Patient Preference and Adherence

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ORIGINAL RESEARCH

Illustrating How to Use the Validated Alsayed_v1 Tools to Improve Medical Care: A Particular Reference to the Global Initiative for Asthma 2022 Recommendations

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Purpose: The current research aimed to illustrate a real case using the validated Alsayed_v1 tools as tutorial training to improve the knowledge and skills of healthcare practitioners in the clinical problem-solving process necessary to implement medical and pharmaceutical care.

Patients and Methods: The Alsayed_v1 instruments consist of principal components: data collection, assessment of treatments, the medical problem oriented plan (MPOP), as well as a care plan and patient education.

Results: This study illustrated a real case of asthma patient using the validated Alsayed_v1 tools. These validated and clinically tested tools provide a coding system for the MPOP that permits easy documentation with an open hierarchical structure where higher levels are broad and lower levels are particular, and the possibility to enter free text. The section dedicated to treatment assessments is intended to synthesize patient information to facilitate the identification of the MPOPs. Effective management requires the development of a partnership between the patient with asthma (or the patient's caregivers) and his healthcare professional(s). This partnership aims to allow the patient to control his condition with guidance from the healthcare professional(s), discuss and agree on therapy goals, and develop a personalized, written, self-management asthma care plan.

Conclusion: By implementing Alsayed_v1 tools, the clinical practitioner can actively give the best practice for optimal patient outcomes.

Keywords: asthma, Alsayed_v1 tools, MPOP, medical care, patient outcome

Introduction

Over the years, pharmacists' role has expanded from traditional dispensing to patient-focused pharmaceutical care practice.[1,2] Pharmacists are now working collaboratively with other healthcare practitioners as a neighborhood of the healthcare team to provide optimized patient care services in hospitals and various clinical settings.[3–7] As pharmacists are now required to possess closer contact with patients,[8] the general public naturally expects them to handle challenges competently and in the best interests of their patients.[9] Numerous studies have found that pharmacists' participation in pharmaceutical care services improves patients' health outcomes by recognizing and preventing treatment-related problems in various disorders[10–17] and saves health care expenses.[18–21]

Among the primary responsibilities of clinical pharmacy and pharmaceutical care practitioners are the detection, prevention, and resolution of medical issues.[7] Pharmacist interventions are pivotal in developing new pharmaceutical care services and increasing knowledge about the types and frequencies of medical problems.[7] Clinical pharmacists must utilize a systematic documentation and classification system when reporting medical problems.[22–26]

Received: 2 February 2023
Accepted: 7 April 2023
Published: 28 April 2023

Pharmaceutical care and clinical problem-solving have a recognized utility as a method that lowers medication errors and patient harm.[27,28] Nevertheless, health care practitioners in general, including pharmacists, receive minimal formal education throughout their college years on how to gather patient data, assess this data, including drugs, establish and implement the patient's care plan, educate the patient, and offer proper follow-up.[27,28] This may be attributed to the lack of awareness and vague understanding of who is responsible for providing this service.[29,30]

Our recent interventional study found that the tutorial improved pharmacy students' decision-making skills. The intervention also taught students teamwork, peer assessment, communication, and critical thinking.[31] The novel Alsayed_v1 tools introduced in a recent paper were applied to actual patient cases and were validated.[31] The tools received favorable feedback from users. The Alsayed_v1 tools include three main parts: the assessment of treatments, the medical problem-oriented plan (MPOP) classification system, and the care plan.[31] The term MPOP was defined in our previous research[9] as "an interventional plan directed to a specific medical problem or event involving patient treatment to achieve the optimum outcomes for a certain patient".

Therefore, this study aims to illustrate a real case using the validated Alsayed_v1 tool as tutorial training to improve the knowledge and skills of healthcare practitioners and pharmacy /medical students in the clinical problem-solving process that is necessary to implement medical and pharmaceutical care. A real asthma case was selected to apply the tools with a particular reference to evidence-based medicine using the updated 2022 version of the Global Initiative for Asthma (GINA).

Materials and Methods

Data Collection and Assessment

In this study, the Alsayed_v1 tools were used.[9] We provided the method in light of our recent two published studies using our related templates.[9,31] The template pertaining to the assessment of therapies was thought to be crucial since it aids in analyzing patient data for the presence of medical problems and aids in providing a suitable plan.[31]

Regarding the data collection, seven parts were included: demographic data, current issues, medical problems, patient history, treatments, tests, and special situations.

In addition to the updated related guidelines, the following websites were utilized throughout the tutorial: Lexicomp's Drug Information, UpToDate, accesspharmacy.mhmedical.com, https://online.epocrates.com, and www.medscape.com. Practitioners are advised to consult a minimum of two sources to gather the relevant information. Practitioners must also possess decision-making and professional communication skills.

The practitioner identified the necessary data in the appropriate sources, documented the patient's data, evaluated the distinct components with documentation, and evaluated the coherence between the recommended and the patient's therapeutic indications. Effectiveness was determined by comparing the patient's therapy to the most recent evidence-based clinical practice guideline recommendations and achieving treatment objectives (treatment goals). The medication's safety was evaluated by examining the patient's symptoms and medical records for any indications of probable adverse reactions, contraindications, or precautionary measures. Possible medication safety issues were also evaluated by determining whether or not the patient was at risk but not receiving prophylaxis. The adequacy of the dosage regimen was determined by comparing doses to evidence-based guidelines and recommendations or by consulting drug information resources such as Lexicomp's Drug Information. The clinical characteristics of the patient were considered when determining the dosing regimen. Utilizing the UpToDate drug interactions tool, clinically significant drug-drug interactions were identified.

The patient's knowledge and adherence were evaluated and recorded. Poor, average, or appropriate levels of knowledge of the disease and non-pharmacological and pharmacological treatments were documented. Assessing and documenting adherence to non-pharmacological and pharmacological therapies are also necessary. Primary and secondary non-adherence to pharmacological treatment can be distinguished. Primary non-adherence occurs when a patient has been prescribed a new medicine but fails to obtain it (or a suitable alternative) within a reasonable period of time. Secondary non-adherence occurs when a patient fills a prescription but does not take the medication as prescribed. Non-adherence can also be characterized based on the patient's intent to take treatment (intentional versus unintentional non-

adherence).[9] Due to the various underlying causes, each type of non-adherence must be addressed separately. It is possible to document the reasons for insufficient knowledge and non-adherence.

Cost-effectiveness was also documented, including questioning the patient about cost. Furthermore, the monitoring parameters and their costs should also be considered.

After completing this analysis step for one drug, all of the patient's medications must be assessed prior to the synthesis step (MPOP tool).

