibiotics without a prescription. This result is consistent with a study in China, where external factors such as customer pressure and doctor habits also significantly influenced the behavior of selling antibiotics without a prescription.(Chen et al., 2020)

Finally, the factor **Belief in Benefits (A)** has a weaker but still significant impact ($\beta = 0.273$; $p = 0.000$). This factor reflects the economic and therapeutic benefits that pharmacy staff believe they will achieve by selling antibiotics without a prescription. Although the economic benefits from selling medications may encourage this behavior, it is not as strong as the behavioral and external factors. This result is also consistent with studies in India, where

the economic benefits from selling antibiotics without a prescription were one of the main factors driving this behavior(Chandran & Manickavasagam, 2022).

The results of the multivariate regression analysis also indicate that the research model explains 52,0% of the variance in the willingness to sell antibiotics without a prescription (Adjusted R-squared = 0.52), showing that the identified factors are significant in understanding the behavioral motivations of retail pharmacy staff in Hanoi.

Managerial Implications

The study results indicate that three main factors influence the sale of antibiotics without a prescription at retail pharmacies in Hanoi: the ability to perform and control behavior by pharmacy staff, external influencing factors, and the belief in the benefits of selling antibiotics without a prescription. Based on these results, several important managerial implications for local pharmaceutical managers can be drawn:

Enhance Training and Capacity Building for Pharmacy Staff: To minimize the sale of antibiotics without a prescription, retail pharmacies should focus on enhancing the ability to perform and control behavior among staff through regular training programs on legal regulations, the role of proper medication use, and the risks of antimicrobial resistance. When pharmacy staff are fully equipped with knowledge and confidence in counseling, they will be less influenced by external factors and can more confidently refuse to sell antibiotics without a prescription.

Create a Favorable Legal and Social Environment: The government and relevant authorities need to make further efforts to strengthen inspections and monitoring of pharmacies to ensure that the sale of antibiotics without a prescription does not occur. Strict penalties for violating pharmacies may be a necessary solution to reduce this issue. At the same time, awareness-raising campaigns should be launched to educate the public about the harms of using antibiotics without a prescription to minimize the negative impacts on public health.

Improve Support Policies and Motivate Pharmacies: Retail pharmacies need support in improving the business environment, such as through providing clear information on regulations and how to comply with legal requirements in selling medications. Additionally, measures such as training pharmacy staff in health counseling and customer care can help reduce external pressures and limit the sale of antibiotics without a prescription. Managers need to create a working environment that encourages staff to comply with regulations while maintaining legal economic benefits for pharmacies through appropriate support policies.

Research Limitations

Although the study has provided important results regarding the factors influencing the sale of antibiotics without a prescription at retail pharmacies in Hanoi, there are also some limitations. First, the study was conducted only in the districts of Bac Tu Liem and Nam Tu Liem, and therefore cannot represent the entire city of Hanoi or other areas. This may affect the generalizability of the results. Second, the convenience sampling method used in the study may lead to bias in the selection of participants and does not guarantee randomness. Finally,

the study focused only on three main factors influencing the behavior of selling antibiotics without a prescription, without considering other factors such as the influence of culture, the work environment, or the impact from health organizations. These limitations should be addressed in future studies to further clarify the influencing factors and provide a more comprehensive view of the issue.

Conclusion

This study has shown that three main factors influence the sale of antibiotics without a prescription at retail pharmacies in the inner city of Hanoi: **Belief in Benefits (A)**, **Ability to Perform and Control Behavior (B)**, and **External Influencing Factors (C)**. Among these, the factor **"Ability to Perform and Control Behavior"** has the strongest influence, followed by **"External Influencing Factors"**, and lastly, **"Belief in Benefits"**. The regression model explained 52.9% of the variance in the willingness to sell antibiotics without a prescription. This highlights the need for comprehensive intervention measures to improve the awareness and capacity of pharmacy staff, while also strengthening supervision and enforcing legal regulations to minimize the sale of antibiotics without a prescription. Implementing awareness campaigns to educate the public on the harms of improper antibiotic use is also necessary. Additionally, support policies for retail pharmacies and the creation of a favorable legal and social environment are key factors in reducing this issue in the future.

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