كليـــــــة الـطـب
والصيدلة - مراكش
FACULTÉ DE MÉDECINE
ET DE PHARMACIE - MARRAKECH

MARRAKECH
جامعة القاضي عياض
UNIVERSITÉ CADI AYYAD

YEAR 2024 Thesis N° 500/24

LA PREVALENCE DES TROUBLE ANXIO-DEPRESSIVE CHEZ LES PATIENTS SUIVI POUR L'ASTHME AU SERVICE DE PNEUMOLOGIE DE L'HOPITAL MILITAIRE AVICENNE

THESIS

PRESENTED AND PUBLICLY DEFENDED ON THE 25/12/2024

BY

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Born on the 05/02/1997 at chamen, The Gambia.

FOR THE OBTAINING OF DOCTORATE IN MEDICINE

KEYWORDS

ASTHMA-ANXIETY-DEPRESSION

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{رَبِّ أَوْزِعْنِي أَنْ أَشْكُرَ نِعْمَتَكَ
الَّتِي أَنْعَمْتَ عَلَيَّ وَعَلَى وَالِدَيَّ
وَأَنْ أَعْمَلَ صَالِحًا تَرْضَاهُ وَأَصْلِحْ
لِي فِي ذُرِّيَّتِي إِنِّي تُبْتُ إِلَيْكَ
وَإِنِّي مِنَ الْمُسْلِمِينَ}

سورة الأحقاف الآية 15

بِسْمِ ٱللَّهِ ٱلرَّحْمَٰنِ ٱلرَّحِيمِ

قَالُوا۟ سُبْحَٰنَكَ لَا عِلْمَ لَنَآ إِلَّا مَا عَلَّمْتَنَآ ۖ إِنَّكَ أَنتَ ٱلْعَلِيمُ ٱلْحَكِيمُ ﴿٣٢﴾

صَدَقَ ٱللَّهُ ٱلْعَظِيمُ

سورة البقرة ٢:٣٢

Hippocratic Oath

Upon being admitted to the medical profession, I pledge my life to the service of humanity.

I will treat my teachers with the respect and gratitude they deserve.

I will practice my profession with conscience and dignity.

The health of my patients will be my first goal.

I will not betray the secrets entrusted to me.

I will maintain by all means in my power the honor and noble traditions of the medical profession.

The physicians will be my brothers and sisters.

No consideration of religion, nationality, race, political and Social consideration will come between my duty and my patient.

I will maintain strict respect for human life from the moment of conception.

Even under threat, I will not use my medical knowledge in a manner contrary to the laws of humanity.

I pledge this freely and on my honor.

Declaration of Geneva, 1948.

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300	IRAQI HOUSSAINI Kawtar	Pr Ass	Gynécologie-obstétrique
301	EL FAHIRI Fatima Zahrae	Pr Ass	Psychiatrie
302	BOUKIND Samira	Pr Ass	Anatomie
303	LOUKHNATI Mehdi	Pr Ass	Hématologie clinique
304	ZAHROU Farid	Pr Ass	Neurochirugie
305	MAAROUFI Fathillah Elkarim	Pr Ass	Chirurgie générale
306	EL MOUSSAOUI Soufiane	Pr Ass	Pédiatrie
307	BARKICHE Samir	Pr Ass	Radiothérapie
308	ABI EL AALA Khalid	Pr Ass	Pédiatrie
309	AFANI Leila	Pr Ass	Oncologie médicale
310	EL MOULOUA Ahmed	Pr Ass	Chirurgie pédiatrique
311	LAGRINE Mariam	Pr Ass	Pédiatrie
312	OULGHOUL Omar	Pr Ass	Oto-rhino-laryngologie
313	AMOCH Abdelaziz	Pr Ass	Urologie
314	ZAHLAN Safaa	Pr Ass	Neurologie
315	EL MAHFOUDI Aziz	Pr Ass	Gynécologie-obstétrique
316	CHEHBOUNI Mohamed	Pr Ass	Oto-rhino-laryngologie
317	LAIRANI Fatima ezzahra	Pr Ass	Gastro-entérologie
318	SAADI Khadija	Pr Ass	Pédiatrie
319	DAFIR Kenza	Pr Ass	Génétique
320	CHERKAOUI RHAZOUANI Oussama	Pr Ass	Neurologie
321	ABAINOU Lahoussaine	Pr Ass	Endocrinologie et maladies métaboliques
322	BENCHANNA Rachid	Pr Ass	Pneumo-phtisiologie
323	TITOU Hicham	Pr Ass	Dermatologie

324	EL GHOUL Naoufal	Pr Ass	Traumato-orthopédie
325	BAHI Mohammed	Pr Ass	Anesthésie-réanimation

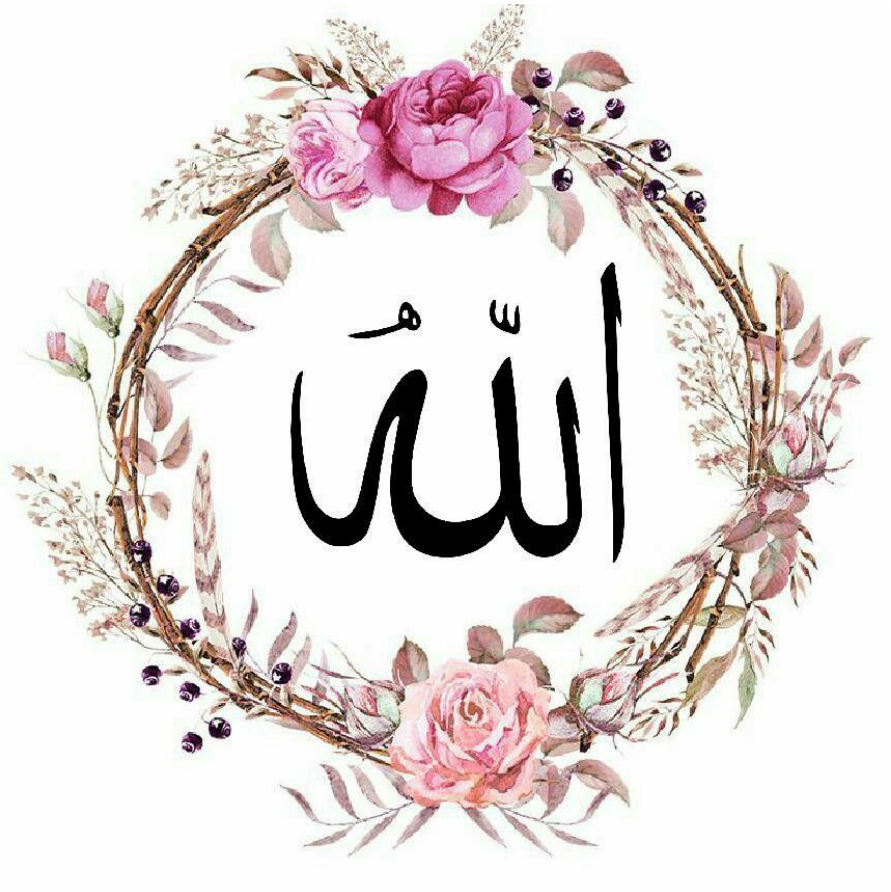
326	RAITEB Mohammed	Pr Ass	Maladies infectieuses
327	DREF Maria	Pr Ass	Anatomie pathologique
328	ENNACIRI Zainab	Pr Ass	Psychiatrie
329	BOUSSAIDANE Mohammed	Pr Ass	Traumato-orthopédie
330	JENDOUZI Omar	Pr Ass	Urologie
331	MANSOURI Maria	Pr Ass	Génétique
332	ERRIFAIY Hayate	Pr Ass	Anesthésie-réanimation
333	BOUKOUB Naila	Pr Ass	Anesthésie-réanimation
334	OUACHAOU Jamal	Pr Ass	Anesthésie-réanimation
335	EL FARGANI Rania	Pr Ass	Maladies infectieuses
336	IJIM Mohamed	Pr Ass	Pneumo-phtisiologie
337	AKANOUR Adil	Pr Ass	Psychiatrie
338	ELHANAFI Fatima Ezzohra	Pr Ass	Pédiatrie
339	MERBOUH Manal	Pr Ass	Anesthésie-réanimation
340	BOUROUMANE Mohamed Rida	Pr Ass	Anatomie
341	IJDDA Sara	Pr Ass	Endocrinologieet maladies métaboliques
342	GHARBI Khalid	Pr Ass	Gastro-entérologie
343	ATBIB Yassine	Pr Ass	Pharmacie clinique

LISTE ARRETEE LE 24/07/2024

DÉDICATIONS

I am grateful to all the people who've supported me
during my journey, who have never wavered in their help and support for me to achieve my goal of becoming a doctor.
It is with love, respect and gratitude that

I dedicate this thesis to



À Allah

Le tout puissant, clément et miséricordieux qui a illuminé ma voie, qui m'a inspiré et guidé dans le bon chemin, qui a facilité mes épreuves, qui a apaisé mon âme aux moments les plus difficiles, qui m'a permis de voir ce jour tant attendu, je te dois ce que je suis devenue. Je te remercie et je te prie de m'aider à accomplir mon métier de médecin avec conscience et dignité.

"الْحَمْدُ لِلَّهِ الَّذِي بِنِعْمَتِهِ تَتِمُّ الصَّالِحَاتُ"


وَكَانَ فَضْلُ اللَّهِ عَلَيْكَ عَظِيمًا

To my loving Mum, Amie Bittaye

As the Wolofs would say 'ligayu ndey anyup dorm' which translate to 'the hard work of a mum shows in her children'

I cannot thank you enough for everything you have done for me ranging from your support, your advices, to your prayers and love. Being a single mum to 5 girls would have drained and made others give up on everything but it didn't have that effect on you. If anything, it increases your strength, hard work and love for your children.

We are grateful to have you as our mum, as the backbone of our family and blessed to still have you around with us. We cannot thank you enough for all the sacrifices you did and continue to do for us.

May Allah the Almighty continue to protect and guide you for us.

To my Late Dad, Modou Salieu Cham

You left this world when I was a toddler, you left too soon but your love and memory live on.

I pray that you continue to rest in peace and may Allah grant you jannatul firdaws

Allahuma Ameen.

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Knowing you is one of the greatest blessings I continue to thank Allah for. You have been my strength, my support system, my go-to person when things get hard and unbearable. My go-to place when I need motivation to get back on my feet, my place of celebration when I'm happy and a shoulder to cry on when I'm sad. Someone who believes in me, shows me that I am capable of it all, that I can do it. Someone who reminds me of why I chose to study medicine and wouldn't let me waver in anyway.

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Thank you for never giving up on this journey and my dreams with me.

Thank you for your patience, your love and understanding.

Thank you for being a part of my story.

I pray that Allah strengthen our bond, our love and our friendship.

We did it!

To my dearest sister, Mariama Cham

I can attest to the saying that the first born of a family becomes the second mum of the family as you are a mum to me. You have been my backbone since the passing of our dad. You have raised me to become an intelligent, smart, independent beautiful young lady. You have instilled morals in me that are rare to see in this modern era. You are someone that have always been there for me. One of my greatest pillars of support that have mold me into who I am today. You are someone I can always lean on in good and bad times.
Thank you for raising me, for taking your time with me, for being patient with me and for all the love and support you showed me.
I pray that Allah continue to protect and guide you, bless you with all of your heart's desire.

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I am so blessed to be family with all of you. You have been crucial pillars in my support system
Thank you.

To my dearest uncle, Baba Bittaye

I consider you as a dad, a friend, someone I look up to because of your love for me and our family. You are the most selfless, hardworking, loving and caring person that I know. You live for the good of your family and we can't express how lucky we are to have you with us. You have been relentless in being part of this journey from all the advices, love and support through all these years. Thank you so much for never giving up on us and for always being there for me and my siblings.

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To the rest of my family, Cham Kunda in The Gambia and Senegal

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To the memories of my lost love ones,

Assan Cham, Mam Musa Cham, Baye Ass Cham, Step Mum Mareme Cham
You all left too soon from this world but your memories will live on. May Allah grant you all jannatul firdaws
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Now let's go change the world!
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I want to extend my sincere gratitude to the entire pneumology department especially the consultation center of the military hospital for their profound help in the realization of this thesis. Special thanks go to the two secretaries for their help in acquiring of all the patients that participated in the survey. Your efforts and kindness are appreciated.

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Professor of internal medicine of the Avicienne Military Hospital in Marrakech

I am delighted and grateful for your acceptance to honor and chair the jury of this thesis. We are very grateful for the knowledge and support you continue to teach and give to your students and everyone around you. It is an honor to have you as part of the panel of judges.

Please accept my sincere gratitude.

TO MY SUPERVISOR PROFESSOR BENJELLOUN HARZIMI AMINE

Professor of pneumology at the Avicienne Military Hospital

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TO OUR PROFESSOR AND JUDGE Pr. SALMA AIT BATAHAR

Professor of pneumology at CHU Mohamed VI in Marrakech

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TO OUR PROFESSOR AND JUDGE Pr. MEHMOUD AMINE LAFFINTI

Professor of psychiatry at the Annex Military Hospital in Marrakech

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TO OUR PROFESSOR AND JUDGE HICHAM JANAH

Professor of pneumology at the Avicienne Military Hospital

Everyone knows you for your hard work, dedication and love towards your students. It is an honor that you accepted to be a judge in this thesis and it is highly appreciated. It is with sincere gratitude to have you as part of our panel. We extend our sincere gratitude.

ABBREVIATIONS

List of abbreviations

ACBS : Asthma Call-Back Surveys
ADHD : Attention Deficit Hyperactivity Disorder
AD : Anxiety Disorder
AR : Allergic Rhinitis
BAI : Beck Anxiety Inventory Scale
BDI : Beck Depression Inventory Scale
BMI : Body Mass Index
BRFSS : Behavioral Risk Factor Surveillance System
CES-D : Center for Epidemiological Studies Depression Scale
CHD : Chronic Heart Disease
CNOPS : National Fund of Social Welfare Organization
COPD : Chronic Obstructive Pulmonary Disease
CVD : Cardiovascular Disease
DASS : Depression Anxiety Stress Scale
DMDD : Disruptive Mood Dysregulation Disorder
DSM-5 : Diagnostic and Statistical Manual of mental disorders, 5th edition
ECT : Electroconvulsive Therapy
FAR : Royal Arm Force
GAD : Generalized Anxiety Disorder
GAD-7 : Generalized Anxiety Disorder 7-Item Scale
GERD : Gastro-Esophageal Reflux Disease
GDS : Geriatric Depression Scale
GINA : Global Initiative for Asthma
HADS : Hospital Anxiety and Depression Scale
HAM-A : Hamilton Anxiety Rating Scale
HBP : High Blood Pressure
HRDS : Hamilton Depression Rating Scale
IBS : Irritable Bowel Syndrome
ICS : Inhaled Corticosteroid
LABA : Long-Acting Beta Agonist
LAMA : Long-Acting Muscarinic Antagonist
MDD : Major Depressive Disorder
NCD : Non-Communicable Disease
NSAID : Non-Steroidal Anti-Inflammatory Drugs
OCD : Obsessive Compulsive Disorder
PDD : Persistent Depressive Disorder
PE : Physical Exercise
PHQ-9 : The Patient Health Questionnaire
PMDD : Premenstrual Dysphoric Disorder
PRIME-MD : The Primary Care Evaluation of Mental Disorders
PTSD : Post Traumatic Stress Disorder
SABA : Short Acting Beta-2-Agonist
SNRI : Serotonin/Norepinephrine Reuptake Inhibitors
SPSS : Statistical package for the social sciences

SSRI : Selective Serotonin Reuptake Inhibitors
STAI : The State-Trait Anxiety Inventory
UN : United Nations
WHO : World Health Organization
ZSDS : Zung Self Rating Depression Scale

FIGURES AND TABLES

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OUTLINE

INTRODUCTION

Asthma is a chronic non-communicable disease affecting people of all ages and sexes. It is usually caused by different trigger factors and results to inflammation and narrowing of the muscles around the airways (1) and symptoms vary in different people. According to World Health Organization (WHO), there are more than 300 million people affected by this disease and has caused 455,000 deaths as of 2019 (2). It is a disease that is usually underdiagnosed and undertreated in low and middle-income countries. Although it can be a serious condition, it is manageable with the right treatment throughout the life of the patient.

Asthma evolves by intermittent attacks triggered by different factors in different people. It is included in the WHO Global Action Plan for prevention and control of Non-Communicable Diseases (NCD) and the UN 2030 agenda for sustainable development as it continues to be a public health problem.

It is imperative to note that from an epidemiologic study made in Morocco, the prevalence of asthma is between 5 to 20% of the general population with the highest prevalence in big cities like Casablanca, rabat and Marrakech while it still remains greatly underdiagnosed and undertreated throughout the country (3).

Like Asthma, mental health is a major problem yet to be tackled in the world. According to WHO, in 2019, one in every eight people, or 970 million people around the world were living with a mental disorder, with anxiety and depressive disorders being the most common, 301 million people were living with an anxiety disorder while 280 million people were living with depression (4). Various researches shows that chronic diseases are associated with an increase in mental health problem. These issues arise from various factors such as prolonged treatments, social isolation, and the rising cost of living.

In Morocco, 48.9% of the general population suffers from mental disorder (5) with an estimated 26.5% aged 15 and above having suffered from depression at some point in their lives. Additionally, 37% of Moroccans experience at least one anxiety disorder (6) with the

highest prevalence of these disorders is rabat, Casablanca and Marrakech according to a study done in these 3 cities (7).

To better understand the link between anxiety and depression with asthmatic patients, we embark on a study to know the estimated number of patients affected by these 2 in relation to different sociodemographic and clinical factors.

OBJECTIVES

The objectives of this study are:

Principal objective

- To estimate the prevalence of anxiety and depression in asthmatic patients

Secondary Objectives

- To determine the clinical and socio-demographic factors associated with anxiety and depression
- To determine how anxiety and depression affects asthma exacerbations and control

METHODS AND MATERIALS

I. Type of Study

We conducted a descriptive cross-sectional study on 64 patients from January 2024 to August 2024.

II. Targeted population and sample

1. Survey Population

Our sample consisted of known asthmatic outpatients of the Avicenne Military Hospital in Marrakech who consults every 3 months and were diagnosed with the disease for more than a year.

2. Inclusion criteria

- Patients 18 years and above
- Confirmed asthmatic patients for more than a year
- Patients with no history of personal psychiatric disorder
- Patients with accepted consent to participate in the survey

3. Exclusion criteria

- Patients with personnel history of psychiatric disorder before diagnosis of asthma
- Questionnaires that were not completed adequately
- Patients that have not given their consent

4. Ethical consideration

This study was done in conformity with the global rules of confidentiality and protection of patient information.

III. The Method

1. Collection of data

The data collection was done at the consultation center of the avicenne military hospital using questionnaires filled by patients which were later transferred to the Statistical Package for the Social Sciences (SPSS) version 26.0 logistic for analytic review.

2. Question sheet used

The survey was done using a 6-page question sheet that was divided in 3 important parts which covers the following:

- The first part covered the socio-demographic (identity, age, sex, family situation, profession, origin, social class, medical insurance, etc.) and clinical aspect of the patient (personal and family history of asthma, personal and family history of psychiatric disorders, personal and family history of other diseases, toxicology history and their way of life etc.).
- The second part concentrates on the characteristics of their asthma which includes their age of diagnose, the symptoms presented by the patient, the number of exacerbations they experience in a year, the different factors which triggers their asthma attacks, the severity of their asthma, their level of control and the treatment plans they are on.
- The third part of the questionnaire focus on the psychological aspect of the survey. We have used the hospital anxiety and depression scale (HADs) for its simplicity and efficiency to detect new potential cases of anxiety and depression in adults. The scale was translated in both French and Arabic for easy understanding.

The scale consisted of 14 questions

- 7 of which explores anxiety signs
  - I feel tense or 'wound up'
  - I get a sort of frightened feeling as if something awful is about to happen
  - Worrying thoughts go through my mind
  - I can sit at ease and feel relaxed
  - I get sort of a frightened feeling like 'butterflies' in the stomach
  - I feel restless as I have to be on the move
  - I get sudden feelings of panic

- 7 of which explores depression signs
  - I still enjoy the things I used to enjoy
  - I can laugh and see the funny side of things
  - I feel cheerful
  - I feel as if I am slowed down
  - I have lost interest in my appearance
  - I look forward with enjoyment to things
  - I can enjoy a good book or radio or tv program

The scores were interpreted as follows

Total score: Depression (D) ----- Anxiety (A) -----

0-7 = Normal

8-10 = Borderline abnormal (borderline case)

11-21 = Abnormal (case)

3. Data entry and analysis

Statistical analysis of the data was done using Statistical Package for the Social Sciences (SPSS) version 26.0 software and the data entry of graphs, tables and text was done using Microsoft ® 2018 software. The Chi-square test in the SPSS logistic was used for frequency comparison within subgroups and for multivariable analysis.

Statistical tests were considered significant for a p value<0.05.

RESULTS

I. Descriptive statistic

1. Epidemiological profile

1.1. Gender

The study done on 64 patients shows that 56.3% of the population were male and 43.7% were female.

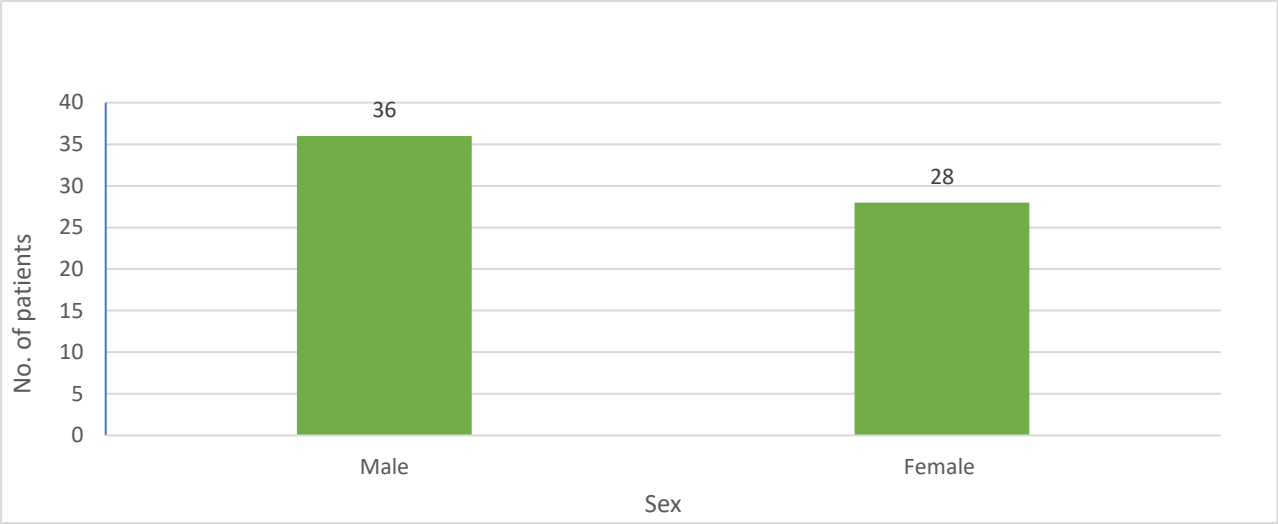


Figure 1: A graph showing the distribution of patient's gender

1.2. Age

Our youngest patient was 19 years old and our oldest was 88 years. The study shows a **mean age of 46 years** and the largest age group was 30-49.

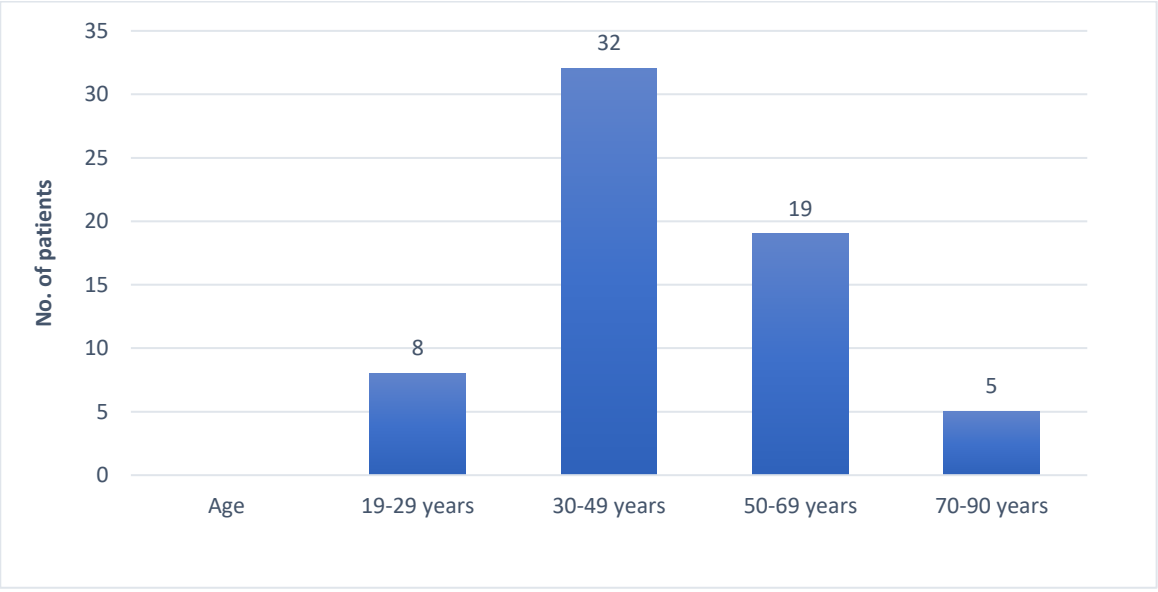


Figure 2: A graph showing the distribution of age groups

1.3. Marital status

82.8% of our patients were married marking the majority, 9.4% were single, 1.5% were divorced and 6.3% were widows.