MPOP, Care Plan, Patient Education, and Follow Up

All medical problems reported in the assessment step were pooled and then classified according to their shared components: Indication, Effectiveness, Safety, Patient, and Miscellaneous, according to the MPOP tool.[9]

The care plan template was created to incorporate the detected MPOP as well as a free-text field for inserting additional intervention, monitoring, and follow-up details. Each care plan table was tailored to a specific patient's disease/condition. Appropriate systematic patient education was provided directly to the patient, with a particular follow-up schedule to evaluate the outcome of the care plan.

Case Summary

A 20-year-old male with a history of uncontrolled persistent asthma presented to his primary care physician with complaints of shortness of breath (SOB), poor exercise tolerance, nighttime awakening, and the need for frequent use of his quick-relief asthma medication. The clinical pharmacist was asked to recognize and address the possible factors contributing to this patient's uncontrolled asthma and to develop a plan for better long-term control of his asthma symptoms using the novel validated "Alsayed_v1" tools.[9,31] Changes in the patient's pharmacotherapeutic regimen for long-term asthma control were needed.

Ethical approval was attained from a medical center in Amman, Jordan (2021-IRB-1-1). The patient's informed consent was obtained to participate in and publish the study, including anonymized responses. This study complies with the Declaration of Helsinki.

Results

Data Collection and Assessment

1. Demographic Data

- Who is the patient? -
- Age: 20 years
- Gender: Male
- Education: Bachelor's student
- Occupation: NA
- Phone no. NA
- Dr name: -

Day and Date: 9 October 2022

2. Current Issues

Day and Date: 9 October 2022

Time: 16.00

CC: "The dust is bothering me."

HPI:

- Location: Lower respiratory tract
- Characteristic of symptoms: cough and SOB
- Timing (onset, duration, frequency):

He reports being awakened by a cough at night once a week during the last 4 weeks. His cough and SOB occur during at least 3 days per week in the last 4 weeks.

- Severity: needs further investigations
- Factors:

Aggravating factors:

The patient states he especially becomes short of breath when he exercises (although he admits that his SOB is not always brought on by exercise and sometimes occurs when he is not actively exercising).

The family has one cat, which may be a possible trigger of his asthma symptoms.
Alleviating factors:
Taking his medications

- Environment: Dust environment; both father and brother are smokers
- Other symptoms: NA
- Differential diagnosis: well-known asthma case

Review of Systems (ROS)

Denies fever, chills, headache, eye discharge or redness, rhinorrhea, sneezing, sputum production, chest pain, palpitations, dizziness, or confusion.

Physical Examination (PE)

Gen: Well-developed, well-nourished male

HEENT: Mild oral thrush is present on the tongue and buccal mucosa

Neck/Lymph Nodes: Supple; no lymphadenopathy or thyromegaly

Lungs/Thorax: No intercostal retractions or accessory muscle use with respirations; good air movement; mild expiratory wheezes bilaterally

CV: RRR; no MRG

Abd: Soft, NTND; (+) BS

Ext: Normal ROM; periphisal pulses 3+; no CCE

Neuro: A&O × 3. Cranial nerves II–XII are grossly intact. No focal weakness or loss of sensation.

Day and Date: 9 October 2022

3. Medical Problems

Table 1 shows the medical problems the patient has.

4. Patient History

- Surgeries: No previous intubations history
- Hospitalization: Once in the last year due to asthma exacerbation and treated with oral corticosteroids (OCS); one visit to the emergency department (ED) during the previous 6 months and treated with OCS.
- Vaccination: NA
- Allergies: No known drug allergies (NKDA)
- Family history (FH): Mother, 45 years old with hypertension (HTN) and allergic rhinitis; (nonsmoker); father, 51 years old (smoker) with HTN, type 2 diabetes mellitus, and some food allergy; brother, age 15, healthy (smoker); sister, age 6, healthy (suspected asthma).
- Social history (SH): No alcohol or tobacco use, single, not sexually active, lives at home with his parents (his father is a teacher) and one cat.

5. Treatments

Table 2 shows the medications and other treatments taken by the patient.

Table 1 Medical Problems Part of Data Collection

Medical Problem	Past, Acute, and Chronic Disease	Stage/ Type/ Class	Current Status	Since	Duration	Day and Date
Asthma	Chronic	Mild persistent	Peak expiratory flow (PEF) = 68% (yellow zone; caution). The patient's level of asthma control over the last 4 weeks was uncontrolled asthma (4/4 points).[32,36] Using Asthma Control Test™ (ACT), the score was 12, indicating a very poorly controlled status.[37]	2007	15 years	9 October 2022
Asthma exacerbation	Past		He was considered at an increased risk of future exacerbations[32,36] based on having had one exacerbation (requiring hospitalization) in the last year, poor inhaled corticosteroid adherence, and possible triggers (smoking).	once in the past year		9-October-2022

Table 2 Treatments Part of Data Collection

Drug Details	Since	Duration	Time of Administration	Adherence
1. Flixotide Evohaler (Fluticasone Propionate) 50 mcg, two puffs BID	NA	NA	Not specified	He was using it "most days of the week."
2. Ventolin Evohaler (Albuterol) two puffs Q 4–6 H as needed for shortness of breath, chest tightness, cough, wheezing	NA	NA	Not specified	During his visit, he reported using his Albuterol approximately 4–5 days per week over the last 2 months, but over the last week, he admits to using Albuterol once daily.

6. Tests

Day and Date: 9 October 2022

Vital signs:

BP 110/68, HR 78, RR 16, T 37°C; Wt 58 kg, Ht 170 cm

Lab tests:

Na 136 mEq/L, K 3.6 mEq/L (at risk for hypokalemia due to frequent Albuterol use), Cl 98 mEq/L, CO2 27 mEq/L, BUN 18 mg/dL, serum creatinine 0.6 mg/dL, Glu 95 mg/dL, Hgb 15 g/dL, Hct 42%, Plts 192 × 103/mm3, WBC 6.0 × 103/mm3, PMNs 56%. Bands 1%, Eosinophils, Basophils 2%, Lymphocytes 33%, Monocytes 5%.

Other tests:

His morning peak expiratory flows (PEF) have been running around 270 L/min (personal best = 400 L/min) over the last several weeks. PEF = 68% (yellow zone; caution).

7. Special Situations

- Pediatric, geriatric, pregnancy, breast-feeding, ethnicity: None
- Age 12+ according to GINA[32]
- Limitations (NPO, bedridden, inability to swallow): None
- Renal impairment: Normal kidney function (Table 3)
- Hepatic impairment: No
- Allergies: No known drug allergy (NKDA)
- Sensitive issues/barriers to communication: No
- Abuse: No

Day and Date: 9 October 2022

Table 3 Basic Calculations

Date	**9 October 2022**
Weight (kg)	58
Height (cm) https://www.feettometres.com/	170
BMI **[Weight (kg) / Height (m)^2]** https://www.nhlbi.nih.gov/health/educational/lose_wt/BMI/bmi-m.htm	20.1
Body Mass Index (BMI) Categories: **Underweight = <18.5** **Normal weight = 18.5–24.9** **Overweight = 25–29.9** **Obesity = 30 or greater**	Normal weight
Ideal Body Weight (IBW) https://www.mdcalc.com/ideal-body-weight-adjusted-body-weigh This formula is only an approximation and generally only applies to people ≥152.4 cm tall. One commonly-used modification for patients under 152.4 cm is to subtract 1 kg for each 2.54 cm below 152.4 cm.	66
Renal impairment (estimated Glomerular Filteration rate; eGFR) https://www.kidney.org/professionals/kdoqi/gfr_calculator eGFR: 90–120 mL/minute/1.73 m2	142 (N)
Others	NA

Basic Calculations and Assessment of Medications

Table 3 shows some basic calculations, and Table 4 and Table 5 detail the assessment of his medications.

