



St. Paul Hospital Millennium Medical College
Graduate Study Program

Assessment of Quality of Life among asthmatic children and adolescents on
Follow-up at St Paul's Hospital Millenium Medical College

By: Hanan Mahdi (MD, Pediatric resident)

Addis Ababa, Ethiopia

March 2024 (GC)



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Follow-up at St Paul's Hospital Millenium Medical College

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Health, Saint Paul's Hospital Millennium Medical College for the Partial
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Child Health

Addis Ababa, Ethiopia
March 2024 (GC)

DECLARATION

I hereby declare that; this thesis report is my original work and has not presented for a degree by another person in this or any other university and all source material used for this thesis have been acknowledged.

Name: _____

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Name of Advisor: _____

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Date_____

ABSTRACT

Introduction – Asthma is one of the most common chronic inflammatory disorders of the lower respiratory tract in children, which significantly impacts the patient's QoL. The assessment of the quality of life (QoL) in asthmatic children and adolescents is of significant importance as it provides a comprehensive evaluation of the physical, emotional, and social aspects of their well-being.

Objectives – to assess the Quality of Life in asthmatic children and adolescents in SPHMMC Pulmonology follow-up clinic.

Methodology – Institution-based cross-sectional study was conducted from May 01, – October 29, 2023. A standard pretested and structured questionnaire containing socio-demographic factors, clinical parameters, and Quality of Life assessment questions was used for data collection. Asthma severity and control were assessed based on GINA 2023 guidelines and QoL was assessed based on PAQLQ. The collected data was coded and checked for completeness, entered into epi-info version 7.0, and exported to SPSS version 26.0 for analysis. Descriptive statistics, Bivariate and Multivariate binary logistic regression were performed.

Result – The study enrolled 137 patients who fulfilled the inclusion criteria. Overall Quality of life was affected in 32.9% of asthmatic children, of which 2.2% had severe impairment. The most affected domain was physical activity (32.8%) followed by the symptom domain (32.1%). There was significant association between poor asthma control ($p=0.005$), moderate or severe asthma ($p=0.05$), and asthma duration of 6-12 months ($p=0.001$), and affected Quality of Life.

Conclusion - The results of this study showed that in children and adolescents, with uncontrolled asthma, disease severity, and asthma duration of 6-12 months were associated with poor QoL. Evaluating the Quality of Life for children with asthma should be a routine part of their care and based on this study, emphasizing aiming for good asthma control will significantly improve QoL.

Keywords – Asthma, Asthmatic children, Quality of Life, SPHMMC

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ABBREVIATIONS AND ACRONYMS

ACT – Asthma Control Test

AOR – Adjusted Odds Ratio

CI – Confidence Interval

COR – Crude Odds Ratio

Dr – Doctor

ETB – Ethiopian Birr

FEV – Forced Expiratory Volume

FVC – Forced Vital Capacity

GINA – Global Initiative for Asthma

HRQoL – Health-Related Quality of Life

ICS – Inhaled Corticosteroids

LABA – Long-Acting Beta Agonists

PAQLQ – Pediatric Asthma Quality of Life Questionnaire

PEF – Peak Expiratory Flow

PFT – Pulmonary Function Tests

PI – Principal Investigator

PRN – As needed

QoL – Quality of Life

SABA – Short Acting Beta Agonists

SPHMMC – St. Paul's Hospital Millennium Medical College

SPSS – Statistical Package for Social Science

1. INTRODUCTION

1.1 Background of the study

Asthma is the most common chronic inflammatory disorder of the lower respiratory tract in children and it is one of the commonest reasons for emergency department visits. It is a cause of significant morbidity, and mortality at all ages[1]. Worldwide it affects 1% - 18% of the population in different countries[1]. Asthma affected an estimated 262 million people in 2019 and caused 455,000 deaths[2]. Asthma is among the most common pediatric diseases in African children with a prevalence range of 9% in Ethiopia[3]. A recent review showed that the overall prevalence of asthma was 13.9% (95% CI 9.6–18.3) in African children younger than 15 years[4]. In 2015, Asthma was estimated to cause 14.7 deaths per 100,000 individuals in Ethiopia, ranking 17th among the top 20 causes of mortality[5]. Asthma can also result in varying degrees of restriction in the physical, emotional, and social spheres of a patients' life forcing them to refashion their adapted way of lifestyle.

