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MEDICATION FOR ASTHMA PROVIDED BY PHARMACISTS IN HOSPITAL

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ABSTRACT

Pharmaceutical care services for asthma patients are implemented and assessed in hospital settings. The study consisted of a prospective, randomized, controlled design. In the intervention group (30 patients) or the control group (20 patients), random assignments were made based on the number of participants. Pharmacy intervention suggestions were made to attending physicians based on a pharmacist review of asthma drug therapy for patients in the intervention group. Asthma education and medication counselling were provided regularly to intervention patients, while routine consultations and dispenses were provided to the control group. Both groups were followed up every two weeks for six months following baseline testing with a structured form. Data analysis was performed using SPSS version 13. Significant levels were set at 0.05. As a result of the intervention, the study group had a significantly greater reduction in acute attacks, nocturnal asthma symptoms, and inhalation of 2 agonists per week than the control group at the end. The mean number of days sick per week decreased significantly (p=0.002) within the intervention group, whereas it increased within the control group. There was a greater improvement in inhalation technique, asthma knowledge, and drug therapy in the intervention group compared with the control group (p 0.001). It is possible that pharmacists' interventions might positively impact asthmatic patients' lives.

Key words: Pharmacists, Asthma, Drug therapy.

INTRODUCTION

In the world, asthma remains a significant health problem. Recent adoption of better drugs and evidence-based guidelines has not resulted in significant improvements in asthma morbidity and mortality. A significant proportion of asthma patients are underdiagnosed and undertreated, so appropriate management requires identifying the illness, assessing its severity, addressing it appropriately, including appropriate medication, teaching patients, preparing a written action plan, monitoring, appropriate follow-up, and referring patients to specialists as needed. Patients should be more involved in the management of their asthma according to the guidelines for treatment [2]. Patients' quality of life is improved when they self-manage their asthma [3, 4].

A health care professional should educate patients about asthma and its appropriate treatment in order to develop self-management skills. Inhaler medications and peak flow meters are two important tools pharmacists can use to educate patients about asthma medications. Asthma management plans can be explained to patients by them. Pharmacists also can monitor asthma medication use and refer patients to physicians for medical treatment when asthma control is poor [5].

Several health outcomes are improved by asthma education and monitoring at four, eight, and 12 months after program implementation, including quality of life, peak expiratory flow, inhaler technique, and compliance with therapy. [6] The Danish study showed pharmacist-physician collaboration improved asthma symptoms, quality of life, sick days, knowledge, and inhaler technique, but not peak flow rate [7, 8]. Various asthma knowledge and medication use were improved through a pharmacy-based study in New Zealand. Several outcome measures related to asthma patients' self-management were positively influenced by pharmacists in two Finnish community pharmacy studies. [10, 11]..

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The majority of patients showed significant improvements in symptom control and peak flow readings, as well as improvements in quality of life [13].

Asthma disease state management program in Indiana was assessed using point-of-care peak flow meters as part of a non-controlled study. One of the pharmacists at the pharmacy developed this program. After completing the program for a year, patients enrolled in this study had a 77% reduction in hospitalizations and a 78% reduction in emergency room visits. [14].

The outcomes of a community pharmacy asthma care program in Australia were analyzed for asthma control and clinical and humanistic factors. A baseline measurement and a follow-up measurement were taken. Control and intervention groups significantly improved asthma control and adherence to preventer medications, while the control group significantly improved asthma knowledge and inhaler technique, but not spirometer values. [15].

As drug therapy has become more complex and drug-related morbidity and mortality have increased significantly, pharmaceutical care practices endeavor to meet a need in the health care system. To resolve medication-related problems, pharmaceutical care is therefore necessary for developing countries. Asthma-related pharmaceutical care services in hospitals were the focus of this study.

METHODS

In order to conduct the study, the Ministry of Health approved and permitted it. The study was conducted with informed consent from all patients. A patient was required to have previously been diagnosed with asthma by a physician in attendance, and be over 18 years of age in order to be eligible for this study. In addition, pregnant women, people with chronic obstructive pulmonary disease (COPD) or emphysema, tuberculosis patients, and mentally disturbed individuals were excluded.

In this study, randomized controlled trials were conducted at one site between April 2022 and March 2022. In order to determine sample size, Java Applets for Power and Sample Size were used [24]. It would be necessary to sample 50 patients with unequal sizes of 30 and 20 in each group for a true difference to be determined. Sample size was calculated by randomly selecting participants from emergency departments and referral clinics.

