

Assessment of Chronic Obstructive Pulmonary Disease Patient's Satisfaction with The Provided Pharmaceutical Care Services

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ABSTRACT

Patient satisfaction is a significant indicator of high-quality pharmacy service delivery, and consequently, assessment of customer satisfaction is a crucial technique for identifying and filling gaps in pharmacy service delivery. Evaluation of chronic obstructive pulmonary disease (COPD) patients' satisfaction with pharmaceutical care services in the chest department outpatient clinic, Ain Shams University Hospitals, Cairo, Egypt, a cross-sectional study utilizing a structurally designed questionnaire was conducted to measure COPD patient satisfaction with pharmaceutical care services. The questionnaire was filled out by thirty COPD patients, after 12 weeks of providing pharmaceutical care services by the researcher (clinical pharmacist). It was a self-administered survey constituted of two main parts; the first one included the patients' demographic data, and the second part included several domains about various pharmaceutical care services. The questionnaire provided a 5-point Likert response scale system used in Arabic and English language. Most of the patients' responses were in the "Good" and the "Very good" categories, and the greater age median of the respondents was associated with a better rating of the services. Providing information about the side effects of the medications and the inhaler technique appeared to enhance patients' satisfaction. The satisfaction of COPD patients towards the services provided by the clinical pharmacist in the chest outpatient clinic is only intermediate, the older aged patients seemed to be more satisfied with the services provided than their younger counterparts. Efforts should be performed to increase the patient's satisfaction with the clinical pharmacy services.

Keywords: *patient satisfaction; patient satisfaction questionnaire; pharmaceutical services; chronic obstructive pulmonary disease; self-administered survey.*

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1. INTRODUCTION

Over the past several decades, the pharmacy profession is experiencing rapid growth and development, particularly in transitions from medication compounding and dispensing to patient-oriented pharmaceutical care services [1]. Increasing competition in every arena today has

an impact on healthcare services; the most significant competitive advantage for healthcare providers is to improve the quality of their healthcare services to give the best possible treatment. Patients' engagement in the assessment of services is necessary for continuous quality improvement.

The development of the pharmacist's practices that provide patient-oriented pharmaceutical care leads to the assessment of the quality of the services provided. Patient satisfaction is a major indicator that can be used to assess the quality of healthcare services [2].

Patients' satisfaction is an unbiased measure that can indicate the gap between the quality of services expectations and patient observation, patient satisfaction measurement provides essential performance information thus contributing to total quality management [3].

Pharmacy services have been progressively expanded beyond simple medication supply to become more patient-centered, optimize patients' quality of life, achieve the best clinical outcome, and build professional relationships and communication [4].

Patient satisfaction surveys are widely used in measuring the standard of care, pharmacists take responsibility for providing drug therapy to achieve definite outcomes and improve the quality of patient's life [5].

Chronic obstructive pulmonary disease (COPD) is primarily characterized by airflow limitation that is usually progressive and associated with the abnormal inflammatory response of the lungs to noxious particles in addition to the loss of lung elasticity or emphysema. Symptoms associated with COPD usually include cough, sputum production, and shortness of breath associated with airflow obstruction. In addition to smoking, other factors such as alpha1-antitrypsin deficiency, prolonged exposure to environmental pollutants, and recurrent respiratory infections during childhood may precipitate COPD [6].

Chronic obstructive pulmonary disease (COPD) is associated with high global morbidity and mortality and pharmacists are uniquely positioned to provide services that may reduce

the burden of this disease on the health system, patients, and their families [7]. In 2012, more than 3 million people worldwide died of this disease and its complications, and it is expected to be the third leading cause of death by 2030 [8]. COPD has a negative impact on quality of life, including sleep interruption and reduced ability to exercise, as well as causing significant pain and distress early interventions can significantly reduce exacerbations, improve quality of life, and reduce costs for the individual, the community, and the health care system [9].

Management of COPD is complex, with patients needing to perform a self-management process that requires challenging behavioral and lifestyle changes such as smoking cessation, proper use of inhalation technique, adherence to exercise therapy along with optimal medication adherence. Multiple co-morbidities are common among patients with COPD, and they are often prescribed complex medication regimens to be administered by multiple routes for both respiratory and non-respiratory conditions. All these factors predispose patients to the risk of nonadherence which is considered the major reason behind emergency hospitalization among COPD patients [10].

Studies have confirmed that COPD patients benefit from multifactorial intervention by clinical pharmacists, including improvement of their disease awareness, medication adherence, quality of life, and decreases in hospitalization and exacerbations.

