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ORIGINAL PAPER

# BARRIERS TO MEDICATION USE AMONG PATIENTS WITH COPD CHARACTERISED USING THE CAPABILITY, OPPORTUNITY AND MOTIVATION BEHAVIOUR (COM-B) MODEL

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## Abstract

**Introduction.** In Vietnam, studies on medication use behaviour in patients with chronic obstructive pulmonary disease (COPD) mainly focus on measuring compliance and identifying related factors. However, there is still a lack of in-depth research around the barriers to COPD medication use.
**The objective of the study** was to assess barriers to medication use and associated factors in patients with COPD.
**Material and methods.** A cross-sectional descriptive study was conducted in 216 COPD patients in a public hospital in Vietnam from February to April 2025. The Vietnamese questionnaire comprised 14 items grounded in the COM-B framework, developed from literature and expert consultation, and evaluated on a 5-point Likert scale. Differences in barriers to medication use according to demographic and health

## Résumé

**Obstacles à l'utilisation des médicaments chez les patients atteints de BPCO caractérisés à l'aide du modèle comportemental de capacité, d'opportunité et de motivation (COM-B)**

**Introduction.** Au Vietnam, les études sur le comportement d'utilisation des médicaments chez les patients atteints de bronchopneumopathie chronique obstructive (BPCO) se concentrent principalement sur la mesure de l'observance et l'identification des facteurs associés. Cependant, les recherches approfondies sur les obstacles à l'utilisation des médicaments contre la BPCO sont encore insuffisantes.
**L'objectif de l'étude** était d'évaluer les obstacles à l'utilisation des médicaments et les facteurs associés chez les patients atteints de BPCO.

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characteristics were assessed using the Mann-Whitney U test.
**Results.** The barrier domains with the highest mean scores were physical opportunity (2.78) and social opportunity (2.55). People under 60 years old encountered more barriers related to automatic motivation (p=0.003); people with lower education encountered more barriers related to reflective motivation (p=0.003). People with a disease duration of 3 years or less had more barriers related to physical capability (p < 0.001), physical opportunity (p < 0.001), social opportunity (p < 0.001), reflective motivation (p < 0.001), and automatic motivation (p < 0.001).
**Conclusions.** The study found that common barriers in people with COPD were related to opportunity, especially communication with doctors and medication use instructions. The findings of this study suggest a need for interventions aimed at patient education to help improve medication use in people with COPD.

**Keywords:** barriers, COPD, medication use, physical opportunity, social opportunity.

**List of abbreviations:**
AuM – automatic motivation
CFI – comparative fit index
CMIN – chi-square minimum discrepancy
COM-B – capability, opportunity, motivation – behaviour
COPD – chronic obstructive pulmonary disease
GFI – goodness of fit index
PhC – physical capability
PhO – physical opportunity
PR – pulmonary rehabilitation
PsC – psychological capability
ReM – reflective motivation
RMSEA – root mean square error of approximation
SD – standard deviation
SoO – social opportunity
SRMR – standardized root mean square residual

**Matériel et méthodes.** Une étude descriptive transversale a été menée auprès de 216 patients atteints de BPCO dans un hôpital public vietnamien de février à avril 2025. Le questionnaire vietnamien comprenait 14 items basés sur le cadre COM-B, élaboré à partir de la littérature et de consultations d'experts, et évalué sur une échelle de Likert à 5 points. Les différences d'obstacles à l'utilisation des médicaments selon les caractéristiques démographiques et de santé ont été évaluées à l'aide du test U de Mann-Whitney.
**Résultats.** Les obstacles ayant obtenu les scores moyens les plus élevés étaient les opportunités physiques (2,78) et les opportunités sociales (2,55). Les personnes de moins de 60 ans ont rencontré davantage d'obstacles liés à la motivation automatique (p = 0,003); les personnes ayant un faible niveau d'éducation rencontraient davantage d'obstacles liés à la motivation réflexive (p = 0,003). Les personnes dont la maladie existait depuis 3 ans ou moins présentaient davantage d'obstacles liés aux capacités physiques (p < 0,001), aux opportunités physiques (p < 0,001), aux opportunités sociales (p < 0,001), à la motivation réflexive (p < 0,001) et à la motivation automatique (p < 0,001).
**Conclusions.** L'étude a révélé que les obstacles courants chez les personnes atteintes de BPCO étaient liés aux opportunités, en particulier la communication avec les médecins et les instructions d'utilisation des médicaments. Les résultats de cette étude suggèrent la nécessité d'interventions visant à éduquer les patients afin d'améliorer l'utilisation des médicaments chez les personnes atteintes de BPCO.

**Mots-clés:** obstacles, BPCO, utilisation des médicaments, opportunités physiques, opportunités sociales.

## Introduction

Chronic obstructive pulmonary disease (COPD) is considered one of the top ten causes of death worldwide[1]. In Vietnam, the prevalence of COPD is 6.7% – the highest in Southeast Asia – and more than half of patients have experienced at least one exacerbation[2,3]. The disease is characterized by persistent airflow limitation accompanied by symptoms such as chronic cough, sputum production, dyspnea, and exercise intolerance[4]. In addition, the disease is associated with other common medical conditions including cardiovascular disease, diabetes, osteoporosis, anxiety, and depression[5]. In patients with COPD, quality of life is often negatively affected, and worsens as the disease progresses[6]. COPD has a significant economic impact, including both direct costs to the healthcare system and indirect costs to society[7]. Therefore, an effective management of COPD is necessary to improve quality of life, reduce the burden of disease, and optimize healthcare resources.