MPOP and Care Plan

Table 6 and Table 7 represent the patient's care plans for chronic asthma and oral thrush infection, including the related MPOP.

Patient Education, Care Plan Implementation, and Follow Up

The care plan and patient education aim to provide the patient with a management plan at home when his peak flow readings go below the Green Zone. Following the care plan will help the patient gain control of his asthma symptoms if they worsen (Table 8). The instructions were given to the patient in Arabic, his mother language.

Discussion

The current research aimed to illustrate a real case using the validated Alsayed_v1 tools as tutorial training to improve the knowledge and skills of healthcare practitioners, pharmacy, and medical students in the clinical problem-solving process necessary to implement medical and pharmaceutical care.

The created classification system (MPOP tool) was intended to be user-friendly, applicable, and valuable in many healthcare settings (general practice, medical centers, hospitals, community pharmacies, etc.), as well as for research and education. The MPOP classification system is an open hierarchical structure with five broad categories at the higher levels and increasing specificity at the lower ones. Incorporating interventions into the classification system is crucial, particularly in medical and pharmaceutical care research, where the type of advice should be documented to evaluate the service's value and impact. It saves practitioners time in keying in the correct interventions. However, this MPOP application user can enter some information in the free text section.[9]

The section dedicated to treatment assessments is intended to synthesize patient information to facilitate the identification of the MPOPs. The absence of an evaluation component is a major limitation in some categorization systems.

The pharmacist's position has changed substantially, and they will likely provide pharmaceutical care services. In most hospitals, pharmacists have not previously collected medication histories.[33] This may be due to poor process knowledge, lack of awareness, unclear understanding of who is responsible for pharmaceutical care services, and shifting obligations to other healthcare professionals.[34,35] Lack of expertise, skills, and awareness hindered pharmaceutical care

Table 4 Assessment for Fluticasone

Date	9 October 2022
Drug name (scientific and trade name) / strength/route/frequency	Flixotide Evohaler (Fluticasone Propionate) 50 mcg, two puffs BID
Medical problem or health care need	Chronic asthma (uncontrolled)
Goals of Treatment	**1. Symptom control and maintain normal activity levels**. ✓ Daytime symptoms no more frequently than 2 days per week ✓ No nighttime awakening due to asthma ✓ No limitations in daily activities ✓ No limitations in exercise **2. Risk reduction**: to minimize future risk of exacerbations, fixed airflow limitation, and medication side effects. ✓ Minimize the need for hospitalization or ED visits. ✓ Prevent oral thrush infection. 3. **Preserve (almost) normal lung function and prevent its progression** 4. Minimal use of SABAs ✓ Need for reliever medications no more often than 2 days per week **5. Improve the patient's quality of life** **6. Improve the medication adherence** 7. Meet the patient's and his family's expectations of and satisfaction with asthma treatment and care 8. Meet any personal goals the patient would like to achieve concerning asthma care and control
Category 1. PTA, current, or discharge 2. P, OTC, or CAM 3. PRN; Stat; or regular	 1. PTA 2. P 3. Regular
Start date	NA
Stop date	Continuous
Time	Non-specific
Indication / Is drug choice appropriate	Asthma, maintenance/controller treatment for step 2 (track 1 or 2 in GINA 12+ age) In step 2, the preferred option (track 1) as a reliever and controller was Budesonide/Formoterol PRN asthma symptoms. The alternative option (track 2) is low-dose ICS as controller and the reliever SABA PRN asthma symptoms. At the time of the clinic visit, the patient was close to track 2. However, he had non-adherence to regular ICS use. Low-dose ICS plus Formoterol is recommended for step 3 (track 1 or 2 in GINA 12+ age). Adapted from[32,36] AA assessment: the current treatment regimen is less preferred.
Effectiveness	Monitoring Parameters (Lexicomp's Drug Information): FEV_1, peak flow, and/or other pulmonary function tests; asthma symptoms; arterial or capillary blood gases (if patient's condition warrants). AA assessment: Signs of uncontrolled chronic asthma, in this case, include the frequent symptoms that the patient reports, PEF = 68%, having been hospitalized during the past year due to asthma exacerbation, ED visit during the previous 6 months, two OCS courses during the last year. The patient's level of asthma control over the last 4 weeks was uncontrolled asthma (4/4 points).[32,36] Using the ACT, the score was 12, indicating a very poorly controlled status.[37] Accordingly, it might not be enough to increase the adherence of ICS to use (step 2, track 2) daily, and it can achieve better effectiveness if stepping up is performed to step 3 (track 1. Preferred option).

(*Continued*)

Table 4 (Continued).