This study aimed to evaluate COPD patients' satisfaction with the provided pharmaceutical care services in the chest department outpatient clinic, Ain Shams University Hospitals, Cairo, Egypt.

2. Materials and Methods

2.1. Study design, setting, and participant:

This is a cross-sectional study that was carried out on thirty COPD patients at the chest department clinic, Ain Shams University Hospitals, Cairo, Egypt. The study protocol was reviewed and approved by the Ethics Committee of the Faculty of Pharmacy, Ain Shams University which is registered at the Egyptian Ministry of Health (MOH). Written informed consent was obtained from patients before their participation without any obligation to withdraw if they want to. The study protocol conforms to the Declaration of Helsinki for protecting human subjects [11].

2.2. Patients

Patients included in the study were male/female patients (aged from 40 to 75 years), their COPD diagnosis was performed according to the Global Initiative for Obstructive Lung Disease (GOLD) [12] when an FEV₁ of less than 80% of the predicted value after bronchodilation, and a ratio of the FEV₁ to the forced vital capacity (FVC) of less than 0.70 (FEV₁/FVC<70%) were obtained. A history of smoking or occupational/environmental exposure to noxious gas, or dust was present. Exclusion criteria included patients with mental conditions preventing adequate comprehension or those who refused to complete the questionnaire.

2.3. Provided pharmaceutical services

To raise patients' understanding of the value of treatment in managing symptoms, patient education was carried out in the current study through the use of instructional materials, educational workshops, monthly appointments, and weekly call reminders. Additionally, by educating patients on how to utilize inhaled medications properly and any side effects they may have.

2.4. Questionnaire design

The study tool was a structurally designed questionnaire that measures COPD patient satisfaction with pharmaceutical care services. It was a self-administered survey that contains two parts; the first part was about patients' demographic information and clinical data including age, gender, height, body mass index (BMI), residency in either the urban or rural area, cigarette smoking, smoking index, COPD diagnosis in years, medication use including respiratory and non-respiratory medications and medication regimen, exacerbation last year and hospital admission, anti-biotic prescribed during last exacerbations as well as if a nebulizer is available at home.

The second part encompasses several domains about various provided pharmaceutical care services. If a patient faced any problem with medication supply availability and inhalation technique and who gives him/her advice about their medication use, health and diseases status, optimum medication use, inhalation technique, medication possible side effects, storage condition, inhalers technique, and optimum drug use, pharmacist and patient relationship pharmacist accessibility and availability, counseling area, medication adherence, and the overall patient satisfaction with pharmacy services. The 5-point Likert response scale system that was used ranges from 5 means excellent, 4=very good, 3=good, 2=poor, and 1=very poor. The self-administered survey was available in two languages Arabic and English [13].

The questionnaire was filled out by 30 COPD patients after 12 weeks of providing clinical pharmacy services. The services included patient counseling and education about COPD disease through printed flyers and consultation about COPD disease management to improve inhaler technique understanding, medication adherence,

and perception of and compliance to non-pharmacological treatment and exacerbation prevention activities.

2.5. Statistical methods

Statistical analysis was done using IBM SPSS® Statistics version 23 (IBM® Corp., Armonk, NY, USA). Numerical data were expressed as mean and standard deviation or median and range as appropriate. Qualitative data were expressed as frequency and percentage. Pearson's Chi-square test or Fisher's exact test was used to examine the relationship between qualitative variables. For not normally distributed quantitative data, a comparison between two groups was done using the Mann-Whitney test (non-parametric t-test). All tests were two-tailed.

A p-value < 0.05 was considered significant.

3. Results

The responses of the 30 COPD patients to the 12 questions of the study questionnaire ranged from poor to excellent, no participant has found the service to be "Very poor". The majority of patients' responses were in the "Good" and the "Very good" categories, the distribution of the responses are shown in Fig. 1.

To facilitate analysis, the patients were grouped into two groups based on their responses: one group comprised patients who rated the services "Poor" or "Good," while the other group included patients who rated them "Very good" plus those who chose "Excellent", (Fig. 2).