“Quality of life” is a rather vague concept often meaning different things to different people, which makes defining the term very difficult. However, most researchers agree that many domains like finances, spirituality, psycho-social, and health (and for children, there is also the school, home environment, and parental support) contribute to the quality of life, and each of these domains also affects the others. HRQL is the component of overall quality of life that is determined primarily by the person's health, and which can be influenced by clinical interventions. For convenience, the definition by Schipper, and colleagues is appropriate: “the functional effects of an illness and its consequent therapy upon a patient, as perceived by the patient.”[6]. The final phrase is important because it emphasizes on the patient's point of view.

Many physicians now acknowledge the importance of incorporating an assessment of QoL into their clinical studies. Clinical measures usually provide valuable information about the status of the affected organ, but they rarely capture the functional impairments like physical (shortness of breath, wheezing, and cough), emotional (fear, anger, and frustration because of the attacks), and social (limited sports activities, school absence) that are important to children in their day-to-day

lives. To obtain a complete picture of a child's health status, measuring both the clinical indices and the child's QoL is vital[7].

So, this study tried to describe the Quality of life in asthmatic children and adolescents on follow-up at SPHMMC, help to recognize the extent of its effect on the patient's QoL, and come up with appropriate recommendations to improve their well-being.

1.2 Statement of the Problem

Quality of life is a multidimensional concept that includes physical, psychological, and social aspects, and it is an essential outcome measure in the management of chronic diseases[8]. Regarding pediatric asthma patients visiting the pediatric pulmonology follow-up clinic in our institution, despite the availability of effective treatments, many patients continue to experience symptoms that can negatively impact their physical, emotional, and social well-being. Even though, they are under follow-up mainly based on their clinical indices, other related parameters are rarely addressed. Two patients with very similar clinical profiles might have varying degrees of perception of their illness, and the illness might impact their activity, emotions as well as social life on different levels. But we need concrete evidence to see the magnitude, and so far, I haven't come up with literature stating such data in our context. Therefore, the assessment of QoL in asthmatic children is vital to address gaps observed in evidence-based information.

Also, as to my information, there is a lack of research on the assessment of the quality of life in asthmatic children and adolescents. This study tried to assess the quality of life and identify its affecting factors in asthmatic children and adolescents.

1.3 Significance of the Study

The assessment of the quality of life (QoL) in pediatric asthma patients is of significant importance as it provides a comprehensive evaluation of the physical, emotional, and social aspects of their well-being. While asthma is a common chronic respiratory condition among children, its impact on their QoL can often be underestimated. Thus, understanding the various factors that contribute to the QoL of these patients is crucial in developing effective interventions and treatment strategies to improve their overall health.

The results obtained from this study reveal the significance of assessment of QoL, thus, potentially informing the concerned bodies to incorporate standard QoL assessment guidelines (including psychological support and counseling) into the already existing clinical measures of assessing severity patterns. Moreover, the revealed findings and recommendations of this research could be used as a base for further studies in this area.

2. LITERATURE REVIEW

In recent years, many works of literature have been available that appraised the overall Quality of life or one of its domains in the pediatric asthmatic population, with almost all of them identifying many significant affecting factors.

A systematic review and meta-analysis were done in Xijing Hospital, China in 2023, in a total of 9 studies selected from 3919 articles; suggested that Physical Activity could improve FVC, FEF₂₅₋₇₅, and the quality of life in asthmatic children, but there was insufficient evidence of improvement in FEV1 and airway inflammation[9].

A study Published by Oxford University, on behalf of the Society of Pediatric Psychology in 2015 investigated quality of life in children with asthma and associated factors. In this study, 192 children within ages 5-12 years with asthma and their caregivers participated, and the result showed among older children, QOL levels were lower in the presence of worse asthma severity and more routine burden[10].