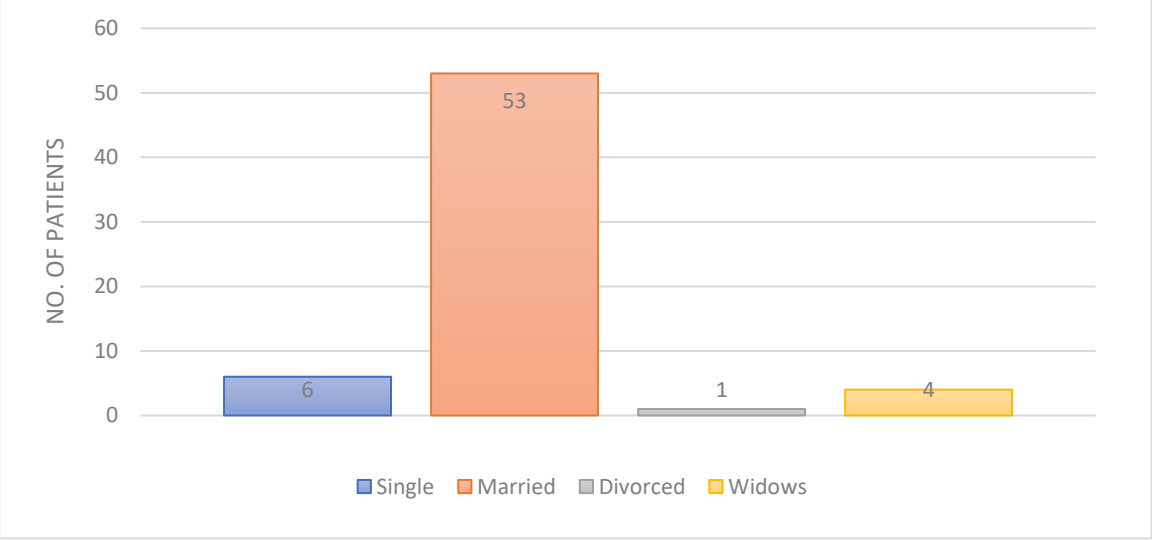


Figure 3: A graph showing the distribution of marital status

1.4. Social class

The different social classes were defined according to the monthly income of the patients:

Monthly income (Dirhams)	Class	Number of patients
< 3000	Lower class	14
3000-6000	Middle class	46
>6000	Upper class	4
Total		**64**

The middle-class accounts for 72% of the population making it the majority. 22% were found in the lower class while only 6% of the population made the upper class.

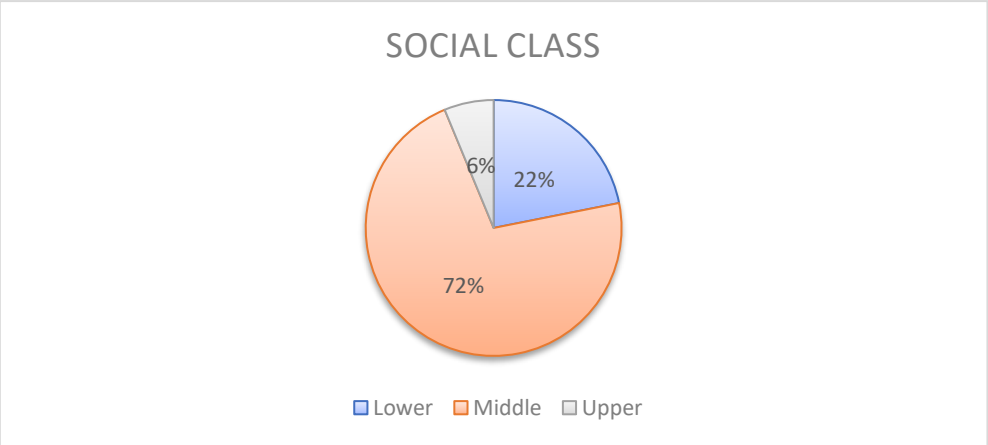


Figure 4: A pie chart showing the distribution of social class in 64 patients

1.5. Origin

We had our highest number of patients who participated in this study from Marrakech and Essaouira. The category others represent the city of Tahla, Errachidia, Imintanoute, khenifra and Zagora.

City	Marrakech	Casablanca	Essaouira	Benguerir	El kelaa de sraghna	Others
No of patients	50	2	3	2	2	5

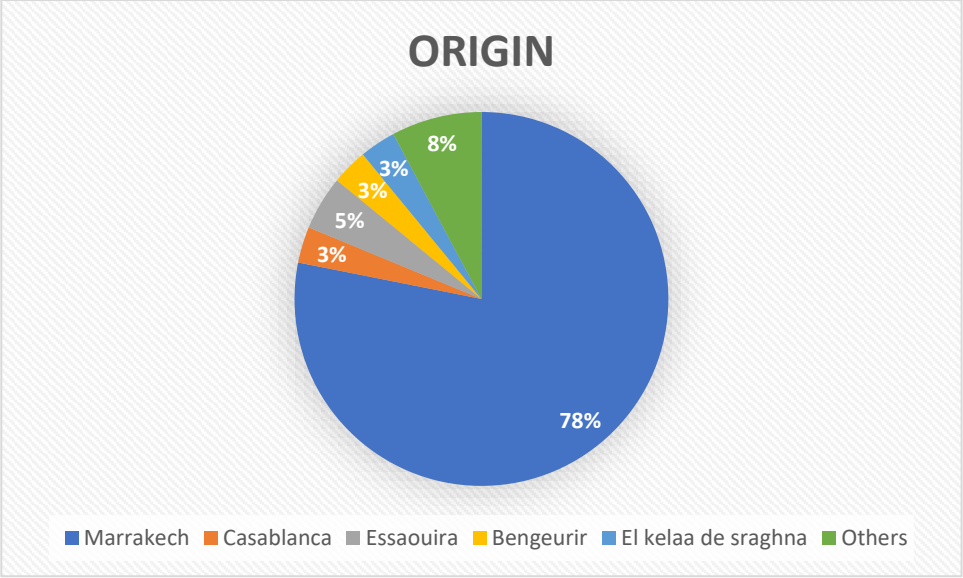


Figure 5: A pie chart showing the distribution of different origins in 64 patients

1.6. Type of medical insurance

In this study, 79.7% had family insurance of Royal Armed Force (FAR) and 20.3% had CNOPS (Caisse Nationale de l'Organisme de Prevoyance Sociale).

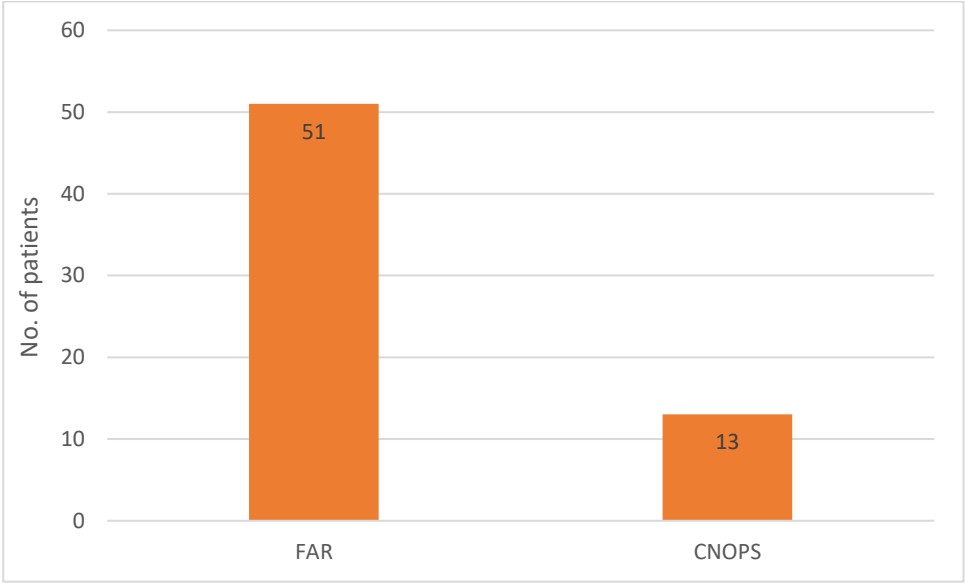


Figure 6: Distribution of patient's medical insurance

1.7. Profession

30% of the patients in this study were housewives marking the majority of the population.

The groups of others include 2 cleaners and a seller.

Profession	No of patients	Percentage (%)
Auxiliary force	13	20.3
Housewife	19	29.7
Retired	10	15.6
Soldiers	14	21.9
Students	3	4.7
Cleaners	2	3.1
Nurse	2	3.1
Salesperson	1	1.6
Total	**64**	**100**

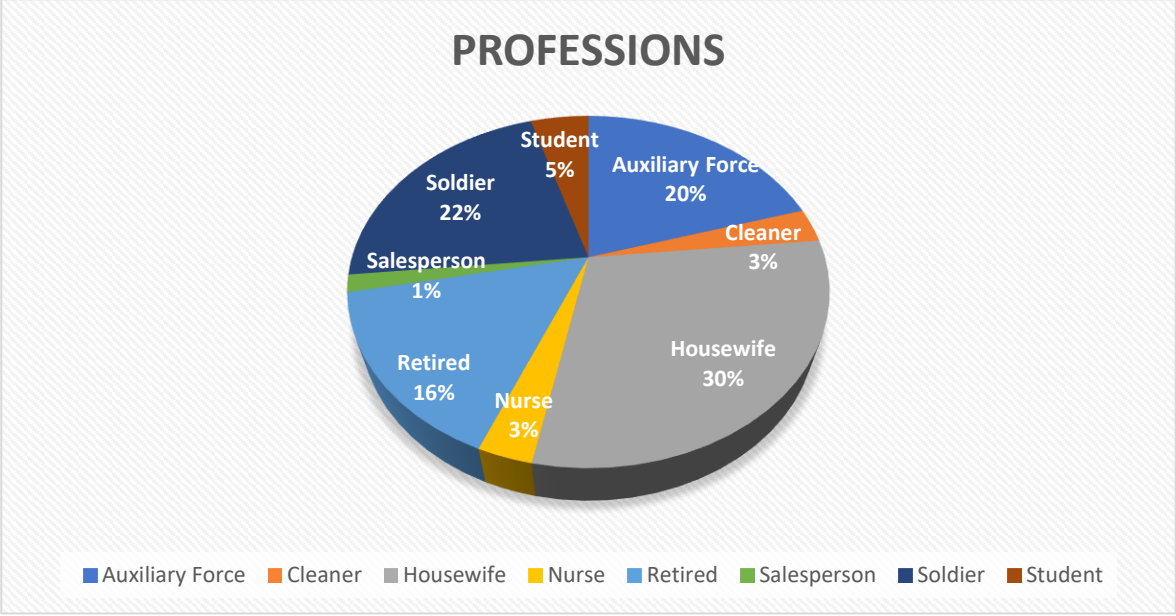


Figure 7: Distribution of professions in 64 patients

2. Patient's Medical history

2.1. Personal psychiatry history

All the patients included in this study had no personal history of depression, anxiety or any other psychiatric disorder.

2.2. Respiratory disease history

29 or 45.3% of the patients reported a personal history of lung disease in the last year while 54.7% reported no history of lung disease. The different diseases are outline in the table below.

❖ Type of lung disease	❖ No of patients	❖ Percentage (%)
Acute bronchitis	15	23.4
Flu	6	9.4
Pneumonia	5	7.8
Whooping cough	3	4.7
Total population with respiratory disease history	**29**	**45.3**
Total population with no respiratory disease history	**35**	**54.7**
Grand total	**64**	**100**

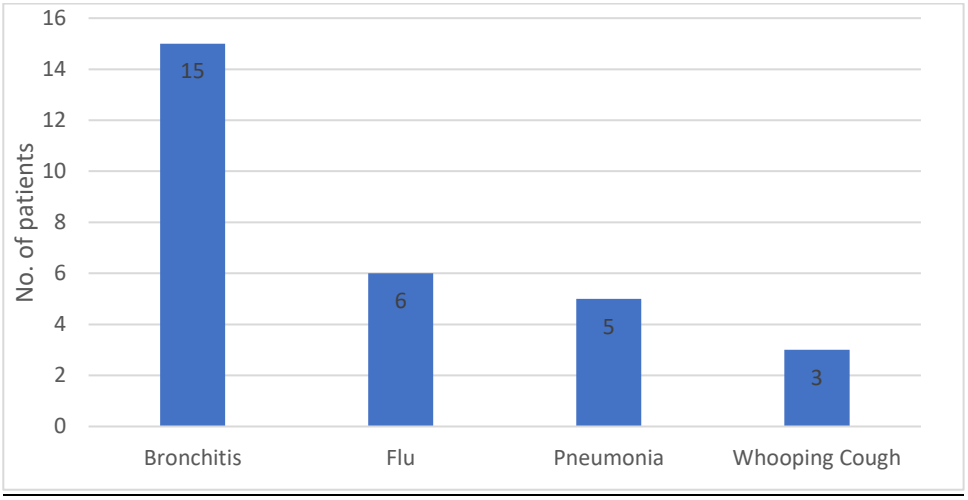


Figure 8: A graph showing the distribution of different respiratory disease in 64 patients

2.3. Family history of Asthma

Out of the 64 patients 26.6% reported a family history of asthma while 15.6% reported the presence of atopy in their families. 28.1% had a family history of both asthma and atopy while 29.7% of the rest of the population had no family history of either asthma or atopy.

Family history	No of patients	Percentage (%)
Asthma	17	26.6
Atopy	10	15.6
Both asthma and atopy	18	28.1
Population with no family history	19	29.7
Total	**64**	**100**

2.4. Family psychiatry history

Only 3 patients reported a family history of psychiatric disorder while the remaining 61 patients reported no family history of psychiatric disorder.

3. Toxic habits and Allergies

3.1. Smoking

There were no active smokers in our study. 16 patients reported being ex-smokers and 48 patients have never smoked in their lives.

History of smoking	Active Smoker	Non-smokers	Ex-Smoker	Total
No. of patients	0	48	16	64
Percentage	0	75%	25%	100%

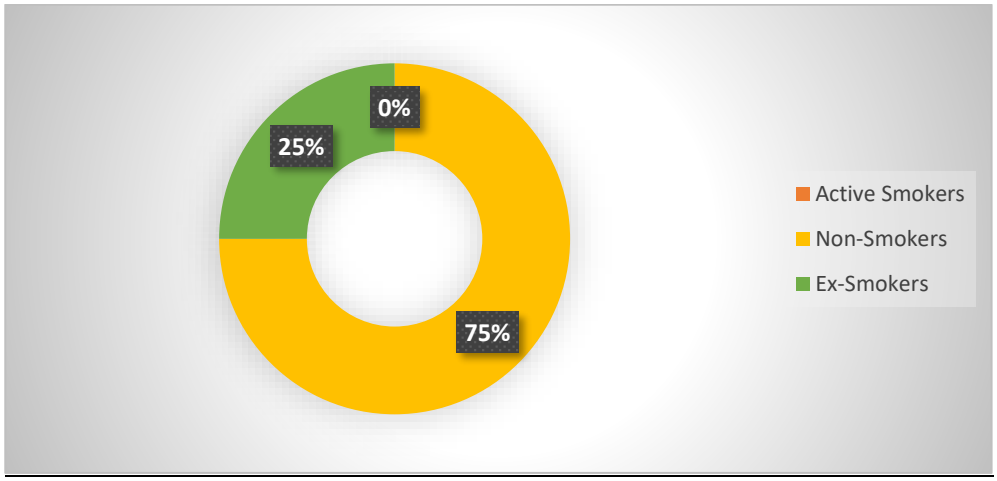


Figure 9: Distribution of patient's history of smoking

3.2. Other toxic habits

Patients were interrogated on their exposure to other toxic habits (alcohol, cannabis etc.) but the results came back negative.

3.3. Allergy diseases

- 51 patients presented with allergic rhinitis under treatment
- 23 patients reported conjunctivitis
- 3 patients reported eczema

Other Allergies

- 5 patients reported allergic to different medications (4 aspirin and 1 paracetamol)
- 3 patients reported reactions to certain foods; nuts, seafood and milk.
- 1 patient had an allergy to sheep wool.

Allergy diseases	No of patients	Percentage (%)
Allergic rhinitis	51	79.7
Conjunctivitis	23	35.9
Eczema	3	5.0
Other allergies		
Medications	5	7.8
Food	3	4.7
Sheep wool	1	1.6
No allergies	4	6.2
Total	**64**	

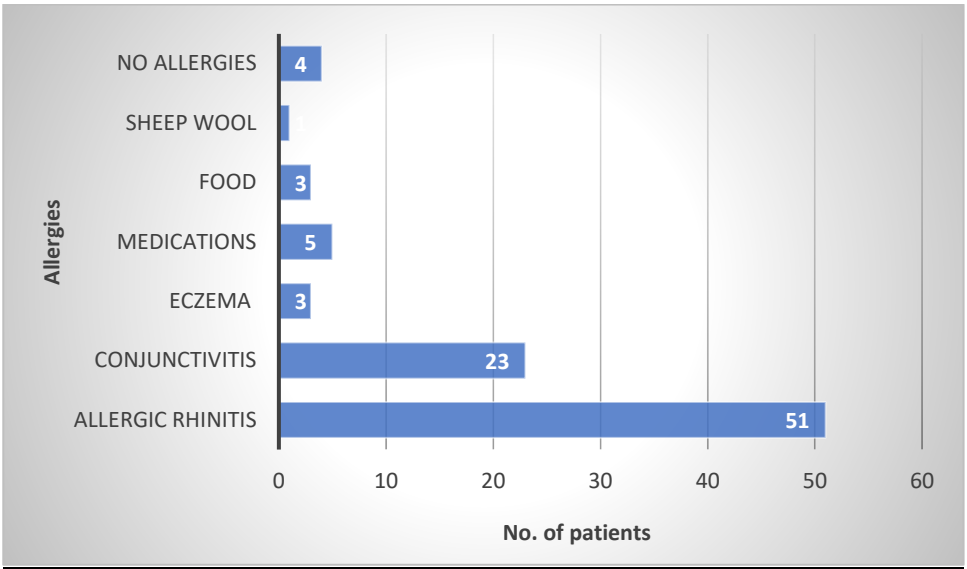


Figure 10: A graph showing the different allergy distribution in 64 patients

4. Comorbidities

44 patients or 68.75% from our study had comorbidities associated with their asthma while 20 patients or 31.25% reported no comorbidity associated. Gastroesophageal reflux disease (GERD) was the most frequent comorbidity and was reported by 42% of the total population. The graph below shows the different comorbidities reported by 44 patients.

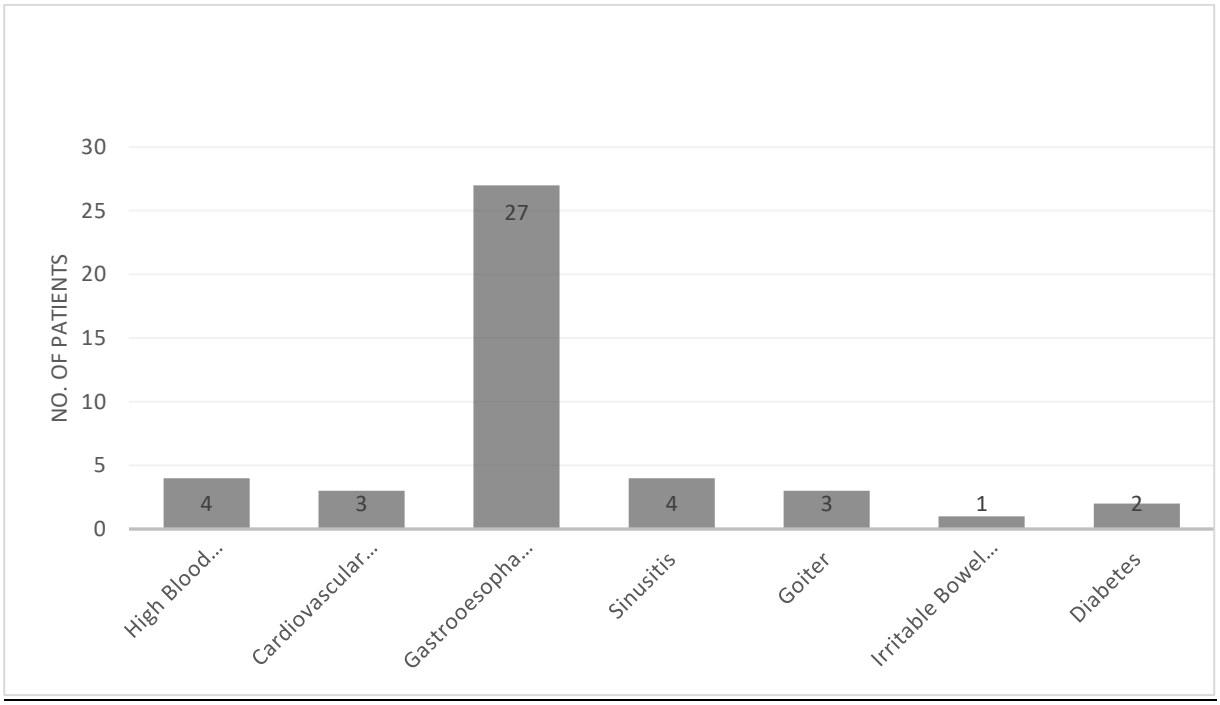


Figure 11: A graph showing the distribution of different comorbidities in 44 patients

5. Body Mass Index (BMI)

The BMI of the patients were graded according to standard international grading system as follows:

BMI (kg/m2)	Interpretation
< 18.4	Underweight
18.5-24.9	Normal
25.0-29.9	Overweight
30.0-39.9	Obese
>40.0	Severe obesity

From our sample of 64 patients:

- ✓ 36 had normal body weight
- ✓ 23 were overweight and
- ✓ 5 were obese
- ✓ No underweight was found in any of the patients

BMI	No of patients	Percentage (%)
Normal weight	36	56
Overweight	23	36
Obesity	5	8
Underweight	0	0
Total	**64**	**100**

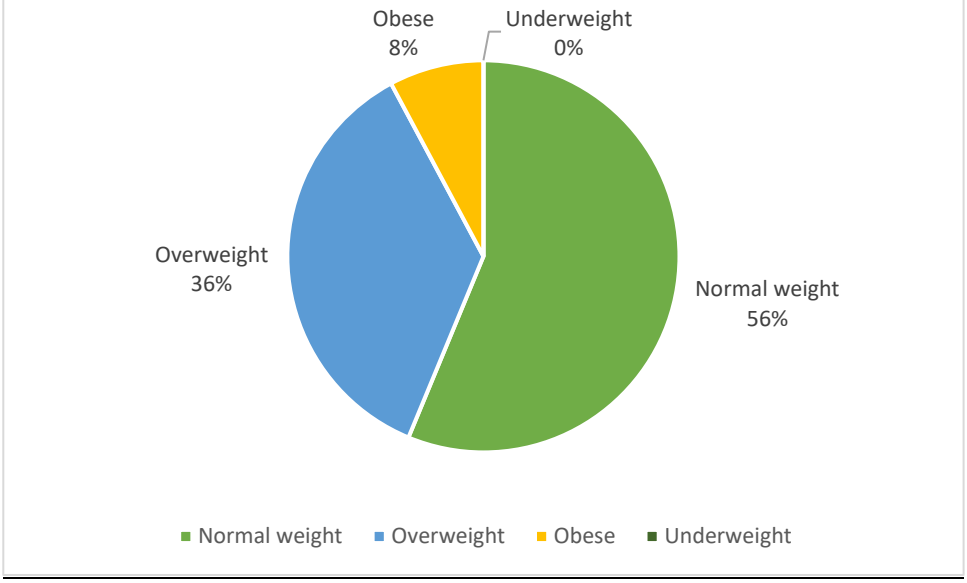


Figure 12: A pie chart showing the different percentages of BMI In 64 patients

6. Stress frequency

6.1. Stress due to asthma

The frequency of stress experience by patients due to their asthma was reported as follows:

Stress frequency	Stress level	No of patients	Percentage (%)
Rarely	Low	17	26.6
Occasionally	Moderate	42	65.6
Daily	High	5	7.8
Total		**64**	**100**

65.6% out of the 64 patients reported to experience stress due to their asthma on an **occasional** bases while **7.8%** reported a **daily** occurrence of stress. **26.6% rarely** experience stress due to the disease.

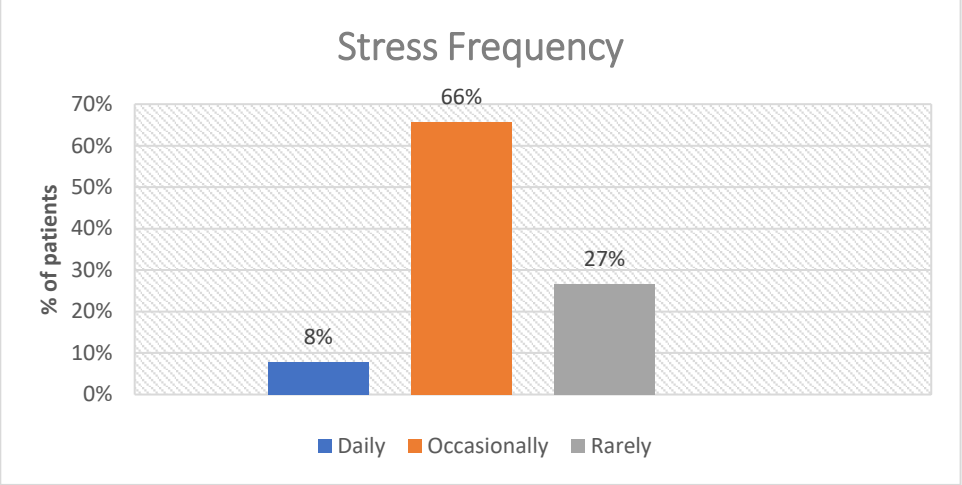


Figure 13: A bar chart showing the different distribution of stress frequency in 64 patients.