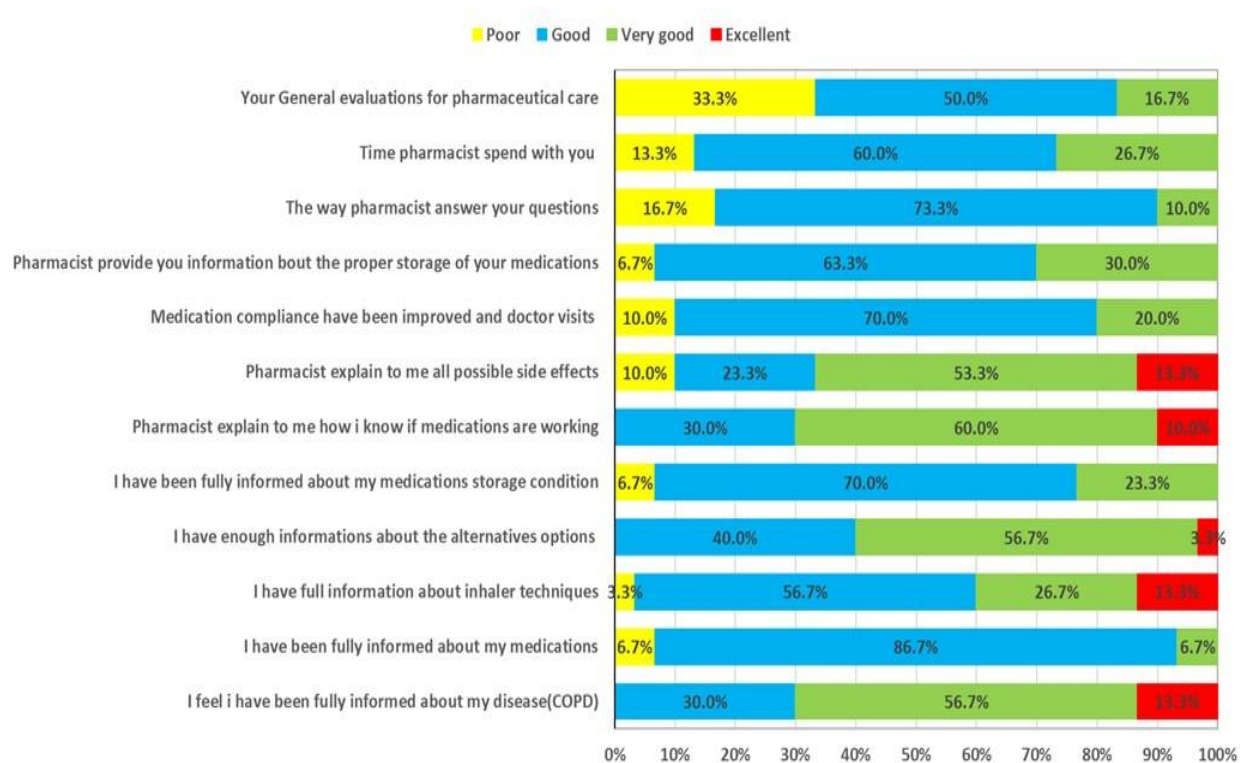


Fig. 1. Percentages of patients in the categories of responses to the patient satisfaction survey for the provided pharmaceutical care services