Another study done in West Bank, Palestine in 2022 recruited 132 participants. Of the patients, 35.6% had controlled Asthma and 64.3% had uncontrolled Asthma. When compared to uncontrolled asthma individuals, participants with controlled asthma had improved QoL and scored significantly higher in the symptom, activity, and emotional domains. Poor QoL was significantly associated with hospitalization for asthma, disease severity, uncontrolled asthma, and male gender[11].

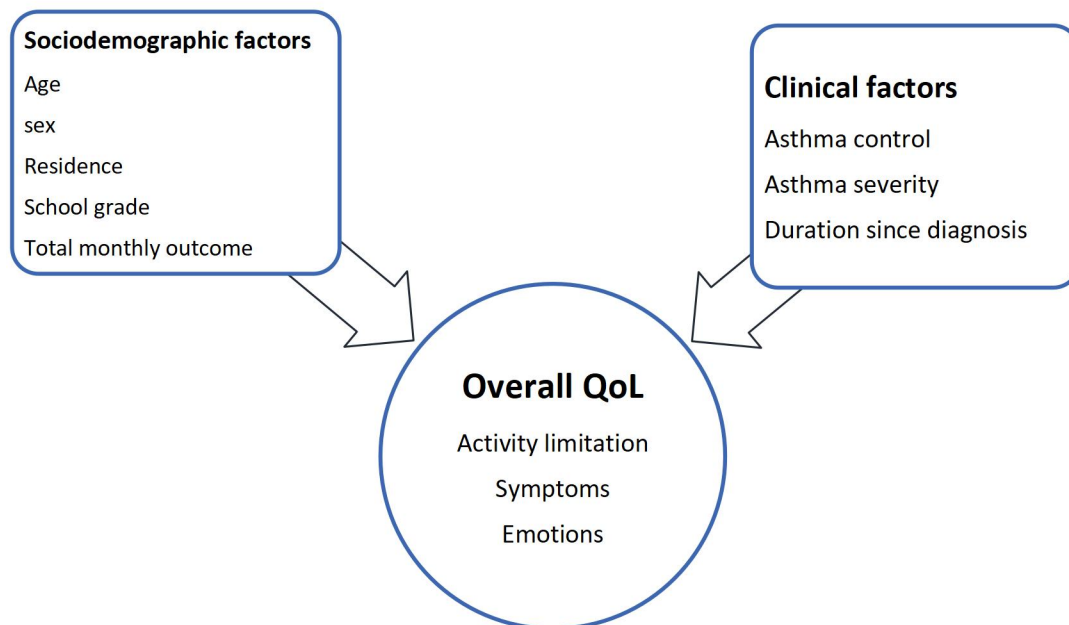
A case-control study done at Assiut University Hospital, Assiut, Egypt in 2012 reviewed 230 asthmatic outpatients, aged 7-18 years & compared with another 272 non-asthmatic patients. The results showed about 40% were diagnosed with uncontrolled asthma based on their night awakenings. Severe asthma was reported in 42.6%. Asthma affects the quality of life of all patients. There were significant differences between the two groups regarding symptoms, Activity, Impact, and Total score. There was a negative correlation between asthma severity and quality-of-life score. Lower QoL was associated with school absences, younger females (<10 years), and patients with poorer treatment adherence. It concluded that asthma affected all lifestyles of the majority of patients, including physical exercise limitation, sleep disturbance, and emotional function[12].

A cross-sectional study of 46 children with asthma was conducted in a tertiary hospital in Nigeria. Asthma severity and asthma control were defined based on the GINA protocol. About 61% of the study population were moderately impaired in their QoL and 41.3% had uncontrolled asthma. The activity domain and the emotion domain were the most affected. There was a significant association between QoL and age 7-10, asthma severity, asthma control, and social class but not Gender[13].