6.2. Work conditions

Out of the 35 working patients, the level of stress at work were as follows:

Exposure to stress at work	No of patients	Percentage (%)
Low	17	48
Moderate	16	46
High	2	6
Total	**35**	**100**

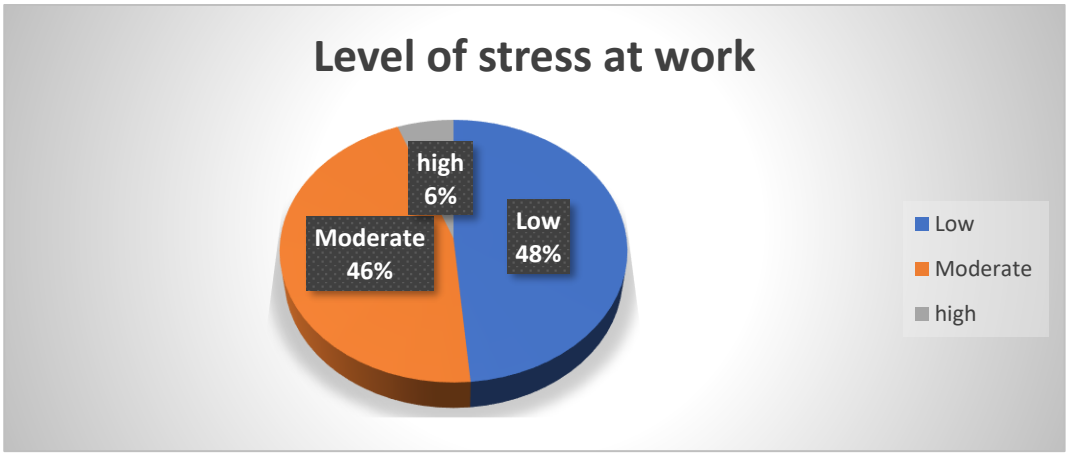


Figure 14: A pie chart showing different level of stress in 35 working patients.

6.3. Stress Management

Majority of the patients uses physical exercise (aerobic, musculation, etc.) as a stress management method. The table below shows the different methods used by patients.

Stress management method	No of patients	Percentage (%)
Physical exercise	31	48
Walks	29	45
Yoga	1	2
None	3	5
Total	**64**	**100**

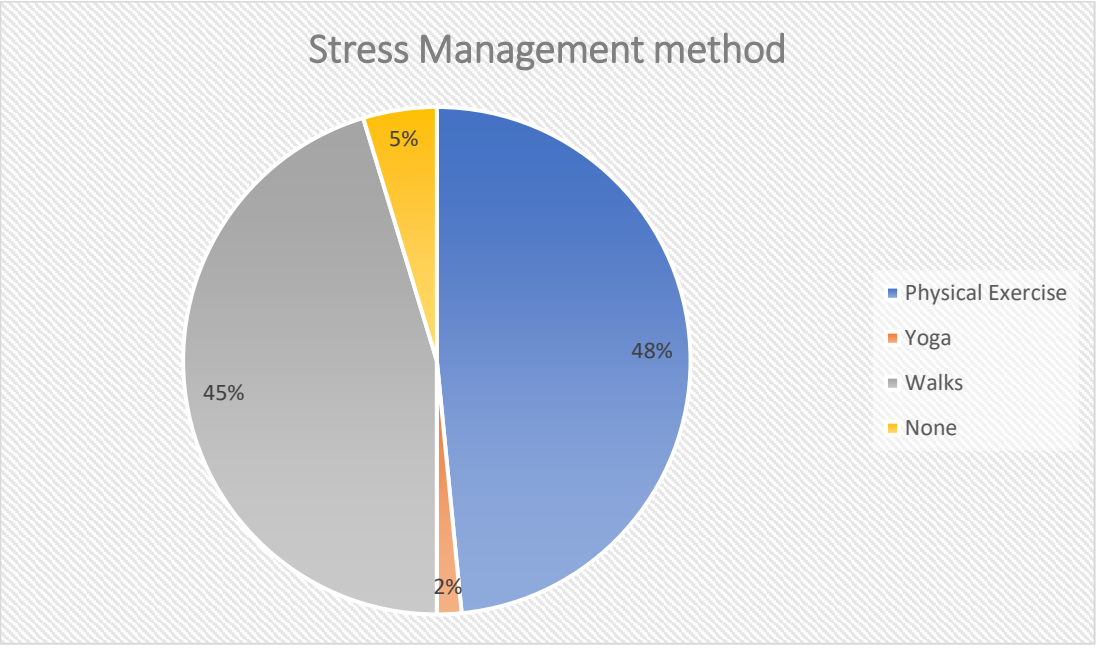


Figure 15: Distribution of different stress management methods used by the 64 patients.

6.4. Quality of life

Patients were asked to grade their quality of life using the scale of Likert graded from 1-5 (1 being the worst and 5 being the best). The following results were found.

Scale	No of patients	Percentage
5	6	9%
4	44	69%
3	11	17%
2	3	5%
1	0	0
TOTAL	64	100%

7. Asthma characteristics

7.1. Age of symptom onset

From our study, we have found that the onset of asthma symptoms in patients started before 18 years. 47% of the cases studied had symptom onset between 15-30 years old, 31% were found in the 31-45 years range and 22% of the cases presented asthma symptoms after 45 years. Our mean age of asthma symptom onset was 35.6 years old.

Age of symptom onset	No. of patients	Percentage
15-30 years	30	47%
31-45 years	20	31%
>45	14	22%
Total	64	100

7.2. Diagnosis Duration

It is important to note the number of years our patients had been diagnose with asthma since their first onset of symptoms as the risk of psychological issues increases with the number of years they had been diagnosed. This is reported in the table below:

Diagnosis Duration (years)	No. of patients	Percentage (%)
<15	43	67.2
15-30	17	26.6
>30	4	6.2
Total	64	100

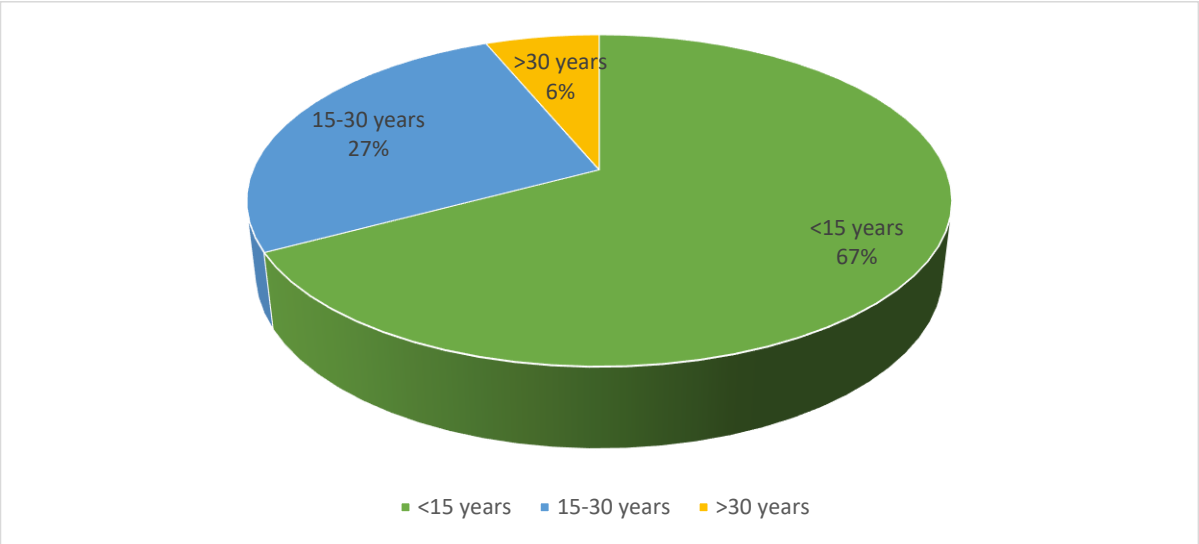


Figure 16: A pie chart showing the distribution of diagnosis duration in 64 asthma patients.

7.3. Trigger factors

Different patients reported different factors that triggers their asthma attacks. In our study, patients reported more than 1 factor with the majority affected by dust, tobacco smoke and physical effort as shown in the graph below.

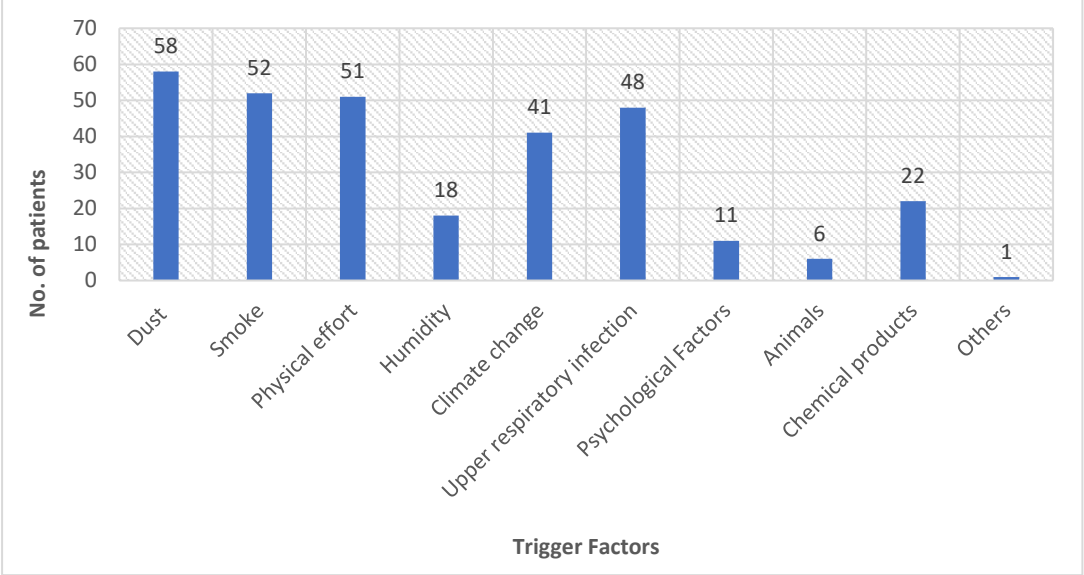


Figure 17: A graph showing the distribution of different trigger factors in 64 patients

7.4. Main symptoms

An association of different symptoms were reported by patients when they experience asthma attacks.

- 55 patients reported the presence of dyspnea
- 56 patients reported the presence of wheezing
- 27 patients reported the presence of dry cough and
- 15 patients reported chest pains

7.5. Frequency of exacerbations per year

Out of the 64 patients in this study the majority experience exacerbation as low as 1 while others reported having many exacerbations per year. The graph below shows the different distribution.

No of exacerbations in the last year	No of patients	Percentage (%)
0	16	25
1	14	22
2	13	20
3	7	11
>3	14	22
Total	**64**	**100**

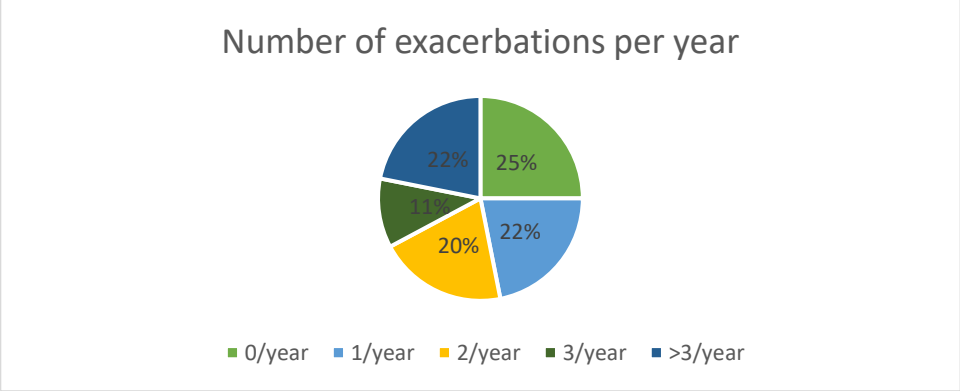


Figure 18: A pie chart showing the number of exacerbations experience by patients in a year.

7.6. Number of hospitalizations for asthma exacerbations

Only 12 patients or 18.8% of the sample reported a history of hospitalization for asthma attacks.

No. of hospitalization	0	1	2	3
No. of patients	52	12	0	0
Percentage (%)	81.2	18.8	0	0

7.7. Place and Method of exacerbation management

- 45% of the patients manage their asthma exacerbation at an emergency department where they are treated with Ventolin nebulization and corticoids depending on the severity of the attack.
- 38% manages it at home by the use of rescue medication (inhalers) prescribed by their doctors.
- The remaining 17% self-medicate during an attack (unspecific).

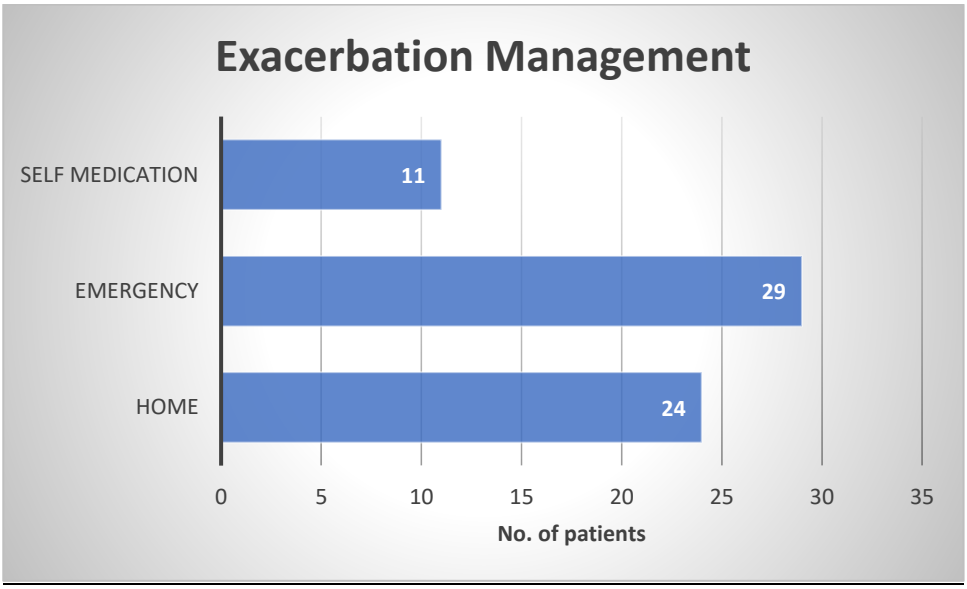


Figure 19: Distribution of different methods of asthma exacerbation management

7.8. Asthma Treatments

❖ **Long term treatments**

All the patients in this study were put under short acting beta 2-agonists (SABA) or 'rescue' medications in association with their long-term treatments for the relieve of sudden severe asthma symptoms.

- 6% of the patients were under SABA only (patients that don't adhere to their long-term treatments).
- 94% were treated by an association of long-acting beta agonist (LABA) and inhaled corticosteroids (ICS)
- None of the patients were under LABA only
- None of the patients were treated by an association of ICS and SABA
- None of the patients were treated by an association of LABA and long-acting muscarinic antagonist (LAMA)
- None of the patients were treated by an association of LABA, LAMA and ICS

❖ **Non pharmacological treatments**

3 main points were searched for in the adherence of non-pharmacological treatments,

- **Smoking**: 25% of the population reported to have stopped smoking after they were diagnosed with asthma while the remaining 75% were non-smokers.
- **Physical exercise**: 67% reported doing physical exercises as a form or way of preventing attacks and improving their health.
- **Elimination of trigger factors:** A vast majority of the patients live in an environment that harbor a lot of their trigger factors such as
  - ✓ Exogen factors: Carpets reported by 36%, air pollution, allergens etc.
  - ✓ Endogen factors: stress, gastroesophageal reflux disease reported by 42% etc.

- ✓ 64% reported the presence of good ventilation in their houses with enough sunlight and no carpets.

❖ **Adherence to treatment.**

Patients were interrogated on their adherence to their long-term treatments and 79.7% reported adhering to their treatments regularly while 20.3% had an irregular treatment observance.

The different reasons to their non observance are listed below:

- Stop/forgot/psychologically tired: 10 patients
- Lack of means to buy medication: 3 patients
- Secondary effects of treatments: 0 patients

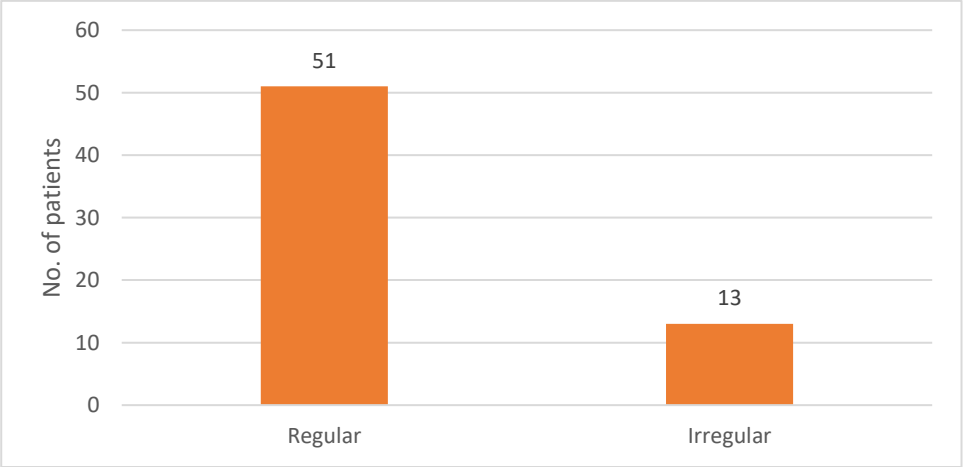


figure 20: A graph showing the distribution of patient's adherence to long term treatments.

7.9. Treatment cost coverage

Having the means to sustain a long-term treatment is important and can play a major role in the psychological effects of chronic diseases.

Only 5% or 3 of the patients in this study reported a difficulty in buying their medications while the remaining 95% were capable of covering their treatment cost.

7.10. Asthma Severity

60 patients out of the population had a moderate persistent asthma according to the long-term treatment plans they were on while 4 had an intermittent severity level. No patient was found to have a severe persistent asthma.

Asthma severity	Intermittent	Mild persistent asthma	Moderate persistent asthma		Severe asthma
Treatment plan	Step 1	Step 2	Step 3	Step 4	Step 5
No of patients	4	0	55	5	0
Percentage	6%	0%	86%	8%	0%

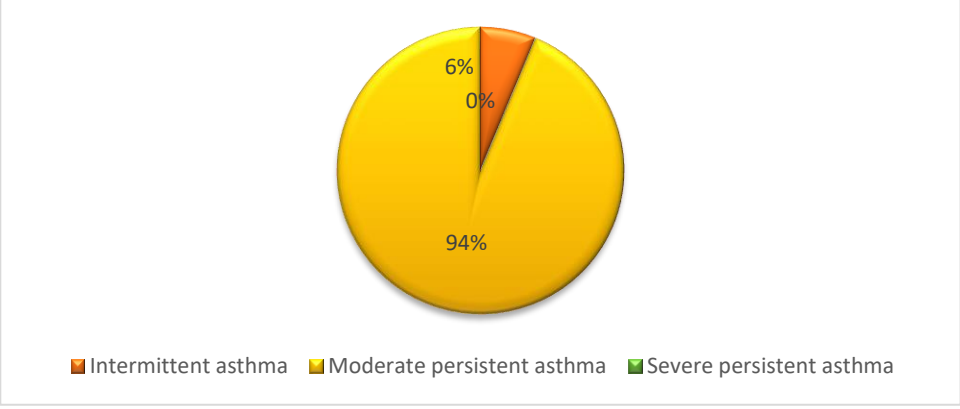


Figure 21: A pie chart showing different asthma severity levels in patients according to their treatment plan.

7.11. Asthma Control

In every chronic disease, it is important to monitor its evolution in order to maintain a healthy and long life for the patient. We used the asthma control test (ACT) to searched for the control level of asthma in patients according to the grading below.

ACT Score	Interpretation
<15	Uncontrolled
15-19	Partially controlled
20-25	Controlled

ACT	Number of patients	Percentage (%)
Controlled	31	49
Partially controlled	18	28
Uncontrolled	15	23
Total	**64**	**100**

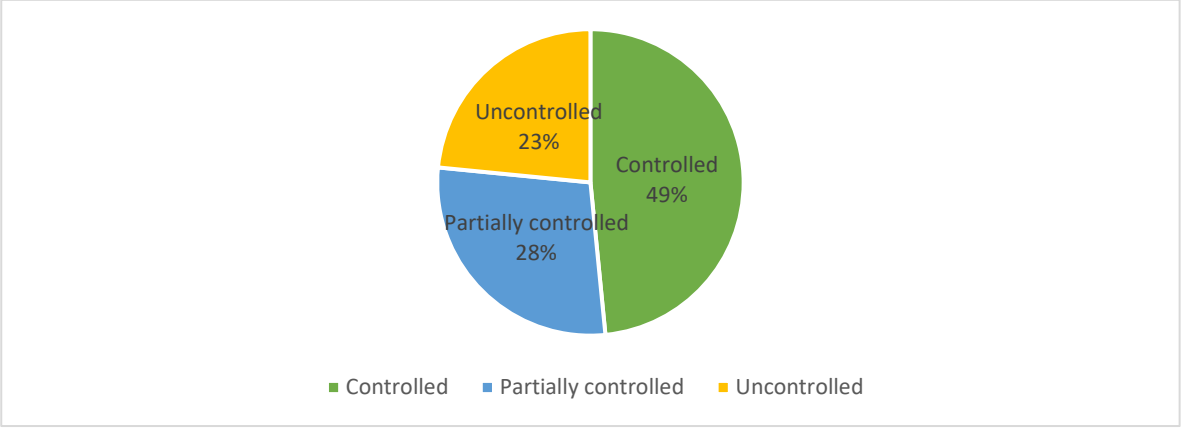


Figure 22: A pie chart showing the distribution of different control levels in asthma patients.

8. Evaluation of anxiety and depression morbidity in 64 asthma patients

The Hospital Anxiety and Depression scale (8) was used to detect anxio-depressive symptoms in 64 patients. **39 patients** were found with symptoms of anxiety and depression making up **60.8%** of the population sample.

Hospital Anxiety and Depression Scale (HADS)

Tick the box beside the reply that is closest to how you have been feeling in the past week. Don't take too long over you replies: your immediate is best.

D	A		D	A	
		I feel tense or 'wound up':			**I feel as if I am slowed down:**
	3	Most of the time	3		Nearly all the time
	2	A lot of the time	2		Very often
	1	From time to time, occasionally	1		Sometimes
	0	Not at all	0		Not at all
		I still enjoy the things I used to enjoy:			**I get a sort of frightened feeling like 'butterflies' in the stomach:**
0		Definitely as much		0	Not at all
1		Not quite so much		1	Occasionally
2		Only a little		2	Quite Often
3		Hardly at all		3	Very Often
		I get a sort of frightened feeling as if something awful is about to happen:			**I have lost interest in my appearance:**
	3	Very definitely and quite badly	3		Definitely
	2	Yes, but not too badly	2		I don't take as much care as I should
	1	A little, but it doesn't worry me	1		I may not take quite as much care
	0	Not at all	0		I take just as much care as ever
		I can laugh and see the funny side of things:			**I feel restless as I have to be on the move:**
0		As much as I always could		3	Very much indeed
1		Not quite so much now		2	Quite a lot
2		Definitely not so much now		1	Not very much
3		Not at all		0	Not at all
		Worrying thoughts go through my mind:			**I look forward with enjoyment to things:**
	3	A great deal of the time	0		As much as I ever did
	2	A lot of the time	1		Rather less than I used to
	1	From time to time, but not too often	2		Definitely less than I used to
	0	Only occasionally	3		Hardly at all
		I feel cheerful:			**I get sudden feelings of panic:**
3		Not at all		3	Very often indeed
2		Not often		2	Quite often
1		Sometimes		1	Not very often
0		Most of the time		0	Not at all
		I can sit at ease and feel relaxed:			**I can enjoy a good book or radio or TV program:**
	0	Definitely	0		Often
	1	Usually	1		Sometimes
	2	Not Often	2		Not often
	3	Not at all	3		Very seldom

Please check you have answered all the questions

Scoring:
Total score: Depression (D) _____ Anxiety (A) _____
0-7 = Normal
8-10 = Borderline abnormal (borderline case)
11-21 = Abnormal (case)

Figure 23: A picture showing the Hospital Anxiety and Depression Scale (8).