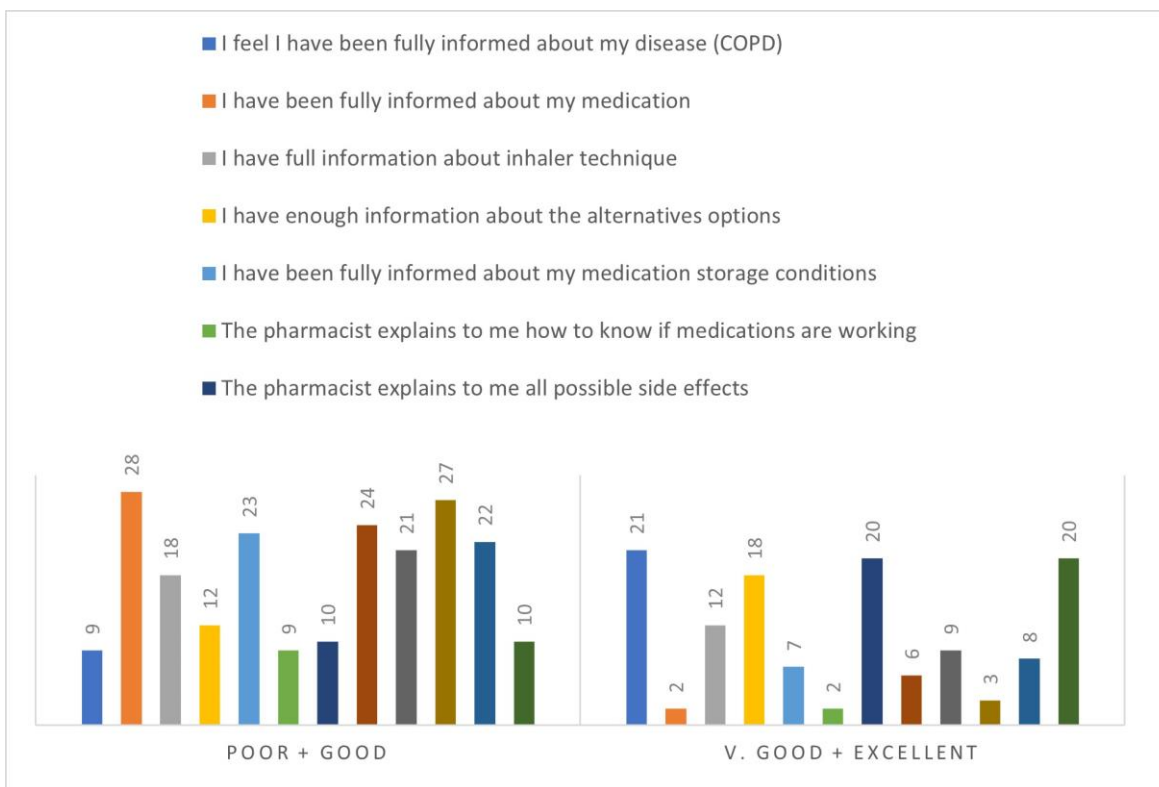


Fig. 2. Histogram showing the distribution of the participants according to the patient satisfaction with pharmaceutical care services responses

Concerning the demographics of the study patients' sample, there was no significant statistical relationship between the patients' residency, cigarette smoking, smoking index, COPD diagnosis in years, exacerbation last year, and hospital admission, as well as patients' COPD stage.

The responses to the questionnaire domains concerning sex are shown in **Table 1**, male and female COPD patients didn't differ in their satisfaction levels toward pharmaceutical-provided services in the current study.

However, satisfaction was significantly higher in patients with an age median of 63.0 (42.0– 74.0) years than in those with lower age, 53.5 (40.0 – 64.0), $p = 0.048$, regarding the response to the item “I have full information about the inhaler technique” as shown in **Table 2**.

When it comes to the comparison between COPD patients who had a nebulizer at home and those who did not, regarding their responses to the satisfaction survey, the percentage of patients in the group who had the nebulizer at home rated the service item namely “The pharmacist explains to me all possible side effects” to be very good or excellent was 86.7% and this was significantly higher than the percentage of patients who rated the item as poor or only good (13.3%), $p = 0.020$, however, patients who have not got a nebulizer at home did not show a noticeable difference between their responses percent toward the same item, ‘poor + good’ versus ‘very good + excellent’ were 53.3% versus 46.7%, these results are shown in **Table 3**.

It is clear from the data presented in **Table (4)** that another statistical significance was

obtained regarding the previously mentioned item in the questionnaire, literally, "The pharmacist explains to me all possible side effects" when those patients who suffered problems with medication use were compared to the responses

of those who didn't, where 82.4% of patients with no medication use problems responded by 'Very good + Excellent' and only 17.6% responded by 'Poor + good'.

Table 1. Effect of sex on patients' satisfaction towards the provided pharmaceutical care services

Patient satisfaction survey of pharmaceutical care services	Sex				χ^2	p
	Male (n=21)		Female (n=9)			
	Poor + good	V. good+ Excellent	Poor + good	V. good+ Excellent		
1. I feel I have been fully informed about my disease (COPD)	6 (28.6%)	15 (71.4%)	3 (33.3%)	6 (66.7%)	0.068	0.794
2. I have been fully informed about my medication	19 (90.5%)	2 (9.5%)	9 (100.0%)	0 (0%)		
3. I have full information about the inhaler technique	13 (61.9%)	8 (38.1%)	5 (55.6%)	4 (44.4%)	0.106	0.745
4. I have enough information about alternatives options	9 (42.9%)	12 (57.1%)	3 (33.3%)	6 (66.7%)	0.238	0.626
5. I have been fully informed about my medication storage conditions	16 (76.2%)	5 (23.8%)	7 (77.8%)	2 (22.2%)		1.000
6. The pharmacist explains to me how to know if medications are working	7 (33.3%)	14 (66.7%)	2 (22.2%)	7 (77.8%)	0.370	0.543
7. The pharmacist explains to me all possible side effects	7 (33.3%)	14 (66.7%)	3 (33.3%)	6 (66.7%)	0.0	1.000
8. My medication compliance has been improved and doctor visits	16 (76.2%)	5 (23.8%)	8 (88.9%)	1 (11.1%)		0.637
9. Pharmacists provide you information about the proper storage of your medications	16 (76.2%)	5 (23.8%)	5 (55.6%)	4 (44.4%)	1.277	0.258
10. The way the pharmacist answers your questions	18 (85.7%)	3 (14.3%)	9 (100%)	0 (0%)		
11. Time pharmacists spend with you	15 (71.4%)	6 (28.6%)	7 (77.8%)	2 (22.2%)	0.130	0.719
12. Your general evaluations of pharmaceutical care	8 (38.1%)	13 (61.9%)	2 (22.2%)	7 (77.8%)	0.714	0.398