Worldwide, previous studies have used qualitative methods to identify and classify barriers to medication use in COPD patients. The study of Nygård et al. identified almost all aspects of these barriers[8]. Another study by O'Toole et al. highlighted barriers

related to individual awareness and behaviour, health system and service access, and economic/financial factors[9]. However, these studies are still limited, because they do not quantify the impact of each behavioural factor on medication use behaviour in patients. In Vietnam, studies on medication use behaviour in patients with COPD mainly focus on measuring compliance and identifying related factors[10,11]. However, there is still a lack of in-depth research around the barriers to COPD medication use, especially from the perspective of behavioural change theory.

Strategies targeting behaviour change are recognized to be more effective when using implementation theory, compared to those without a philosophical approach[12]. Nygård et al.[8] demonstrated that the use of a theoretical framework is useful to identify and describe barriers and facilitators related to medication-taking behaviour in people with COPD. The Capability, Opportunity, Motivation – Behaviour (COM-B) model is a widely used theoretical framework to specify the necessary aspects for behaviour change interventions[13].

**The objective of the study** was to assess barriers to medication use and associated factors in patients with COPD using the COM-B model.

## Materials and methods

### Study setting

A cross-sectional descriptive study was conducted in COPD patients who visited the Respiratory Clinic, Department of Examination, at the An Giang Central General Hospital, Vietnam. The selection criteria included patients over 18 years old with a confirmed diagnosis of COPD. The exclusion criteria were inability to communicate sufficiently due to health conditions or cognitive impairment. The study period ran from February to April 2025. The study was approved by the Ethics Committee in Biomedical Research, Can Tho University of Medicine and Pharmacy, approval no. 25.035.HV.UD/PCT-HĐĐĐ.

The sample size was calculated using the sample size estimation formula for a proportion. The calculation assumed a confidence level of 95%, an acceptable error of 6%, and a rate of COPD patients with good treatment adherence of 49.3%, according to the results of a previous study[14]. The minimum sample size required was 179 patients. To accommodate attrition and missing data, a 10% margin was added. Therefore, the study aimed to recruit a total of 216 patients.

Participants were recruited using convenience sampling, whereby all patients who came to the hospital's Respiratory Clinic who were diagnosed with COPD were invited to participate in the survey after completing their initial clinical examination. Consenting patients were provided with a self-administered paper questionnaire to complete while waiting for their test results. Recruitment and data collection were carried out continuously until the sample size was reached with no subject completing the survey more than once.

### Data collection

The questionnaire was provided in Vietnamese and consisted of two parts. In the first part of the survey, barriers related to medication use were assessed through 14 structured items, built on the COM-B theoretical model, grouped into 6 domains comprising Physical Capability (2 items), Psychological Capability (2 items), Physical Opportunity (2 items), Social Opportunity (3 items), Reflective Motivation (3 items), and Automatic Motivation (2 items). These items were developed from a literature review[15–21] and expert consultation, to ensure comprehensiveness in content. Each item was measured using a 5-point Likert scale, ranging from "strongly disagree" to "strongly agree".

The second part of the survey collected information on socio-demographic characteristics including age, gender, ethnicity, education level, current occupation, living situation, and household economic conditions. In addition, information on health-related characteristics including duration of COPD, family history of the disease, and frequency of contact with healthcare workers was also collected.

### Data analysis

The collected data were processed using SPSS version 22.0. The results were presented through descriptive statistics such as frequency, percentage, mean, standard deviation. Confirmatory factor analysis was used to evaluate the construct validity of the barrier survey tool. A cut-off for factor loadings of 0.30 was adopted for interpretation purposes[22]. The model fit was tested based on CMIN ($\chi^2$/df) < 2, GFI > 0.9, CFI > 0.9[23], SRMR ≤ 0.08, RMSEA ≤ 0.06[24], as a comparative fit index. Spearman's rank correlation coefficients were calculated to assess correlations between barriers to medication use. Differences in barriers to medication use according to demographic and health characteristics were assessed using the Mann-Whitney U test. Statistically significant differences were recorded at a threshold of $p < 0.05$.

## Results

A total of 216 COPD patients participated in this study (Table 1). The mean±standard deviation (SD) age of participants was 67.28±9.65 years and ages ranged from 40 to 94 years. The majority of

**Table 1.** Demographic and health characteristics of study participants (n = 216)

| *Characteristic* | | *Frequency (n)* | *Percentage (%)* |
|---|---|---|---|
| ***Demographic*** | | | |
| Age group (years) | < 60 | 42 | 19.4 |
| | ≥ 60 | 174 | 80.6 |
| | Mean (SD) | 67.28 | 9.65 |
| Gender | Man | 207 | 95.8 |
| | Woman | 9 | 4.2 |
| Ethnicity | Kinh | 214 | 99.1 |
| | Khmer | 2 | .9 |
| Education level | Primary school | 97 | 44.9 |
| | Lower secondary school | 76 | 35.2 |
| | Upper secondary school | 29 | 13.4 |
| | College / university / postgraduate | 14 | 6.5 |
| Occupation | Employed | 39 | 18.1 |
| | Retired / unemployed | 177 | 81.9 |
| Living arrangement | Living alone | 8 | 3.7 |
| | Living with family | 208 | 96.3 |
| Household economic status | Poor | 13 | 6 |
| | Not poor | 208 | 96.3 |
| **Health** | | | |
| Duration of COPD (years) | ≤3 | 92 | 42.6 |
| | >3 | 124 | 57.4 |
| Family member with COPD | Yes | 6 | 2.8 |
| | No | 210 | 97.2 |
| Frequency of healthcare visits | Weekly | 3 | 1.4 |
| | Monthly | 205 | 94.9 |
| | Only when symptomatic | 8 | 3.7 |