More literature background on asthma in children affecting QoL on the psycho-social aspect was reviewed. A multi-country cross-sectional survey revealed that asthma has a significant adverse effect on the QoL of children as indicated by the high prevalence of behavioral and emotional difficulties that include increased school absenteeism and poor and deteriorating academic performance[14]. A study done in Nigeria revealed around 25% of the children on follow-up at asthma clinic reported that asthma greatly interfered with their day-to-day activities and were psychologically affected[15]. A Cross-sectional study that was conducted in two governmental hospitals in Jeddah, Saudi Arabia, in 2018, involving 106 asthmatic children between the ages of 7-17 years. The study revealed that 84% of the participants had poor asthma control and it was associated with a significantly affected QoL ($p = <0.001$). The study recommended that psychosocial well-being should be assessed during clinic visits for a better holistic approach and effective improvement of outcomes [16].

I haven't found any articles reviewing the assessment of QoL in Asthmatic children in Ethiopia.

Conceptual Framework



3. OBJECTIVES

3.1 General Objectives

The general objective of this study is to assess the Overall Quality of Life in children and adolescents with asthma on follow-up in SPHMMC

3.2 Specific Objectives

- To evaluate the influence of asthma on the emotional well-being of children with asthma
- To evaluate the impact of asthma on exercise and daily physical activity levels of children with asthma
- To assess the effectiveness of medical management and asthma control in improving the overall quality of life of children with asthma

4. METHODS AND MATERIALS

4.1 Study Area

This study was conducted at St. Paul's Millennium Medical College Pediatric and Adult Pulmonology follow-up clinic. SPHMMC is the second largest hospital in the capital Addis Ababa with a catchment population of more than 5 million. The hospital was established in 1969 GC and is currently governed by a board under the federal Ministry of Health. In addition to an inpatient capacity of more than 700 beds, on average 1200 emergency and outpatient clients are seen daily in the hospital.

The pediatric pulmonology unit was founded in 2017 GC and currently is run by two pediatric pulmonology and critical care consultants, and one Fellow. Its patients are seen at ROPD, EOPD, Pediatric Ward, PICU, and pulmonology follow-up clinic. The pediatric pulmonology follow-up clinic works twice weekly, on Mondays and Thursdays. In the clinic, the patients are seen by four to six residents, a fellow, and a subspecialist. On average, 120 – 170 patients visit the follow-up clinic every month.

Patients from age 15-17 were followed in adult pulmonology follow-up clinic, that works twice weekly, on Tuesdays and Fridays.

4.2 Study Design

A hospital-based cross-sectional study was conducted to assess the Overall Quality of Life in Asthmatic children on follow-up at SPHMMC.

4.3 Study Period

This study was conducted from May 01 – October 29, 2023.

4.4 Source Population & Study Population

The source population was all pediatric patients on follow-up at the pulmonology clinic at SPHMMC.

The study population was all asthmatic children and adolescents 7-17 years of age who were diagnosed by a physician at least 6 months before the study according to the GINA guidelines for

the diagnosis of asthma on follow-up at SPHMMC. This age group was selected based on the PAQLQ instrument.

4.5 Inclusion and Exclusion Criteria

Inclusion criteria - all asthmatic children 7-17 years of age who were physician-diagnosed at least 6 months before the study were eligible.

Exclusion Criteria - Asthmatic children with acute exacerbation at the time of enrollment, children with underlying other morbidities, and children for whom consent isn't obtained were excluded.

4.6 Sample Size Determination & Sampling Procedure

The sample size was calculated by using the formula

$$n_0 = \frac{Z^2 P(1-P)}{d^2}$$

n_0 = the minimum sample size

Z = the standard normal deviate at 95% confidence level (1.96)

d = margin of error (0.05)

P = is the sample proportion (50% taken since there isn't a local study done)

N = the number of children with asthma seen at follow-up clinic

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

The final sample size was 308. However, only 137 patients were included due to the short study period.

4.7 Measurements

4.7.1 Study Variables

Dependent Variable - The Overall Quality of Life of asthmatic children

Independent Variables -

- Age
- Sex
- Residence
- School grade
- Total monthly income
- Severity of Asthma
- Degree of asthma control
- Duration of asthma

4.7.2 Instruments

The study used a standard tool to assess the QoL in asthmatic children. Asthma severity and asthma control level were assessed according to GINA guidelines 2023, and QoL was assessed using the Pediatric Asthma Quality of Life Questionnaire (PAQLQ). It has a total of 23 questions, classified within 3 domains which assess the QoL – Physical activity, Emotion, and Symptom. The answer to each question was scored from 7 (7 – no impairment, 2 to 6 – moderate impairment, 1 – severe impairment).