χ^2 : Chi-square test

p: p-value for comparing the studied categories

P values are not computed when the number of readings is too small

Table 2. Effect of age on patients' satisfaction towards the provided pharmaceutical care services

Patient satisfaction survey of pharmaceutical care services	Age		U	p		
	N	Poor + good Median (Min. – Max.)			N	V. good + Excellent Median (Min. – Max.)
1. I feel I have been fully informed about my disease (COPD)	9	50.0 (40.0 – 73.0)	21	62.0 (41.0 – 74.0)	64.0	0.178
2. I have been fully informed about my medication	28	56.5 (40.0 – 74.0)	2	59.0 (54.0 – 64.0)		
3. I have full information about the inhaler technique	18	53.5 (40.0 – 64.0)	12	63.0 (42.0– 74.0)	61.50*	0.048*
4. I have enough information about alternatives options	12	53.0 (40.0 – 63.0)	18	60.5 (41.0 – 74.0)	69.0	0.104
5. I have been fully informed about my medication storage conditions	23	54.0 (40.0 – 74.0)	7	64.0 (45.0 – 70.0)	52.0	0.174
6. The pharmacist explains to me how to know if medications are working	9	57.0 (41.0 – 73.0)	21	56.0 (40.0 – 74.0)	93.50	0.965
7. The pharmacist explains to me all possible side effects	10	51.0 (42.0 – 64.0)	20	60.0 (40.0 – 74.0)	73.0	0.248
8. My medication compliance has been improved and doctor visits	24	54.0 (40.0 – 74.0)	6	64.0 (53.0 – 74.0)	36.0	0.065
9. Pharmacists provide you information about the proper storage of your medications	21	57.0 (40.0 – 74.0)	9	54.0 (42.0 – 70.0)	89.50	0.824
10. The way the pharmacist answers your questions	27	54.0 (40.0 – 74.0)	3	64.0 (57.0 – 73.0)		
11. Time pharmacists spend with you	22	56.5 (40.0 – 74.0)	8	59.0 (42.0 – 74.0)	73.50	0.504
12. Your general evaluations of pharmaceutical care	10	53.0 (41.0 – 64.0)	20	60.0 (40.0 – 74.0)	73.50	0.248

U: Mann-Whitney test

p: p-value for comparing the studied categories

*: Statistically significant at $p \leq 0.05$

P values are not computed when the number of readings is too small

Table 3. Relation between nebulizer at home and patient satisfaction survey of pharmaceutical care services (n=30)

Patient satisfaction survey of pharmaceutical care services	Nebulizer at home				χ^2	P
	No (n=15)		Yes (n=15)			
	Poor + good	V. good+ Excellent	Poor + good	V. good+ Excellent		
1. I feel I have been fully informed about my disease (COPD)	5 (33.3%)	10 (66.7%)	4 (26.7%)	11 (73.3%)		1.000
2. I have been fully informed about my medication	15 (100%)	0 (0%)	13 (86.7%)	2 (13.3%)		
3. I have full information about the inhaler technique	8 (53.3%)	7 (46.7%)	10 (66.7%)	5 (33.3%)	0.556	0.456
4. I have enough information about alternatives options	6 (40%)	9 (60%)	6 (40%)	9 (60%)	0.0	1.000
5. I have been fully informed about my medication storage conditions	12 (80%)	3 (20%)	11 (73.3%)	4 (26.7%)		1.000
6. The pharmacist explains to me how to know if medications are working	5 (33.3%)	10 (66.7%)	4 (26.7%)	11 (73.3%)		1.000
7. The pharmacist explains to me all possible side effects	8 (53.3%)	7 (46.7%)	2 (13.3%)	13 (86.7%)	5.400*	0.020*
8. My medication compliance has been improved and doctor visits	10 (66.7%)	5 (33.3%)	14 (93.3%)	1 (6.7%)		0.169
9. Pharmacists provide you information about the proper storage of your medications	11 (73.3%)	4 (26.7%)	10 (66.7%)	5 (33.3%)		1.000
10. The way the pharmacist answers your questions	13 (86.7%)	2 (13.3%)	14 (93.3%)	1 (6.7%)		
11. Time pharmacists spend with you	12 (80%)	3 (20%)	10 (66.7%)	5 (33.3%)		0.682
12. Your general evaluations of pharmaceutical care	5 (33.3%)	10 (66.7%)	5 (33.3%)	10 (66.7%)	0.0	1.000

