Original Article

Role of Home Based Educational Intervention on Illness Perception and Health Services Utilization among Chronic Obstructive Pulmonary Disease Patients

Farzana Yasmin[1], Quratul Ain[2], Ayesha Liaqat[3], Abdul Haseeb Danish[4], Humaira Saddique[1]*

[1]Nursing Instructor, College of Nursing (SIMS), Lahore, Pakistan.
[2]Assistant Nursing Instructor, College of Nursing, District Headquarters Bahawalnagar, Bahawalnagar, Pakistan.
[3]Charge Nurse, Services Hospital, Lahore, Pakistan.
[4]Medical Officer, Services Hospital, Lahore, Pakistan.
*Corresponding Author: Humaira Saddique, Nursing Instructor; Email: Humairasaddique5@gmail.com
Conflict of Interest: None.

ABSTRACT

Background: Chronic Obstructive Pulmonary Disease (COPD) remains a significant public health challenge globally, particularly affecting middle-aged and older adults. Effective management of COPD requires not only clinical interventions but also patient-centric educational programs that enhance illness perception and encourage appropriate health services utilization.

Objective: This study aimed to evaluate the effectiveness of a home-based educational intervention in improving illness perception and health services utilization among COPD patients.

Methods: A quasi-experimental study was conducted at the Pulmonology Out-Patient Department of a public hospital in Lahore. From an initial screening of 200 participants, 130 met the inclusion criteria based on their illness perception scores. Following random sampling, 84 participants were enrolled and divided into control and intervention groups. The intervention group received a structured educational program on COPD management. Data on demographics, illness perception, and health services utilization were collected pre and post-intervention. Statistical analyses were performed using SPSS version 25, employing t-tests to compare the outcomes between the groups.

Results: The study consisted predominantly of participants aged 30-60 years, with the majority (57.1%) in the 30-40 year age group. Post-intervention, the illness perception in the intervention group showed a significant improvement, with the mean score increasing from 54.24 ± 5.905 to 75.24 ± 7.564 (t =-14.183, p < 0.000). Health services utilization also saw a notable enhancement in the intervention group, with the mean score rising from 12.38 ± 1.396 to 20.07 ± 2.202 (t =-19.117, p < 0.000).

Conclusion: The home-based educational intervention significantly improved both the illness perception and health services utilization among COPD patients. Such interventions can be pivotal in managing COPD effectively, reducing hospital readmissions, and promoting self-management.

Keywords: Chronic Obstructive Pulmonary Disease, COPD management, home-based intervention, illness perception, health services utilization, patient education, quasi-experimental study.

INTRODUCTION

The health system in any nation plays a crucial role in promoting, maintaining, and restoring the health of its populace (1). Currently, global health systems are grappling with the rapid spread of both communicable and non-communicable diseases, the dynamics of which are changing every hour due to insufficient intervention and management within healthcare systems (2). This is particularly evident in developing countries like Pakistan, where the health services are notably disorganized and face the challenges of an ever-changing health system landscape, further burdened by the high prevalence of both communicable and non-communicable diseases (3-5).

Among the significant health concerns worldwide is Chronic Obstructive Pulmonary Disease (COPD), which ranks as one of the leading respiratory causes of death globally (6). The prevalence of COPD varies, estimated globally at around 10.1%, with a higher prevalence in men (11.8%) compared to women (8.4%) (5, 6). Notably, Cape Town reports the highest rates, with 22.2% in men and

16.7% in women, while in Pakistan, the prevalence in those aged 40 and above is around 2.1%, with a considerable number admitted to hospitals or frequently visiting emergency rooms due to acute exacerbations (7-10).

COPD is a persistent health issue characterized by restricted airflow that significantly impacts global economies and health systems, being the fifth most burdensome disease economically and the third leading cause of death (11, 12, 17). The Global Burden of Disease report estimated that annually, 174.5 million adults are affected, leading to approximately 3.4 million deaths in 2015 (18). Moreover, COPD adversely affects patients' physical and psychological health, impacting their independence, self-esteem, socioeconomic status, and placing a burden on family members who provide daily care and manage the disease (19-23).

The nature of COPD as a chronic condition, which is often progressive and not fully reversible, affects patients' disease perception and hampers their lifestyle modifications (24-26). Modifying disease perception is crucial as it enhances patient involvement in self-care, which is essential for effective management of COPD (27). Frequent hospitalizations and poor disease outcomes are often linked to inadequate disease awareness, contributing to heightened anxiety and depression among patients (28). Research indicates that integrated care strategies and educational programs about COPD can reduce hospital stays, readmission rates, emergency visits, and overall disease costs while improving disease management (29-32).

