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

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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)
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<table>
<thead>
<tr>
<th>Age in Years</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-40 years</td>
<td>48</td>
<td>57.1%</td>
</tr>
<tr>
<td>41-50 years</td>
<td>28</td>
<td>33.3%</td>
</tr>
<tr>
<td>51-60 years</td>
<td>8</td>
<td>9.5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Education Level</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uneducated</td>
<td>31</td>
<td>36.9%</td>
</tr>
<tr>
<td>Primary</td>
<td>9</td>
<td>10.7%</td>
</tr>
<tr>
<td>High School</td>
<td>30</td>
<td>35.7%</td>
</tr>
<tr>
<td>Intermediate</td>
<td>10</td>
<td>11.9%</td>
</tr>
<tr>
<td>Graduation and above</td>
<td>4</td>
<td>4.8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Marital Status</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
<td>69</td>
<td>82.1%</td>
</tr>
<tr>
<td>Unmarried</td>
<td>15</td>
<td>17.9%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COPD Category</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEV1/FVC 50-79</td>
<td>45</td>
<td>53.6%</td>
</tr>
<tr>
<td>FEV1/FVC 30-49</td>
<td>39</td>
<td>46.4%</td>
</tr>
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</table>

Table 2: Normality Assumptions

<table>
<thead>
<tr>
<th></th>
<th>Kolmogorov-Smirnov</th>
<th>Shapiro-Wilk</th>
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<tbody>
<tr>
<td>Statistic</td>
<td>Df</td>
<td>Sig.</td>
</tr>
<tr>
<td>Pre perception score</td>
<td>.086</td>
<td>82</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Illness Perception Level</th>
<th>Control Group [n (%)]</th>
<th>Intervention Group [n (%)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Illness Perception</td>
<td>5 (11.9)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>Moderate Illness Perception</td>
<td>37 (88.1)</td>
<td>23 (54.8)</td>
</tr>
<tr>
<td>High Illness Perception</td>
<td>0 (0.00)</td>
<td>19 (45.2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Health Services Utilization</th>
<th>Control Group [n (%)]</th>
<th>Intervention Group [n (%)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Health Services Utilization</td>
<td>5 (11.9)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Moderate Health Services Utilization</td>
<td>37 (88.1)</td>
<td>13 (31)</td>
</tr>
<tr>
<td>High Health Services Utilization</td>
<td>0 (0.00)</td>
<td>29 (69)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control Group Mean ± SD</th>
<th>Intervention Group Mean ± SD</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illness Perception</td>
<td>54.24 ± 5.905</td>
<td>75.24 ± 7.564</td>
<td>+21</td>
</tr>
<tr>
<td>Health Services Utilization</td>
<td>12.38 ± 1.396</td>
<td>20.07 ± 2.202</td>
<td>+7.69</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Variables</th>
<th>Control group Mean ± SD</th>
<th>Interventional group Mean ± SD</th>
<th>t</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illness Perception</td>
<td>54.24 ± 5.905</td>
<td>75.24 ± 7.564</td>
<td>-14.183</td>
<td>.000</td>
</tr>
<tr>
<td>Health Services Utilization</td>
<td>12.38 ± 1.396</td>
<td>20.07 ± 2.202</td>
<td>-19.117</td>
<td>.000</td>
</tr>
</tbody>
</table>

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).
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

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