Morbidity	Number of patients	Percentage
Anxiety	11	17.2%
Depression	2	3%
Association of anxiety and depression	11	17.2%
Borderline Abnormality	15	23.4%
Total population affected	**39**	**60.8%**
Total Population not affected	**25**	**39.2%**
Overall Total	**64**	**100%**

- The borderline abnormality found in **15** patients are distributed as follows:
  - 12 had borderline anxiety
  - 1 had borderline depression
  - 2 had both anxiety and depression borderline

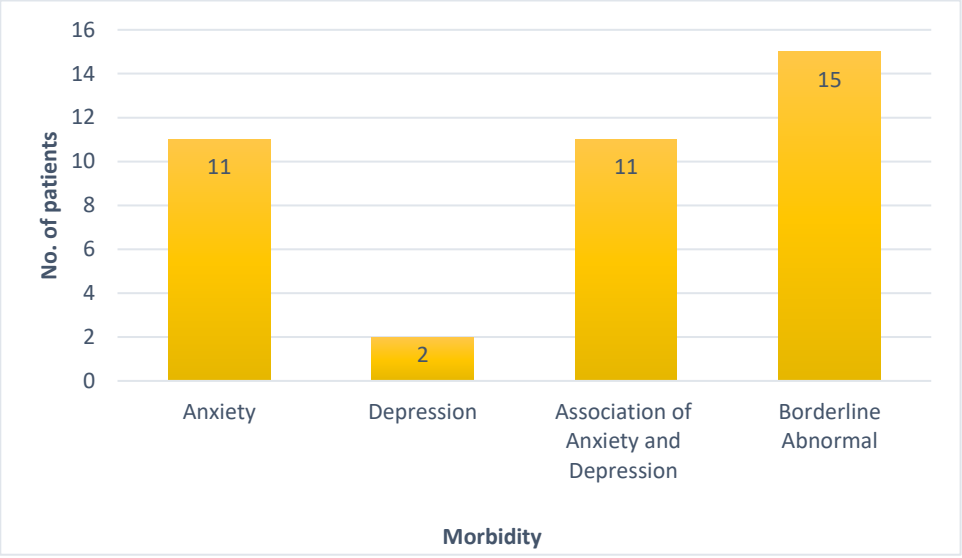


Figure 24: A graph showing Anxiety and Depression prevalence in asthmatic patients

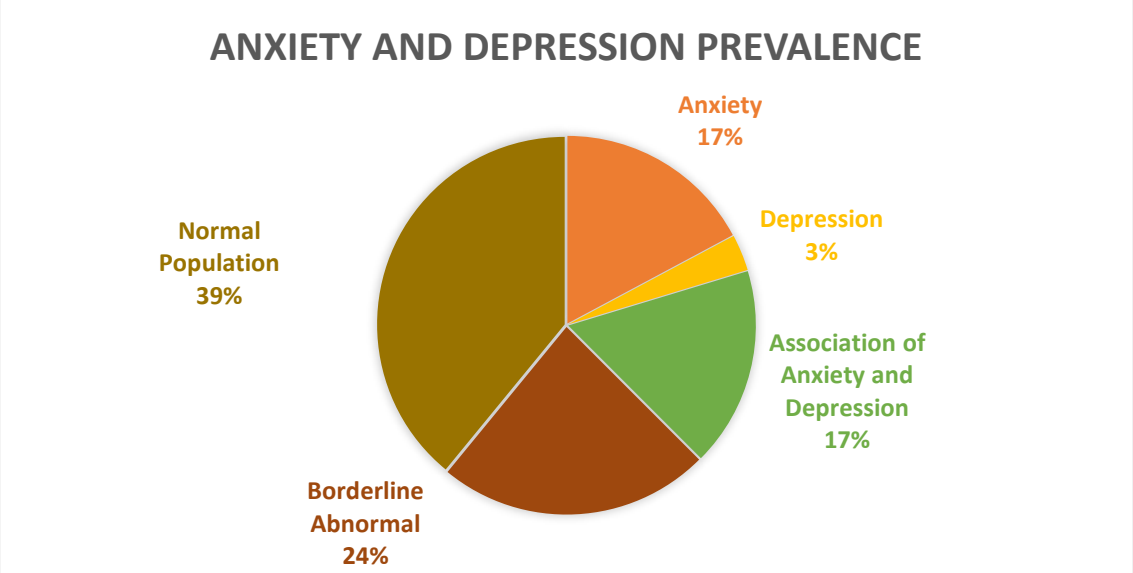


Figure 25: A pie chart showing the prevalence of Anxiety and Depression in Asthmatic patients

8.1. Evaluation of socio-demographic and clinical factors associated with 39 patients found with anxiety and depression symptoms

Table I: A table detailing the different socio demographic and clinical factors associated in 24 patients with Anxiety and Depressive symptoms

Variable	Anxiety	No. of pat.	Percentage (%)	Depression	No. of pat.	Percentage (%)	Association of Anxiety and Depression	No. of pat.	Percentage (%)
		11	17.2%		2	3%		11	17.2%
Sex	Masculine Feminine	8 3	72.7% 27.3%	Masculine Feminine	2	100%	Masculine Feminine	3 8	27.3% 72.7%
Mean age	41 years			52 years			44 years		
Marital status	Married Single Divorce Widow	10 1	90.9% 9.1%	Married Single Divorce Widow	2	100%	Married Single Divorce Widow	8 1 1 1	72.7% 9.1% 9.1% 9.1%
Social class	Low Middle High	3 7 1	27.3% 63.6% 9.1%	Low Middle High	2	100%	Low Middle High	2 9	18.2 81.8%
Professions	Soldiers Auxiliary force Housewives Retired Students Cleaners Nurses	3 3 3 2	27.3% 27.3% 27.3% 18.1%	Soldiers Retired Housewives Students Cleaners Nurses Auxiliary force	1 1	50% 50%	Housewives Nurses Auxiliary force Soldiers Students Cleaners Retired	4 2 2 1 1 1	36.4% 18.2% 18.2% 9.1% 9.1% 9%

Variable	Anxiety	No. of pat.	Percentage (%)	Depression	No. of pat.	Percentage (%)	Association of Anxiety and Depression	No. of pat.	Percentage (%)
		11	**17.2%**		**2**	**3%**		**11**	**17.2%**
Comorbidity associated	GERD + Conjunctivitis	4	36.4%	Gastroesophageal reflux	2	100%	GERD + conjunctivitis	7	63.6%
	HBP	3	27.3%				Diabetes + HBP	1	9.1%
	Diabetes + CVD	1	9%				No comorbidity	3	27.3%
	No comorbidity	3	27.3%						
BMI	Overweight	6	54.5%	Overweight	1	50%	Overweight	7	63.6%
	Obese	1	9.1%	Obese			Obese	1	9.1%
	Normal	4	36.4%	Normal	1	50%	Normal	3	27.3%
Quality of life	1			1			1		
	2	1	9.1%	2			2	2	18.2%
	3	4	36.4%	3			3	2	18.2%
	4	6	54.5%	4	2	100%	4	7	63.6%
	5			5			5		
Stress frequency	Rarely			Rarely			Rarely		
	Occasional	2	18%	Occasional	2	100%	Occasional	3	27.3%
	Daily	9	82%	Daily			Daily	8	72.7%

Variable	Anxiety	No. of pat.	Percentage (%)	Depression	No. of pat.	Percentage (%)	Association of Anxiety and Depression	No. of pat.	Percentage (%)
		11	17.2%		2	3%		11	17.2%
No. of exacerbations per year	0 1 2 3 >3	1 3 3 3 1	9.1% 27.3% 27.3% 27.3% 9%	0 1 2 3 >3	1 1 	50% 50% 	0 1 2 3 >3	 2 7 2	 18.2% 63.6% 18.2%
Long term treatments	SABA only LABA + ICS	11	100%	SABA only LABA + ICS	1 1	50% 50%	SABA only LABA + ICS	1 10	9.1% 90.9%
Adherence to treatment	Regular Irregular	7 4	63.6% 36.4%	Regular Irregular	2	100%	Regular Irregular	6 5	54.5% 45.5%
Asthma severity	Intermittent Moderate persistent Severe persistent	3 8	27.3% 72.7%	Intermittent Moderate persistent Severe persistent	2	100%	Intermittent Moderate persistent Severe persistent	11	100%
Asthma control	Controlled Partially controlled Uncontrolled	2 4 5	18.2% 36.4% 45.4%	Controlled Partially controlled Uncontrolled	2	100%	Controlled Partially controlled Uncontrolled	4 3 4	36.4% 27.2% 36.4%

Table II: A table detailing the different socio demographic and clinical factors associated in 15 patients with borderline Anxiety and Depressive symptoms

Variable	Borderline Abnormality	No. of patients 15	% 23.4%	Variable	Borderline abnormality	No. of patients	%
Sex	Male Female	9 6	60% 40%	**Stress frequency**	Daily Occasional Rarely	15	100%
Mean age	48 years			**No. of exacerbation per year**	0 1 2 3 >3	4 3 3 3 2	26.7% 20% 20% 20% 13.3
Marital status	Married	15	100%	**Long term treatments**	SABA only LABA + ICS	1 14	6.7% 93.3%
Social class	Low Middle High	3 10 2	20% 66.7% 13.3%	**Adherence to treatment**	Regular Irregular	12 3	80% 20%
Professions	Housewives Auxiliary force Soldiers	5 4 3 2	33.3% 26.7% 20% 13.3%	**Asthma severity**	Intermittent Moderate persistent Severe persistent	1 14	6.7% 93.3%

	Retired Sales person	1	6.7%				
Variable	**Borderline Abnormality**	**No. Of patients**	**%**	**Variable**	**Borderline abnormality**	**No. Of patients**	**%**
		15	**23.4%**				
BMI	Overweight Obese Normal	3 1 11	20% 6.7% 73.3				
Quality of life	1 2 3 4 5	 2 12 1	 13.3% 80% 6.7%				

II. Analytic Review:

SPSS logistic software was used to analyze statistically the association of socio demographic and clinical factors with anxiety and depression. The results were considered significant for a p value ≤ 0.05 as indicated in the table below.

1. HADS -ANXIETY

- **Anxiety and sex**

  The crosstab analysis of anxiety and sex results to p=0.46 which shows statistically the absence of a significant association between the two variables.

- **Anxiety and age**

  A p=0.81 shows statistically the absent of a significant association between anxiety and age.

- **Anxiety and marital status**

  There is a statistical absent of a significant association between anxiety and marital status for p=0.55.

- **Anxiety and professions**

  The crosstab analysis shows a statistical absent of significant association between anxiety and profession of the patient for p=0.56.

- **Anxiety and social class**

  The p value test shows a statistical absent of a significant association between anxiety and social class for p=0.91.

- **Anxiety and personal history of respiratory disease**

  No statical significant association was found between anxiety and history of pulmonary disease for p=0.60.

- **Anxiety and smoking**

  There is a statistical absent of a significant association between anxiety and toxic habits for p=0.76.

- ***Anxiety and No. of comorbidities**

  The Pearson chi-square test shows statistically the presence of a significant association between the number of comorbidities a patient has and anxiety for p=0.020.

- ***Anxiety and obesity/overweight**

  The crosstab analysis shows statistically the presence of a significant association between anxiety and obesity/overweight for p=0.013.

- **Anxiety and diagnosis duration**

  A p=0.78 shows the absent of a significant association between these two variables.

- **Anxiety and No. of exacerbations per year**

  The crosstab analysis statistically shows the absence of a significant association between these two variables for p=0.07.

- **Anxiety and No. of hospitalizations per year**

  No significant association was found statistically between these two variables for p=0.20

- ***Anxiety and treatment adherence**

  The Pearson chi-square test shows statistically the presence of a significant association between anxiety and asthma treatment adherence for p=0.003.

- **Anxiety and Asthma severity**

  A p=0.13 statistically shows the absence of a significant association between these two variables.

- ***Anxiety and asthma control**

  The crosstab analysis statistically shows the presence of a significant association between anxiety and asthma control for p=0.022.

- ***Anxiety and quality of life**

  There is statistically the presence of a significant association between anxiety and the quality of life of a patient for p=0.018.

- ***Anxiety and stress frequency**

  The Pearson chi-square crosstab test shows statistically a significant association between these two variables for p=0.001.

- ***Anxiety and depression**

  The Pearson chi-square crosstab test shows statistically a significant association between these two variables for p=0.001.

Table III: A table summarizing the association between socio-demographic and clinical factors with anxiety

Variable	P value
Sex	0.46
Age	0.81
Marital status	0.55
Professions	0.56
Social class	0.91
Personal history of pulmonary disease	0.60
Toxic habits	0.76
Comorbidities	0.020*
BMI	0.013*
Diagnosis duration	0.78
No. of Exacerbations/year	0.07
No. of hospitalization/year	0.20
Treatment adherence	0.003*
Asthma severity	0.13
Asthma control	0.022*
Quality of life	0.018*
Stress frequency	0.001*
Depression	0.001*

The association is statistically significant for a p value ≤ 0.05

1.1. Study of the correlations between anxiety, sociodemographic and clinical factors

- The Pearson correlation between anxiety and number of comorbidities is **r=0.36**, indicates a moderate positive relationship between the two variables varying in the same direction. The value of **p=0.020** statistically consider the relationship significant. This means that the more the number of comorbidities a patient has, the higher their anxiety score.
- The Pearson correlation between anxiety and body mass index is **r=0.018**, indicating a moderate positive relationship between these two variables. A **p value of 0.013** indicates the relationship being statistically significant and vary in the same direction. This explains that the higher the BMI score of patients, the higher their level of anxiety.
- The Pearson correlation between anxiety and depression indicates a strong positive relationship between the two variables for **r=0.648** and varies in the same direction. A **p value of 0.001** statistically shows that the correlation is significant. This means that depression increases the odds of anxiety and vice versa.

Table IV: Correlation between anxiety score and sociodemographic and clinical factors

Sociodemographic and clinical factors	R	P
Age	-0.46	0.81
No. of comorbidities	0.361	0.020
BMI score	0.018	0.013
Diagnosis duration	-0.40	0.78
No. of exacerbations/year	0.253	0.07
No. of hospitalization/year	0.202	0.20
Quality of life	-0.432	0.018
Asthma control score	-0.481	0.022
Depression	0.648	0.001

2. HADS -DEPRESSION

- **Depression and sex**

  The crosstab analysis of depression and sex results to p=0.14 which shows statistically the absence of a significant association between the two variables.

- **Depression and age**

  A p=0.86 shows statistically the absent of a significant association between depression and age.

- **Depression and marital status**

  There is a statistical absent of a significant association between depression and marital status for p=0.25.

- **Depression and profession**

  The crosstab analysis shows a statistical absent of significant association between depression and profession of the patient for p=0.15.

- **Depression and social class**

  The p value test shows a statistical absent of a significant association between depression and social class for p=0.42.

- **Depression and personal history of lung disease**

  No statical significant association was found between depression and history of pulmonary disease for p=0.18.

- **Depression and smoking**

  There is a statistical absent of a significant association between depression and toxic habits for p=0.86.

- ***Depression and No. of comorbidities**

  The Pearson chi-square test shows statistically the presence of a significant association between the number of comorbidities and depression for p=0.012.

- **Depression and obesity/overweight**

  The crosstab analysis shows statistically the absence of a significant association between depression and obesity/overweight for p=0.08.

- **Depression and diagnosis duration**

  A p=0.93 shows the absent of a significant association between the two variables.

- ***Depression and No. of exacerbations per year**

  The crosstab analysis statistically shows the presence of a significant association between depression and the number of exacerbations experience by patients in a year for p=0.047.

- **Depression and No. of hospitalizations per year**

  No significant association was found statistically between these two variables for p=0.65.

- **Depression and treatment adherence**

  The Pearson chi-square test shows statistically the absence of a significant association between depression and asthma treatment observation for p=0.06.

- **Depression and Asthma severity**

  A p=0.85 statistically shows the absence of a significant association between these two variables.

- **Depression and asthma control**

  The crosstab analysis statistically shows the absence of a significant association between depression and asthma control for p=0.76.

- **Depression and quality of life**

  There is statistically absence of a significant association between depression and the quality of life of a patient for p=0.14.

- ***Depression and stress frequency**

  The Pearson chi-square crosstab test shows statistically a significant association between these two variables for p=0.009.

- ***Depression and anxiety**

  The Pearson chi-square crosstab test shows statistically a significant association between these two variables for p=0.001.

Table V: A table showing the different association between socio-demographic factors and depression

Variable	P value
Sex	0.14
Age	0.86
Marital status	0.25
Professions	0.15
Social class	0.42
Personal history of pulmonary disease	0.18
Toxic habits	0.86
Comorbidities	0.012*
BMI	0.08
Diagnosis duration	0.93
No. of Exacerbations/year	0.047*
No. of hospitalizations/year	0.65
Treatment adherence	0.06
Asthma severity	0.85
Asthma control	0.76
Quality of life	0.14
Stress frequency	0.009*
Anxiety	0.001*

The association is considered significant for a p value ≤ 0.05.

2.1. Study of the correlation between depression, sociodemographic and clinical factors

- The Pearson correlation between depression and the number of comorbidities is **r=0.20**, indicating a moderate positive relationship between the two variables and varies in the same direction. The value of **p being 0.012** statistically consider the

relationship to be significantly related. This means that the more the number of comorbidities a patient has, the higher their anxiety level.

- The Pearson correlation between depression and number of asthma exacerbations/year is **r=0.207**, indicating a moderate positive relationship between the two variables. A **p value of 0.047** indicates the relationship being statistically significant and vary in the same direction. This explains that the higher the number of exacerbations a patient experience, the higher the level of anxiety.
- The Pearson correlation between depression and anxiety indicates a strong positive relationship between the two variables for **r=0.648** and varies in the same direction. A **p value of 0.001** statistically shows that the correlation is significant. This means that anxiety increases the odds of depression and vice versa.

Table VI: Correlation between depression score and sociodemographic and clinical factors

Sociodemographic and clinical factors	R	P
Age	0.47	0.14
No. of comorbidities	0.208	0.012
BMI score	0.03	0.08
Diagnosis duration	0.68	0.93
No. of exacerbations/year	0.207	0.047
No. of hospitalization/year	0.101	0.65
Quality of life	-0.325	0.14
Asthma control score	-0.310	0.76
Anxiety	0.648	0.001

DISCUSSION

I. DEFINATIONS AND CONCEPTS

1. Asthma

1.1. Definition

As defined by 2022 Global Initiative for Asthma (GINA): "Asthma is a heterogeneous disease, usually characterized by chronic airway inflammation and obstruction. It is defined by a history of respiratory symptoms, such as wheeze, shortness of breath, chest tightness, and cough, that vary over time and in intensity, together with variable expiratory airflow limitation". Often, airway hyperresponsiveness, bronchoconstriction, and airway edema cause the reversible airway obstruction that is characteristic of asthma. One of the key drivers of asthma is acute and chronic inflammation.

1.2. Epidemiology

In the world

Asthma is a chronic respiratory disease that affects 1% to 29% of populations in varying countries. According to recent surveys of WHO, more than 300 million people are affected by this disease and has caused 455000 deaths as of 2019. Although symptoms may resolve spontaneously, exacerbations can often be life-threatening and carry significant financial burdens to patients and the communities in which they live.

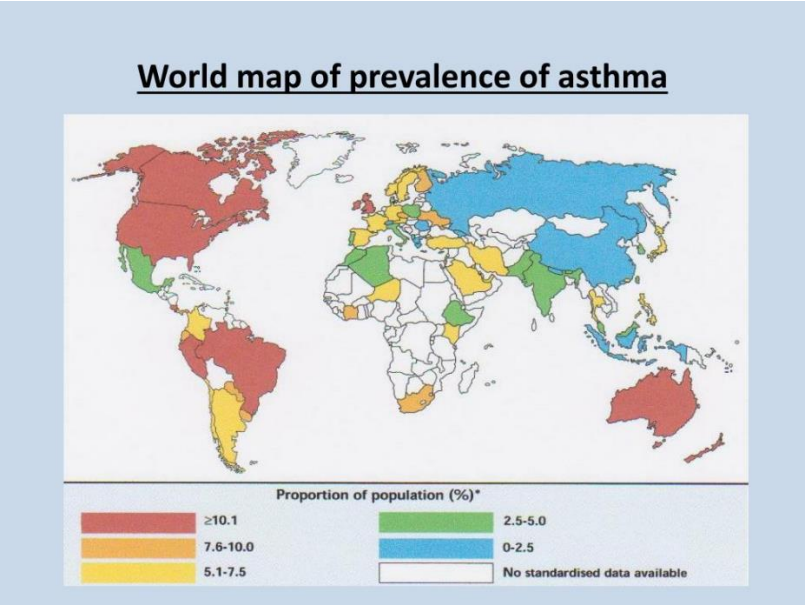


FIGURE 26. The world map showing the prevalence of Asthma According to GINA 2022 (9).

In Morocco

It is imperative to note that from an epidemiologic study made in Morocco, the prevalence of asthma is between 5 to 20% of the general population with the highest prevalence in big cities like Casablanca, rabat and Marrakech while it still remains greatly underdiagnosed and undertreated throughout the country.

1.3. Risk factors

- Exposure to environmental allergens
- Air pollutions and tobacco smoke
- Exposure to frequent respiratory infections especially viral
- Occupational exposure to allergens
- Obesity
- Personal history of atopy
- Family history of Asthma, allergies or atopy
- Gastroesophageal reflux disease
- Aspirin or non-steroidal anti-inflammatory drug hyper sensibility
- Stress or emotional factors

1.4. Mechanism

The mechanism of asthma is a complex process at a cellular level which explains the different or main symptoms presented by the patient. It usually involves 3 components of airway inflammation in the atopic type 2 asthma, bronchial hyperresponsiveness in the non-type 2 asthma and bronchial obstruction.

1.4.1. Bronchial Inflammation

The inflammation stage of asthma is triggered by IgE antibodies that are usually produced and released by plasma cells. These antibodies react to environmental triggers, such as the risk factors listed above by binding to high-affinity mast cells and basophils. Upon exposure to pollutants or risk factors through inhalation, the mast cells release cytokines and de-granulate discharging histamine, prostaglandins and leukotrienes. This release leads to contraction of the smooth muscle and cause airway tightening.

Th2 lymphocytes play a crucial role in the inflammatory stage by releasing series of interleukins (IL-4, IL-5, IL-13) and GM-CSF, which interact with other cells to cause inflammation. IL-3 and IL-5 promote eosinophils and basophils survival while IL-13 is involved in tissue remodeling, fibrosis, and hyperplasia (10).

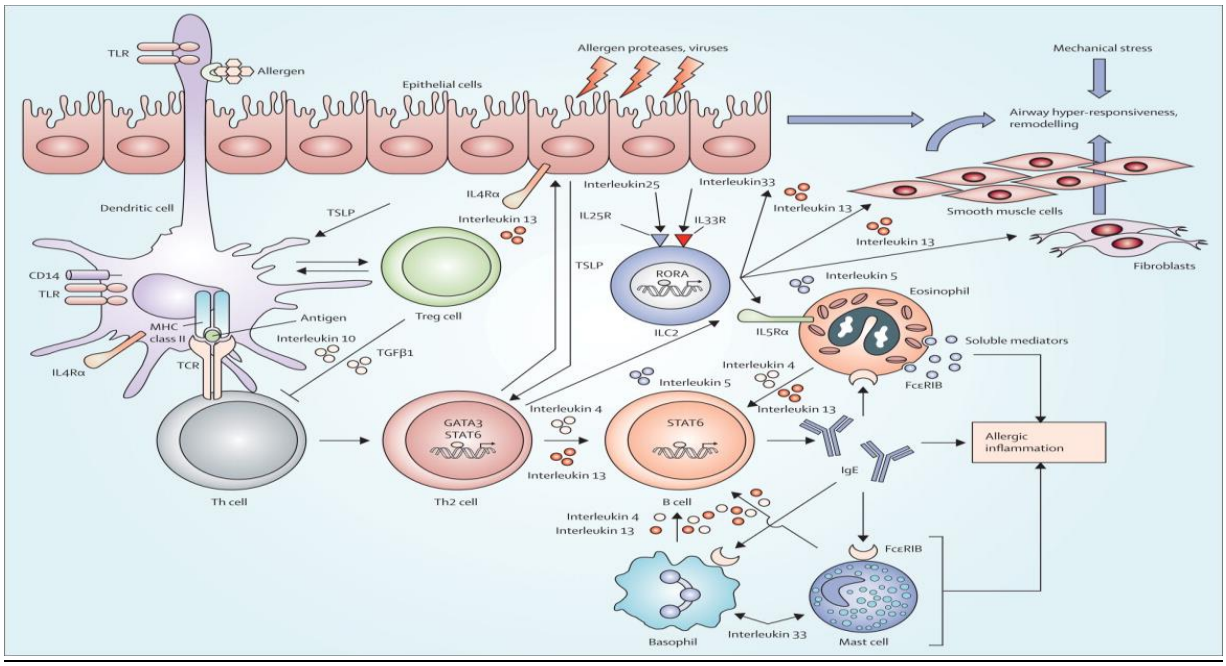


FIGURE 27. A figure showing the inflammation mechanism of Atopic Type 2 Asthma Current Understanding of Asthma Pathogenesis and Biomarkers (11).

1.4.2. Bronchial hyperresponsiveness

Within a few hours, bronchial hyperresponsiveness begins characterized by an accumulation of neutrophils, mast cells, helper and memory T-cells in the lungs. These cells result in the contraction of smooth muscles peri bronchial, exaggerate reactivity in the bronchioles and exacerbate inflammation. Mast cells play a crucial role in bringing reactants from the inflamed areas to smooth muscle cells resulting in fibrosis, airway remodeling and eventually airway hyperresponsiveness. Bronchial hyperresponsiveness is often referred to as the ''hallmark'' of asthma. It is vital to recognize both the inflammatory and hyperresponsiveness mechanisms when targeting therapies with treatments tailored to the disease's severity (10).