There is a clear need for innovative, continuous, and accessible educational resources to help patients and their families understand and manage COPD more effectively. Such interventions can aid in efficient disease management, allowing patients to maintain a reasonable quality of life socially and physically (33). Self-management programs have shown promise in improving health behaviors and disease perception, thereby enabling patients to live with and manage their chronic conditions more optimally (34-36).

Moreover, providing self-management education at patients' homes can address the urgent need for support in managing this chronic condition and its impact on quality of life (42). Recognizing the importance of early disease recognition and continuous research, both the American Thoracic Society and the European Respiratory Society emphasize these aspects to mitigate the impact of COPD and enhance the quality of life for affected individuals (43). Thus, this study aims to evaluate the effectiveness of home-based educational interventions in transforming illness perception and reducing the utilization of health services among COPD patients, ultimately fostering a proactive approach in patient self-management and care.

MATERIAL AND METHODS

In this quasi-experimental study, the setting was the Pulmonology Out-Patient Department at a public hospital in Lahore. The initial phase involved pre-assessment data collection from participants who were screened based on inclusion criteria at the same department. From an initial pool of 200 potential participants, those with higher illness perceptions were excluded, resulting in 130 eligible subjects. The final sample was determined through simple random sampling using the lottery method to mitigate selection bias. This approach yielded a balanced sample of 84 participants, divided equally into intervention and control groups, with the sample size for each group set at 42. This number was calculated to achieve a power of 80%, taking into account the mean difference and standard deviation between the two groups. Participants included in the study were diagnosed with COPD, specifically categorized into stages 2 and 3 of the disease. The age range for inclusion was set from 40 to 60 years, and the study welcomed participants of both genders.

Data collection involved structured interviews and COPD assessment tests, which were administered before and after the intervention. Ethical approval for the study was obtained from the Ethics Committee of the hospital, in accordance with the Declaration of Helsinki. Participants were informed about the study's nature and provided written informed consent before participation. Data analysis was performed using SPSS version 25. Descriptive statistics were used to summarize participant characteristics, while inferential statistics, including t-tests and chi-square tests, were employed to evaluate the differences between the intervention and control groups post-intervention.

RESULTS

In this study, a total of 84 participants with chronic obstructive pulmonary disease (COPD) were analyzed for demographic characteristics, illness perceptions, and health services utilization. The age distribution of the participants varied, with the majority (57.1%) falling within the 30-40 year age group, followed by 33.3% in the 41-50 year range, and a smaller segment (9.5%) aged between 51-60 years, as detailed in Table 1. Regarding educational background, a significant proportion of the participants were uneducated (36.9%), while 35.7% had completed high school, and a smaller fraction had attained higher educational levels (Table 1).

Table 1: Demographic Characteristics of Participants (n=84)

Age in Years		
30-40 years	48	57.1%
41-50 years	28	33.3%
51-60 years	8	9.5%
Education Level		
Uneducated	31	36.9%
Primary	9	10.7%
High School	30	35.7%
Intermediate	10	11.9%
Graduation and above	4	4.8%
Marital Status		
Married	69	82.1%
Unmarried	15	17.9%
COPD Category		
FEV1/FVC 50-79	45	53.6%
FEV1/FVC 30-49	39	46.4%

Table 2: Normality Assumptions

	Kolmogorov-Smirnov		Shapiro-Wilk	
Statistic	Df	Sig.	Statistic	Df
Pre perception score	.086	82	.187	.982

Table 3: Illness Perception Level (Control vs. Intervention) (N=84)

Illness Perception Level	Control Group [n (%)]	Intervention Group [n (%)]
Low Illness Perception	5 (11.9)	0 (0.00)
Moderate Illness Perception	37 (88.1)	23 (54.8)
High Illness Perception	0 (0.00)	19 (45.2)
Health Services Utilization		
Low Health Services Utilization	5 (11.9)	0 (0.0)
Moderate Health Services Utilization	37 (88.1)	13 (31)
High Health Services Utilization	0 (0.00)	29 (69)

Table 4: Illness Perception Level (Control vs. Intervention) (N=84)

Variable	Control Group Mean ± SD	Intervention Group Mean ± SD	Mean Difference
Illness Perception	54.24 ± 5.905	75.24 ± 7.564	+21
Health Services Utilization	12.38 ± 1.396	20.07 ± 2.202	+7.69

Table 5: Independent Sample Test (Control vs. Intervention) (N=84)

Variables	Control group Mean ± SD	Interventional group Mean ± SD	t	P value
Illness Perception	54.24 ± 5.905	75.24 ± 7.564	-14.183	.000
Health Services Utilization	12.38 ± 1.396	20.07 ± 2.202	-19.117	.000

The marital status revealed that the vast majority of the participants (82.1%) were married, with the remainder (17.9%) being unmarried (Table 1). COPD severity, categorized by FEV1/FVC ratios, was nearly evenly split between moderate (FEV1/FVC 50-79, 53.6%) and more severe stages (FEV1/FVC 30-49, 46.4%) (Table 1).