**Table 2.** Correlation between medication use barriers among participants (n = 216)

| No. | Domains | Mean (SD) | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| 1 | Psychological capability | 1.95 (0.56) | | | | | | |
| 2 | Physical capability | 2.2 (1.08) | 0.03 | 1 | | | | |
| 3 | Physical opportunity | 2.77 (1.3) | -0.22* | 0.39* | 1 | | | |
| 4 | Social opportunity | 2.55 (1.09) | -0.07 | 0.33* | 0.45* | 1 | | |
| 5 | Reflective motivation | 1.69 (0.96) | -0.13 | 0.32* | 0.43* | 0.33* | 1 | |
| 6 | Automatic motivation | 1.57 (0.94) | -0.11 | 0.21* | 0.29* | 0.10 | 0.20* | 1 |

*Note:* *p <0.001.

participants were male (95.8%), of Kinh ethnicity (99.1%), retired or not working (81.9%), living with family (96.3%), and had a non-poor economic status (94%). More than half of the participants had COPD for more than 3 years.

Confirmatory factor analysis showed that the model describing barriers to medication use had an acceptable fit ($\chi^2(62) = 106.086$, $p < 0.001$; $\chi^2/df = 1.71$). The model fit indices were at the recommended level (GFI = 0.93, CFI = 0.92, RMSEA = 0.06, 90% CI [0.04, 0.08], SRMR = 0.06). In the six-factor model, all 14 items showed factor loadings above the acceptable threshold of 0.3 on their target factors (Figure 1).

When considering individual items in the 14-item model, the two most commonly reported barriers among participants included physicians not having enough time to advise on medication use (58.3%) and unclear instructions on prescriptions (54.2%), as shown in Figure 2. When considering the barrier domains, physical opportunity (2.78) and social opportunity (2.55) were the two most commonly reported barrier domains influencing medication use in COPD patients (Figure 3). Physical opportunity had a moderate positive correlation with social opportunity (0.45) and reflective motivation (0.43), as shown in Table 2.

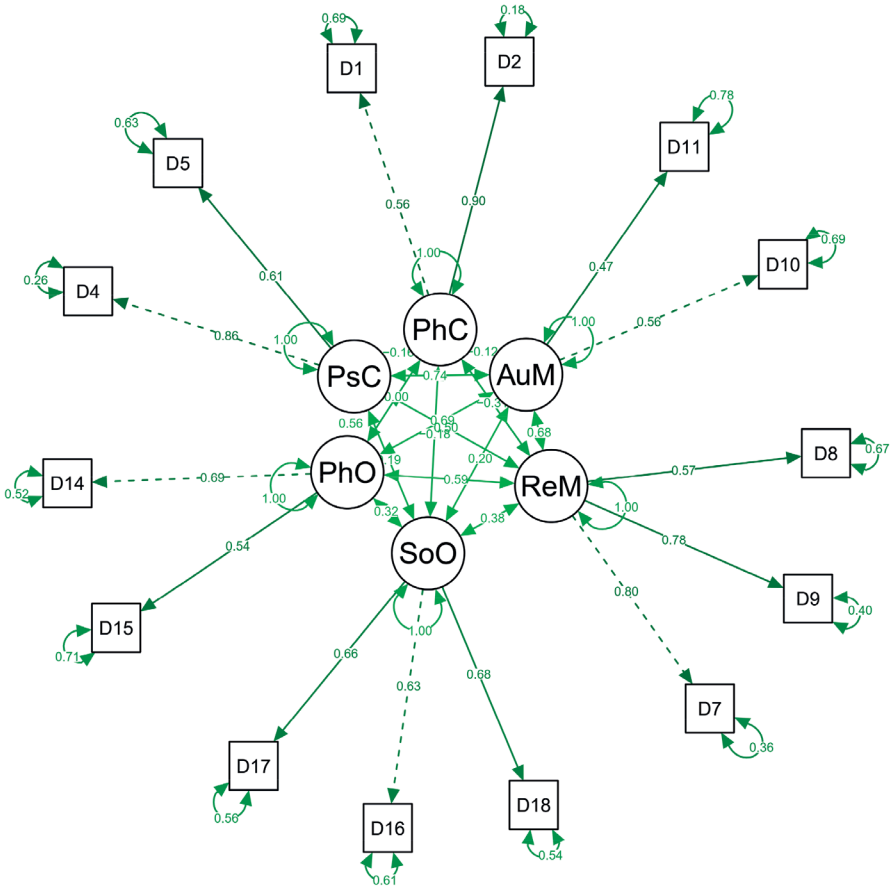



**Figure 1.** Confirmatory factor analysis of the model of barriers to medication use.
Note: PhC – Physical Capability, PsC – Psychological Capability, ReM – Reflective Motivation, AuM – Automatic Motivation, PhO – Physical Opportunity, SoO – Social Opportunity.