A special recording and documentation system was developed for this study. Patients were interviewed by a pharmacist in a structured interview; others were examined by the attending physicians after their clinical examination. Structured forms were used by both groups to document all study parameters. Individual care and problem solving were the focal points of the intervention. Each two-week period during the intervention, pharmacists educated intervention patients about their non-drug therapy measures, disease, self-management, pharmacotherapy, inhalation technique and self-management, Traditionally, medical consultations and dispensing services were provided to the control group. Both groups had baseline outcome measures and were followed up every two weeks for 22 weeks following enrollment.

In this study, the percentage of acute attacks, the percentage of nocturnal symptoms, the percentage of all-day sickness, and the percentage of hospitalizations were considered critical outcomes. At the time of enrollment, the patients reported the above measures, and they were given cards that they were required to complete at every follow-up. Peak expiratory flow rate was also evaluated as an outcome measure. Aspirin techniques, patient knowledge about asthma, and patient knowledge about drug therapy were factors that prevented the measurement being performed on a daily basis.

The statistical analysis was conducted using Statistic Package for the Social Sciences 13.0. The 95% confidence interval was used to estimate prevalence. A confidence interval was calculated using EpiCalc 2000 (CDC, USA). Both groups were compared at baseline using Mann-Whitney's nonparametric data analysis test, and differences between the groups were analyzed using between intervention and control groups at 2, 4, 6, 8, 10, 12, 14, 16, 18, 20 and 22 weeks. The statistical significance level was set at 0.05.

RESULTS

A total of 30 patients were participating in the intervention group, compared to 20 patients in the control group. There were 6 patients who dropped out of the intervention group, compared to 5 patients in the control group. One patient died in the intervention group after 6 weeks, one changed residence, and others did not feel they needed the follow-up services since they did not feel they needed the treatment. Control group patients only got pregnant in two cases, and the other walked out without explanation.

There were 45 % males and 55 % females enrolled in the control group, whereas 41.7 % males and 58.3 % females were enrolled in the intervention group. Among the control group were 45 percent (18-30 years old), 20 percent (30-40 years old), 25 percent (40-50 years old), and 10 percent (50-60 years old), while the intervention group had 35 percent, 40 percent, 21 percent, and 4 percent. Nine of the control group patients and 23 of the intervention group patients had asthma for more than ten years, respectively, while the remaining patients had asthma for less than ten years. The control group had 14 patients and the intervention group had 20,

respectively, who had a family history of asthma. Based on the identification and acceptance of interventions in the intervention group, table 1 shows the drug-therapy-related problems in the intervening group. Collaboration with attending physicians led to the change in drug therapy towards evidence-based guidelines.

A significant difference in mean acute attacks per week was not observed in either group at baseline (p>0.05). The intervention group differed significantly from the control group (p=0.01). The nocturnal asthma symptoms per week at baseline were not significantly different between the two groups (p>0.05). Between the 20th and 22nd weeks of follow-up, the intervention group showed a significant reduction in mean frequency (p 0.01), in comparison to the control group.

Based on information collected at baseline, Table 3 shows the pattern of use of inhaled beta2-agonists per week. It was not significant (p>0.05) that the two groups were different. A significant reduction was achieved in the intervention group (p 0.05) between the 6th week and 22nd week of the intervention.

The number of sickness days per week did not differ significantly between the two groups (p>0.05). In the control group, days of sickness increased during the 22nd week of the intervention, while in the intervention group they decreased (p0.05). The intervention group had a significant decrease (p0.05) in days of sickness/week, while the control group had an increase (1.0; SD=0.1). Comparing the rate of hospitalization at baseline with the rate in the intervention group, the rate in the control group increased by not significant amounts (p>0.05).

There was no difference in peak expiratory flow rates between the two groups at baseline (p>0.05). In the intervention group, peak expiratory flow rate did not differ statistically significantly between the two groups (p>0.05). There was no significant improvement in peak expiratory flow rate from week 12 until the end of the study.

Statistically, neither group showed a significant difference (p>0.05) in mean score for the method of inhaler use, as shown in table 4. In the intervention group, patient health significantly improved (P 0.05) compared to the control group.

In terms of assessing patients' knowledge about asthma at baseline enrollment, there was no significant difference between both groups (p>0.05). In the follow-up weeks, the intervention group's asthma knowledge improved significantly more than the control group's (p0.05). Both groups at baseline did not differ significantly with respect to their knowledge of appropriate use of asthma drug therapy (p > 0.05). In the intervention group, improvements from the 10th to the end of the follow-up period were significantly greater (p0.05) than in the control group.