Safety	Using Lexicomp's Drug Information: **Contraindications** (-) Hypersensitivity to fluticasone or any formulation component; severe hypersensitivity to milk proteins or lactose. Canadian labeling: (-) Untreated fungal, bacterial, or tubercular respiratory tract infections. **Warnings/Precautions** ***Concerns related to adverse effects:*** • (-) Adrenal suppression: May produce hypercortisolism or hypothalamic-pituitary-adrenal (HPA) axis suppression, especially in young children or individuals receiving large doses for lengthy durations; HPA suppression can cause adrenal crises. Withdrawal and discontinuation of a corticosteroid should be made slowly and carefully. Particular care is needed when switching from systemic to ICS due to adrenal insufficiency or withdrawal symptoms, including increased allergy reactions. • (-) Bronchospasm: Paradoxical bronchospasm that may be life-threatening may occur with inhaled bronchodilator (BD); the reaction should be distinguished from the inadequate response. If paradoxical bronchospasm occurs, discontinue fluticasone and institute alternative therapy. • (-) Immunosuppression: Prolonged use of corticosteroids may increase the incidence of secondary infection, mask acute infection (including fungal infections), prolong or exacerbate viral infections, or limit response to vaccines. Avoid use if possible in patients with ocular herpes; active or quiescent tuberculosis infections of the respiratory tract; or viral, fungal, bacterial, or parasitic systemic infections. • (+) Oral candidiasis: Local oropharyngeal Candida infections have been reported; if this occurs, treat appropriately while continuing therapy. Patients should be instructed to rinse their mouths with water without swallowing after each use. ***Disease-related concerns:*** • (-) Asthma: Stress or severe asthma attacks may require oral or parenteral steroids. Use is contraindicated in status asthmaticus or during these acute asthma requiring intensive measures. ***Other warnings/precautions:*** • (-) Discontinuation of therapy: A gradual tapering dose may be required before discontinuing therapy; there have been reports of systemic corticosteroid withdrawal symptoms when used both as inhalation and orally (eg, joint/muscle pain, lassitude, depression) when withdrawing oral inhalation therapy. **Adverse Reactions** >10%: (-) Central nervous system: Fatigue (≤16%), malaise (≤16%), headache (5% to 14%) (+) Gastrointestinal: Oral candidiasis (2% to 31%) (-) Neuromuscular & skeletal: Arthralgia (17%), musculoskeletal pain (3% to 12%) (-) Respiratory: Sinus infection (≤33%), sinusitis (≤33%), upper respiratory tract infection (6% to 31%), throat irritation (≤22%), nasal congestion (16%), rhinitis (3% to 13%) 1% to 10%: (-) Infection: Viral infection (5%), influenza (<3%), abscess (≤1%) **Advanced Practitioners Physical Assessment/Monitoring** • When changing from systemic steroids to inhalational steroids, taper reduction of systemic medication slowly (may take several months). • Monitor growth with long-term use in pediatric patients. • Evaluate for HPA axis suppression/adrenal insufficiency symptoms and signs. • Assess for ocular changes. • Assess for signs and symptoms of oral Candida infection with long-term use. Obtain peak flow, FEV1, and pulmonary function tests. • Obtain hepatic function tests. • Monitor for possible eosinophilic conditions (including Churg Strauss syndrome). Monitoring Parameters (-) Possible eosinophilic conditions; ocular symptoms; skin infections. **Nursing Physical Assessment/Monitoring** Check lab and pulmonary function test results and report abnormalities—instruct patient on proper administration. AA assessment: This medication is relatively safe. However, oral candidiasis should be treated and prevent further fungal infections.
Is dose appropriate	Using Lexicomp's Drug Information: Mild persistent asthma: low dose (100 to 250 mcg/day) Moderate persistent asthma: medium dose (>250 to 500 mcg/day) Severe persistent asthma: high dose (>500 mcg/day) Fluticasone furoate has a higher binding affinity for the lung glucocorticoid receptor than fluticasone propionate. The resulting enhanced affinity is reflected in the lower dose of fluticasone furoate compared to fluticasone propionate. Further studies are needed to elucidate a clinical effect. AA assessment: The currently used dose is within the low-dose range.
Product preparation (procedures, methods), compatibility, and stability	Metered dose inhaler (fluticasone propionate [aerosol]): Store between 20°C and 25°C; excursions are permitted to 15°C to 30°C. Discard the device when the dose counter reads "000." Store with the mouthpiece down. Do not expose to temperatures greater than 48.8°C. Do not puncture or incinerate. AA assessment: This information was discussed with the patient and should be addressed regularly.

(*Continued*)

Table 4 (Continued).

Drug interactions (drugs, foods, tests)	Using UpToDate drug interactions tool: **Fluticasone / Albuterol** **Route**: The clinical significance of this interaction is likely greater for systemic corticosteroids. ICSs do not appear to interact with beta2 agonists to a clinically relevant extent. Risk Rating B: No action is needed Summary Fluticasone may enhance the hypokalemia of Beta2-Agonists. **Severity**: Moderate. **Reliability Rating**: Fair: Existing data/reports are inconsistent. Patient Management: No action is required for most patients. Patients using higher doses and/or systemic (vs inhaled) administration of either drug may be at a higher risk for a clinically significant interaction, and warrant increased monitoring for hypokalemia. AA assessment: Nothing to be significant for the current care plan.
Patient (knowledge, adherence) **Knowledge**: o Poor o Average o Appropriate **Adherence**: o Appropriate o Primary non-adherence o Secondary non-adherence o Intentional non-adherence o Unintentional non-adherence	AA assessment: The patient had appropriate knowledge, secondary unintentional non-adherence. The patient's inhaler technique should be assessed using the teach-back method when using his inhalers. His inhalation technique should be observed periodically and corrected if needed. If he has difficulty, alternative or ancillary devices should be considered (eg, dry powder inhalers [DPIs], spacer devices).
Reference	Mentioned within the sections

Notes: (-) indicates negative, meaning the patient did not have the side effect at the assessment time but can be at risk later. (+) indicates positive, meaning the patient has the side effect at the assessment time.

Abbreviations: ACT, asthma control test; BID, twice a day; CAM, complementary and alternative medicine; ED, emergency department; FEV_1, forced expiratory volume in one second; GINA, Global Initiative for Asthma; HPA, hypothalamic-pituitary-adrenal; ICS, inhaled corticosteroid; OCS, oral corticosteroid; OTC, over-The-counter; P, prescribed; PRN, per registered nurse (as needed); PTA, prior to admission; SABA, short-acting beta 2 agonist.

Table 5 Assessment for Albuterol

Date	9 October 2022
Drug name (scientific and trade name) / strength/route/frequency	Ventolin Evohaler (Albuterol) two puffs Q 4–6 H PRN SOB, chest tightness, cough, wheezing
Medical problem or health care need	Chronic asthma (uncontrolled)
Goals of treatment	As mentioned in Table 4
Category 1. PTA, current, or discharge 2. P, OTC, or CAM 3. PRN; Stat; or regular	 1.PTA 2. P 3. PRN
Start date	NA
Stop date	Continuous
Time	Non-specific
Indication / Is drug choice appropriate	**Intermittent symptom relief (alternative agent)**: Utilization on an as-needed basis (relief therapy) rather than regularly. For maintenance therapy, additional controller therapy should be included.[32] Asthma, reliever treatment for step 2 (track 2 in GINA 12+ age) In this case, the preferred option (track 1) as a reliever and controller: is Budesonide/Formoterol PRN asthma symptoms. The alternative option (track 2) is low-dose ICS as controller and the reliever SABA PRN asthma symptoms. At the time of the clinic visit, the patient was close to track 2. However, he had non-adherence to regular ICS use. AA assessment: The patient takes the less preferred option (Track 2).

(*Continued*)

Table 5 (Continued).