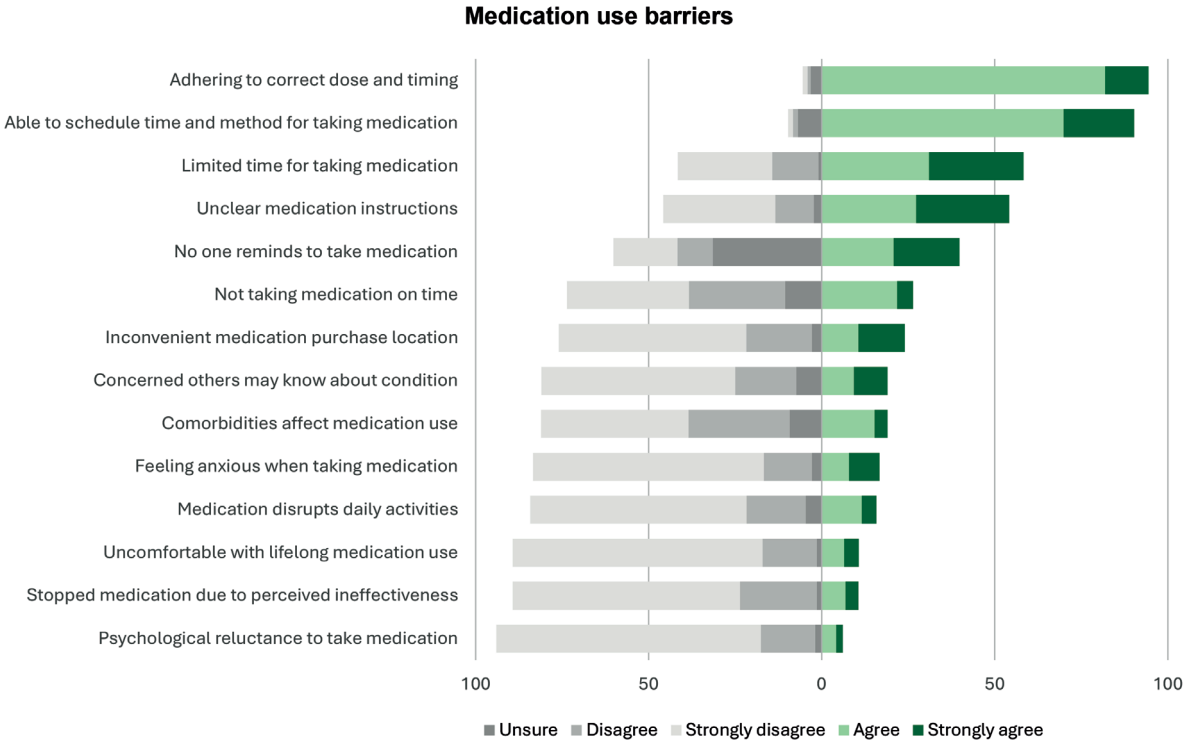



**Figure 2.** Description of medication use barriers among study participants (n = 216).

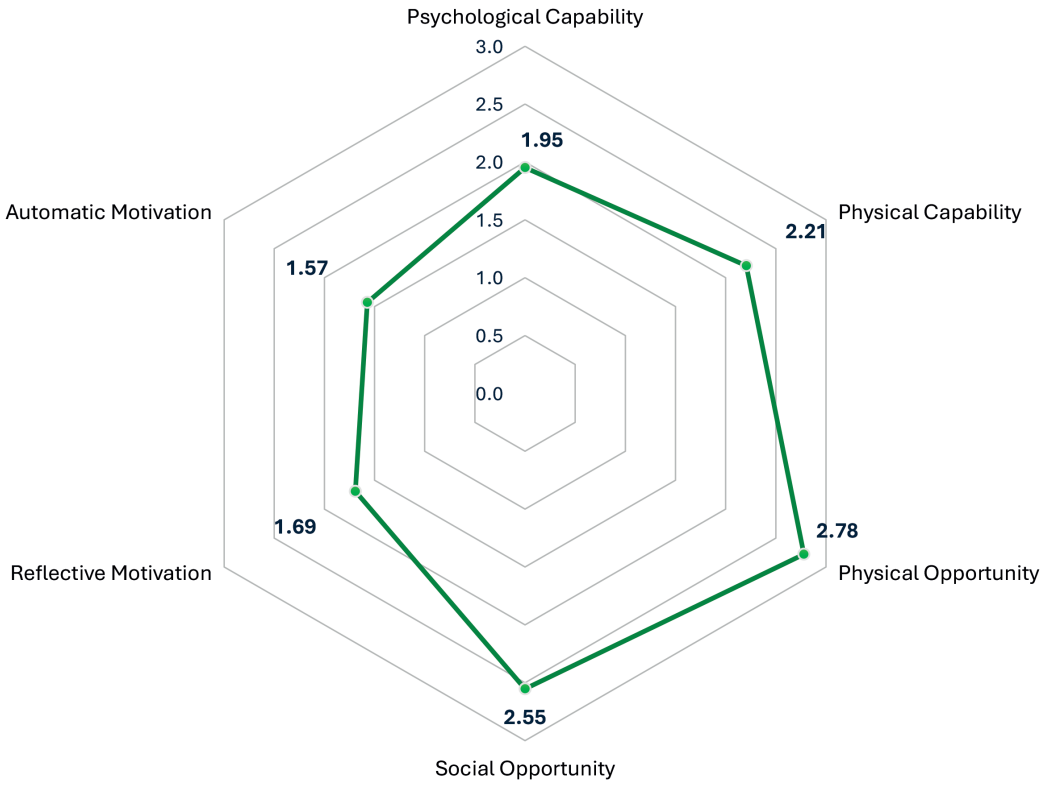



**Figure 3.** Distribution of medication use barrier domains (n = 216).

Older adults reported fewer barriers to automatic motivation than those under 60 (p = 0.003). Those who had completed a primary education reported more barriers to reflective motivation than those with secondary education or higher (p = 0.003). Those with an illness duration of 3 years or less reported more barriers to physical capability, physical opportunity, social opportunity, reflective motivation, and automatic motivation, but fewer barriers to psychological capability than those with an illness duration of more than 3 years (Table 3).