χ^2 : Chi-square test

p: p-value for comparing the studied groups

*: Statistically significant at $p \leq 0.05$

P values are not computed when the number of readings is too small

Table 4. Relation between a problem with medication use and patient satisfaction survey of pharmaceutical care services (n=30)

Patient satisfaction survey of pharmaceutical care services	Problem(s) with medication use				χ^2	p
	No (n=17)		Yes (n=13)			
	Poor + good	V. good+ Excellent	Poor + good	V. good+ Excellent		
1. I feel I have been fully informed about my disease (COPD)	4 (23.5%)	13 (76.5%)	5 (38.5%)	8 (61.5%)	0.782	0.376
2. I have been fully informed about my medication	16 (94.1%)	1 (5.9%)	12 (92.3%)	1 (7.7%)		
3. I have full information about the inhaler technique	11 (64.7%)	6 (35.3%)	7 (53.8%)	6 (46.2%)	0.362	0.547
4. I have enough information about alternatives options	6 (35.3%)	11 (64.7%)	6 (46.2%)	7 (53.8%)	0.362	0.547
5. I have been fully informed about my medication storage conditions	14 (82.4%)	3 (17.6%)	9 (69.2%)	4 (30.8%)		0.666
6. The pharmacist explains to me how to know if medications are working	6 (35.3%)	11 (64.7%)	3 (23.1%)	10 (76.9%)	0.524	0.469
7. The pharmacist explains to me all possible side effects	3 (17.6%)	14 (82.4%)	7 (53.8%)	6 (46.2%)	4.344*	0.037*
8. My medication compliance has been improved and doctor visits	15 (88.2%)	2 (11.8%)	9 (69.2%)	4 (30.8%)		0.360
9. Pharmacists provide you information about the proper storage of your medications	12 (70.6%)	5 (29.4%)	9 (69.2%)	4 (30.8%)	0.006	0.936
10. The way the pharmacist answers your questions	16 (94.1%)	1 (5.9%)	11 (84.6%)	2 (15.4%)		
11. Time pharmacists spend with you	12 (70.6%)	5 (29.4%)	10 (76.9%)	3 (23.1%)		1.000
12. Your general evaluations of pharmaceutical care	6 (35.3%)	11 (64.7%)	4 (30.8%)	9 (69.2%)	0.068	0.794

χ^2 : Chi-square test

p: p-value for comparing the studied groups

*: Statistically significant at $p \leq 0.05$

P values are not computed when the number of readings is too small

4. Discussion

Chronic obstructive pulmonary disease (COPD) care is difficult, and patients must engage in a self-management approach that includes difficult behavioral and lifestyle adjustments such as smoking cessation, proper use of inhalation techniques, exercise therapy adherence, and compliance. COPD is associated

with high global morbidity and mortality and pharmacists are in a unique position to provide services that may help to decrease the disease's impact on the healthcare system, patients, and their families [7].

It is worthy to mention that, besides smoking prevalence, the lack of knowledge of COPD among the general population, and the fact that

management of this illness remains suboptimal, COPD is rapidly becoming one of the most challenging health problems worldwide that are of particular importance in specific countries including Egypt [14].

The development of pharmacist practices that provide patient-centered pharmaceutical care leads to the assessment of the provided services' quality. Patients' satisfaction is a key metric for evaluating healthcare service quality [2].

The current study showed that the overall satisfaction depending on the majority of responses is only intermediate. No relation was observed between the patient's demographic characteristics and their satisfaction toward the pharmaceutical provided services except for their ages, where the older aged patients seemed more satisfied with the provided services, the responses to the domain "I have full information about the inhaler technique" revealed better satisfaction by older patients than younger ones.

Concerning the other domains, there was a tendency toward better satisfaction by the older age as well, although with no statistical significance. This conclusion is consistent with the findings of a study [15] carried out on ENT patients, as well as with later studies [16, 17] that found elderly patients to be more satisfied than their younger counterparts. However, our finding was contrary to that reported by De Tran, V., et al [18] that found low levels of satisfaction with the elderly patients and proposed that the community pharmacy staff need to spend more time for consultations on proper medication use with elderly patients.