The normality of the pre-perception scores was assessed using the Kolmogorov-Smirnov and Shapiro-Wilk tests, yielding statistics of .086 and .982 respectively, indicating normal distribution of data with no significant deviations from normality (Table 2). Reliability of the measurement instrument was high, with a Cronbach's alpha of .953 across 25 items, confirming the internal consistency of the scales used in the study (Table 3).

Home-Based Intervention: COPD Patients' Perception and Healthcare Use
Yasmin F., et al. (2024). 4(2): DOI: https://doi.org/10.61919/jhrr.v4i2.892

Journal of Health
and Rehabilitation
Research 2791-156X
JHRR

When comparing the illness perception levels between the control and interventional groups, marked differences were observed. In the control group, 88.1% of the participants had a moderate illness perception, with only a small fraction (11.9%) reporting low illness perception and none reporting high. Conversely, in the interventional group, while 54.8% still reported moderate illness perceptions, a significant 45.2% were categorized with high illness perceptions, indicating a shift towards more acute self-awareness of their condition post-intervention (Table 4).

Health services utilization also differed significantly between the two groups. In the control group, the majority (88.1%) had moderate health services utilization, and none exhibited high utilization levels. In contrast, the interventional group demonstrated a substantial increase, with 69% reporting high health services utilization, suggesting an enhanced engagement with health services following the educational intervention (Table 5).

The quantitative analysis further underscored these differences. The mean illness perception score in the interventional group was significantly higher (75.24 ± 7.564) compared to the control group (54.24 ± 5.905), with a mean difference of 21 points. Similarly, health services utilization scores were higher in the interventional group (20.07 ± 2.202) compared to the control group (12.38 ± 1.396), with a difference of 7.69 points, both of which were statistically significant as shown by the t-tests (Table 6 and Table 7).

These results demonstrate that the educational intervention effectively enhanced both the illness perception and health services utilization among COPD patients, suggesting that such interventions could be a valuable tool in managing COPD more effectively.

DISCUSSION

The findings from this study predominantly involved participants aged between 30 and 60 years, with the largest age group being 30-40 years, comprising 57.1% of the sample. This contrasts with previous studies where the majority of participants were older. For instance, one study reported the largest group between 51–60 years, accounting for 50% of participants (44), highlighting a demographic shift in the patient population that may influence disease perception and management strategies.

Educational levels among participants varied, with a significant portion being uneducated (37%), which is notably higher compared to 14% in similar previous research (45). The distribution of education levels has critical implications for health communication strategies, as lower educational attainment can hinder effective communication and understanding of health information, thereby impacting illness perception and self-management capabilities (45).

Marital status showed that a majority of the participants were married (82%), similar to findings from other studies indicating a high proportion of married individuals among COPD patients, which might influence social support mechanisms available for managing the disease (44, 45).

Regarding COPD severity, the study identified a nearly equal distribution among moderate to severe categories. This is somewhat consistent with other findings, where a majority had FEV1 and FVC ratios indicative of moderate to severe COPD (44, 46). Understanding the distribution of disease severity is crucial for tailoring interventions that are appropriate for the level of disease progression.

The study also shed light on illness perception changes post-intervention. It was observed that no participants in the interventional group retained a low illness perception post-intervention, and a significant shift towards high illness perception was noted (45.2%). This is a notable improvement compared to the control group, where no high illness perception was reported. This outcome suggests that educational interventions can effectively enhance disease awareness and perception among COPD patients, potentially leading to improved self-management (46). Such findings underscore the importance of targeted educational programs in modifying patients' perceptions to foster better management of their conditions.

The enhancement in illness perception paralleled with increased health services utilization in the intervention group, where a substantial proportion (69%) reported high utilization, as opposed to none in the control group. This aligns with findings from other studies indicating that interventions can significantly impact health behaviors and access to care, particularly in chronic disease management (47-50).