Effectiveness	Monitoring Parameters (Lexicomp's Drug Information): FEV_1, peak flow, and/or other pulmonary function tests; asthma symptoms; arterial or capillary blood gases (if patient's condition warrants). AA assessment: Signs of uncontrolled chronic asthma, in this case, include the frequent symptoms that the patient reports, PEF = 68%, having been hospitalized during the past year due to asthma exacerbation, ED visit during the previous 6 months, two OCS courses during the last year. The patient's level of asthma control over the last 4 weeks was uncontrolled asthma (4/4 points).[32,36] Using the ACT, the score was 12, indicating a very poorly controlled status.[37] Accordingly, it might not be enough to increase the adherence of ICS to daily use (step 2, track 2), and it can achieve better effectiveness if stepping up is performed to step 3 (track 1, preferred option).
Safety	**Contraindications** (-) Hypersensitivity to Albuterol or any formulation component; severe hypersensitivity to milk proteins (DPI). (-) Documentation of allergenic cross-reactivity for sympathomimetics is limited; however, because of similarities in chemical structure and/or pharmacologic actions, the possibility of cross-sensitivity cannot be ruled out with certainty. Canadian labeling: Additional contraindications (not in US labeling): (-) Inhalation: Hypersensitivity to Albuterol or any component of the formulation; tocolytic use in patients at risk of premature labor or threatened abortion. **Warnings/Precautions** **Disease-related concerns:** • (-) Cardiovascular disease: Use caution in patients with cardiovascular disease. • Hyperthyroidism: Use caution; may stimulate thyroid gland activity. • (K=3.6, at risk) Hypokalemia: Use caution in patients with hypokalemia; SABA may decrease potassium concentration serum. • (-) Renal impairment: Use caution. • (-) Seizures: Use caution; may cause CNS stimulation/excitation. **Dosage form specific issues:** • (-) Some dosage formulations may contain sodium benzoate/benzoic acid; high doses of benzyl alcohol (99 mg/kg/day) have been linked to possibly lethal toxicity (gasping syndrome) in newborns. **Adverse reactions** >10%: (-) Nervous system: Excitement (2%-20%), nervousness (4%-15%) (-) Neuromuscular and skeletal: Tremor (5%-38%; frequency increases with age) 1% to 10%: (-) Cardiovascular: Chest discomfort, chest pain (<3%), edema (<3%), extrasystoles (<3%), flushing, hypertension (1%-3%), palpitations, tachycardia (1%-7%) (-) Dermatologic: Diaphoresis (<3%), pallor (children: 1%), skin rash (<3%), urticaria (≤2%) (-) Endocrine and metabolic: Diabetes mellitus (<3%), increased serum glucose (10%) (-) Endocrine and metabolic: Diabetes mellitus (<3%), increased serum glucose (10%) (-) Gastrointestinal: Anorexia (children: 1%), diarrhea (<3%), dyspepsia (1%-2%), eructation (<3%), flatulence (<3%), gastroenteritis (3%), glossitis (<3%), increased appetite (children and adolescents: 3%), nausea (2%-10%), unpleasant taste (inhalation site: 4%), viral gastroenteritis (1%-3%), vomiting (3%-7%), xerostomia (<3%) (-) Genitourinary: Difficulty in micturition, urinary tract infection (≤3%) (-) Hematologic and oncologic: Decreased hematocrit (7%), decreased hemoglobin (7%), decreased white blood cell count (4%), lymphadenopathy (3%) (-) Hepatic: Increased serum alanine aminotransferase (5%), increased serum aspartate aminotransferase (4%) (-) Hypersensitivity: Hypersensitivity reaction (3%-6%) (-) Infection: Cold symptoms (3%), infection (<3%; skin/appendage: ≤2%) (-) Local: Application site reaction (HFA inhaler: 6%) (-) Nervous system: Anxiety (<3%), ataxia (<3%), depression (<3%), dizziness (<7%), drowsiness (<3%), emotional lability (1%), fatigue (1%), headache (3%-7%), hyperactive behavior (children and adolescents: 2%), insomnia (1% to 3%), malaise (2%), migraine (≤2%), pain (2%), restlessness, rigors (<3%), shakiness (children and adolescents: 9%), vertigo, voice disorder (<3%) (-) Neuromuscular and skeletal: Back pain (2%-4%), hyperkinetic muscle activity (≤4%), lower limb cramps (<3%), muscle cramps (1%-7%; frequency increases with age), musculoskeletal pain (3%-5%)

(*Continued*)

Table 5 (Continued).

	(-) Ophthalmic: Conjunctivitis (children: 1%) (-) Otic: Ear disease (<3%), otalgia (<3%), otitis media (≤4%), tinnitus (3C3%) (-) Respiratory: Bronchitis (≥2%), cough (≥3%), dyspnea (<3%), epistaxis (children and adolescents: 1%), flu-like symptoms (3%), increased bronchial secretions (2%), laryngitis (<3%), nasal congestion (1%), nasopharyngitis (≥5%; children: 2%), oropharyngeal edema (<3%), oropharyngeal pain (≥5%; children: 2%), pulmonary disease (<3%), respiratory system disorder (6%), sinus headache (1%), sinusitis (≥5%), throat irritation (10%), upper respiratory tract inflammation (5%), viral upper respiratory tract infection (7%), wheezing (1% to 2%) (-) Miscellaneous: Accidental injury (<3%), fever (≥5%-6%) **Monitoring Parameters** Asthma symptoms; serum glucose, potassium, and creatinine; blood pressure, heart rate; CNS stimulation; arterial or capillary blood gases (if patients condition warrants). AA assessment: This medication is unsafe, due to the risk of hypokalemia and exacerbation in SABA-alone treatment because the patient has a problem with ICS adherence.
Is dose appropriate	Using Lexicomp's Drug Information: Nebulized therapy may be preferable for patients with more severe symptoms or who cannot effectively use an inhaler. Metered-dose inhaler or dry powder inhaler (90 mcg/actuation): Oral inhalation: 2 inhalations every 4 to 6 hours as needed; some experts recommend up to 4 inhalations every 4 to 6 hours for moderate to severe symptoms. DPI (200 mcg/actuation): Ventolin Diskus [Canadian product]: Oral inhalation: 1 inhalation every 4 to 6 hours as needed. Ventolin Rotacaps [International product]: Oral inhalation: 200 to 400 mcg (1 to 2 capsules) inhaled 3 to 4 times daily (use on an as-needed basis; maximum: 2,400 mcg (12 capsules)/day. Nebulization solution: Oral inhalation: 2.5 mg every 4 to 6 hours as needed. Exercise-induced bronchoconstriction (prevention): Metered-dose inhaler or dry powder inhaler (90 mcg/actuation): Oral inhalation: 2 inhalations 5 to 20 minutes prior to exercise (ATS [Parsons 2013]; Bonini 2013; O'Byrne 2020). Canadian formulation: Ventolin Diskus [Canadian product]: DPI (200 mcg/inhalation): Oral inhalation: 1 inhalation 15 minutes prior to exercise. AA assessment: The patient takes the correct dose.
Product preparation (procedures, methods), compatibility, and stability	
Drug interactions (drugs, foods, tests)	Similar to what is mentioned in Table 4
Patient (knowledge, adherence) **Knowledge**: o Poor o Average o Appropriate **Adherence**: o Appropriate o Primary non-adherence o Secondary non-adherence o Intentional non-adherence o Unintentional non-adherence	AA assessment: The patient had appropriate knowledge and adherence. The patient's inhaler technique should be assessed using the teach-back method when using his inhalers. His inhalation technique should be observed periodically and corrected if needed. If he has difficulty, alternative or ancillary devices should be considered (eg, dry powder inhalers [DPIs], spacer devices).
Reference	Mentioned within the sections

Notes: (-) indicates negative, meaning the patient did not have the side effect at the assessment time but can be at risk later. (+) indicates positive, meaning the patient has the side effect at the assessment time.