The features of the COPD disease and its complex management using different inhalation devices pose difficulties to the patients especially the elderly with their poor vision, memory, and, manual dexterity which makes them more in need of pharmaceutical care and consultation, this may

explain why the higher age median was associated with the better rating of the response to the services provided in this specialized outpatient clinic. Furthermore, younger age may have been linked to lower satisfaction, maybe due to the higher expectations typical among the younger population.

This study's small patients sample may be a cause why no statistical significance was observed in the relationship between socio-demographic characteristics and the respondents' satisfaction with the service, however, in concordance with our findings several other studies did not also obtain an association between socio-demographic variables like gender and residency and supposed level of satisfaction in them [19-22].

In the present study, most of the respondents to the satisfaction questionnaire who rated the domain "The pharmacist explains to me all possible side effects" with Very good/Excellent responses were those who have got a nebulizer at home and those who suffered fewer problems with medication use. These results can be explained by the point that pharmacists are in the ultimate position to supply COPD patients with the medication care that will educate them against their medication's side effects and decrease the undesirable effects which improve their adherence. Polypharmacy and hospitalization for an acute exacerbation of COPD are associated with greater disease severity and an increased risk of adverse drug events (ADEs). Pharmacists can aid in the prevention of ADEs by examining the drug list and discontinuing (or recommending discontinuation of) medicines that do not provide adequate disease control or cause ADEs [23].

The published data showed that more than half of patients use inhalers improperly, indicating that the incidence of correct inhaler usage remains unacceptably low. Poor inhaler

technique affects the effectiveness of delivering a sufficient dosage to the lungs and is linked to poor disease outcomes, ADEs, and higher costs. Pharmacist-led treatments help individuals with COPD improve their inhaler technique and enhance physician-led instruction [24]. It was found that patients who received pharmacist-led training were less likely to make one or more mistakes when practicing the inhalation method. Proper explanation of side effects enhances patient satisfaction with the pharmaceutical care provided [25].

Limitations of this study include its small sample size and being a single-centered study. In addition, the absence of open-ended questions encourages the participants to discuss their reasons for less or unsatisfaction. Furthermore, all participants were recruited from an urban area, leaving out those in rural areas whose level of satisfaction may have been different. Further larger interventional studies which can predict determinants of satisfaction and allow the satisfaction enhancement and optimization of COPD patient care are required.

Conclusion

The satisfaction of COPD patients toward the services provided by the clinical pharmacist in the chest outpatient clinic is only intermediate, the older aged patients seemed more satisfied with the service than their younger counterparts.

Recommendations

Efforts should be performed to increase satisfaction with the clinical pharmacy services in the outpatient clinic to improve health outcomes for patients with COPD.

Declarations

Ethics approval and consent to participate

The study procedure adhered to the ethical standards of the research ethical committee at Ain Shams University's Faculty of Pharmacy

(approved number: M.Sc No.181) and was carried out in accordance with the Declaration of Helsinki's principles and rules. Before participating in the trial, all patients gave their informed consent.

Consent to publish

Not applicable.

Availability of data and materials

All data generated and/or analyzed during the current study are involved in the published manuscript.

Competing interest

The authors declare that they have no conflict of interest.

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Author contribution

Asmaa Shean Suliman Shean, Gamal Abdel Rahman, Nagwa Ali Sabri, and Marwa Adel Ahmed, contributed to the conceptualization and methodology of the study as well as writing review and editing of the final manuscript. Asmaa Shean Suliman Shean was responsible for data collection, and statistical analysis. Asmaa Shean Suliman Shean and Marwa Adel Ahmed were responsible for writing the original draft of the manuscript. Marwa Adel Ahmed, Gamal Abdel Rahman, and Nagwa Ali Sabri were responsible for the supervision of all the study aspects. All authors contributed to the revision, reading, and approval of the submitted version of the manuscript.

5. REFERENCES

1. Hasen, G. and B. Negeso, Patients satisfaction with pharmaceutical care and associated factors in Southwestern Ethiopia. Patient preference and adherence, 2021. 15: p. 2155.
2. Larasanty, L.P.F., et al., Patient satisfaction