The mechanism is showed in the figure below:

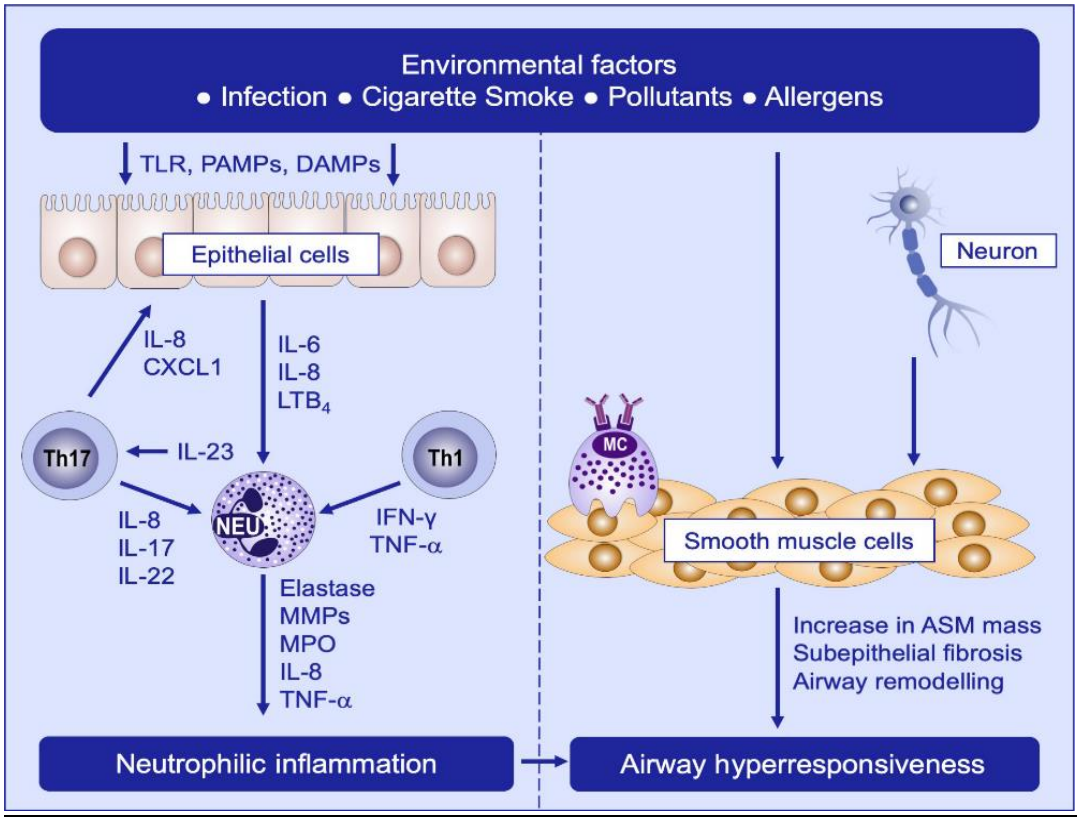


FIGURE 28. Diagram showing bronchial hyperresponsiveness in non-Type 2 asthma. Current Understanding of Asthma Pathogenesis and Biomarkers (11).

1.4.3. Consequences of inflammation and bronchial hyperresponsiveness

❖ **Bronchoconstriction**

Bronchospasm, a key characteristic of asthma, is the sudden contraction of bronchial smooth muscles resulting to narrowing of the airways. It is cause by infiltration of inflammatory agents, remodeling of airways, increase in mucus secretion and bronchial hyperreactivity. In cases of poorly managed and untreated asthma, airway remodeling occurs leading to changes in structural cells and tissues in the lower respiratory tract and can result in permanent fibrotic damage.

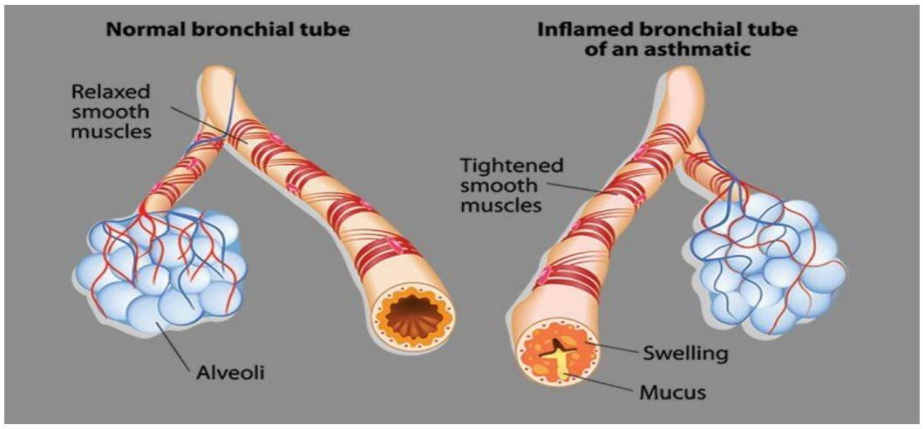


FIGURE 29. Diagram showing inflammation and bronchiole obstruction in Asthma (12).

- **Epithelial damage**

The epithelium, which lines the airways, can become damaged and starts to shed. This shedding contributes to airway hyper-responsiveness in several ways: the loss of the protective barrier function which allows the penetration of allergens easily, enzymes that break down inflammatory mediators are reduced, and sensory nerves become exposed potentially triggering reflex neural effects on the airway (13). Changes in the subepithelial layer such as collagen deposition can also occur (14).

- **Mucus hypersecretion**

Asthma stimulates mucus-secreting cells in the airways to proliferate and the mucous glands to expand leading to the production of thick mucus plugs that can obstruct the airways (15).

- **Oedema**

The capillaries within the airway walls can dilate and leak. The microvascular leakage results in increased airway secretions, impaired muco-ciliary clearance and oedema, which may contribute to airway narrowing and hyper-responsiveness (13).

1.5. Diagnosis

1.5.1. Clinical history

The diagnosis of asthma can be simple if we are present during an attack or difficult depending on the symptoms presented by the patient at a particular time which includes cough, wheezing, difficulty in breathing and chest tightening. These symptoms can be all present at once or others may be absent which does not eliminate the diagnose. Associated with these symptoms are;

- Family or personal history of asthma and atopy
- Presents of a trigger factor
- Characteristic of symptoms occurring at night

1.5.2. Physical examination

- A thorough physical examination of the patient is necessary to search for chest distension and wheezing
- General examination to exclude other differential diagnosis is important.

1.5.3. Tests

- Lung function testing (spirometry or whole-body plethysmography)
- followed by reversibility testing (in case of airway obstruction) or
- hyperreactivity testing (if there is no airway obstruction).
- Allergy testing should also always be performed (clinical history, skin prick tests, blood tests).

1.5.4. Imaging

- Chest x-ray is obligatory to exclude other respiratory diseases.

1.6. Severity evaluation before treatment

The severity of asthma can range from intermittent to severe and dictates the kind of treatment plan the patient will be put on or adjusted to.

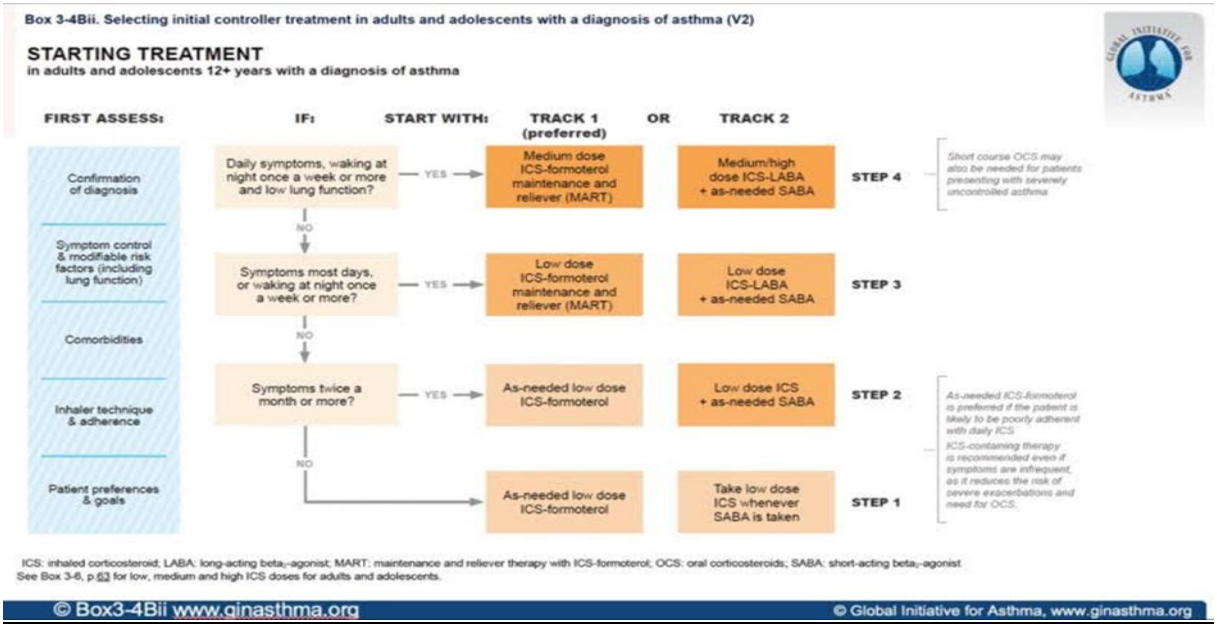


Figure 30: A figure showing the classification of asthma severity from GINA 2023 guidelines (16).

1.7. Differential diagnosis

'Not everything that wheeze is asthma'. In adults, the main differential diagnosis of asthma are:

- COPD
- Acute edema of the lungs
- Tracheal and bronchial lesions
- Foreign body aspiration
- Congestive heart failure
- Chronic Sinusitis disease
- Gastroesophageal reflux
- Aspergillosis
- Bronchiolitis
- Upper respiratory tract infection
- Pulmonary embolism

1.8. Asthma exacerbations

Exacerbations usually occurs when the symptoms presented by a patients persist or gets worst after 48 hours of their onset which differentiates it from asthma attacks. Exacerbations are major health problems in asthmatic patients as it increase the number of hospital admissions and cost of treatment (17).

The mode of onset and their mechanism are different for every asthmatic patient depending on different factors. The evolution of the exacerbation and its classification depends on different clinical and paraclinical criteria.

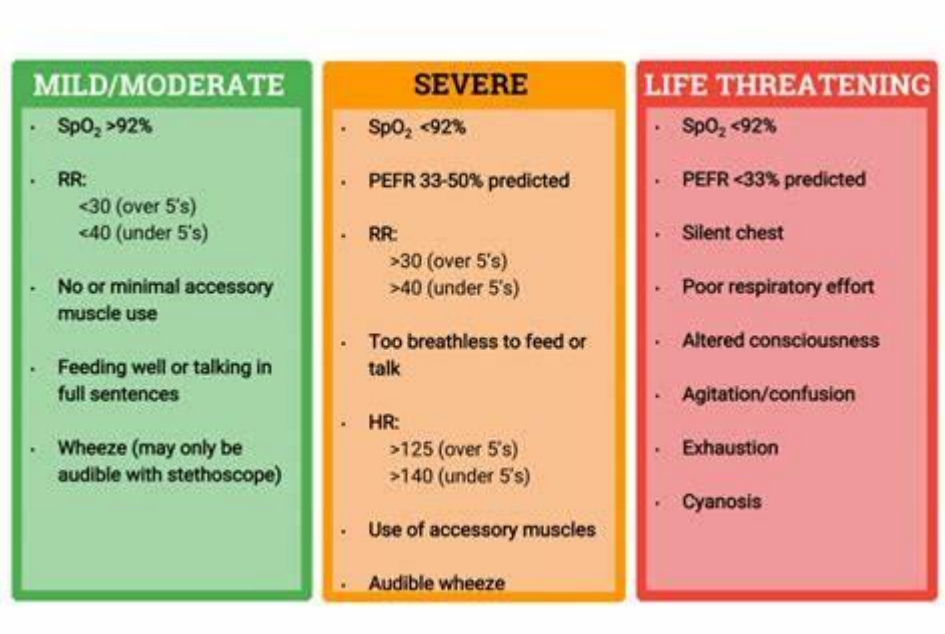


Figure 31: Classification of asthma exacerbation severity by GINA 2022 (18).

1.9. Treatments

Asthma being a chronic non communicable disease involves a life-long treatment with continuous assessment, adjustments and control test to avoid exacerbations and aggravation of the disease (19).

Different methods are used ranging from non-pharmacological methods such as risk factor control and comorbidities treatments to use of pharmacological methods depending on the individual level of severity and control.

Recently, GINA advice on the involvement of the patient in the decision making of their treatment plans. An assessment of the patient is necessary to determine if a patient needs a step up or step down of its treatment (20).

1.9.1. Objectives of treatment according to GINA 2023

- Increase awareness of asthma and its public health consequences.
- Promote identification of reasons for the increased prevalence of asthma.
- Promote study of the association between asthma and the environment.
- Reduce asthma morbidity and mortality.
- Improve management of asthma
- Improve availability and accessibility of effective asthma therapy
- Reduce the risk of exacerbations
- Reduce the risk of secondary effects of asthma treatments

1.9.2. Pharmacological treatment options

GINA recommended the use of inhale corticosteroid (ICS) containing treatment instead of short acting beta-agonist (SABA) alone to reduce the risk of serious exacerbation and to control symptoms. These medications are divided into relivers and controllers (21).

Table VII: List of different pharmacological asthma treatment option and their classification

Medication	Form	Mode of action	Side Effects
Bronchodilators			
Short acting beta-agonist Example: salbutamol, Terbutaline	Nebulized Inhale	'Rescue medication' -relieve of asthma symptoms -reduce exacerbation	Trembling Heart palpitations Nervousness Muscle cramps Headaches
Long-acting beta-agonist Example: Salmeterol Formoterol Olodaterol	Inhale Tablets	They function as add-on treatment or extra support to lower the risk of asthma symptoms NB. They should always be taken in association.	Trembling Headaches Palpitations Muscle cramps
Theophylline	Tablets	Prescribed for their anti-inflammatory actions	Nausea Insomnia Increased heart rate Seizures Headache Skin rash
Long-acting muscarinic antagonists (LAMA) Example: Aclidinium Glycopyrronium	Nebulized	Reduced exacerbation, and improve control when in association with ICS and LABA	Dry mouth and sore throat Reduced respiratory track secretions Hyperthermia Confusion Disorientation Tachycardia
Anti-inflammatory agents and antiallergics			
Corticosteroids			
Inhale Corticosteroid Example: Fluticasone Beclomethasone	Inhale		Oral candidiasis Cough Voice Hoarseness Etc.
Systemic corticosteroids Example: Prednisolone Prednisone Methylprednisolone	Oral IV	Enhance beta-adrenergic response to relieve muscle spasm Reverse mucosal edema Decrease vascular permeability by vasoconstriction	Short term. Diabetes Glaucoma hypokalemia Long term. Osteoporosis Obesity Decrease immune system with risk of infection
Leukotriene modifiers			
Example: Montilukast	Oral	Inhibitors of leukotriene receptors	Cold symptoms Diarrhea
Cromones Example: nedocromil	Inhale	Inhibit degranulation of mast cells	Burning/stinging/irritation of the eye
New drugs Antibodies			
Anti Ig E, eg Omalizumab Ac Anti Il 5 eg Mepolizumab Ac anti Il 3 eg lebrikizumab			

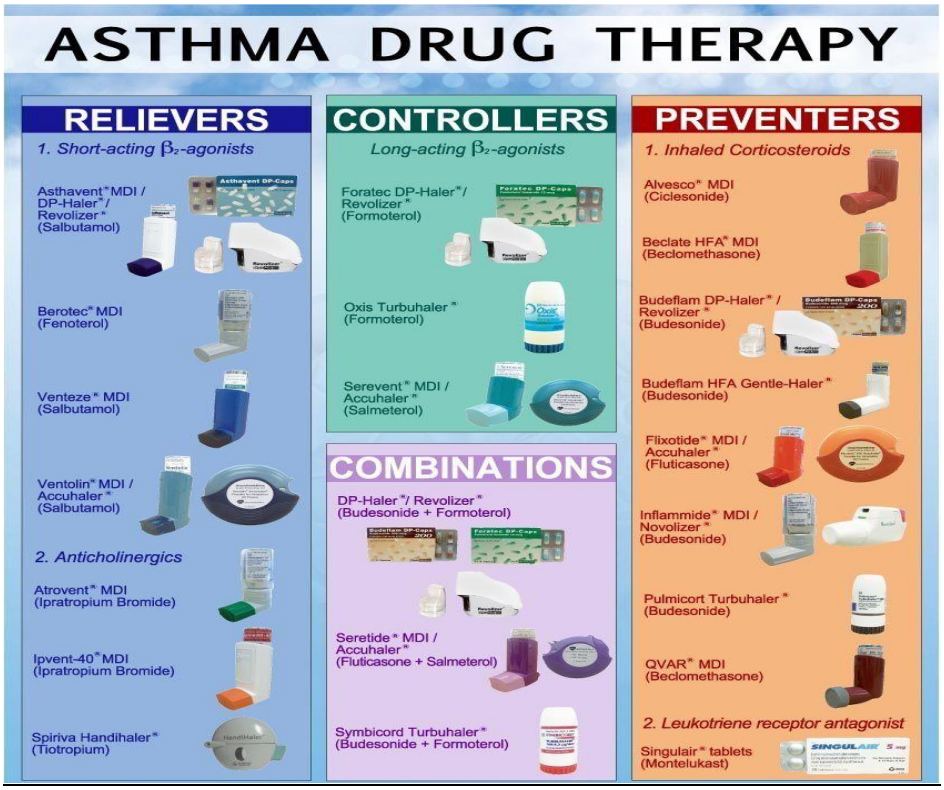


Figure 32: Asthma drug therapy chart (22).

1.9.3. Allergen immunotherapy

This is a therapeutic approached aimed at treating IgE mediated allergic reactions to common triggers like pollens, dust, mites and insect venom originally introduced in 1911 (23). The method involves administering subcutaneous injections of gradually increasing allergen doses followed by maintenance injections over a 3-year period. This method helps establish a long-lasting allergen specific tolerance often providing clinical benefits that persist after the treatment has stopped.

1.9.4. Non pharmacological treatments

a. Bronchial thermoplasty

This is a cutting-edge treatment for individuals with severe asthma. This procedure performed via bronchoscopy, uses radio frequency energy to target and reduce the smooth muscles strain in the airway walls (24). Clinicals trials have demonstrated that this method can decrease the frequency of asthma exacerbations and improve the quality of life for those with

severe uncontrolled asthma. It is considered a safe intervention with most side effects occurring shortly after the procedure. It however, still needs further research to fully understand the effects on the airways and to determine the best parameters for patient selection and treatment optimization (25).

b. Therapeutic education

The education of asthmatic patients and their families plays a major role in their long-term treatments, exacerbations frequency and management. This education includes;

- The understanding of the disease and it's different symptoms
- The different types of treatments available and their use
- The different technics of inhalers
- Education on the different trigger factors and how to avoid them
- Education on treatment adherence
- Education on eviction of all non-indicated medications like aspirin
- Education on recognition and management of asthma attacks
- Lifestyle modifications such as regular exercise, smoking cessation and healthy eating
- Regular checkups to adjust treatment plans if necessary and for control test
- Education on the importance of psychological and social supports

1.9.5. Treatment indication

a. Asthma Long-term treatment

(i) Based on asthma severity level

Asthma diagnosis and long-term treatments follow a standardized international rule guided by GINA for their different indication. Based on the level of severity and control of a patient's asthma, different treatment options are indicated for different patients as shown in the figure below (26).

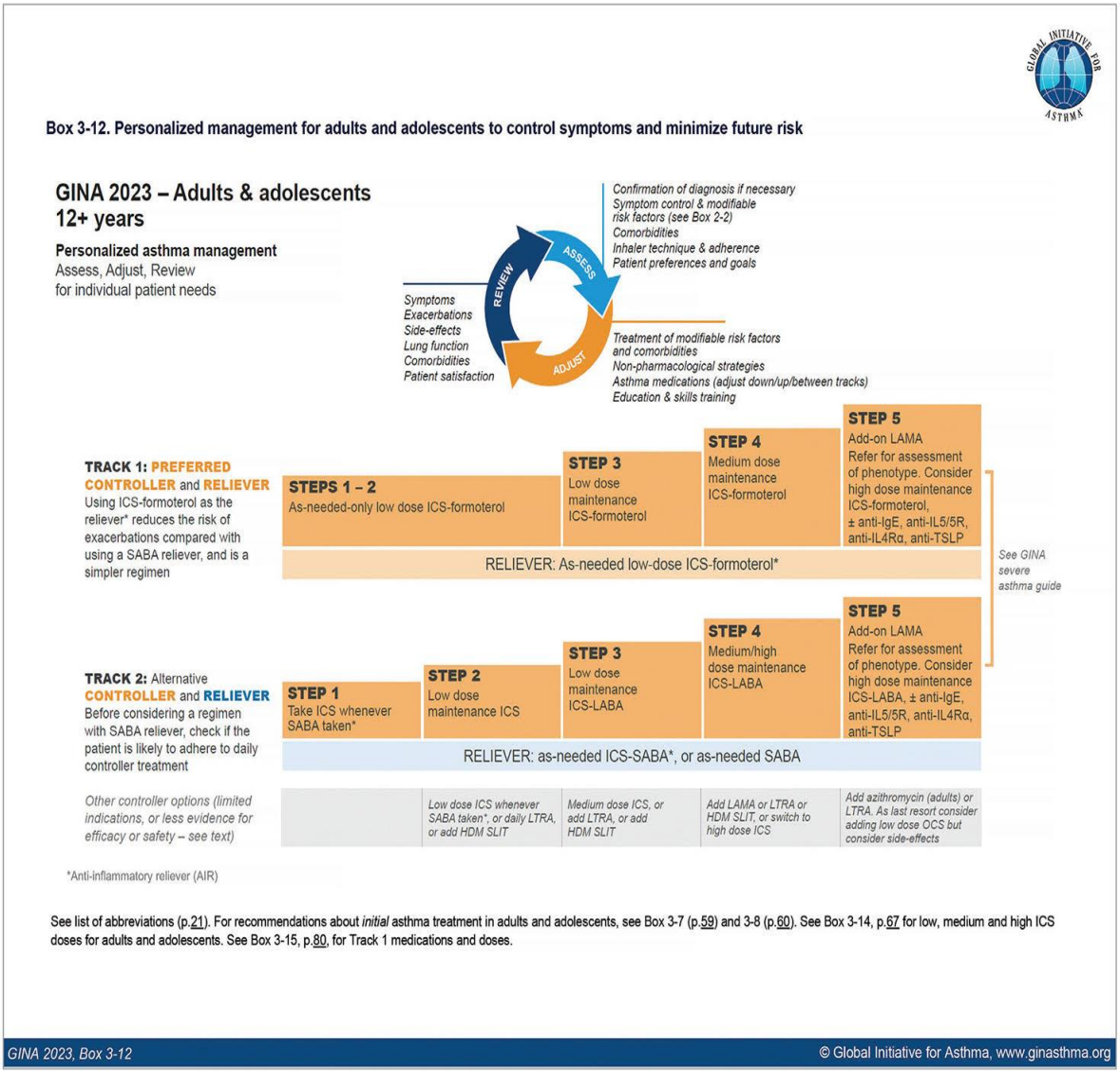


Figure 1. GINA 2023 personalised asthma management plan for adults and adolescents aged 12 years and older.

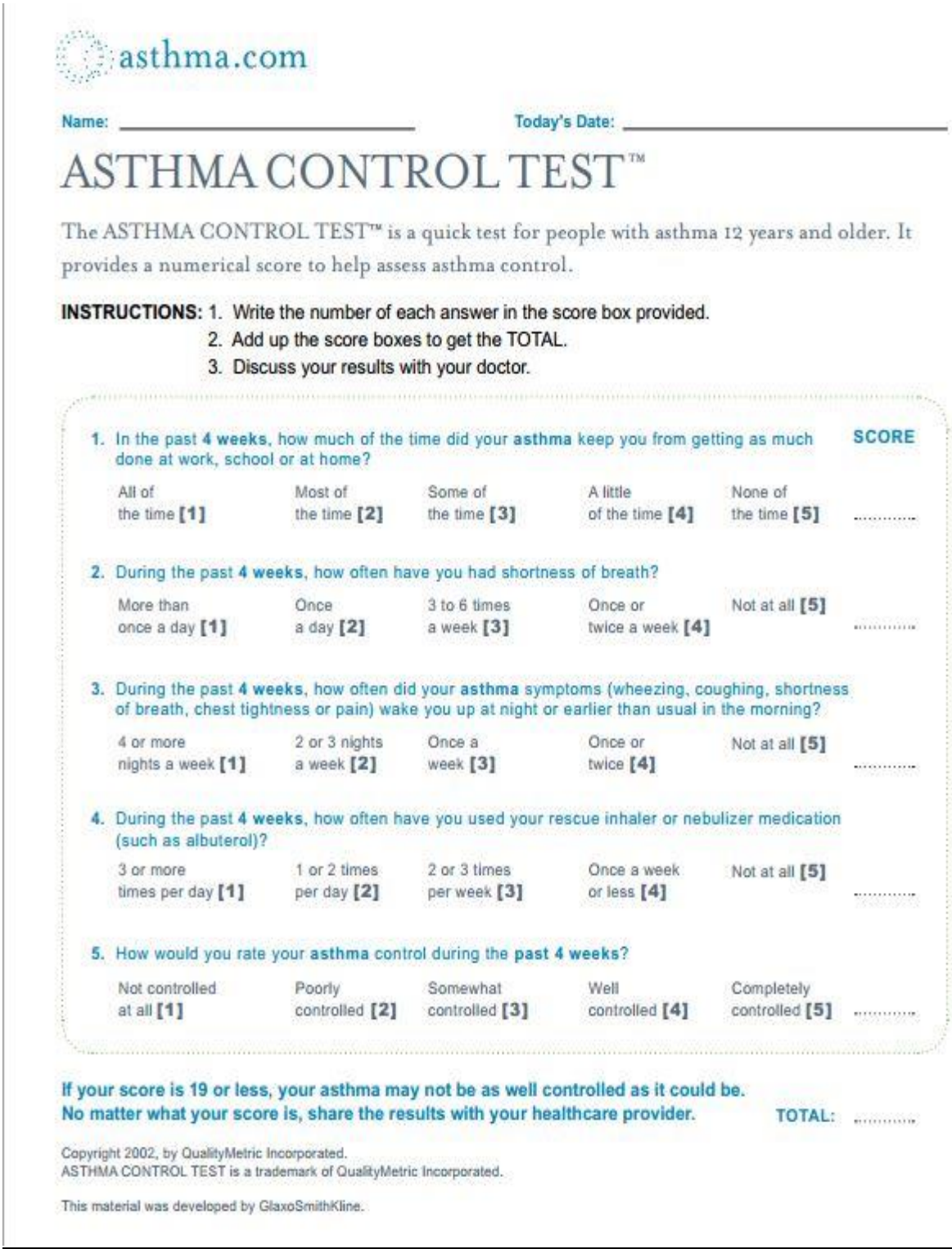
Reproduced with permission from: Global Initiative for Asthma (GINA). Box 3-12. In: Global strategy for asthma management and prevention, 2023. GINA, 2023.[1] © Global Initiative for Asthma, 2023.