The effectiveness of the home-based educational program was statistically significant in improving both illness perception and health services utilization, with t-values indicating robust differences between the pre and post-intervention scores. These results suggest that home-based interventions are potent tools for improving COPD management outcomes, aligning with previous research advocating for patient education as a cornerstone in chronic disease management (52, 53).

Despite these positive findings, the study is not without limitations. The single-hospital setting and relatively small sample size may affect the generalizability of the results. Future studies could benefit from a broader geographic scope and a larger participant pool to enhance the representativeness of the findings.

CONCLUSION

In conclusion, the study underscores the significant role of home-based educational interventions in transforming patient outcomes for those with COPD. By improving illness perception and encouraging greater utilization of health services, such interventions hold promise for reducing hospital readmissions and enhancing patient self-management capabilities. It is recommended that health systems consider integrating patient education more centrally into the treatment protocols for chronic diseases like COPD, not only to enhance patient knowledge and self-efficacy but also to support healthcare providers in delivering more effective preventive care.

REFERENCES

1. Zahid N, Ahmed F, Israr N, Ali A, Farooq S, Syed MJAJoM, et al. The Cuban Healthcare System: An Insight. 2021:63-9.

2. Skou ST, Mair FS, Fortin M, Guthrie B, Nunes BP, Miranda JJ, et al. Multimorbidity. 2022;8(1):48.

3. Sehar T, Mushafiq M, Asif K, Rafiq W. Intellectual brain drain and economic growth in developing countries: A theoretical solution of strategic compensation. 2021.

4. Kurji Z, Premani ZS, Mithani YJJAMCA. Analysis of the health care system of Pakistan: lessons learnt and way forward. 2016;28(3):601.

5. Scales SE, Park JW, Nixon R, Guha-Sapir D, Horney JA. Disease Burden in Refugees in Mainland Grecian Refugee Camps, 2016-2017: A retrospective cross-sectional study. 2023.

6. Chan KPF, Ma TF, Kwok WC, Leung JKC, Chiang KY, Ho JCM, et al. Significant reduction in hospital admissions for acute exacerbation of chronic obstructive pulmonary disease in Hong Kong during coronavirus disease 2019 pandemic. 2020;171:106085.

7. Xie M, Liu X, Cao X, Guo M, Li XJRr. Trends in prevalence and incidence of chronic respiratory diseases from 1990 to 2017. 2020;21(1):1-13.

8. Bridevaux P-O. PREVALENCE OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) IN SWITZERLAND AND IN EUROPE.

9. Solomon S, Mulugeta WJJocp. Diagnosis and risk factors of advanced cancers in Ethiopia. 2019;24(3):163.

10. Bertrand Hugo M, Lum C, Ebenezer A, Anastase D, Roger NJAPRC. Chronic obstructive pulmonary disease in patients with stable heart failure: Prevalence and associated factors. 2020;6(1):090-5.

11. Vogelmeier CF, Criner GJ, Martinez FJ, Anzueto A, Barnes PJ, Bourbeau J, et al. Global strategy for the diagnosis, management, and prevention of chronic obstructive lung disease 2017 report. GOLD executive summary. 2017;195(5):557-82.

12. Chan KY, Li X, Chen W, Song P, Wong NWK, Poon AN, et al. Prevalence of chronic obstructive pulmonary disease (COPD) in China in 1990 and 2010. 2017;7(2).

13. Jonkman NH, Westland H, Trappenburg JC, Groenwold RH, Bischoff EW, Bourbeau J, et al. Do self-management interventions in COPD patients work and which patients benefit most? An individual patient data meta-analysis. 2016;11:2063.

14. Mwai D, Gathecha G. National strategic plan for the prevention and control of non-communicable diseases: 2021/22-2025/26. 2021.

15. Cui Y, Zhan Z, Zeng Z, Huang K, Liang C, Mao X, et al. Blood Eosinophils and Clinical Outcomes in Patients With Acute Exacerbation of Chronic Obstructive Pulmonary Disease: A Propensity Score Matching Analysis of Real-World Data in China. 2021;8:867.

16. Lacedonia D, Scioscia G, Santomasi C, Fuso P, Carpagnano GE, Portacci A, et al. Impact of smoking, COPD and comorbidities on the mortality of COVID-19 patients. 2021;11(1):1-9.

17. Yadav UN, Hosseinzadeh H, Baral KPJCE, Health G. Self-management and patient activation in COPD patients: an evidence summary of randomized controlled trials. 2018;6(3):148-54.