TABLE 1: Drug therapy related problems identified in the intervention group (n = 30 patients)

Problems	Prevalence (number)	Interventions Accepted and implemented (n)
1. A Thoracic Society guideline was not followed for the management of chronic asthma	66.66 % (20)	20
2. Dosage of oral prednisolone that is insufficient	12.2% (4)	4
3. Prednisolone tablets are used inappropriately instead of steroids inhaled	43.12% (13)	10
4. The patient's regimen did not include inhaled corticosteroids	43.12 % (13)	16
5. Inappropriate chronic use of oral β2-agonists rather than inhaled medications	30.01% (9)	9
6. Adverse reactions a] Thrush in the mouth b] As a side effect, you may experience tremors and palpitations	 16.6% (5) 57.7% (17)	 5 16
7. Using inhalers by patients who refuse to do so	26.6% (8)	8
8. Inhalers are used incorrectly	83.33% (25)	25
9. Asthma drugs have insufficient information about their roles	50.0% (15)	14
10. Noncompliance of patients with their treatment	66.66% (20)	20

TABLE 2: Weekly Frequencies Of Acute Attacks: Mean (Sd) Reductions In Weekly Frequencies Of Acute Attacks

	Intervention group	Control group	P value
Baseline	1.20 (0.7) n=30	0.50 (0.20) n=20	0.05
Second week	-0.53 (0.06) n=29	-0.53 (0.09) n=17	0.02
Fourth week	-0.93 (0.06) n=28	-0.86 (0.09) n=16	0.02
Sixth week	-0.95 (0.07) n=27	-0.60 (0.09) n=16	<*0.001
Eighth week	-0.81 (0.05) n=26	-0.80 (0.08) n=15	0.01

Tenth week	-0.91 (0.06) n=26	-0.86 (0.09) n=15	0.01
Twelfth week	-0.93 (0.07) n=25	-0.20 (0.05) n=15	0.05
Fourteenth week	-0.81 (0.06) n=24	-0.76 (0.07) n=15	0.01
Sixteenth week	-1.14 (0.06) n=24	-0.83 (0.08) n=15	0.01
Eighteenth week	-0.99 (0.06) n=24	-0.80 (0.07) n=15	0.01
Twentieth week	-0.83 (0.06) n=24	-0.82 (0.08) n=15	0.02
Twenty second week	-0.81 (0.07) n=24	-0.10 (0.03) n=15	0.01

TABLE 3: Frequency of using inhaled beta2-agonist pet week

	Intervention Group	Control Group	P value
Baseline	25.6(1.4) n=30	18.2 (1.2) n=20	0.07
Second week	-8.0 (0.09) n=29	-2.2 (2.3) n=17	0.25
Fourth week	-10.5 (0.4) n=28	-7.2 (1.7) n=16	0.35
Sixth week	-15.0 (0.8) n=27	-0.8 (0.11) n=16	0.012
Eighth week	-15.3 (0.7) n=26	-2.0 (1.7) n=15	0.03
Tenth week	-17.9 (0.9) n=26	-2.7 (2.8) n=15	0.02
Twelfth week	-18 (1) n=25	-.3 (1.7) n=15	0.01
Fourteenth week	-18.5 (0.9) n=24	-4.2 (1.5) n=15	0.15
Sixteenth week	-17.9 (1) n =24	-7.8 (1.10) n=15	0.03
Eighteenth week	-15.8 (0.9) n=24	-6.1 (1.6) n=15	0.08
Twentieth week	-18.8 (1) n=24	-5.5 (1.9 n=15	0.02
Twenty second week	-18.8 (1) n=24	-2.2 (1.4) n=15	0.01

Table 4: Evaluation of the technique of inhaler use

	Intervention group	Control group	P value
Baseline	2.3; n=30	4.3; n=20	0.02
Second week	+0.9; n=29	0.70; n=17	0.03
Fourth week	+2.2; n=28	0.54 n=16	*<0.001
Sixth week	+2.5; n=27	0.65; n=16	*<0.001
Eighth week	+2.7; n=26	0.81 n=15	*<0.001
Tenth week	+3.1; n=26	0.13 n=15	*<0.001
Twelfth week	+3.1; n=25	0.15 n=15	*<0.001
Fourteenth week	+3.4; n=24	0.14 n=15	*<0.001
Sixteenth week	+3.5; n=24	0.14; n=15	*<0.001
Eighteenth week	+3.6; n=24	0.16; n=15	*<0.001
Twentieth week	+3.6; n=24	0.15; n=15	*<0.001
Twenty second week	+3.7; n=24	0.14; n=15	*<0.001