Abbreviations: HDM = house dust mite; ICS = inhaled corticosteroid; Ig = immunoglobulin; IL = interleukin; LABA = long-acting beta2-agonist; LAMA = long-acting muscarinic antagonist; LTRA = leukotriene receptor antagonist; OCS = oral corticosteroids; SABA = short-acting beta2-agonist; SLIT = sub-lingual immunotherapy; TSLP = thymic stromal lymphopoietin. Some of these medications are not available in Australia (combination ICS-SABA; anti-TSLP).

Figure 33: A figure showing the different steps in asthma treatment: GINA 2023 guidelines (27).

(ii) Based on asthma Control

The main aim of treating a chronic disease is to have a well-controlled disease that has little to no major effect on the daily activities of the patient. Asthma control is measured by using a simple questionnaire accepted internationally; the Asthma Control Test (ACT). The scores of this control test dictates if a patient needs adjustment in their long term-treatment plan or not.



asthma.com

Name: _____ Today's Date: _____

ASTHMA CONTROL TEST™

The ASTHMA CONTROL TEST™ is a quick test for people with asthma 12 years and older. It provides a numerical score to help assess asthma control.

INSTRUCTIONS: 1. Write the number of each answer in the score box provided.
2. Add up the score boxes to get the TOTAL.
3. Discuss your results with your doctor.

					SCORE
1. In the past **4 weeks**, how much of the time did your **asthma** keep you from getting as much done at work, school or at home?					
All of the time **[1]**	Most of the time **[2]**	Some of the time **[3]**	A little of the time **[4]**	None of the time **[5]**	.....
2. During the past **4 weeks**, how often have you had shortness of breath?					
More than once a day **[1]**	Once a day **[2]**	3 to 6 times a week **[3]**	Once or twice a week **[4]**	Not at all **[5]**	.....
3. During the past **4 weeks**, how often did your **asthma** symptoms (wheezing, coughing, shortness of breath, chest tightness or pain) wake you up at night or earlier than usual in the morning?					
4 or more nights a week **[1]**	2 or 3 nights a week **[2]**	Once a week **[3]**	Once or twice **[4]**	Not at all **[5]**	.....
4. During the past **4 weeks**, how often have you used your rescue inhaler or nebulizer medication (such as albuterol)?					
3 or more times per day **[1]**	1 or 2 times per day **[2]**	2 or 3 times per week **[3]**	Once a week or less **[4]**	Not at all **[5]**	.....
5. How would you rate your **asthma** control during the **past 4 weeks**?					
Not controlled at all **[1]**	Poorly controlled **[2]**	Somewhat controlled **[3]**	Well controlled **[4]**	Completely controlled **[5]**	.....

If your score is 19 or less, your asthma may not be as well controlled as it could be.
No matter what your score is, share the results with your healthcare provider. TOTAL: .....

This material was developed by GlaxoSmithKline.

Figure 34: Asthma control test (28).

b. Asthma Exacerbation treatment

Asthma exacerbations are treated according to the severity level presented by the patient.

The figure below shows a summarize explanation of asthma exacerbations treatments and their indications.

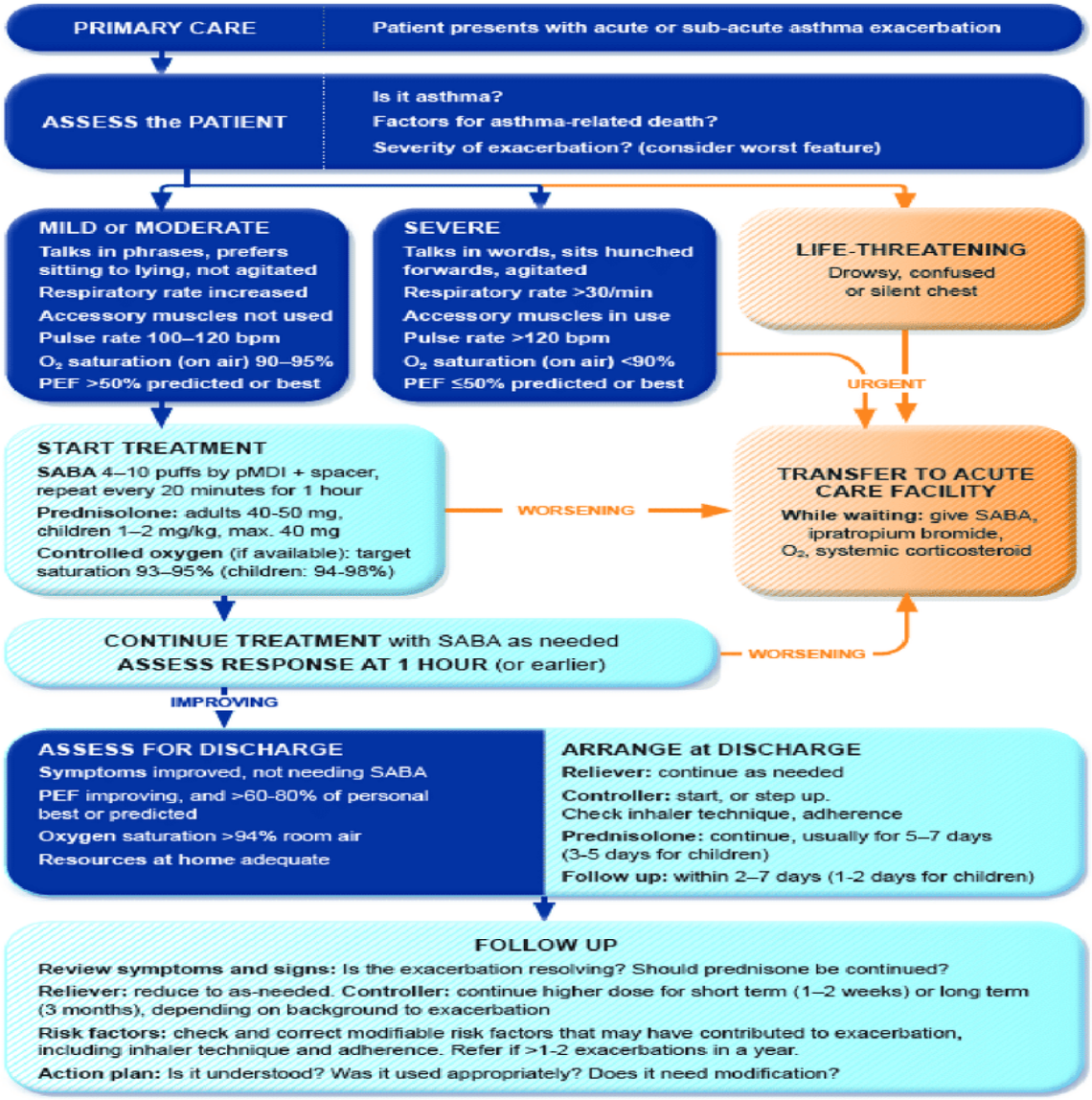


Figure 35: A figure showing asthma exacerbation management strategies according to GINA 2023 guidelines (29)

1.10. Asthma prevention

The prevention of a chronic disease can be achieved in 3 main ways; primary prevention which involves the necessary actions taken to avoid the onset of the disease, secondary prevention which aims to reduces or slow down the rate of evolution of the disease after it's onset and the tertiary prevention which includes the management of morbidities associated with the disease to avoid its worsening. In asthma:

1.10.1. Primary prevention

Primary preventive methods can, not only lower the likelihood of developing sensitivity to common allergens and subsequent risk of symptom development, but also reduce morbidity in individuals with existing persistent disease (30).

- ✓ **Fight against smoking (active and passive)**

Smoking is the most common indoor air pollutant, on the respiratory system of children and adults. Mothers who smoke during pregnancy or parents who expose their children to passive smoking double the risk of the child having respiratory infections such as pneumonia, bronchiolitis in their infancy and serve as risk factors to the development of asthma in their later lives (30-31).

- ✓ **Reduction of expositions to allergens**

Different geographical areas have different allergens with indoor allergens specifically important because many people spend most of their time indoors. Several reasons may explain why certain allergens are mostly associated with asthma: smaller particles and therefore, more inhalable; the allergens having more potent in their enzymic activity; and very high level of exposure to allergens (31).

Exposure to allergens influences the development of an atopic phenotype especially during the early life of a patient when its immune system is not fully developed yet. This results to the production of memory T-cells responsible for manufacturing antibodies IgE when the patient is re-exposed in the future.

A prospective cohort study was done in children by SPORIK et al. (32) and found that the development of asthma symptoms such as wheezing was due to the level of house-dust mite allergens found in the child's bed, and that children who were exposed to high levels were five times more likely to have asthma at the age of 11 years. These studies shows that reduction of exposure to allergen in early life of a child has the potential to delay sensitization and to reduce the risk that severe asthma will develop in the later life of the patient.

- **Indoor allergens:** pets such as cats and dogs, cockroaches and molds can also play an important role in the onset of asthma and their exposition should be greatly reduced.
- **Outdoor allergens:** such as Tree pollen (early spring) Grass pollen (late spring to early summer) Weed pollen (late summer to early fall) and Molds

✓ **Reduction of respiratory infections risk**

Respiratory infections can be prevented by keeping a clean healthy life in adults and by avoiding or cutting the cycle of infection transmission at work places and at home. The vaccination of certain diseases for children should be advocated in all levels of life for a healthy population.

✓ **Eating a healthy balanced diet**

It has been scientifically proven that diets which includes the consumption of plant-based foods might be a source of protection against asthma development and improve asthma symptoms by their effects on systemic inflammation, oxidation, and microbial composition. Furthermore, increased intake in fruits and vegetables, reduced consumption in animal product and weight management can mediate cytokine release, free radical damage, and stop or immune the responses involved in the development and course of asthma (33).

1.10.2. Secondary prevention

Secondary prevention comes after the onset of the disease. In asthma, secondary prevention is especially based on a well-controlled asthma, prevention of asthma attacks and exacerbations by eliminating all risk factors. This includes:

- **Pharmacological treatment**

The most important aspect of a patient with asthma is to be covered on a long-term treatment plan to prevent frequent exacerbations. These are indicated depending on the severity and level of control of the disease.

- **Reduction to allergen exposition**

As already stated above, different patients have different trigger factors and the reduction of their exposition reduce asthma attacks and exacerbations.

- **Non pharmacological treatments**

Another important aspect of secondary prevention is the adherence to non-pharmacological treatments such as regular physical exercise, having a healthy balanced diet, a good way of life, the cessation of smoking etc. These healthy life styles go a long way in the prevention of asthma attacks and exacerbations.

1.10.3. Tertiary prevention

It was reported from our study that 68.75% from the population sample presented with comorbidities associated with their asthma. From this result, it is imperative to treat and control these comorbidities alongside their asthma to avoid an increase in asthma attacks and exacerbations and promote a well-controlled asthma.

2. Anxiety

2.1. Definition

Anxiety is defined as having a feeling of fear that happens when faced with menacing or stressful situations. It is usually considered a normal reaction when confronted with danger, but considered a disorder if it is overwhelming or the feeling persist and repeats in similar situations (34). It was differentiated from other types of negative effects by Latin and Greek physicians and philosophers and classified as a medical disorder. Different methods were suggested by Ancient Epicurean and Stoic philosophers to reach an anxiety-free state of mind that are similar to modern cognitive psychology. Anxiety was not classified as a separate illness until the late 19th century despite the presence of typical cases of anxiety disorder (35).

Anxiety disorders remains one of the major groups of disorders discovered in psychiatry, and in medicine at large. Many years have passed and the classification of these disorders haven't changed despite the advances in neuroscience and therapeutic's focused on its grouping. Many international conferences were held between 2003 and 2008 to enhance the main separation points of anxiety disorders through the DSM-5 processing (36). Below are definitions of the most common anxiety disorders in Morocco and the world at large.

2.2. Anxiety Disorders, their definitions and symptoms

2.2.1. Generalized anxiety disorders

Generalized anxiety disorder (GAD) is considered one of the most common and restricting illness define as the presence of chronic excessive anxiety for a duration more than 6 months. It is a disease that is often underdiagnosed and undertreated with an increased suicidal risk and cardiovascular-related events and death (37). The diagnosis and management of GAD is usually done by primary care physicians with some of its symptoms including chronic anxiety and distress of fear partnered with nonspecific physical and psychological symptoms such as restlessness, fatigue, difficulty concentrating, irritability, muscle tension, or sleep disturbances. Some of the treatments that has been found to be effective include psychotherapy (often

cognitive behavioral therapy) and pharmacotherapy, such as selective serotonin reuptake inhibitors and serotonin-norepinephrine reuptake inhibitors.

2.2.2. Panic disorder

About 5% of the population are affected by panic disorder at some point in their life. It is a common mental disorder often disabling particularly if complicated by agoraphobia and results to substantial functional morbidity and reduced quality of life (38). This mental disorder is also considered costly for the patient and society in general due to increased use of health care, lot of absenteeism, and reduced workplace productivity. Some diseases such as asthma has a high prevalence of panic disorder accompanied with certain lifestyle factors such as smoking (39). Its treatment includes several effective pharmacological and cognitive behavioral options and making it available to frontlines medical personnel by the public health community should be primordial.

2.2.3. Separation anxiety

Separation anxiety disorder is the onset of a chronic anxiety due to being separated from a love one, an object etc. it is one of the most underdiagnosed and undertreated type of anxiety disorders. It is considered to have a lifetime prevalence of 4.8% with its age of onset being above 18 years (40).

2.2.4. Phobias

Phobia is a pathological fear, a disproportionate anxious fear triggered by an object or a situation that in itself does not have any dangerous characteristics almost systemic and immediate, uncontrollable and excessive leading to avoidance behaviors. Three types of phobias are usually diagnosed in patients with the most prevalent being social anxiety (41).

- Social anxiety
- Agoraphobia and
- Simple phobias.

2.3. Causes of anxiety

Different anxiety disorders have different causes and usually stems from our everyday life experiences and need therapies. The main causes of anxiety are:

- The onset of an acute or chronic disease
- A physical or psychological family situation
- Unstable Professional or environmental changes
- A major change in one's life (divorce, separation, retirement etc.)
- A traumatic experience
- Physiological evolution of an individual (adolescent to adulthood, pregnancy)
- Death of a love one
- Etc

2.4. Anxiety assessment tools

❖ **Hospital anxiety and depression scale (HADS)**

The HADS consists of a depression and anxiety component designed to serve as a brief measure of generalized anxiety and depression symptoms in medically Ill patients. The main objective of the HADS-A is to identify clinically significant anxiety while the HADS-D is used to identify signs of depression (43). Each component comprises of 7 questions with responses ranked 0-3 with the scale items varying depending on the specific question. It is usually used for outpatients as was the case of our study.

❖ **Hamilton anxiety rating scale (HAM-A)**

The HAM-A is known to be one of the first rating scales developed to measure the severity of anxiety symptoms, and is still widely used today in both clinical and research settings. The scale consists of 14 items, each defined by a series of symptoms, and measures both psychic anxiety (mental agitation and psychological distress) and somatic anxiety (physical complaints related to anxiety). Although the HAM-A remains widely used as an outcome measure in clinical trials, it has been criticized for its sometimes-poor ability to differentiate between anxiolytic and antidepressant effects, and somatic anxiety versus somatic side effects (44). The HAM-A

does not provide any standardized probe questions. Despite this, the reported levels of inter-rater reliability for the scale appear to be acceptable.

- **Beck anxiety inventory scale (BAI)**

The BAI scale is considered to be a self-assessment scale moderately comparable with the revised Hamilton Anxiety Rating Scale and mildly comparable with the Hamilton Depression Rating Scale according to Beck et al. (45).

- **Generalized anxiety disorder 7-item scale**

The Generalized Anxiety Disorder 7-item scale (GAD-7), a subscale of the Patient Health Questionnaire, is a fast and easy questionnaire that helps identify patients with anxiety and is used to monitor treatment response as well.

- **The state-trait anxiety inventory (STAI)**

With the availability of many anxiety scales, the STAI is considered the most popularly used scale to measure anxiety. It was designed to assess an individual's predisposition to experience anxiety. However, its discriminant validity has been questioned due to strong correlations observed between STAI scores and measures of depression (46). The scale is composed of 2 parts. The first part is comprised of 20 phrases and measures trait anxiety while the second part comprises of 20 phrases and searches state anxiety or the emotional state of the person. It's important to note that the scale doesn't include somatic manifestation of anxiety.

2.5. Treatments (47)

The treatment of anxiety is done is three steps:

2.5.1. General measures

The treatment of any disease starts with educating the patient about the disease, the symptoms, how it evolves and what are the possible treatments available. An important aspect of this is the way of life of the patient. A patient with anxiety should be encouraged to adopt a

healthy life style of no smoking, eating a balanced diet, having hobbies, travelling, doing yoga, physical exercises etc.

2.5.2. Psychotherapies

Different psychotherapies are available for the treatment of anxiety. They range from cognitive and comportment therapy to simple supportive therapy rendered to the patient by a generalist of a psychologist.

2.5.3. Pharmacological treatments

Anxiolytics are the well-known treatments that are fast in relieving anxiety symptoms. However, one should be very careful with the risk of dependency associated with taking these drugs. The long-term treatment for anxiety depends on anti-depressants for a period of minimum 6 months.

2.6. Association between anxiety and asthma (48-49-50)

There is a lot of researches done to understand the correlation between anxiety and asthma over the past two decades. Accumulative evidences have shown that prenatal and early-life psychological stress including factors like maternal anxiety or depression significantly increases the risk of respiratory disorders such as asthma and other atopic disorders in children (eczema and allergic rhinitis) and adults.

furthermore, co-exposure to prenatal stress and chemical triggers (e.g., prenatal air pollution) can amplify the risk of childhood respiratory diseases and eventually affects them in adulthood. Although the association between prenatal stress and asthma-related phenotypes is well established, the pathways linking childhood stress to chronic respiratory conditions in adulthood remains unclear.

Moreover, it has been established that disruption in immune neuroendocrine and autonomic functions caused by prenatal stress likely contribute to respiratory issues and lung development. Altered functioning of these systems during early development may increase vulnerability to asthma and negatively impact lung growth in adults.

Another study was done to investigate shared genetics and the causal link between mental health disorders. A large-scale genome-wide cross-trait association study to investigate genetic overlap between asthma from the UK Biobank and eight mental health disorders from the Psychiatric Genomics Consortium established that in the single-trait genome-wide association analysis, the replicated 130 previously reported loci were discovered with 31 novel independent loci that are associated with asthma (49). They identified that attention deficit hyperactivity disorder (ADHD), anxiety disorder (AD) and major depressive disorder (MDD) have a strong genetic correlation with asthma at the genome-wide level.

A Study that documents a relationship between asthma and an increased use of emergency room services for asthma, established an association of the anxiety and asthma being driven by a common third factor, such as low socioeconomic status (50). Emerging evidence suggests that there may be shared risk factors for both asthma and anxiety disorders in youths (e.g., urban residence, parental smoking), and future investigations into this link is important.

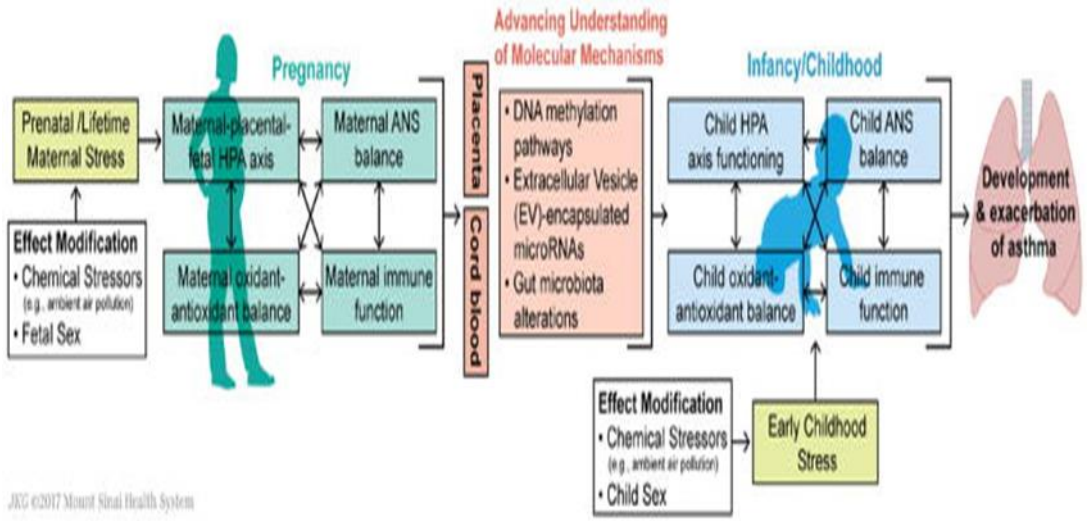


Figure 36: Stress and Asthma: State of the Science and Potential Mechanisms.

This conceptual diagram summarizing the state of the science and highlighting promising mechanistic pathways that warrant future investigation.

3. Depression

3.1. Definition

According to WHO, 5% of the population worldwide are affected by depression and is a condition that is different from usual mood changes and feelings about everyday life. It can affect all aspects of a patient's life, including relationships with family, friends and community and can be a result of or lead to problems at school and at work (51). It is usually defined as a mood disorder characterized by a prolonged feeling of sadness and a lack of interest in activities (52). The hallmark or common symptoms to the different depressive disorders include feelings of sadness, emptiness or irritability along with physical and cognitive changes that significantly hinder the individual's ability to function (53).

3.2. Types of depressive disorders

According to the American psychiatric association's diagnostic and statistical manual of mental disorders fifth edition, DSM-5, depressive disorders are categorized into several types including (54):

3.2.1. Disruptive mood dysregulation disorder (DMDD)

This depressive disorder is usually frequent in children and adolescents. Since the mid-1990s, there's been a debate on how mania in children and adolescents differs from that of adults. Pediatric-onset mania was proposed to manifest as severe non episodic irritability with extended periods of rapid mood changes occurring within the same day as opposed to distinct mood cycles (55). The diagnosis of DMDD is based on two main criteria (56):

- frequent severe temper outbursts and
- chronic non-episodic irritability.

Although relatively new, DMDD is the only diagnosis in the DSM-5 depressive disorder that requires childhood onset (56). The DSM-5 specifically emphasizes that individuals who meet the criteria for both DMDD and oppositional defiant disorder (ODD) should only receive the diagnosis of DMDD.

3.2.2. Major depressive disorder (MDD)

Major depressive disorder (MDD) was identified as the third leading cause of the global disease burden by the WHO in 2008 (57). The organization has further predicted that by 2030, MDD will become the leading cause. MDD is diagnosed when an individual experiences a persistently low mood or lack of interest in enjoyable activities (anhedonia), alongside symptoms such as feelings of guilt or worthlessness, low energy, difficulty concentrating, change in appetite, psychomotor agitation or retardation, sleep problems, or suicidal thoughts. According to DSM-5, a person must exhibit five or more of these symptoms to be diagnosed with MDD, with at least one being either a depressed mood or anhedonia (58). Additionally, the possibility of a manic or hypomanic episode must be ruled out for a diagnosis to be retained.

3.2.3. Persistent depressive disorder (dysthymia)

Persistent depressive disorder (PDD) as outlines in the DSM-5 in 2013 combines the previous diagnoses of dysthymic disorder and chronic major depressive disorder (59). PDD is characterized by persistently depressed mood lasting for most of the day on more days than not, for a minimum of two years in adults or one year in children and adolescents. PDD often begins early in life and can develop into chronic condition with symptoms that either persist or fluctuate but never fully resolve. Individuals with PDD are at an increased risk of suicidal thoughts and behaviors with impairments that can be as severe or more severe than those seen in MDD (60).

3.2.4. Premenstrual dysphoric disorder

Premenstrual dysphoric disorder (PMDD) is a type of depressive disorder only seen in women of reproductive age (61). PMDD symptoms involves a combination of emotional, behavioral and physical signs that occur in a cyclical pattern before menstruation, typically subsiding once the menstrual period begins (59). For most women, these symptoms are mild and do not interfere with daily life. However, 5% to 8% of women experience moderate to severe symptoms leading to significant distress and difficulties in functioning (62). Premenstrual

symptoms may range from mood and behavioral symptoms, including irritability, tension, depressed mood, tearfulness, and mood swings to somatic complaints, such as breast tenderness and bloating (59).

3.2.5. Depressive disorder due to another medical condition

This is a type of a depressive disorder resulting from another medical condition or factor.

It is a disorder that is becoming more and more frequent due to the increase in the prevalence of chronic diseases and other medical conditions (63). Pneumologist and other health personnel must include psychological assessment in patients with chronic diseases for timely intervention if detected.

Other types of depression are melancholy, seasonal affective disorder, depressive episodes in bipolar disorder, perinatal depression and perimenopausal depression.

3.3. Causes of depression

The specific cause of depression in a patient involves a combination of different factors:

- **Hormonal imbalance**: An imbalance of neurotransmitters, including serotonin and dopamine can be responsible for the development of depression.
- **Genetics**: A first-degree relative (biological parent or sibling) with depression can increase the patient's risk of developing the condition three times compared to the general population.
- **Stressful life events**: Certain life experiences such as the death of a loved one, trauma, divorce, isolation and lack of support often results to depression in many people if the right help is not given.
- **Medical conditions**: Chronic conditions like asthma, diabetes, heart diseases, heavy surgeries can lead a patient to depression.
- **Medication and toxic habits:** The use of certain substances like alcohol can cause depression or worsen an already diagnosed depression. Certain medications can also give depression as side effects.