Abbreviations: ED: emergency department; ICS: inhaled corticosteroid; OCS: oral corticosteroid; PEF: peak expiratory flow; PRN: per registered nurse (as needed); SABA: short-acting beta 2 agonist; LABA: long-acting beta 2 agonist.

service implementation. This study developed an innovative learning tool to help pharmacy and medical students and medical practitioners understand clinical problem-solving.

The ongoing project seeks to evaluate the implementation and user satisfaction of Alsayed_v1 tools in daily practice and analyze data obtained from hospitals, medical centers, community pharmacies, and other primary care settings. In addition, these templates are part of a larger project managed and owned by the corresponding

Table 6 The Care Plan for the Chronic Asthma

Patient Care Plan	
Date	9 October 2022
Medical problem or healthcare need	Chronic asthma
Goal(s) of Treatment	**1. Symptom control and maintain normal activity levels**. ✓ Daytime symptoms no more frequently than 2 days per week ✓ No nighttime awakening due to asthma ✓ No limitations in daily activities ✓ No limitations in exercise **2. Risk reduction**: to minimize future risk of exacerbations, fixed airflow limitation, and medication side effects. ✓ Minimize the need for hospitalization or ED visits. ✓ Prevent oral thrush infection. **3. Preserve (almost) normal lung function and prevent its progression** **4. Minimal use of SABAs** ✓ Need for reliever medications no more often than 2 days per week **5. Improve the patient's quality of life** **6. Improve the medication adherence** **7. Meet the patient's and his family's expectations of and satisfaction with asthma treatment and care** 8. Meet any personal goals the patient would like to achieve concerning asthma care and control
Medical Problems Oriented Plan (MPOP)	II. Effectiveness (Actual uncontrolled Condition) A. Replace 1. Add the new intervention with abrupt discontinuation 3- Error, harm O Category E: An error occurred that resulted in the need for treatment or intervention and caused temporary patient harm. Description: The patient has persistent asthma uncontrolled by Step 2, track 2 (alternative) therapy (a low-dose Fluticasone plus a PRN SABA). IV. Patient B. Adherence b. Skip (from the patient or by the caregiver) 1. Patient/caregiver education 3- Error, harm O Category E: An error occurred that resulted in the need for treatment or intervention and caused temporary patient harm. Description: Non-adherence to long-term controller therapy (ICS) to properly control asthma symptoms.
Intervention(s) / Recommendation(s)	**Non-pharmacological treatments** 1. The patient should attempt to reduce his exposure to irritants, allergens, smoking and other factors that may be contributing to his asthma severity. The patient should be questioned about his exposure to the following: ✓ Inhalant allergens, such as animal allergens (in this case, the patient's family has one cat), house dust mites, cockroach allergens, indoor fungi (molds), and outdoor allergens. ✓ Irritants, such as tobacco smoke (in this case, the patient is being exposed to second-hand smoke), chemicals, indoor/outdoor pollution, or irritants. ✓ Other factors: Symptoms of rhinitis/sinusitis; gastroesophageal reflux; sensitivity to aspirin, other nonsteroidal anti-inflammatory drugs, and sulfites; use of topical and systemic β-blockers; viral respiratory infections. **Strategies to reduce exposure to common irritants and allergens**: • **House dust mites**: ✓ Wash bed linens weekly in hot water (water must be at least 55 °C to kill mites) and dry them in a hot dryer or in the sun. Encase mattress and pillowcases in allergen-impermeable covers. Do not sleep or lie on cloth-covered furniture or upholstery. ✓ Replace carpets with hard flooring if possible, or at least in the bedroom. Remove rugs, stuffed toys, and upholstered furniture from sleeping areas. ✓ Use vacuum cleaners with a high-efficiency particulate air filter or double-layered bag. If the patient has to vacuum or dust, he should be instructed to wear a dust face mask. ✓ Reduce indoor humidity to below 60% (ideally 30–50%). Dehumidifiers or central air systems are helpful to accomplish this. ✓ Apply acaricides or tannic acid to kill mites, but be sure the patient is not at home during the application.

(*Continued*)

Table 6 (Continued).