## Discussion

Our study highlighted the two most common barriers reported by participants: lack of time given by physicians to provide advice on medication use, and unclear instructions on prescriptions. This may be due to the reported problem of overcrowding in hospitals in Vietnam[25] and limited communication skills between physicians and patients[26]. Patient trust is significantly affected by communication between physicians and patients[27]. Short consultation times can reduce trust, leading to less confidence in the diagnosis and treatment plan provided by the physician, leading in turn to non-adherence[28]. In addition, when patients receive incomplete information that does not meet their individual needs, this can directly affect the effectiveness of the treatment[29]. Therefore, clinicians should provide patients with adequate and consistent information, both verbally and in writing, so that patients can better receive information on medication use, thereby improving their adherence to medication. In addition, the information delivery can be personalized to suit the needs of each specific patient.

In the COM-B Model, physical opportunity is positively correlated with social opportunity. This is relevant because when patients have difficulty obtaining or receiving medications due to their distance from a pharmacy or hospital (reflecting physical opportunity), it may reduce the advice and support given by physicians to help them take their medications correctly and regularly, reflecting social opportunity. The context after pulmonary rehabilitation (PR) helps explain this association. Specifically, the loss of supportive environments and structures after pulmonary rehabilitation (physical opportunity) is also associated with a decrease in social contact and disconnection with others (social opportunity)[30]. Physical opportunity was also found to be positively correlated with reflective motivation. This means that when patients have more physical opportunities to perform a behavior (e.g., electronic medication

**Table 3.** Differences in medication use barriers by demographic and health characteristics among participants (n = 216)

| *Characteristic* | | *Psychological capability* | *Physical capability* | *Physical opportunity* | *Social opportunity* | *Reflective motivation* | *Automatic motivation* |
|---|---|---|---|---|---|---|---|
| Age group (years) | < 60 | 1.86 (0.46) | 2.39 (1.03) | 3.06 (1.24) | 3.06(1.24) | 2.56 (1.01) | 1.95 (1.14) |
| | ≥ 60 | 1.97 (0.58) | 2.16 (1.1) | 2.71 (1.32) | 2.71(1.32) | 2.55 (1.11) | 1.63 (0.92) |
| *p-value* | | 0.484 | 0.141 | 0.146 | 0.966 | 0.097 | **0.003** |
| Gender | Man | 1.95 (0.57) | 2.2 (1.09) | 2.77 (1.29) | 2.77(1.29) | 2.54 (1.09) | 1.69 (0.96) |
| | Woman | 2.06 (0.3) | 2.44 (1.07) | 2.92 (1.72) | 2.92(1.72) | 2.89 (1.17) | 1.72 (1.23) |
| *p-value* | | 0.173 | 0.173 | 0.447 | 0.699 | 0.424 | 0.839 |
| Ethnicity | Kinh | 1.96 (0.56) | 2.21 (1.09) | 2.77 (1.31) | 2.77(1.31) | 2.55 (1.1) | 1.7 (0.97) |
| | Khmer | 1.5 (0.71) | 2 (0.71) | 4.15 (0.21) | 4.15(0.21) | 2.5 (0) | 1.25 (0.35) |
| *p-value* | | 0.269 | 0.269 | 0.944 | 0.113 | 0.8 | 0.685 |
| Education level | Primary school | 1.92 (0.51) | 2.36 (1.12) | 2.85 (1.33) | 2.85(1.33) | 2.78 (1.05) | 1.77 (0.96) |
| | Lower secondary school or higher | 1.98 (0.59) | 2.08 (1.04) | 2.72 (1.29) | 2.72(1.29) | 2.37 (1.1) | 1.63 (0.98) |
| *p-value* | | 0.735 | 0.735 | 0.069 | 0.444 | **0.003** | 0.136 |
| Occupation | Employed | 1.9 (0.4) | 2.09 (0.99) | 3.13 (1.17) | 3.13(1.17) | 2.5 (0.95) | 1.9 (1.29) |
| | Retired / unemployed | 1.96 (0.59) | 2.23 (1.11) | 2.7 (1.33) | 2.7(1.33) | 2.56 (1.12) | 1.65 (0.88) |
| *p-value* | | 0.794 | 0.794 | 0.576 | 0.087 | 0.911 | 0.543 |
| Living arrangement | Living alone | 2.25 (1.16) | 1.94 (0.62) | 3.66 (0.98) | 3.66(0.98) | 2.63 (1.38) | 1.75 (0.6) |
| | Living with family | 1.94 (0.52) | 2.22 (1.1) | 2.75 (1.31) | 2.75(1.31) | 2.55 (1.09) | 1.69 (0.98) |
| *p-value* | | 0.825 | 0.825 | 0.644 | 0.049 | 0.84 | 0.213 |
| Household economic status | Poor | 1.88 (0.58) | 2.04 (1.18) | 2.82 (1.43) | 2.82 S4(1.43) | 2.38 (0.87) | 1.92 (0.98) |
| | Not poor | 1.96 (0.56) | 2.22 (1.08) | 2.78 (1.3) | 2.78 S4(1.3) | 2.56 (1.11) | 1.68 (0.97) |
| *p-value* | | 0.376 | 0.471 | 0.939 | 0.702 | 0.188 | 0.41 |
| Duration of COPD (years) | ≤3 years | 1.78 (0.52) | 2.6 (1.16) | 3.49 (1.2) | 3.49(1.2) | 2.99 (1.18) | 2.06 (1.09) |
| | >3 years | 2.08 (0.56) | 1.92 (0.93) | 2.25 (1.12) | 2.25(1.12) | 2.23 (0.9) | 1.42 (0.76) |
| *p-value* | | **<0.001** | **<0.001** | **<0.001** | **<0.001** | **<0.001** | **<0.001** |

reminders), their conscious motivation (intention to adhere) tends to increase as well[31]. Another example is that establishing healthy habits is a major benefit during PR, but maintaining them post-PR is difficult when the supportive environment is no longer there, reducing reflective motivation[30].