3.4. Depression assessment tools

Different tools are available in the assessment of depression (64). These include the Hamilton Depression Rating Scale (HRDS), the Hospital anxiety and depression scale (HADS), the Zung self-rating depression scale (ZSDS), the Beck Depression Inventory (BDI), the Centre for Epidemiological Studies Depression Scale (CES-D), the Patient Health Questionnaires 9 (PHQ-9), the Depression Anxiety Stress Scale (DASS), the Primary Care Evaluation of Mental Disorders (PRIME-MD) and the Geriatric Depression Scale (GDS).

- **BDI:** is an auto questionnaire that contains 21 questions of variable intensity depending on the degree of importance of depressive symptoms graded from 0-3 (65).
- **HRDS:** HRDS has been modified several times into different questionnaire versions and the most frequently used version is the one with 17 items. It is usually used for the evaluation of the severity of a patient's depression in the past week (66).

It is important to note that HRDS, ZSDS, BDI, CES-D, and PHQ-9 are mainly used in detecting depression and its severity level whereas the DASS is commonly used to detect depression status, anxiety, and stress levels. The GDS is designed to detect depression among the elder population of 60 years and above whereas the Prime-MD is specifically designed for general doctors in the DSM-5 for the detection of depression symptoms (67). In most of the research articles it was found that the PHQ-9 tool was used for assessing depression whiles in our study, HADs was used in the collection and detection of depressive symptoms.

3.5. Depression Treatments

Many types of treatments such as antidepressants, phototherapies and electroconvulsive therapies are used in the treatment of depression (68).

3.5.1. Antidepressants

Antidepressants operate through different mechanisms, each targeting specific neurotransmitters that regulate mood and behavior. Current antidepressants medications are thought to boost levels of serotonin, norepinephrine or both within the synaptic space. While

the exact processes by which these neurotransmitters are increased can differ, the primary action of most antidepressants is to block their reuptake at nerve terminals allowing for greater ability in the brain (69). Around 70 to 80% of individuals with major depressive disorder can significantly reduce symptoms if covered under antidepressants drugs. The most commonly used antidepressants include Selective Serotonin Reuptake Inhibitors (SSRIs), Serotonin/Norepinephrine Reuptake inhibitors (SNRIs), Atypical antidepressants, Tricyclic antidepressants and Monoamine oxidase inhibitors (70).

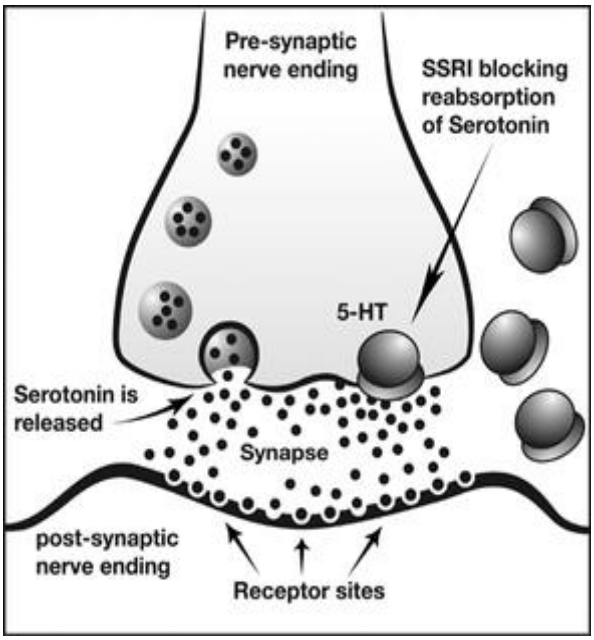


Figure 37: Schematic diagram showing mechanism of action of SSRIs.

3.5.2. Phototherapies

Phototherapies are use in the treatments of seasonal depressions. A 30mins/ day exposure to light of intensity 10 000 lux3 is used in this method.

3.5.3. Electroconvulsive therapy (ECT)

Electroconvulsive therapy (ECT) introduced in 1938 is the earliest form of neurostimulation preceding the development of all currently available antidepressants (71). It is still regarded as the most effective and rapid treatments for major depression. ECT works by

delivering an electrical current through electrodes places on the scalp which induces a controlled seizure while the patient is under general anesthesia and muscle relaxation (72). Despite significant progress in the development of oral antipsychotics and anti-depressants, ECT remained a key biological intervention for treating severe mood and psychotic disorders for many decades.

3.5.4. Other therapies

Other types of therapies include cognitive and comportment therapy and simple support therapies.

3.6. Association between depression and asthma

A cross-sectional study was conducted in the Pneumology Department at the Hassan II University Hospital in Fez in 2021 by Bahra N (73) using an anonymous questionnaire to collect sociodemographic, clinical, and therapeutic data. The Moroccan version of the HADS was used to measure depression and anxiety in 209 patients. The results shows that 46.4% of the population presented an association of their asthma with depression.

Furthermore, a retrospective study done in South Africa in 2008 on 3840 individuals by Peltzer (74) were found with an overall prevalence of symptom-based depression in the past 12 month at 4.0%. In the multivariable analysis chronic conditions such as asthma were associated with self-reported depression symptoms in the past 12 months.

Another study done by Surve et al (75) on a rigorous search in PubMed using terms "asthma" and "depression" was performed and results showing that there exists a correlation between asthma and depression, with specific biological mechanisms and genetic factors playing a crucial role in their concurrent occurrence.

Two studies done in Korea by Choi (76) shows that the Hazard Ratio (HR) of depressive disorders was significantly higher in patients with asthma than in patients without asthma and the HR of asthma in patients with depression was significantly higher than that in patients without depression.

II. Evaluation of anxiety and depression morbidity in 64 asthmatic patients

From our study, we have found an anxiety prevalence of 34.4% of the population and depression prevalence of 20.3%. A 23.4% of the population were found to have borderline abnormality of both anxiety and depression.

In comparison to the study done at the pneumology department of the Hassan II teaching hospital of Fes in 2017 on 80 asthmatic patients by El Ismaili et al (77), 47 % were found to have depressive symptoms.

In another study done by khouchilia et al (78) at the pneumology department of the Ibn Rochd teaching hospital of Casablanca in 2018, the results show that depression was found in 23% of a total population of 100 patients and anxiety was found in 53 % of the population studied.

A cross-sectional study by Liu S et al (79) in a Chinese tertiary center was done on asthmatic outpatients to investigate the prevalence of the association between asthma, anxiety and depression. The results shows that 11.8% out of 261 patients had anxiety symptoms while 13.4% had depressive symptoms.

In Nigeria, a study done by Adewuya AO et al (80) found that out of 203 adult asthmatics, 34.5% were found with symptoms of Anxiety or Depression.

Another cross-sectional study done by Bedolla-Barajas M et al (81) of 164 consecutively recruited patients with asthma in Mexico with the age of 18and above using the BAI and BDI-II found that 54.3% of the population had anxiety symptoms and 50.6% had depressive symptoms.

Another cross-sectional study including 175 adults with asthma who visited the tertiary asthma clinic in three Jordanian Governmental hospitals was done by Karsaneh et al (82) using the HADS scale and found 8% of the population with anxiety and 11.43% with depression.

The study conducted at the pulmonary clinic of the Department of Pulmonary Diseases, Osijek University Hospital Centre in Croatia by Labor S et al (83) on 200 adult asthma outpatients

also found 24.5% of the population studied with depressive symptoms and 44.5% with anxiety symptoms.

Table VIII: A table showing the prevalence of anxiety and depression in 64 asthma patients in comparison to the literature study

Series	Country	Number of cases	% Of Anxiety	% Of Depression
A. EL Ismaili et al (77)	Morocco (Fes)	80	-	47
Kouchilia et al (78)	Morocco (Casablanca)	100	53	23
Liu S et al (79)	China	261	11.8	13.4
Adewuya AO et al (80)	Nigeria	203	34.5	-
Bedolla-Barajas et al (81)	Mexico	164	54.3	50.6
Karsaneh et al (82)	Jordan	175	8	11.43
Labor S et al (83)	Croatia	200	44.5	24.5
Our series	**Morocco (Marrakech)**	**64**	**34.4**	**20.3**

These results correlate with the findings from our study which shows an increase in the frequency of anxiety and depression in asthmatic patients that are usually underdiagnosed and undertreated. It is imperative to note the importance of screening asthmatic patients for anxiety and depression as an association of these comorbidities can affect the patient's adherence to treatment, asthma control, increase in asthma attacks and risk of psychological complications if not treated.

III. Analysis of epidemiological and clinical factors associated with anxiety and depression in asthmatic patients in comparison to the literature study

Different factors can be responsible for increasing the risk of anxiety and depression in asthmatic patients. Some of these factors comes from the chronicity of the disease, the long-term treatments, the cost of treatments and the overall change of the life of the patient that accompanies the disease. Some of these factors found from our study will be discussed and compared to already available data.

1. Socio-demographic factors

1.1 Age

Asthma tends to affect middle age individuals in adults. In our study, we have found our mean age to be 46 closed to the study reported by El ismaili et al (77) in Fes, khouchilia et al (78) in Casablanca, Abarray (84) in Marrakech, Senhaji et al (85) in Fes and Ketfi et al (86) in Algeria. The mean age reported in Senegal by Ndiaye et al (87) and France by Oster et al (89) are lower the data we found from our study. The study done in Tunisia by Gharrsali et al (88) shows a higher mean age.

Table IX: A table showing different mean age in comparison with the literature study

Series	Country	Number of cases	Mean Age (years)
El Ismaili (77)	Morocco (Fes)	80	41
Khouchilia (78)	Morocco (Casablanca)	100	45
Abarray (84)	Morocco (Marrakech)	160	46.5
Senhaji (85)	Morocco (Fes)	33	47
Ketfi (86)	Algeria	343	44.04
Ndiaye (87)	Senegal	120	33
Gharssali (88)	Tunisia	250	55
Oster (89)	France	46	39.5
Our series	**Morocco (Marrakech)**	**64**	**46**

1.2 Sex

In our study, we reported a 56.3% of male dominance while 43.7% were female. In the series of El Ismaili et al (77) 68.75% of a population of 80 patients were found to be female and 31.25% were male. The study of Labor S et al (83) conducted at the pulmonary clinic of the Department of Pulmonary Diseases, Osijek University Hospital Centre in Croatia on 200 adult asthma outpatients found 65.5% female and 35.5% male. In other series such as Abarray (84) a male dominance was found at 81.25% out of the 160-population studied and 18.75% were reported to be female. In the series of Kadoussi et al (90) a predominance of female was found at 60.2% and a male population of 39.8%. It can be observed that apart from the series of Abarray, all the other series contradicts our results of male dominancy. This can be explained by the fact that these two studies were done at the military hospital in Marrakech dominated by men.

Table X: A table showing sex distribution according to the literature study

Series	Country	Male (%)	Female (%)
El Ismaili (77)	Morocco (Fes)	31.25	68.75
Labor S et al (83)	Croatia	35.5	65.5
Abarray (84)	Morocco (Marrakech)	81.25	18.75
Kadoussi (90)	Tunisia	39.8	60.2
Our series	**Morocco (Marrakech)**	**56.3**	**43.7**

1.3 Socio-economic status

72% of our patients were found to be in the middle class grouping and 22% of the total population were reported to be in the lower class which tally with the cross-sectional study done in the department of Internal Medicine at the University of Gothenburg in Sweden (91), which shows that Low socio-economic status is significantly associated with an increased risk

for prevalent and incident asthma and respiratory symptoms in their longitudinal population-based survey.

1.4 BMI

A lot of evidence has been established in the association of asthma and obesity. It is a significant public health issue and serve as both a key risk factor and a modifier of asthma in children and adults. Individuals with obesity have a heightened risk of asthma and those with asthma who are obese tend to experience more symptoms frequently with severe exacerbations (92). It is also observed that they have a reduced response to certain asthma treatments and a reduced quality of life.

In our study, we found 36% of the population being overweight and 8% being obese which tally with the study of Abarray (84) which reported a 31.25% of the population being obese. 20.2% of the population were found to be obese in the study of Neino et al (93) while the study of Irani C et al (94) found 35.5% being overweight and 15.3% being obese. Another study done in Saudi Arabia by Algarni AA et al (95) found 31.1% asthma patients overweight and 46% obese.

It was also proven from our study that the presence of overweight/obesity in asthma patients increases the odds of anxiety and depression.

Table XI: Distribution of overweight and obesity according to the literature study

Authors	Country	Overweight	Obese
Abarray (84)	Morocco (Marrakech)	-	31.25%
Neino et al (93)	Niger	-	20.2%
Irani C et al (94)	Lebanon	35.5%	15.3%
Algarni AA et al (95)	Saudi Arabia	31.1%	46.0%
Our series	**Morocco (Marrakech)**	**36%**	**8%**

1.5 Toxic habits

In our study, 25% of the population are ex-smokers and no active smoker was reported. It is imperative to insist on the importance of no smoking in asthmatic patients as tobacco is

known to play a role in the increase of production of IgE and the increase in broncho hyperreactivity (70). This is also reported by Abarray (84) which found 33.4% who were either active or ex-smokers. The series of senhaji et al (85) shows the same results.

1.6 Medical history

1.5.1. Family history of asthma and atopy

Most asthmatic patients inherit their asthma from their parents which explains the importance of genetics in asthma. In our study, 26.6% of the population reported a family history of asthma, 15.6% reported a history of atopy and 28.1% reported a family history of both asthma and atopy. These numbers correlate with the results reported by Abarray (84) which shows a 32.5% of a history of atopy in the population studied.

1.5.2. Allergic rhinitis (AR)

There is a known frequent association between allergic rhinitis and asthma. 79.7% of the patients from our study reported an association of allergic rhinitis and their asthma. this association usually has an impact on the control and treatment of asthma if not treated. These results corelates with the study of Abarray (84) which reported a 54.37% of allergic rhinitis and the study of Amro et al (96) which reported a prevalence of AR at 41% from the population studied. The study of Boussehra et al (97) shows a 72% prevalence and the study of Elmghari (98) shows an AR prevalence of 76%.

1.5.3. Conjunctivitis

In our study, 35.9% of the population reported an association of conjunctivitis with their asthma. It is a disease which is becoming frequently associated with allergic rhinitis and asthma. It is reported in the study of Abarray (84) that 46.87% of the population had conjunctivitis while the study of Amro et al (96) reported a 28% prevalence. A 63% prevalence of conjunctivitis was found in the study of Boussehra et al (97) a value close to the results found in the study of Elmghari (98) at 65%.

1.5.4. Eczema

Only 5% of our population studied reported an association of eczema with their asthma as compared to the study of Abarray (84) which shows a prevalence of 18.75%. This result

correlates with the study of Amro et al (96) shows a prevalence of 7.6% of the population. The study of Boussehra et al (97) found 24% of the population with atopic dermatitis. while that of Elmhari (98) reports 19%.

Table XII: Allergy manifestation according to the literature study

Author	Allergic rhinitis	Conjunctivitis	Eczema
Abbarray (84)	54.37%	46.8%	18.75
Amro (96)	41%	28%	7.6%
Boussehra et al (97)	72%	63%	24%
Elmghari (98)	76%	65%	19%
Our series	**79.7%**	**35.9%**	**5%**

1.5.5. Other Allergies

7.8% from our study reported being allergic to aspirin and paracetamol while 4.7% reported having food allergies (nuts, seafood and milk). Only 1.6% had an allergy to sheep wool. These are also reported in many publications such as Kowalski ML (99) and Abramson (100).

1.7 Comorbidities

From our study, 68.75% of the population had comorbidities associated with their asthma with a 42% prevalence of Gastro-Esophageal Reflux Disease (GERD) reported, 6.25% reported the presence of High Blood Pressure and 4.7% reported an association of a cardiovascular disease without precision. 6.25% reported the presence of Sinusitis, 4.7% had thyroid gland disease associated, 3% had diabetes and 1.6% reported the association of irritable bowel syndrome. No Chronic Obstructive pulmonary disease was reported.

These results corelates with the data found in the study of Boussehra et al at the CHU Ibn Rochd in Casablanca (97) which reported a 30% of GERD from a 598 population, 17% reported Diabetes, HBP was reported by 9% of the population, 4% had goiter, 2 patients reported congenital cardiopathy and 4 patients reported COPD.

In the study of Abarray (84) in Marrakech, 40.3% of the population had GERD, 28.7% presented with HBP, 26.6% reported diabetes and 6.25% of the population reported an association of COPD with their asthma. The study of Neino et al (93) in Niger shows that GERD

was reported in 54% of the population, sinusitis was found in 39,4%, HBP was at a prevalence of 7%, diabetes was 5,6% of the population and COPD was found in 2,3% of the population.

In the study of E. Ogbu et al (101) which utilized the Behavioral Risk Factor Surveillance System (BRFSS) and Asthma Call-Back Surveys (ACBS) as the primary data source in the USA, the prevalence of comorbidities in asthmatic adults were: hypertension 38.4%, diabetes 17.2%, Angina/chronic heart disease (CHD) 6.0%, and Emphysema/Chronic bronchitis/COPD 19.0%.

The study of Gharsalli et al from Tunisia (88) and Terzano et al (102) in Italy shows similar results as indicated in the table below.

Table XIII: A table showing different comorbidities from our study in comparison to the literature study

Authors	Country	GERD	HBP/CVD	Sinusitis	Goiter	Diabetes	Irritable Bowel Syndrom	Chronic Obstructive Pulmonary Disease
Abarray (84)	Morocco (Marrakech)	40.3%	28.7%	-	-	26.6%	-	6.25%
Gharssali et al (88)	Tunisia	14%	14.8%	-	-	32%	-	-
Neino et al (93)	Niger	54%	7%	39.4%	-	5.6%	-	2.3%
Boussehra et al (97)	Morocco (Casablanca)	30%	9%/2 patients	-	4%	17%	-	4 patients
E.Ogbu et al (101)	USA	-	34.4%/6.0%	-	-	17.2%	-	19.0%
Terzano et al (102)	Italy	16.8%	14.8%	-	-	3.8%	-	-
Our series	**Morocco (Marrakech)**	**42%**	**10.95%**	**6.25%**	**4.7%**	**3.%**	**1.6%**	**-**

2. Clinical factors

2.1. Stress frequency due to asthma

We have found from our study that 26.6% had low level of stress and 65.6% had moderate stress level. Only 7.8% of the population had a high stress level. These results are lower than the values found in a study done in Nigeria by Arawoma AO et al (103) which found 63% of 100 adult asthma patients with high stress level.

2.2. Asthma characteristics

- **Mean age of asthma onset**

The mean age of symptom onset from our study was 35.6 years old. It is close to the results found from the study of Mjid (104), Lyoussfi (105) and Bejar (106).

Table XIV: A table showing different mean ages in comparison to the literature study

Authors	CL	Mean age
Mjid et al (104)	Tunisia	30
Lyoussfi et al (105)	Morocco (Casablanca)	24
Bejar (106)	Tunisia	32
Our series	**Morocco (Marrakech)**	**35.6**

- **Trigger factors**

Different trigger factors are responsible for the onset of asthma attacks. These factors can be different in different patients. The results found from our study detailed below are similar to that of Abramson (100) done on 795 patients at the Department of Social and Preventive Medicine, Monash Medical School, Alfred Hospital, Melbourne, VIC., where the most frequently reported trigger factors were viral upper respiratory tract infections, cigarette smoke, house dust, smog and other non-specific irritants. In our study, the most frequently reported trigger factors were:

- **Dust**

Dust was found to be the most frequent trigger factor as 90.6% of the population reported it. This result is similar to the study of Moussa (107) where 75.97% reported dust as trigger factor and Abarray who reported 50% from the population studied.

- **Cigarette smoke**

81.25% of our population studied reported exposure to cigarette smoke triggers their asthma. Similar results were found in the study of Abarray.

- **Upper respiratory infections**

75% from our series reported upper respiratory infection to be a trigger factor of their asthma. This tally with the data reported by many authors (84) (101) (108). The most frequently reported by our patients was repetitive upper respiratory infections.

- **Physical efforts**

It is noted in our study that 79.68% of the population reported that physical efforts can trigger their asthma. This can be explained by the manifestation of bronchial hyper-reactivity that poses a special problem for asthmatic patients and leads to exercise-induced asthma (109). This is also reported in the study of boussehra (97) and Abramson (100).

- **Climate change**

in our series, 64% reported that climate change affects or triggers their asthma. It was also noted in the study of Patz JA (110), the study of D'Amato G (111) and Abarray which reported a 30% prevalence.

- **Chemical products**

It was noted that 34.4% of our population studied were found to having exposure to bleach and detergents as trigger factors to their asthma. Similar results were found in the study of Norback D et al (112).

- **Exposure to allergies (animals, medications etc.).**

9.4% reported exposure to animals triggers their asthma and 7.8% reported the taking of aspirin and paracetamol trigger their asthma. It is well known that NSAID exacerbates respiratory diseases by resulting in chronic eosinophilic, inflammatory disorder of the respiratory tract as seen in asthma patients (113). This is similarly reported in many other studies like Abarray, Abramson and Norback D et al.

- **Psychological factors**

It was found that 17.2% of our total population has psychological factors such as stress triggering their asthma. Similar results were found in the study of Abarray at 16%.

❖ **Symptoms**

In our study of 64 patients, 85.9% reported difficulty in breathing, 87.5% reported wheezing, 42.2% reported dry cough and 23.4% reported chest pains. It has to be noted that these symptoms are experienced by the patient in association with each other.

These results are similar to the data found in the study Abarray (84) which shows that 85% had dry cough, 75% reported difficulty in breathing, 66.25% reported wheezing, and 25% reported chest pain.

In the study of Migaou et al (108) wheezing was reported in 86,11 % of the population studied, dry cough was found in 19,44 %, chest pain was at 8,33 % and difficulty in breathing was found at 89.81.

Table XV: Distribution of most frequent symptoms in asthma patients according to the literature study

Authors	Country	Symptoms			
		Wheezing	Difficulty in breathing	Chest pain	Cough
Abarray (84)	Morocco (Marrakech)	66.25%	75%	25%	85%
Migaou et al (108)	Tunisia	86.11%	89.81%	8.33%	19.44%
Our series	**Morocco (Marrakech)**	**87.5%**	**85.9%**	**23.4%**	**42.2%**

❖ **Exacerbations/year**

The number of exacerbations found in patients were significantly associated with their asthma control test scores as fewer exacerbations were reported in well-controlled asthmatic patients. We found a 53% of our population having

1-3 exacerbations/year. This result was found to be similar to the study of Moussa et al (107) where 1 à 3 exacerbations/year were found in 67,8 % of the population.

❖ **Treatments**

o **Long-term treatments**

in our study, all patients, were under short acting beta-2-agonists (SABA) or rescue medication for fast relieved of sudden symptoms in association with their long-term treatments. 92% were treated by an association of long-acting beta agonist (LABA) and Inhaled corticosteroids (ICS) and 6% were under with SABA only (patients that don't adhere to their long-term treatments). Similar results were found in the series of Abarray (84) where 65% of the patients were under LABA+ICS, and 25% were under ICS only. 10 % were found to be under LABA + ICS + Theophylline. These results contradict the data found in the series of Migaou et al (108) where 91.67% of the cases were under ICS only and 19.4% were under the association of ICS and LABA.

o **Exacerbation treatments**

It was noted that 38% of our patients relieve their exacerbations by the use of rescue medications such as salbutamol, 45% uses oxygen at the emergency department and 17% don't use any medication. Similar results were found in series of Alghamdi et al (114) in which to relieve exacerbation, most of the patients used salbutamol 51.5%, 35.2% used oxygen and 30.4% do not use any medication.

❖ **Asthma control**

Table XVI: Levels of asthma control according to the literature study in comparison to our results

Authors	Country	No. of patients	Controlled	Partially Controlled	Uncontrolled
Moussa (107)	Morocco (Fes)	31	29%	48.4%	22.6%
Migaou et al (108)	Tunisia	108	63.9%	31.5%	4.6%
Alghamdi et al (114)	Saudi Arabia	227	35%	22.9%	26%
Arrais et al (115)	Angola	305	25%	36%	35%
Our series	**Morocco (Marrakech)**	**64**	**48.4%**	**28%**	**23.6%**

In our series, 48.4% of the population studied had controlled asthma, 28% had partially controlled asthma while 23.6% were uncontrolled.

In comparison to other studies such as the study of Moussa (107) done on 31 patients, 29% had controlled asthma, 48,4 % were partially controlled and 22,6 % were uncontrolled.

In the study of A. Migaou et al (108) done on 108 patients, 63.9% of the cases studied had their asthma well controlled, 31.5% were partially controlled and 4.6% were uncontrolled

The study of Alghamdi (114) done on 227 adult asthma patients show that uncontrolled asthma was present in 26% of the patients, 22.9% were partially controlled and 51.1% had well-controlled asthma.

The study of Arrais et al (115) shows that about 28% out of 305 patients had controlled asthma, 36% had partially controlled and 35% were uncontrolled.

IV. LIMITS OF OUR STUDY

Our study was confronted with some difficulties:

- A small sample population :
  - This is explained by a lot of patients not consenting to taking part in the study due to personal reasons.
  - The study also took place at the consultation center of the pneumology department of the avicenne military hospital with limited number of asthma patients per consultation.
- The HADS used is a tool for detection of symptoms only and doesn't confirm the diagnosis of anxiety and depression.

CONCLUSION

Asthma is a chronic non-communicable disease (NCD) affecting more than 300 million people of all ages around the world according to WHO. It is a disease that is usually underdiagnosed and under treated in low and middle-income countries which explains the importance of its inclusion in the WHO Global Action Plan for prevention and control of NCDs and the UN 2030 agenda for sustainable development as it continues to be a public health problem. From an epidemiologic study made in Morocco, the prevalence of asthma is between 5 to 20% of the general population with the highest prevalence in big cities while it still remains greatly underdiagnosed and undertreated throughout the country.

In 2019, one in every eight people around the world were living with anxiety or depressive disorders according to WHO with 48.9% of the general population in Morocco suffering from a mental disorder. The association of asthma as a chronic disease and mental disorders pose a threat of reduction of quality of life of the patient with risk of worsening of the disease and calls for a multidisciplinary intervention.