18. Wang R, Xu J, Wang YJRCE. A population-based survey of the prevalence and risk factors of chronic obstructive pulmonary disease in Shanxi Province, China. 2021.

19. Chai Y-H, Yang H, Huang G-P, Wu T, Dong YJIJoCOPD. Nursing Outcomes and Risk Factors of Patients with Chronic Obstructive Pulmonary Disease After Discharge. 2021;16:2911.

20. Cormican O, Meskell P, Dowling MJIJoNP. Psychosocial vulnerability among carers of persons living with a chronic illness: A scoping review. 2021:e13024.

21. Nichol L, Wallace SJ, Pitt R, Rodriguez AD, Hill AJJD, Rehabilitation. Communication partner perspectives of aphasia self-management and the role of technology: an in-depth qualitative exploration. 2021:1-18.

22. Kusk KH, Storgaard LH, Weinreich UM, Grønkjaer M, Thorup CBJCJoCOPD. Social Distancing among COPD Patients during the COVID-19 Pandemic—A Qualitative Study. 2021:1-8.

23. Norbrun G. Reduction of Hospital Readmissions in Patients with a Diagnosis of COPD: An Integrative Review. 2021.

24.   Joshi Y, Saklani S, Bisht SJR, Science DiP. PREVALENCE OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE: A GLOBAL REVIEW. 2021:51.

25.   Tantucci CJERoRM. Assessment and treatment of airflow obstruction in patients with chronic obstructive pulmonary disorder: a guide for the clinician. 2021;15(3):385-91.

26.   Lehtisalo J, Palmer K, Mangialasche F, Solomon A, Kivipelto M, Ngandu TJFiP. Changes in lifestyle, behaviors, and risk factors for cognitive impairment in older persons during the first wave of the Coronavirus disease 2019 pandemic in Finland: results from the FINGER Study. 2021;12:21.

27.   Hurst JR, Buist AS, Gaga M, Gianella GE, Kirenga B, Khoo EM, et al. Challenges in the implementation of chronic obstructive pulmonary disease guidelines in low-and middle-income countries: An official American Thoracic Society workshop report. 2021;18(8):1269-77.

28.   Iversen BR, Løkke A, Bregnballe V, Rodkjær LØJSJoCS. Does affiliation to a cross-sectorial lung team impact well-being, health-related quality of life, symptoms of anxiety and depression and patient involvement in patients with COPD? A randomised controlled trial. 2021.

29.   Hudd TRJAJoH-SP. Emerging role of pharmacists in managing patients with chronic obstructive pulmonary disease. 2020;77(19):1625-30.

30.   Koff P, Jones RH, Cashman JM, Voelkel NF, Vandivier RJERJ. Proactive integrated care improves quality of life in patients with COPD. 2009;33(5):1031-8.

31.   Mak V, D'Ancona G, Rampersad R, Saleem A, Khambh J. Reducing inappropriate high dose ICS prescribing for COPD in primary care using respiratory integrated care virtual clinics. Eur Respiratory Soc; 2015.

32.   Buttery SC, Zysman M, Vikjord SA, Hopkinson NS, Jenkins C, Vanfleteren LEJR. Contemporary perspectives in COPD: Patient burden, the role of gender and trajectories of multimorbidity. 2021;26(5):419-41.

33.   Wagner EH, Austin BT, Davis C, Hindmarsh M, Schaefer J, Bonomi AJHa. Improving chronic illness care: translating evidence into action. 2001;20(6):64-78.

34.   Song T, Deng N, Cui T, Qian S, Liu F, Guan Y, et al. Measuring Success of Patients' Continuous Use of Mobile Health Services for Self-management of Chronic Conditions: Model Development and Validation. 2021;23(7):e26670.

35.   Li L-C, Han Y-Y, Zhang Z-H, Zhou W-C, Fang H-M, Qu J, et al. Chronic Obstructive Pulmonary Disease Treatment and Pharmacist-Led Medication Management. 2021;15:111.

36.   Smalley KR, Aufegger L, Flott K, Mayer EK, Darzi AJPe, counseling. Can self-management programmes change healthcare utilisation in COPD?: A systematic review and framework analysis. 2021;104(1):50-63.

37.   Howell DJLCM. Enabling patients in effective self-management of breathlessness in lung cancer: the neglected pillar of personalized medicine. 2021(0):LMT52.

38.   Sandelowsky H, Hylander I, Krakau I, Modin S, Ställberg B, Nager AJSjophc. Time pressured deprioritization of COPD in primary care: a qualitative study. 2016;34(1):55-65.