Older adults report fewer barriers to automatic motivation, such as mood, habits, and other decision-making heuristics. Taking medication may have become part of a daily routine, such as taking it with breakfast or setting an alarm at night. However, when these routines are disrupted, familiar cues that prompt the action (taking medication) may be missed, leading to a failure to take medication[32]. Although it is difficult for older adults to initially form a habit, once it is formed, it tends to become firmly attached to the behaviour and is performed automatically[33]. It can be assumed that the older adults in the study with long-standing chronic diseases are accustomed to taking medication, and their less-changed lifestyle reinforces this habit in an automatic motivational way. One study found that more than 90% of older adults reported using activity-based methods to remember to take medications, relying on mealtimes and waking or bedtimes as the primary activities around which medications were planned[34], thereby enhancing the automatic motivation factor in treatment adherence behavior.

People with lower levels of education have more barriers to reflective motivation, that is, self-conscious planning and evaluation[35]. People with lower levels of education may have more difficulty with the planning and evaluation related to managing their chronic disease, due to limited cognitive skills and abilities to absorb and process complex information. A previous study found that people with lower education levels tend to have lower health literacy levels compared to those with higher education[36], therefore negatively affecting their ability to adhere to treatment. In particular, COPD patients with limited

health literacy have lower treatment adherence rates than those with adequate health literacy[37].

People with a disease duration of 3 years or less have more barriers to physical capability, physical opportunity, social opportunity, reflective motivation, and automatic motivation. Effectiveness of self-management is crucial for patients newly diagnosed with a chronic disease, as they often face several physiological, emotional, and social challenges[38]. In the early stages of illness, chronically ill people describe how they experience altered life circumstances, altered symptoms, loss of meaningful activities, and increased risk of social isolation[39], reflecting barriers to physical capability, physical opportunity, and social opportunity. In terms of motivation, a range of emotional responses such as shock, anger, sadness, and fear or anxiety occur in the early stages after diagnosis[40]. These emotions, part of automatic motivation, can significantly influence a person's reflective motivation to manage the disease. This stage is often dominated by feelings of a loss of control over life[41], highlighting the challenges to both types of motivation. To reduce barriers for people with chronic illness, health professionals can encourage them to openly share their diagnosis, helping to alleviate anxiety and isolation. Additionally, eliciting positive social comparisons, such as "this illness is not life-threatening" or "current medicine controls symptoms well", can significantly reduce stress[41].

In contrast, psychological capability barriers were more common among people with COPD who had had the disease for three years or more. This may be because they are at higher risk of cognitive impairment, a factor that reduces the ability to think, understand, and make decisions needed to manage the disease[42]. According to the results of Fekri et al., COPD significantly increases the risk of cognitive impairment, especially in those with more severe disease, low arterial oxygen saturation, and older age[43]. Chronic cognitive impairment may affect the ability to self-manage treatment, adhere to medication, and be independent, thereby reducing health-related quality of life[44].

Our study, using the COM-B model, showed that the main barrier to adherence in COPD medication use were social and physical opportunities. People under 60 years old, those with lower education levels, and with a disease duration of 3 years or less reported more challenges across all COM-B domains. These findings align with qualitative research by Nygård et al.[8] and O'Toole et al.[9], who identified issues related to access, information, and cost. By identifying vulnerable populations and quantifying the relative weight of different barriers, our study provides evidence to support the development of more targeted adherence strategies, building on previous research.

This study has some limitations. First, the use of a convenience sampling method in a single public general hospital may limit the generalizability of the results. Second, the collection of data through self-administered questionnaires may lead to the possibility of social desirability bias, when patients tend to answer according to what they think is acceptable or recall bias. Third, some components with only two items may not fully reflect the complexity of this aspect.

## Conclusions

This study was successful in identifying and assessing barriers to medication use in people with COPD. Physical and social opportunities were the most frequently reported barrier domains influencing medication use among COPD patients. In addition, patients younger than 60 years, those with lower education levels, and those with a disease duration of three years or less reported greater challenges across COM-B domains. These results highlight the importance of designing interventions targeted to specific populations based on age, education level, and disease duration to optimize medication adherence in COPD patients. Further research should explore effective intervention strategies based on these barriers.