Patient Care Plan	
	• **Animal dander**: ✓ Keep animals with fur or feathers out of the home if possible, or at least out of the bedroom (keep the bedroom door closed). ✓ Cover air vents in the home with a filter. ✓ Wash and brush fur-covered pet(s) regularly. • **Tobacco smoke**: ✓ Family members should be educated about the impact of their smoking on the patient's asthma and encouraged to quit. If quitting is not possible or desirable at this time, then the family members should be asked to smoke outside the home and not in family vehicles. ✓ Avoid places with tobacco smoke and people who smoke. ✓ Do not allow smoking in the patient's home or car. • **Cockroaches**: ✓ Clean the home thoroughly and often. Keep food and garbage in covered containers. ✓ If volatile chemicals are used, be sure the patient is not at home when used and the odor is gone before the patient returns home. • **Outdoor pollens and mold**: ✓ Keep windows and doors closed, and remain indoors when pollen counts are highest (midday and afternoon). ✓ Avoid outdoor activities that disturb decaying plant materials (raking leaves). • **Indoor mold**: ✓ Fix leaky faucets and pipes. Clean damp or moldy areas frequently. ✓ Dehumidify basements, if possible. • **Other factors**: ✓ Cold air: Have the patient cover his nose and mouth with a scarf on cold and windy days. ✓ Avoid strong odors (perfumes), chemicals (paints), sprays (hairspray), and wood-burning stoves or fireplaces. ✓ Avoid or minimize consumption of food or preservatives that may trigger asthma symptoms. Common causes may be sulfite-containing foods or beverages (these include beer, wine, shrimp, processed potatoes, and dried fruit). ✓ Upper respiratory infections are a common cause of worsening asthma symptoms and exacerbations; therefore, an annual inactivated influenza vaccine is recommended every fall/winter. **2. Physical activity**: • Encourage the patient to engage in regular physical activity. • Provide advice about the prevention and management of exercise-induced bronchoconstriction. • Breathing exercises may be a useful supplement to asthma treatment. 3. Further clarification regarding patient's adherence to his medication regimen should be sought. Ask the patient how many times per week and month he misses a dose of his inhaled fluticasone propionate. Discuss strategies to help the patient remember to take his medications. 4. Educate the patient on proper inhaler technique using the teach-back method. **Pharmacological treatments** • After assessing adherence to current treatments, inhaler technique, and potential for environmental triggers, this patient should be considered for adjustment in his long-term control medications to reflect the severity of his asthma. Because his asthma is uncontrolled, his long-term control therapy should be stepped up one step to Step 3 therapy. It might not be enough to increase the adherence of ICS to daily use (step 2, track 2), and it can achieve better effectiveness if stepping up is performed to step 3 (track 1. Preferred option). Thus, the preferred regimen for long-term control of the patient's asthma symptoms at this time is the combination of a low dose of ICS plus a LABA. A combination inhaler may offer advantages for this patient in terms of adherence and convenience. Symbicort Turbuhaler (Budesonide 160 mcg/dose, Formoterol Fumarate Dihydrate 4.5 mcg/dose), two inhalations BID would be an appropriate choice for convenience of dosing and administration.[32] Maximum recommended maintenance dose: 4 inhalations/day. During the worsening of asthma, the dose may temporarily be increased up to a maximum of 8 inhalations/day. **The alternative option (more convenient but less preferred in terms of effectiveness)**: Since he is already receiving low-dose inhaled fluticasone propionate, more convenient therapeutic options include the addition of a LABA to the patient's current ICS: ✓ Fluticasone propionate (Flixotide Evohaler) 50 mcg, two inhalations BID, plus Oxis Turbohaler (Formoterol Fumarate Dihydrate 4.5 mcg/dose) one inhalation BID— each given separately. • Education regarding the importance of medication adherence is needed. If the initial care plan fails after 4 weeks of adherence, consider stepping up. If the patient is well-controlled (symptoms and lung function) on the same medication regimen for at least 3 consecutive months, is not traveling, and has no respiratory infection, consider stepping down the patient's therapy to the lowest treatment step/dose that maintains control of the patient's symptoms. Rescue doses of SABA, short-term scheduled use during exacerbations, and a short course of oral corticosteroids (OCS); prednisone is typical acute therapy options. A physician or pharmacist should monitor the frequency of usage and implementation of the asthma care plan to determine if adjustments to the chronic treatment regimen are required.

(*Continued*)

Table 6 (Continued).

Patient Care Plan	
Follow-up (Monitoring and Evaluation) Monitoring parameter(s) (therapeutic or toxic) / Endpoints / Frequency Follow-up (timeframe)	Reevaluate the patient within 2–6 weeks (ideally, in 2 weeks) to assess his response to changes in his asthma therapy. The monitoring of asthma control can be based on symptoms, peak flow monitoring, or both. Since this patient is already using peak flow monitoring, he should be encouraged to continue with daily peak flow monitoring to assess the patient's asthma control. Review the established zones for this patient according to PEF (Green Zone = ≥80%; Yellow Zone = 50–79%; Red Zone <50%). The patient should also be encouraged to monitor his symptoms. Also, his control can be measured, impending exacerbations can be detected, and if his asthma symptoms are well-controlled and monitored closely, a step-down in treatment can be tried. Ask the patient to maintain an asthma diary. This should include the following documentation: frequency of asthma symptoms (daily and nocturnal), use of reliever (quick-relief) medications, participation in physical activities, and factors that contribute to asthma severity. In conjunction with peak flow monitoring, this will assist in assessing the patient's asthma control level. Review the patient's peak flow readings and asthma diary. The patient should be questioned for the following: ✓ Has your asthma been better or worse since your past visit? ✓ What have been your highest and lowest peak flow readings since your last visit? ✓ Have you used your written asthma action plan since your last visit? ✓ Have you been unable to perform usual activities, including exercise, because of asthma? ✓ How often and how much have you used your reliever (quick-relief)inhaler? ✓ How often have you had asthma symptoms during the day or at night? ✓ How often have you awakened at night with asthma symptoms? ✓ Have you missed work due to asthma symptoms? ✓ Have you had any urgent care or ED visits since your last visit? In addition, medication adherence and side effects should also be assessed. Questions to ask include: ✓ Which medications are you currently taking and how often? ✓ How many times a week do you miss your medications? ✓ What problems have you had taking the medications (cost, time)? ✓ What concerns do you have about your medications? ✓ Show me how you take your medications. Educate the patient about his medications, including the role of each medication, and discuss differences between reliever (quick-relief) medications and controller (long-term control) medications. Explain how each medication helps control and/or prevent asthma symptoms with proper use and the importance of using a spacer and rinsing his mouth out with water after using his ICS to prevent oral candidiasis.
References	[32]
Outcome (Date) o Resolved o Stable o Improved o Partially Improved o Unimproved o Worsened o Failure	10 November 2022 o Stable
Physician action and comments o Agreed and implemented o Agreed but not implemented o Not agreed	o Agreed and implemented

Abbreviations: ED, emergency department; ICS, inhaled corticosteroid; OCS, oral corticosteroid; PEF, peak expiratory flow; PRN, per registered nurse (as needed).; SABA, short-acting beta 2 agonist; LABA, long-acting beta 2 agonist.

author, including a website and a mobile application to provide medical care support (https://www.asami-draacare.com).

Effective management requires the development of a partnership between the patient with asthma (or the patient's caregivers) and his healthcare professional(s). The goal of this partnership is to provide the patient with the ability to control his condition with guidance from the healthcare professional(s), discuss and agree on therapy goals, and develop a personalized, written, self-management asthma care plan.[32]

While initial diagnosis and treatment of asthma typically begin with primary care providers, there are situations when specialists should become involved in managing the asthmatic patient. Education can be conducted by PharmD,

Table 7 The Care Plan for the Oral Thrush Infection

Patient Care Plan	
Date	9 October 2022
Medical problem or healthcare need	Mild oral thrush infection (likely due to ICS use)
Goal(s) of Treatment	Resolve untreated oral thrush infection and prevent future infections
Medical Problems Oriented Plan (MPOP)	I. Indication A. Untreated condition a. Acute disease 2. Add pharmacological treatment 3- Error, harm O Category E: An error occurred that resulted in the need for treatment or intervention and caused temporary patient harm. IV. Patient **A. Knowledge** c. Pharmacological therapy 1. Patient education 3- Error, harm O Category E: An error occurred that resulted in the need for treatment or intervention and caused temporary patient harm.
Intervention(s) / Recommendation(s)	Add antifungal medication, such as nystatin (5 mL swish and swallow QID), in order to eradicate the current thrush infection. The patient should be educated regarding ways to prevent similar infections from occurring in the future (eg, mouth rinsing after each use of the ICS, as well as use of a spacer device if a metered-dose inhaler is used for ICS administration).
Follow-Up (Monitoring and Evaluation) Monitoring parameter(s) (therapeutic or toxic) / Endpoints / Frequency Follow-up (timeframe)	Monitor for resolution of the oral thrush infection. At the 2-week follow-up appointment, evaluate the patient for resolution of the oral thrush infection.
Refereces	[32]
Outcome (Date) o Resolved o Stable o Improved o Partially Improved o Unimproved o Worsened o Failure	10 November 2022 o Resolved
Physician action and comments o Agreed and implemented o Agreed but not implemented o Not agreed	o Agreed and implemented

Abbreviations: ICS, inhaled corticosteroid; QID, four times daily.