39.   Klumpp M, Hintze M, Immonen M, Ródenas-Rigla F, Pilati F, Aparicio-Martínez F, et al., editors. Artificial intelligence for hospital health care: Application cases and answers to challenges in european hospitals. Healthcare; 2021: Multidisciplinary Digital Publishing Institute.

40.   Schrijver J, Effing TW, Brusse-Keizer M, van der Palen J, van der Valk P, Lenferink AJPe, et al. Predictors of patient adherence to COPD self-management exacerbation action plans. 2021;104(1):163-70.

41.   Gautam Roy P, Bhardwaj R, Goel A. Health and Social Concerns in Elderly Men. Gerontological Concerns and Responses in India: Springer; 2021. p. 69-98.

42.   Brand S, Timmons SJHE. Knowledge sharing to support long-term condition self-management—Patient and health-care professional perspectives. 2021;24(2):628-37.

43.   Deng N, Sheng L, Jiang W, Hao Y, Wei S, Wang B, et al. A home-based pulmonary rehabilitation mHealth system to enhance the exercise capacity of patients with COPD: development and evaluation. 2021;21(1):1-15.

44.   Ibrahim RA, Abd El-Maksoud MM. Effect of educational programs on knowledge and self-management of patients with chronic obstructive pulmonary disease. Egyptian Nursing Journal. 2018;15(3):246.

45.   Ng WI, Smith GD. Effects of a self-management education program on self-efficacy in patients with COPD: a mixed-methods sequential explanatory designed study. International journal of chronic obstructive pulmonary disease. 2017:2129-39.

46.   Weldam SW, Schuurmans MJ, Zanen P, Heijmans MJ, Sachs AP, Lammers J-WJ. The effectiveness of a nurse-led illness perception intervention in COPD patients: a cluster randomised trial in primary care. ERJ open research. 2017;3(4).

47.   Slevin P, Kessie T, Cullen J, Butler MW, Donnelly SC, Caulfield B. Exploring the potential benefits of digital health technology for the management of COPD: a qualitative study of patient perceptions. ERJ open research. 2019;5(2).

48.   Rakhshan M, Rahimi M, Zarshenas L. The Effect of an Education Program Based on Illness Perception on the Lifestyle of Patients with Metabolic Syndrome: A Randomized Controlled Clinical Trial. International journal of community based nursing and midwifery. 2019;7(4):279.

49.   Hu W, Li T, Cao S, Gu Y, Chen L. Influence of Nurse-Led Health Education on Self-Management Ability, Satisfaction, and Compliance of Elderly Patients with Chronic Obstructive Pulmonary Disease Based on Knowledge, Belief, and Practice Model. Computational and Mathematical Methods in Medicine. 2022;2022.

50.   Clark B, Schopp L. The Case for Self-Management. Self-Management in Chronic Illness: Principles, Practice, and Empowerment Strategies for Better Health. 2021:11-32.

51.   Vogelmeier CF, Román-Rodríguez M, Singh D, Han MK, Rodríguez-Roisin R, Ferguson GT. Goals of COPD treatment: focus on symptoms and exacerbations. Respiratory medicine. 2020;166:105938.

52.   Zhong CC, Wong CH, Cheung WK, Yeoh E-k, Hung CT, Yip BH, et al. Effectiveness of Peri-Discharge Complex Interventions for Reducing 30-Day Readmissions among COPD Patients: Overview of Systematic Reviews and Network Meta-Analysis. International journal of integrated care. 2022;22(1).

53.   Yadav UN, Hosseinzadeh H, Lloyd J, Harris MF. How health literacy and patient activation play their own unique role in self-management of chronic obstructive pulmonary disease (COPD)? Chronic respiratory disease. 2018;16:1479973118816418.

54.   Turner A, Anderson JK, Wallace LM, Bourne C. An evaluation of a self-management program for patients with long-term conditions. Patient education and counseling. 2015;98(2):213-9.

55.   Ray WA, Chung CP, Stein CM, Smalley W, Zimmerman E, Dupont WD, et al. Association of rivaroxaban vs apixaban with major ischemic or hemorrhagic events in patients with atrial fibrillation. Jama. 2021;326(23):2395-404.

56.   Martinez FJ, Thomashow B, Sapir T, Simone L, Carter J, Han M. Does evaluation and management of COPD follow therapeutic strategy recommendations? Chronic Obstructive Pulmonary Diseases: Journal of the COPD Foundation. 2021;8(2):230.