### Author Contributions:

*Conceptualization, Q.P.P., K.Q.H., T.T.L., and V.D.T.; methodology, Q.P.P. and V.D.T.; validation, V.D.T.; formal analysis, Q.P.P., K.Q.H., T.N.T., and V.D.T.; investigation, Q.P.P.; data curation, K.Q.H. and T.K.L.N.; visualization, K.Q.H. and R.S.D.; writing–original draft preparation, Q.P.P., K.Q.H., T.K.L.N., T.T.L., R.S.D., T.N.T., and V.D.T.; writing–review and editing, Q.P.P., K.Q.H., T.K.L.N., T.T.L., R.S.D., T.N.T., and V.D.T.; supervision, V.D.T. All authors have read and agreed to the published version of the manuscript.*

### Compliance with Ethics Requirements:

*"The authors declare no conflict of interest regarding this article"*

*"The authors declare that all the procedures and experiments of this study respect the ethical standards in the Helsinki Declaration of 1975, as revised in 2008(5), as well as the national law. Informed consent was obtained from all the patients included in the study"*

*"The study was approved by the Medical Ethics Council of Can Tho University of Medicine and Pharmacy, Can Tho, Vietnam. Participants were informed that taking part in the study was voluntary."*

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**Availability of data and material:**

*The data that support the findings of this study are available from the corresponding authors (i.e., upon reasonable request).*

## References

1. Al Wachami N, Guennouni M, Iderdar Y, et al. Estimating the global prevalence of chronic obstructive pulmonary disease (COPD): a systematic review and meta-analysis. *BMC Public Health* 2024;24(1): 297.
2. Nguyen TTT, Upvall M, Nguyen HTY, Nguyen HT, Tran L Van, Nguyen PTA. Validity and reliability of the Vietnamese version of chronic obstructive pulmonary disease- questionnaire for measuring knowledge of chronic obstructive pulmonary disease patients. *Journal of Health Science and Medical Research* 2022;41: e2022881.
3. Pham KH, Tran NTC, Tran H Do, et al. Single nucleotide polymorphisms of FAM13A gene in chronic obstructive pulmonary disease—a case control study in Vietnam. *Advances in Respiratory Medicine* 2023;91(3): 268-277.
4. Lee H, Jhun BW, Cho J, et al. Different impacts of respiratory symptoms and comorbidities on COPD-specific health-related quality of life by COPD severity. *International Journal of Chronic Obstructive Pulmonary Disease* 2017;12: 3301-3310.
5. Kumar P. Comorbidities in chronic obstructive pulmonary disease: the hidden epidemic. *Pulmon* 2024;26(3): 77-78.
6. Ahmed MS, Neyaz A, Aslami AN. Health-related quality of life of chronic obstructive pulmonary disease patients: Results from a community based cross-sectional study in Aligarh, Uttar Pradesh, India. *Lung India : official organ of Indian Chest Society* 2016;33(2): 148-53.
7. Iheanacho I, Zhang S, King D, Rizzo M, Ismaila AS. Economic burden of chronic obstructive pulmonary disease (COPD): a systematic literature review. *International Journal of Chronic Obstructive Pulmonary Disease* 2020;15: 439-460.
8. Nygård T, Wright D, Kjome RLS, Nazar H, Aarli B, Raddum A. Barriers and enablers to medicine-taking behaviours in chronic obstructive pulmonary disease: a qualitative interview study. *International Journal of Clinical Pharmacy* 2025;47(3):775-783.
9. O'Toole J, Krishnan M, Riekert K, Eakin MN. Understanding barriers to and strategies for medication adherence in COPD: a qualitative study. *BMC Pulmonary Medicine* 2022;22(1): 98.
10. Phan TT, Vu VG, Tuyet-Lan L-T, Nguyen VN, Ngo QC. Medication adherence assessment and cost analysis of COPD treatment under out-patient clinic in Vietnam. *Health Services Insights* 2023;16: 11786329231177545.
11. Nguyen T-S, Nguyen TLH, Pham TT Van, Hua S, Ngo QC, Li SC. Impact of pharmaceutical care in the improvement of medication adherence and quality of life for COPD patients in Vietnam. *Respiratory Medicine* 2019;153: 31-37.
12. De Leo A, Bayes S, Bloxsome D, Butt J. Exploring the usability of the COM-B model and Theoretical Domains Framework (TDF) to define the helpers of and hindrances to evidence-based practice in midwifery. *Implementation Science Communications* 2021;2(1): 7.
13. West R, Michie S. A brief introduction to the COM-B model of behaviour and the PRIME theory of motivation. *Qeios.* 2020. DOI:10.32388/WW04E6.2
14. Huu Anh T, Ngoc Tam N, Thi Thanh Huyen V. Assessment the medication adherence in outpatients with chronic obstructive pulmonary disease. *Vietnam Medical Journal* 2022;508(2).
15. Hamalaw S, Hama Salih A, Weli S. Non-adherence to anti-diabetic prescriptions among type 2 diabetes mellitus patients in the Kurdistan region of Iraq. *Cureus* 2024;16(5):e60572.
16. Gupta SK, Lakshmi PVM, Chakrapani V et al. Understanding the diabetes self-care behaviour in rural areas: Perspective of patients with type 2 diabetes mellitus and healthcare professionals. *PLOS ONE* 2024;19(2): e0297132.
17. Mishra P, Vamadevan AS, Roy A, et al. Exploring barriers to medication adherence using COM-B model of behaviour among patients with cardiovascular diseases in low- and middle-income countries: a qualitative study. *Patient Preference and Adherence* 2021;15: 1359-1371.
18. Bailey S, Annis I, Reuland D, Locklear A, Sleath B, Wolf M. Development and evaluation of the Measure of Drug Self-Management. *Patient Preference and Adherence* 2015: 1101.
19. Bhattacharya D, Brown TJ, Clark AB, et al. Validation of the identification of medication adherence barriers questionnaire (IMAB-Q); a behavioural science-underpinned tool for identifying non-adherence and diagnosing an individual's barriers to adherence. *Patient Preference and Adherence* 2023;17: 2991-3000.
20. Plaza V, Fernández-Rodríguez C, Melero C, et al. Validation of the 'Test of the Adherence to Inhalers' (TAI) for asthma and COPD patients. *Journal of Aerosol Medicine and Pulmonary Drug Delivery* 2016;29(2): 142-152.
21. Neame R, Hammond A. Beliefs about medications: a questionnaire survey of people with rheumatoid arthritis. *Rheumatology* 2005;44(6): 762-767.
22. Lim Y-J. Exploratory structural equation modeling analysis of the social network site use motives scale. *Psychiatry Investigation* 2022;19(2): 146-153.
23. Cho M-K, Cho Y-H. Reliability and validity of the Korean version of lung cancer screening health belief scale. *Healthcare* 2023;11(11): 1525.
24. Shirai C, Nonaka D, Kobayashi J. Evaluating the cross-cultural competence instrument for healthcare professionals (CCCHP) among nurses in Okinawa, Japan. *BMC Health Services Research* 2024;24(1): 369.
25. Thi Thao Nguyen S, Yamamoto E, Thi Ngoc Nguyen M, et al. Waiting time in the outpatient clinic at a national hospital in Vietnam. *Nagoya Journal of Medical Science* 2018;80(2): 227-239.
26. Nguyen Ngoc H, Nguyen Thi Trang N, Nguyen Thi Toan T. The current situation of doctor communication with patients and related factors in outpatient department, Gia Dinh People hospital, 2021. *Journal of Health and Development Studies (Vietnam)* 2022;06(03): 89-97.
27. Liu X, Zeng J, Li L, et al. The influence of doctor-patient communication on patients' trust: the role of patient-physician consistency and perceived threat of disease. *Psychology Research and Behavior Management* 2024;17: 2727-2737.
28. Jabour AM. The impact of longer consultation time: a simulation-based approach. *Applied Clinical Informatics* 2020;11(05): 857-864.
29. Bekker CL, Mohsenian Naghani S, Natsch S, Wartenberg NS, van den Bemt BJF. Information needs and patient