DISCUSSION

Efficacy of pharmaceutical care services for asthma patients in Sudan is described in this study for the first time. Based on our findings, we discovered that prescribing practices for asthma management failed to comply with the current clinical guidelines. Therefore, in order to provide patients with asthma in Sudan with appropriate and effective care, it is necessary to have treatment guidelines that are consensus-based. Pharmacists identified and corrected drug-related problems in the intervention patients in this study. It was found that doctors accepted and implemented pharmacists' interventions well. For pharmaceutical care to be successful, pharmacists and physicians must enhance their professional relationships in order to form a mutually beneficial partnership in which both share responsibility for patient treatment. As a matter of fact, current evidence clearly demonstrates that pharmacists and physicians work more closely together to manage their patients' drug therapy outcomes.

A pharmacist-physician collaboration in a hospital practice reinforces its value for optimizing asthmatic patients' drug therapy, limiting drug-related problems, and improving quality of care.

Patients participating in the intervention experienced a significant improvement in their inhalation of beta-agonists, the frequency of acute asthma attacks, and the number of days spent sick. This result is also consistent with what has been reported in the literature. It is possible for the pharmacist to improve asthma patient outcomes as a member of the healthcare team through the implementation of appropriate interventions to optimize drug therapy and enhanced counseling and monitoring.

Other studies have reported similar results for the peak expiratory flow rate changes in this study. At the 12th week, intervention patients had higher mean percentage improvements than control patients but there was no statistically significant difference between the two groups. Rather than measuring peak expiratory flow rates daily, peak expiratory flow rates were measured periodically on follow-up dates instead of on a daily basis. Consequently, there is a limited amount of data available. This study also suggests that the readings should be interpreted with caution, as several studies indicate that the peak expiratory flow variability does not exhibit a linear response, and their use increases significantly with an increase in the inter- and intra-meter variation. In conjunction with spirometer measures and clinical symptoms, peak flow meters should be calibrated on a regular basis.

The intervention patients' inhalation technique greatly improved when compared to the control group. Pharmacists can also improve patients' inhalational techniques, according to previous research. A positive outcome of asthma drug therapy depends on this technical aspect of patient counseling. During baseline enrollment in this study, up to 81.7% of intervention patients failed to properly use their inhalers. When asthma medications are inhaled, they are less effective because of improper technique and uneven medication delivery. It is therefore important to demonstrate proper techniques skills to patients and to reinforce them on an annual basis or ideally at every visit. By providing patient counseling, pharmacists can help improve the use of inhalation devices.

In the follow-up, the intervention group showed significant improvements in pharmacotherapy knowledge. In line with previous findings, pharmacists can provide patients with greater insight into their illnesses and drug therapy through individual counseling sessions. [1,7,12] Pharmacy can play a significant role in helping patients better understand their diseases and drug therapies, according to the authors. As a result of better knowledge, asthma patients may become more confident in managing the condition themselves and will be able to use prescription drugs in a rational, safe manner. Research shows asthma patients have better control over their symptoms when they have a greater understanding of their disease and drug therapy.As a result of the current study, pharmacists' regular counseling of asthmatics is clearly associated with better treatment outcomes, demonstrating that pharmacists are key to pharmaceutical care.

Taking an active role in the healthcare process may be a result of patient empowerment. In addition, asthmatic students in the intervention group received face-to-face education and counseling that met their individual needs and enabled them to interact and become involved in their own treatment decisions. In order to provide high quality pharmaceutical care, pharmacists and patients need to develop a bond through effective communication.

Improvements in a few key outcomes measures in the control group may have contributed to the reduction in apparent effect size of pharmaceutical services over the study period. There are a number of factors that could explain this. One factor that may have had an impact on the prescribers' prescribing patterns was identifying drug-related problems in the intervention group. Also, participants could consider completing study forms and attending follow-up evaluations as educational interventions

Using trained pharmacists as educators for asthma patients has been shown to improve treatment and monitoring efficacy and improve patient outcomes. In turn, patients become more aware of their disease and its treatment and have greater control over their illness as a result. In order to resolve medication-related problems and improve patient care quality in developing countries, pharmaceutical care must be introduced. Additionally, pharmaceutical care is expected to reduce the bill from drug-related problems, which are considered to be "multibillion-dollar problems". Therefore, this practice needs to be adopted in developing countries where prescribing and dispensing practices are often illogical and irrational.

CONCLUSIONS

Physicians, pharmacists, and asthma patients can benefit from collaboration, and pharmacists' intervention can impact asthma patient outcomes. To improve the quality of asthmatic patient care, we developed pharmaceutical care practices in hospitals based on our results

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