Our study has shown an important prevalence of anxiety and depression in asthmatic patients in association with other sociodemographic and clinical factors. We have significantly found these disorders in the male middle-class population with uncontrolled asthma, overweight and obese, an occasional presence of stress due to the disease, a high number of exacerbations (>2) per year, an asthma severity of moderate persistent and an association of other comorbidities with irregular adherence to treatment. It was also found that there was no significant correlation between these disorders and their personal or family history of psychiatric disorders.

It is to be noted that a well-controlled asthma decreased the likelihood of anxiety and depression as proven in the multivariable test.

Finally, the association of asthma and anxio-depressive disorders call for a collaboration between pneumologist and psychiatrist to emphasize the importance of its systematic detection by the use of simple tools available. The distributions of HADS questionnaire at hospitals and consultation centers to asthmatic patients can facilitate the detection and management of anxio-depressive disorders in order prevent the risk of complications associated with these disorders.

RECOMMENDATIONS

Recommendations

This study shows results of the existence of a high prevalence of anxiety and depressive disorders in Asthmatic outpatients at the military hospital. This justifies or calls for collaboration between pneumologist and psychiatrist for the systematic detection and management of these patients for a better quality of life.

- The HADs is a simple tool that can be distributed to all outpatients to fill at their consultation appointments.
- Patients found with symptoms of anxiety or depression should be referred to a psychiatry for further evaluation and treatment.
- Patients found with high score or symptoms from this study should be followed and referred to a psychiatry for evaluation and treatment.

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ABSTRACT

ABSTRACT

INTRODUCTION: According to WHO, in 2019, one in every eight people, or 970 million people around the world were living with a mental disorder, with anxiety and depressive disorders being the most common. In Morocco, about 48.9% of the general population are living with a mental disorder with majority of this number being underdiagnosed and undertreated. The presence of a chronic disease such as asthma is a high-risk factor or a cause in the development of mental disorders especially anxiety and depression.

The purpose of this study is to estimate the prevalence of anxiety and depression in asthmatic patients and to determine the sociodemographic and clinical factors associated with them.

OBJECTIVES:

The principal objectives of this study were:

- To estimate the prevalence of anxiety and depression in asthmatic patients.
- To determine the clinical and socio-demographic factors associated with anxiety and depression
- To determine how anxiety and depression affects asthma exacerbations and control

MATERIALS AND METHODS: We conducted a descriptive cross-sectional study on 64 patients from January 2024 to August 2024 (duration of 8 months) at the pneumology department of the Avicenne Military Hospital in Marrakech. A detail question sheet containing the sociodemographic and clinical aspect of the patient was use in association with the Hospital Anxiety and Depression scale (HADS).

RESULTS: We have found from our study that 56.3% of the population were male and 41.7% were female with a mean age of 46 years. The prevalence of anxiety was 34.4% and depression was 20.3%. 17.2% of the population were found to have an association of both anxiety and depression. These disorders were significantly found in the male middle-class population with uncontrolled asthma, overweight and obese, an occasional presence of stress due to the disease, a high number of exacerbations (>2) per year, an asthma severity of moderate persistent and an association of other comorbidities with irregular adherence to treatment.

CONCLUSIONS: Our results are in concordance with available literature and highlights the importance of involving psychiatric doctors and other multidisciplinary in the management of asthmatic patients.

RESUME

INTRODUCTION : Selon l'OMS, en 2019, une personne sur huit, soit 970 millions de personnes dans le monde, vivait avec un trouble mental, les troubles anxieux et dépressifs étant les plus courants. Au Maroc, environ 48,9 % de la population générale vit avec un trouble mental, la majorité de ce nombre étant sous-diagnostiqué et sous-traité. La présence d'une maladie chronique telle que l'asthme est un facteur de risque élevé ou une cause dans le développement de troubles mentaux, en particulier l'anxiété et la dépression.

Le but de cette étude est d'estimer la prévalence de l'anxiété et de la dépression chez les patients asthmatiques et de déterminer les facteurs sociodémographiques et cliniques qui leur sont associés.

OBJECTIFS :

Les principaux objectifs de cette étude étaient les suivants :

- Estimer la prévalence de l'anxiété et de la dépression chez les patients asthmatiques.
- Déterminer les facteurs cliniques et sociodémographiques associés à l'anxiété et à la dépression
- Déterminer comment l'anxiété et la dépression affectent les exacerbations de l'asthme et le contrôle

MATÉRIELS ET MÉTHODES : Nous avons réalisé une étude transversale descriptive sur 64 patients de janvier 2024 à août 2024 (durée de 8 mois) au service de pneumologie de l'hôpital militaire Avicenne de Marrakech. Une feuille de questions détaillée contenant l'aspect sociodémographique et clinique du patient a été utilisée en association avec l'échelle HADS (Hospital Anxiety and Depression Scale).

RÉSULTATS : Nous avons constaté à partir de notre étude que 56,3 % de la population était masculine et 41,7 % était féminine avec un âge moyen de 46 ans. La prévalence de l'anxiété était de 34,4 % et celle de la dépression de 20,3 %. 17,2 % de la population présentait une association entre l'anxiété et la dépression. Ces troubles ont été significativement retrouvés dans la population masculine de la classe moyenne avec de l'asthme non contrôlé, du surpoids et de l'obésité, une présence occasionnelle de stress due à la maladie, un nombre élevé d'exacerbations (>2) par an, une sévérité de l'asthme modérément persistante et une association d'autres comorbidités avec une observance irrégulière du traitement.

CONCLUSIONS : Nos résultats sont en concordance avec la littérature disponible et soulignent l'importance d'impliquer des médecins psychiatres et d'autres multidisciplinaires dans la prise en charge des patients asthmatiques.

ملخص

مقدمة: وفقا لمنظمة الصحة العالمية ، في عام 2019 ، كان واحد من كل ثمانية أشخاص ، أو 970 مليون شخص حول العالم يعانون من اضطراب عقلي ، مع كون اضطرابات القلق والاكتئاب هي الأكثر شيوعا. في المغرب ، يعيش حوالي 48.9٪ من عامة السكان مع اضطراب عقلي مع غالبية هذا العدد غير مشخصين بشكل كاف ويعانون من عدم العلاج. يعد وجود مرض مزمن مثل الربو عامل خطورة عالية أو سبب في تطور الاضطرابات النفسية وخاصة القلق والاكتئاب.

الغرض من هذه الدراسة هو تقدير انتشار القلق والاكتئاب لدى مرضى الربو وتحديد العوامل الاجتماعية والديموغرافية والسريرية المرتبطة بهم.

اهداف:

كانت الأهداف الرئيسية لهذه الدراسة هي:

- تقدير انتشار القلق والاكتئاب لدى مرضى الربو.
- لتحديد العوامل السريرية والاجتماعية والديموغرافية المرتبطة بالقلق والاكتئاب
- لتحديد كيفية تأثير القلق والاكتئاب على تفاقم الربو والسيطرة عليه

المواد والطرق: أجرينا دراسة وصفية مقطعية على 64 مريضا في الفترة من يناير 2024 إلى أغسطس 2024 (مدة 8 أشهر) في قسم أمراض الرئة في مستشفى ابن سينا العسكري بمراكش. تم استخدام ورقة أسئلة تفصيلية تحتوي على الجانب الاجتماعي الديموغرافي والسريري للمريض بالاشتراك مع مقياس القلق والاكتئاب في المستشفى (HADS).

النتائج: وجدنا من دراستنا أن 56.3٪ من السكان كانوا من الذكور و 41.7٪ من الإناث بمتوسط عمر 46 عاما. كان انتشار القلق 34.4٪ والاكتئاب 20.3٪. وجد أن 17.2٪ من السكان لديهم ارتباط بين القلق والاكتئاب. تم العثور على هذه الاضطرابات بشكل ملحوظ في السكان من الطبقة الوسطى الذكور الذين يعانون من الربو غير المنضبط ، وزيادة الوزن والسمنة ، ووجود الإجهاد في بعض الأحيان بسبب المرض ، وعدد كبير من التفاقم (2<) سنويا ، وشدة الربو المعتدلة المستمرة وارتباط الأمراض المصاحبة الأخرى مع الالتزام غير المنتظم بالعلاج.

الاستنتاجات: تتوافق نتائجنا مع الأدبيات المتاحة وتسلط الضوء على أهمية إشراك الأطباء النفسيين وغيرهم من الأطباء متعددي التخصصات في إدارة مرضى الربو.

ANNEXES

EXPLOITATION SHEET
Anxiety and Depression in Asthmatics

Date of Investigation:

Identity

- Name and surname: Tel:
- Sex:
- Age:
- Family situation:
- Profession:
- Geographical origin:
- Socio-economic level: Low □ Middle □ High □
- Medical coverage: FAR □ CNOPS □ Paid □ Other □
- Children: yes □ no□

Medical History

Personal:

- **Medical:**

  Lung diseases: Yes □

  No □

  Known asthmatic:
  Allergic rhinitis:
  Repetitive respiratory infections:
  Tuberculosis:
  COPD:
  Chronic bronchitis:
  Pulmonary emphysema:
  Other:

Other Diseases (Comorbidities):
Conjunctivitis □
Eczema □
Sinusitis □
GERD □
HTA □
Diabetes □
Cardiovascular □

Bronchi cancer □
Pulmonary Fibrosis □

- **Chirurgical:**
- **Toxic habits**: Tobacco: Active: Yes □ PA:
  No □
  Passive: yes □ non □

  Ex-smoker □ Quit since:
  Exposure time:

  Food allergy□
  Pets □
  Medications □
  Other Toxic Habit: Alcohol □ Cannabis □ Other □

- **Hospitalization in the pulmonology department**: Yes □ Number:
  No □
- **Metabolic**:
  Weight: height: BMI:
  Normal □ Undernutrition □ overweight □ obese □

- **Psychiatric:**
  Anxiety: yes □ Non □
  Generalized anxiety disorder □
  Phobias □
  Panic disorder □
  PTSD □
  Depression*:* Yes □ No □
  Date of diagnosis:
  Taking psychiatric medications: Yes □
no □
  Anxiolytics □
  Antidepressants □
  Antipsychotic □
  Follow-ups: Regular □ irregular □
  Suicide attempt: Yes □ No □
  Evolution: ongoing disorder □ disorder cured □ since:

Worsening of asthma: Yes □ No □

Family:

- Asthma in the family:
- Atopy in the family:
- Psychiatric: Anxiety □ Depression □ suicide attempt □
  Other:

Lifestyle

- ✓ Airy/sunny room:
- ✓ Carpet/Rug:
- ✓ Hygiene:
- ✓ Humidity
- ✓ Dust
- ✓ Animals:
- ✓ Cockroaches:
- ✓ Plants:
- ✓ Occupational exposure:
- ✓ Nearby Factory:

Quality of life

- Stress Frequency
  Daily □
  Occasional □
  Rarely □

- Stress Management Method
  Physical Exercise □
  Yoga □
  Meditation □
  Therapy □
  Others (walking, music, reading, friends...) □

- Impact on asthma
  No change □
  Deterioration □

Improvement □

- Impact of asthma on daily activities (work, sports, etc.)
  Normal activity: yes □ no □

- Quality of life on a scale of Likert 1-5 (1 being very poor and 5 being excellent)
  1 □
  2 □
  3 □
  4 □
  5 □

- Working conditions
- Occupational exposure to asthma-inducing products
  Yes □
  No □
- Stress at work
  Low □
  Moderate □
  High □

CHARACTERTICS OF ASTHMA

- Age de diagnostic

- Main symptoms
  Dry cough
  Dyspnea
  Chest pain
  Wheezing
  Other

- Number of attacks/years:

Attack management

At home□
At emergency Department □
Self-medication □

Seasons

Winter □
Autumn □
Spring □
Summer □
Annual □

- Number of hospitalization/year:

- Triggers YES NO
  - ✓ Dust:
  - ✓ Smoke:
  - ✓ Effort:
  - ✓ Humidity:
  - ✓ cold:
  - ✓ Infectious episode:
  - ✓ Contact animal:
  - ✓ Food:
  - ✓ Plants:
  - ✓ Psychological factors:
  - ✓ Caustic product:
  - ✓ Medicaments:
  - ✓ Pregnancy:

Post-therapeutic severity:
Mild □
Moderate persistent □
Severe □

Control:

Test de Contrôle de l'Asthme (test ACT)

1. Au cours des 4 dernières semaines, votre asthme vous a-t-il **empêché(e) de pratiquer vos activités** au travail, à l'école/université ou chez vous ?					
❍ Tout le temps	❍ La plupart du temps	❍ Quelques fois	❍ Rarement	❍ Jamais	Score :
1	2	3	4	5	
2. Au cours des 4 dernières semaines, avez-vous été **essoufflé(e)** ?					
❍ Plus d'1 fois par jour	❍ 1 fois par jour	❍ 3 à 6 fois par semaine	❍ 1 ou 2 fois par semaine	❍ Jamais	Score :
1	2	3	4	5	
3. Au cours des 4 dernières semaines, les symptômes de l'asthme (sifflements dans la poitrine, toux, essoufflement, oppression ou douleur dans la poitrine) vous ont-ils **réveillé(e) la nuit** ou plus tôt que d'habitude le matin ?					
❍ 4 nuits ou plus par semaine	❍ 2 à 3 nuits par semaine	❍ 1 nuit par semaine	❍ Juste 1 ou 2 fois	❍ Jamais	Score :
1	2	3	4	5	
4. Au cours des 4 dernières semaines, combien de fois avez-vous utilisé votre **inhalateur/aérosol-doseur de secours** ?					
❍ 3 fois ou plus par jour	❍ 1 ou 2 fois par jour	❍ 2 ou 3 fois par semaine	❍ 1 fois ou moins par semaine	❍ Jamais	Score :
1	2	3	4	5	
5. Comment évalueriez-vous votre **maîtrise de l'asthme** au cours des 4 dernières semaines ?					
❍ Pas maîtrisé du tout	❍ Très peu maîtrisé	❍ Un peu maîtrisé	❍ Bien maîtrisé	❍ Totalement maîtrisé	Score :
1	2	3	4	5	
Test de Contrôle de l'Asthme (www.asthmacontroltest.com)					TOTAL :

Le score des 5 questions est additionné en un score total pouvant varier entre 5 et 25. Au plus le score total est élevé, au mieux l'asthme est contrôlé. Le tableau ci-dessous présente les interventions que peut faire le pharmacien en fonction du score total obtenu.

Score ACT	Interprétation score ACT	Intervention du pharmacien
<15	Asthme non contrôlé	Essayez de trouver la cause : 1/ Observance thérapeutique 2/ Technique d'inhalation, choix du dispositif d'inhalation 3/ Interaction avec un β-bloquant 4/ Mesures non-médicamenteuses mal suivies 5/ Traitement inadapté
15-19	Asthme partiellement contrôlé	
20-25	Asthme bien contrôlé	Informez le patient que son asthme est bien sous contrôle et insistez sur l'importance de continuer à prendre chaque jour le médicament

Basé sur le protocole Soins pharmaceutiques dans l'asthme, UGent.

ASTHMA TREATMENT:

1. Pharmacological:
   - Long-term treatment:

   - Treatment of exacerbation:

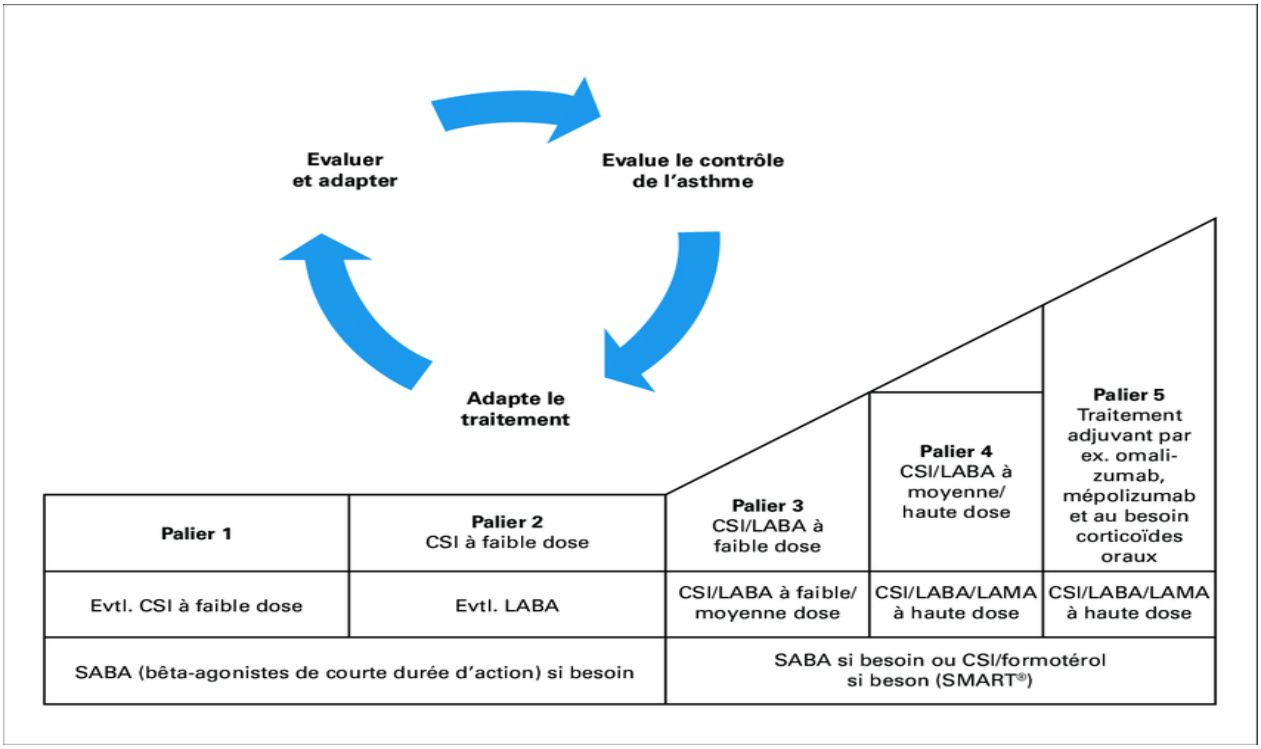
2. Non-Pharmacological treatment:
   Smoking cessation □
   Physical activity □
   Elimination of triggering agents: Exogenous: Allergen □ Pollutant and Irritant□
   Carpet at home □
   Room ventilation □
   Infectious Agents □
   Endogenous: GERD □ Stress □

3. Purchasing power of the treatment: YES: □ NO: □

4. Treatment adherence:
   Regular □
   Irregular □

Reason for non-adhesion:
Stop/Forget □
Lack of means to buy medication □
Side effects □

THERAPEUTIC LEVEL



Hospital anxiety and depression scale: English version

Hospital Anxiety and Depression Scale (HADS)

Tick the box beside the reply that is closest to how you have been feeling in the past week.
Don't take too long over you replies: your immediate is best.

D	A		D	A	
		I feel tense or 'wound up':			**I feel as if I am slowed down:**
	3	Most of the time	3		Nearly all the time
	2	A lot of the time	2		Very often
	1	From time to time, occasionally	1		Sometimes
	0	Not at all	0		Not at all
		I still enjoy the things I used to enjoy:			**I get a sort of frightened feeling like 'butterflies' in the stomach:**
0		Definitely as much		0	Not at all
1		Not quite so much		1	Occasionally
2		Only a little		2	Quite Often
3		Hardly at all		3	Very Often
		I get a sort of frightened feeling as if something awful is about to happen:			**I have lost interest in my appearance:**
	3	Very definitely and quite badly	3		Definitely
	2	Yes, but not too badly	2		I don't take as much care as I should
	1	A little, but it doesn't worry me	1		I may not take quite as much care
	0	Not at all	0		I take just as much care as ever
		I can laugh and see the funny side of things:			**I feel restless as I have to be on the move:**
0		As much as I always could		3	Very much indeed
1		Not quite so much now		2	Quite a lot
2		Definitely not so much now		1	Not very much
3		Not at all		0	Not at all
		Worrying thoughts go through my mind:			**I look forward with enjoyment to things:**
	3	A great deal of the time	0		As much as I ever did
	2	A lot of the time	1		Rather less than I used to
	1	From time to time, but not too often	2		Definitely less than I used to
	0	Only occasionally	3		Hardly at all
		I feel cheerful:			**I get sudden feelings of panic:**
3		Not at all		3	Very often indeed
2		Not often		2	Quite often
1		Sometimes		1	Not very often
0		Most of the time		0	Not at all
		I can sit at ease and feel relaxed:			**I can enjoy a good book or radio or TV program:**
	0	Definitely	0		Often
	1	Usually	1		Sometimes
	2	Not Often	2		Not often
	3	Not at all	3		Very seldom

Please check you have answered all the questions

Scoring:
Total score: Depression (D) _____ Anxiety (A) _____
0-7 = Normal
8-10 = Borderline abnormal (borderline case)
11-21 = Abnormal (case)

Hospital Anxiety and Depression Scale: Arabic Version

هذا الاستبيان يساعد الطبيب لمعرفة مشاعرك وقراءة أحاسيسك ، لذا يرجى إحاطة الرقم الموازي لأفضل اختيار يصف حالتك خلال الأسبوع الماضي. ليس من المطلوب الاستغراق في التفكير لإختيار الإجابة، وإنما تفضل الإجابات العفوية التلقائية.

من فضلك، قم بإختيار الإجابة المناسبة بوضع دائرة عليها:			Hospital Anxiety Depression Scale (HADS):	
	D	أحس بأنني هامد (فاقد للطاقة) :		A
3		• تقريباً في كل وقت	3	• أكثر الوقت
2		• في كثير من الأحيان	2	• عدة مرات
1		• في بعض الأوقات	1	• أحياناً
0		• لا أشعر بذلك مطلقاً	0	• لا أشعر بذلك مطلقاً
	A	ينتابني شعور بالخوف:		D
0		• لا، على الإطلاق	0	• بالتأكيد، كما كنت
1		• أحياناً	1	• ليس تماماً
2		• كثيراً	2	• قليلاً
3		• في أغلب الأوقات	3	• بالكاد، على الإطلاق
	D	لقد فقدت الإهتمام بمظهري:		A
3		• بالتأكيد فقدت كل الاهتمام	3	• بالتأكيد، وبشكل مزعج
2		• أنا لا أهتم بمظهري كما يجب أن أهتم	2	• نعم، ولكن أقل سوءاً
1		• قد لا أعتني بمظهري كما يجب	1	• قليلاً، لكنه لا يقلقني
0		• أعتني بمظهري بشكل جيد كما كنت سابقا	0	• لا أشعر بذلك على الاطلاق
	A	الإحساس بضيقة الصدر دون مجهود جسدي:		D
3		• في الواقع، كثيراً جداً	0	• كما كنت سابقا
2		• كثيراً، لابأس به	1	• اقل مما كنت سابقا
1		• أشعر بذلك قليلاً	2	• بالتأكيد، ليس كثيراً الآن
0		• لا أشعر بذلك على الإطلاق	3	• لا أشعر بذلك على الإطلاق
	D	أنا أتطلع للأشياء من حولي باستمتاع:		A
0		• بقدر ما يمكنني فعله	3	• أغلب الأوقات
1		• نوعا ما أقل مما اعتدت على فعله	2	• معظم الأوقات
2		• بالتأكيد أقل مما اعتدت على فعلة	1	• من وقت لآخر، ولكن ليس كثيراً
3		• لا، على الإطلاق	0	• أحيانا
	A	ينتابني إحساس مفاجئ بالهلع:		D
3		• في الواقع، في كثير من الأحيان	0	• بالتأكيد
2		• غالباً	1	• عادة ما
1		• ليس كثيراً	2	• ليس كثيراً
0		• لا أشعر بذلك على الإطلاق	3	• لا يمكنني ذلك على الإطلاق
	D	يمكنني الإستمتاع بقراءة كتاب جيد أو مشاهدة البرامج التلفزيونية أو الإستماع إلى الإذاعة:		A
0		• غالباً		يمكنني الجلوس براحة و الشعور بالاسترخاء:
1		• في بعض الأحيان		
2		• ليس كثيراً		
3		• نادراً جداً		

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Hippocratic Oath

Upon being admitted to the medical profession, I pledge my life to the service of humanity.

I will treat my teachers with the respect and gratitude they deserve.

I will practice my profession with conscience and dignity.

The health of my patients will be my first goal.

I will not betray the secrets entrusted to me.

I will maintain by all means in my power the honor and noble traditions of the medical profession.

The physicians will be my brothers.

No consideration of religion, nationality, race, political and Social consideration will come between my duty and my patient.

I will maintain strict respect for human life from the moment of conception.

Even under threat, I will not use my medical knowledge in a manner contrary to the laws of humanity.

I pledge this freely and on my honor.

Declaration of Geneva, 1948.

كليـــــــة الـطـب
و الصيدلة - مراكش
FACULTÉ DE MÉDECINE
ET DE PHARMACIE - MARRAKECH
جامعة القاضي عياض
UNIVERSITÉ CADI AYYAD

سنة 2024 أطروحة رقم: 561

انتشار القلق والاكتئاب لدى مرضى الربو البالغين في قسم أمراض الرئة بالمستشفى العسكري ابن سينا بمراكش

الأطروحة

قدمت ونوقشت علانية يوم 2024/12/25

من طرف

السيدة ساينبو شام

المزدادة في 1997/02/05 في شامن-غامبيا

لنيل شهادة الدكتوراه في الطب

الكلمات الأساسية

القلق - الاكتئاب - الربو

اللجنة

السيد	ح. قاصف أستاذ في الطب الباطني	الرئيس
السيد	أ. بنجلون حرزيمي أستاذ في طب الأمراض التنفسية	المشرف
السيدة	س. أيت بطاهر أستاذة في طب الجهاز التنفسي	الحكام
السيد	م.أ.لافينتي أستاذ في الطب النفسي	
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