perceptions of the quality of medication information available in hospitals: a mixed method study. *International Journal of Clinical Pharmacy* 2020;42(6): 1396-1404.
30. Robinson H, Williams V, Curtis F, Bridle C, Jones AW. Facilitators and barriers to physical activity following pulmonary rehabilitation in COPD: a systematic review of qualitative studies. *Primary Care Respiratory Medicine* 2018;28(1): 19.
31. Fenerty SD, West C, Davis SA, Kaplan SG, Feldman SR. The effect of reminder systems on patients' adherence to treatment. *Patient Preference and Adherence* 2012;6: 127-35.
32. d'Ancona G, Weinman J. Improving adherence in chronic airways disease: are we doing it wrongly? *Breathe (Sheffield, England)* 2021;17(2): 210022.
33. Meredith SJ, Cox NJ, Ibrahim K, et al. Factors that influence older adults' participation in physical activity: a systematic review of qualitative studies. *Age and Ageing* 2023;52(8).
34. Sanders MJ, Van Oss T. Using daily routines to promote medication adherence in older adults. *The American Journal of Occupational Therapy* 2013;67(1): 91-99.
35. Timlin D, McCormack JM, Simpson EE. Using the COM-B model to identify barriers and facilitators towards adoption of a diet associated with cognitive function (MIND diet). *Public Health Nutrition* 2021;24(7): 1657-1670.
36. Shahid R, Shoker M, Chu LM, Frehlick R, Ward H, Pahwa P. Impact of low health literacy on patients' health outcomes: a multicenter cohort study. *BMC Health Services Research* 2022;22(1): 1148.
37. O'Conor R, Muellers K, Arvanitis M, Vicencio DP, Wolf MS, Wisnivesky JP. Effects of health literacy and cognitive abilities on COPD self-management behaviors: A prospective cohort study. *Respiratory Medicine* 2019;160: 105630.
38. Lindgren LH, Thomsen T, Hetland ML, et al. A self-management intervention for newly diagnosed with inflammatory arthritis: a randomized controlled feasibility and fidelity study. *Pilot and Feasibility Studies* 2025;11(1): 15.
39. Aspö M, Visser LNC, Kivipelto M, Boström A-M, Cronfalk BS. Transitions: living with young-onset Alzheimer's disease: a qualitative interview study. *Health Expectations: an International Journal of Public Participation in Health Care and Health Policy* 2024;27(5): e70034.
40. Mahoney-Davies G, Davis C, Glen C, Clifton C, Salkovskis PM. Examining the emotional and psychological experiences of people with heart failure. *British Journal of Cardiac Nursing* 2017;12(4): 192-198.
41. Hellqvist C. Promoting self-care in nursing encounters with persons affected by long-term conditions—a proposed model to guide clinical care. *International Journal of Environmental Research and Public Health* 2021;18(5): 2223.
42. Willmott TJ, Pang B, Rundle-Thiele S. Capability, opportunity, and motivation: an across contexts empirical examination of the COM-B model. *BMC Public Health* 2021;21(1): 1014.
43. Fekri MS, Hashemi-Bajgani S-M, Naghibzadeh-Tahami A, Arabnejad F. Cognitive impairment among patients with chronic obstructive pulmonary disease compared to normal individuals. *Tanaffos* 2017;16(1): 34-39.
44. Ranzini L, Schiavi M, Pierobon A, Granata N, Giardini A. From mild cognitive impairment (MCI) to dementia in chronic obstructive pulmonary disease. Implications for clinical practice and disease management: a mini-review. *Frontiers in Psychology* 2020;11.