Table 8 Patient Education for Chronic Asthma for the Included Patient

Medical Condition	**Chronic Asthma**
Scientific drug name	Budesonide 160 mcg/dose, Formoterol Fumarate Dihydrate 4.5 mcg/dose
Trade drug name	Symbicort (160 mcg/dose, 4.5 mcg/dose)
Background and how the medication works	You are currently receiving two medications for your asthma; both the Budesonide and Formoterol are contained in a combination product called Symbicort, which allows you to receive both medications at the same time with each dose. To control your asthma, you are being treated with a combination of an inhaled steroid (Budesonide) and a long-acting bronchodilator (Formoterol). Inhalation allows these medications to be used safely. This medication represents the long-term control therapy for your asthma. The inhaled corticosteroid controls inflammation (swelling) in your lungs and the bronchodilator relaxes your breathing tubes and allows you to breathe easier. This medication works in just a few minutes to relax your breathing when you have asthma symptoms (coughing, wheezing, and shortness of breath). You should always carry this medication with you in case you need.
How to take your medication	- Symbicort (Budesonide 160 mcg/dose, Formoterol Fumarate Dihydrate 4.5 mcg/dose), two inhalations BID would be an appropriate choice for convenience of dosing and administration. - Use this combination inhaler twice a day every day even if you have no symptoms. Do not increase the dose of this medication unless instructed by your healthcare professional. - Maximum recommended maintenance dose: 4 inhalations/day. During periods of worsening asthma, the dose may temporarily be increased up to a maximum of 8 inhalations/day. - It is important not to miss any doses. If a dose is missed, it should be taken as soon as remembered; if it is almost time for your next dose, skip the missed dose and return to your regular schedule. Do not take double doses. - Before participating in physical activity, you may need to use this medication to prevent asthma symptoms. - Your inhalation technique is very important to get the benefit from the medication, so the pharmacist will check it periodically. Here are instructions on how to use the device: 1. Remove the cap from the inhaler. Open it by placing your thumb on the thumb grip and pushing your thumb away from you until the mouthpiece appears and the device clicks. 2. Hold the device with the mouthpiece facing you in a level and horizontal position (Keep the inhaler upright). 3. Slide the lever on the side away from you until you hear a click (Rotate the grip anti-clockwise, then back until a click is heard). 4. Exhale gently and fully away from the device. 5. Place the mouthpiece between your lips. 6. Breathe in (inhale) quickly and deeply through the device. 7. Remove the device from your lips and hold your breath for as long as comfortable up to 10 seconds, and then exhale normally. 8. You can close the device by sliding the thumb grip toward you until it clicks shut. 9. Rinse your mouth with water after use of this medication, and spit the water out in the sink.
Effectiveness monitoring	Check your peak flow readings every morning when you wake up (before you take your medications) when you are having asthma symptoms, and after taking your quick-relief (reliever) medication during an asthma flare-up. Your peak flow readings will help you monitor your asthma and when used with your asthma care plan, they will provide you with a management plan when you are experiencing asthma symptoms or exacerbations.
Safety monitoring	- You may develop a sore throat or hoarseness, and it is possible that this medication may cause an oral fungal infection, called thrush. In order to prevent this type of infection from occurring, it is important that you rinse your mouth thoroughly following each inhalation. If you do develop thrush, notify your healthcare professional right away so that you may receive proper treatment for the infection. - Side effects that you may notice when taking this medication may include throat or nose irritation, common cold symptoms. - **Talk with your doctor immediately if you have any of the following signs**:

(*Continued*)

Table 8 (Continued).

Medical Condition	Chronic Asthma
	1. Infection 2. High blood sugar like confusion, fatigue, increased thirst, increased hunger, passing a lot of urine, flushing, fast breathing, or fruit smell-like breath. 3. Adrenal gland problems like severe nausea, vomiting, severe dizziness, passing out, muscle weakness, severe fatigue, mood changes, lack of appetite, or weight loss. 4. Mouth irritation or sores 5. Flu-like symptoms 6. Thrush 7. Sinusitis 8. Vision changes, eye pain, or severe eye irritation 9. Trouble breathing 10. Signs of a significant reaction like chest tightness; fever; itching; worsening cough; blue skin color; seizures; or swelling of face, lips, tongue, or throat. **Note**: These side effects usually lessen over time. This is not a comprehensive list of all side effects. Talk to your doctor for more details.
Factors to avoid in relation to the disease or medication	-
The nature of the food to be avoided or eaten concerning the disease or medication	-
Storage instructions	Do not store above 30° C. Keep the container tightly closed.
Other instructions related to the disease and/or drug	To keep track of the amount of medication in your inhaler, estimate the number of times you have used it over a certain period of time; this will give you an idea of the number of inhalations remaining.

pharmacist, respiratory therapist, or nurse to ensure an understanding of the technique and to stress the importance of adherence to new respiratory devices.

Primary care providers should consider referral of the asthmatic patient to pulmonology and/or allergy/immunology practices for any of the following: poorly controlled or severe asthma despite appropriate treatment and compliance, presence of comorbidities that may affect response to treatment (eg, nasal polyps, COPD, etc), additional diagnostic tests are needed (eg, skin allergy testing, bronchoscopy, etc.), asthma diagnosis is uncertain, or occurrence of a life-threatening asthma exacerbation. Referral to appropriate specialists should also be considered when a psychiatric or psychosocial condition impacts the patient's ability to comply with appropriate asthma treatment.

The involvement of a social worker may also be considered when a patient is routinely and unwillingly exposed to environmental triggers which negatively impact their condition, such as cigarette smoke, cockroaches, fumes, etc. A social worker can also help ensure that the patient's family can afford the recommended medications.

Conclusion

This paper applied the validated Alsayed v1 tools to an actual patient situation. These instruments consist of principal components: data collection, assessment of treatments, the MPOP, as well as a care plan and patient education. Incorporating interventions into the classification system is crucial, particularly in pharmaceutical and medical research, where the type of recommendations must be documented to evaluate the service's value and impact, and it saves practitioners time from manually typing the appropriate interventions. These validated, and clinically tested tools provide a coding system for the MPOP that permits easy documentation with an open hierarchical structure where higher levels are broad and lower levels are particular, and the possibility to enter

free text. By implementing Alsayed_v1 tools, the clinical practitioner can actively give the best practice for optimal patient outcomes.

Disclosure

The author report no conflicts of interest in this work.

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