- with pharmaceutical care services provided at primary-level and secondary-level health facilities in Indonesia's health coverage system. *Journal of Health Research*, 2019.
3. Merkouris, A., et al., Assessment of patient satisfaction in public hospitals in Cyprus: a descriptive study. *Health science journal*, 2013. 7(1): p. 28.
 4. Mohiuddin, A.K., *The Role of the Pharmacist in Patient Care: Achieving High Quality, Cost-Effective and Accessible Healthcare through a Team-Based, Patient-Centered Approach*. 2020: Universal-Publishers.
 5. Amorha, K.C., M.J. Okonta, and C.V. Ukwe, Patients' Satisfaction With Pharmaceutical Care Services in Asthma: An Intervention Study in 2 Nigerian Hospitals. *Journal of Patient Experience*, 2021. 8: p. 23743735211034339.
 6. Brandsma, C.A., et al., Recent advances in chronic obstructive pulmonary disease pathogenesis: from disease mechanisms to precision medicine. *The Journal of pathology*, 2020. 250(5): p. 624-635.
 7. Idowu, O., et al., Experience of Patients with COPD of Pharmacists' Provided Care: A Qualitative Study. *Pharmacy*, 2021. 9(3): p. 119.
 8. Hu, Y., et al., Promoting Community Pharmacy Practice for Chronic Obstructive Pulmonary Disease (COPD) Management: A Systematic Review and Logic Model. *International Journal of Chronic Obstructive Pulmonary Disease*, 2020. 15: p. 1863.
 9. Hanania, N.A. and D.E. O'Donnell, Activity-related dyspnea in chronic obstructive pulmonary disease: physical and psychological consequences, unmet needs, and future directions. *International journal of chronic obstructive pulmonary disease*, 2019. 14: p. 1127.
 10. Russell, S., et al., Qualitative systematic review of barriers and facilitators to self-management of chronic obstructive pulmonary disease: views of patients and healthcare professionals. *NPJ primary care respiratory medicine*, 2018. 28(1): p. 1-13.
 11. Association, W.M., *World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects*. *Jama*, 2013. 310(20): p. 2191-2194.
 12. Vogelmeier, C.F., et al., Global strategy for the diagnosis, management, and prevention of chronic obstructive lung disease 2017 report. GOLD executive summary. *American journal of respiratory and critical care medicine*, 2017. 195(5): p. 557-582.
 13. Alomi, Y.A., et al., Patient satisfaction of pharmaceutical care of primary care centers at Ministry of Health in Saudi Arabia. *J Pharm Pract Community Med*, 2016. 2(3): p. 79-87.
 14. Hesso, I., S.N. Gebara, and R. Kayyali, Impact of community pharmacists in COPD management: inhalation technique and medication adherence. *Respiratory medicine*, 2016. 118: p. 22-30.
 15. Alturki, M. and T.M. Khan, A study investigating the level of satisfaction with the health services provided by the Pharmacist at ENT hospital, Eastern Region Alahsah, Kingdom of Saudi Arabia. *Saudi Pharmaceutical Journal*, 2013. 21(3): p. 255-260.
 16. Surur, A.S., et al., Satisfaction of clients with the services of an outpatient pharmacy at a university hospital in northwestern Ethiopia: a cross-sectional study. *BMC health services research*, 2015. 15(1): p. 1-8.
 17. Soeiro, O.M., et al., Patient satisfaction with

- pharmaceutical services in Brazilian primary health care. *Revista de saude publica*, 2017. 51: p. 21s.
18. De Tran, V., et al., Elderly consumers' satisfaction with the quality of community pharmacy services in Ho Chi Minh City, Vietnam: a Q-methodology study. *Pharmacia*, 2020. 67: p. 303.
19. Ayalew, M.B., et al., Patients'/clients' expectation toward and satisfaction from pharmacy services. *Journal of research in pharmacy practice*, 2017. 6(1): p. 21.
20. Druică, E., et al. Determinants of Satisfaction with Services, and Trust in the Information Received in Community Pharmacies: A Comparative Analysis to Foster Pharmaceutical Care Adoption. in *Healthcare*. 2021. Multidisciplinary Digital Publishing Institute.
21. Nagashekara, M., et al., Patient satisfaction in general, intervention and cognitive services among retail pharmacies in Kota Kinabalu, Malaysia. *International Research Journal of Pharmacy*, 2012. 3(8): p. 141-144.
22. Park, K., et al., Public satisfaction with the healthcare system performance in South Korea: Universal healthcare system. *Health Policy*, 2016. 120(6): p. 621-629.
23. Hudd, T.R., Emerging role of pharmacists in managing patients with chronic obstructive pulmonary disease. *American Journal of Health-System Pharmacy*, 2020. 77(19): p. 1625-1630.
24. Usmani, O.S., et al., Critical inhaler errors in asthma and COPD: a systematic review of the impact on health outcomes. *Respiratory research*, 2018. 19(1): p. 1-20.
25. Hämmerlein, A., U. Müller, and M. Schulz, Pharmacist-led intervention study to improve inhalation technique in asthma and COPD patients. *Journal of evaluation in clinical practice*, 2011. 17(1): p. 61-70.