4.8 Data Collection and Procedure

A structured questionnaire was used for data collection and was pretested. Selection and training of data collectors (residents) were conducted.

4.9 Data Quality Control, Statistical analysis, and Interpretation

Pretest was done among 5% (15 patients) of the total sample size. Data was collected by the trained residents. The Principal Investigator provided supervision to ensure accurate and complete data collection.

The data was cleaned and refined by the principal investigator among randomly selected patients during data collection. The collected data was coded and checked for completeness, entered to

Epi-Info version 7.0, and exported into IBM SPSS version 26.0 for analysis. Data consistency and reliability were assessed using Cronbach alpha coefficient and were all greater than 0.90, which indicates good internal consistency.

The quantitative data with parametric distribution were presented as mean and standard deviations and qualitative variables were presented as numbers and percentages. The mean quality of life scores of each domain as well as the overall quality of life scores were calculated. Pearson's correlation coefficient was used to calculate correlations between independent variables and scores of QOL.

The outcome variable - quality of life- was converted into a binary outcome by grouping it into impaired and not impaired. Bivariate Binary logistic regression was done for each of the independent variables with the Outcome. Variables with significant association ($p \leq 0.25$) were entered into a Multivariable binary logistic regression model to detect the predictors of QOL. $p \leq 0.05$ was considered as statistically significant, and $p \leq 0.01$ was considered highly significant.

4.10 Ethical Considerations

The ethical clearance was obtained from SPHMMC ethical review committee, written consent was obtained from the hospital administration, and confidentiality of the information was ensured by using codes rather than names during registering data. During data collection, the data collector clearly explained the purpose of the research to the participants and informed consent was obtained from each participant. Participants were also informed that participation was voluntary and their name was not disclosed

4.11 Operational Definitions

- Quality of Life - the functional effects of an illness and its consequent therapy upon a patient, as perceived by the patient
- Health-Related Quality of life - is the component of overall quality of life that is determined primarily by the person's health, and which can be influenced by clinical interventions
- Asthma Control – the extent to which the manifestations of asthma can be observed in the patient, or have been improved by treatment.
- Mild asthma – Asthma well controlled with low dose ICS PRN $\pm$ SABA PRN

- Moderate asthma – Asthma well controlled with medium dose ICS or LABA
- Severe asthma – Asthma that remains uncontrolled despite optimized treatment
- Underlying comorbidities – Underlying illnesses in patients with Asthma, like Cardiac illness or Chronic lung disease.

5. Results

5.1 Socio- demographic characteristics

A total of 137 children were enrolled in the study. The mean ($\pm$ SD) age was 11.3 ($\pm$ 3.2) with the majority (59.9%) being in the ages between 7-12. Males made up more than half of them (59%) with a male to female ratio of 1.4:1. Majority of the study participants were from urban residences (92%). Nearly three-quarters of the participants were in primary school (73%). The vast majority (79%) of the parents are married. More than half of the mothers (53.3%) have College level higher education and 35% of the high school level education, together comprising 88.3%. and more than half of them have attended higher education. The educational level of the fathers is 33.6% high school level and 61.3% College level adding to 94.9%. Most of the parents have a monthly income exceeding 10,000 ETB (52%). Details of the sociodemographic parameters are displayed in Table 1.

Table 1 - Socio- demographic characteristics of pediatric asthma patients on follow-up at SPHMMC from May 01- October 29, 2023 GC.

Variable		Frequency (N)	Percent (%)
Age in years	7-12	82	59.9
	13-17	55	40.1
Gender	Male	80	58.4
	Female	57	41.6
Residence	Urban	126	92
	Rural	11	8
Religion	Catholic	1	0.7
	Muslim	31	22.6
	Orthodox	64	46.7
	Protestant	41	29.9
School grade	Primary School	100	73
	High School	35	25.5
	Doesn't attend formal education	2	1.5
Parents' marital status	Single	3	2.2
	Married	108	78.8
	Divorced/separated	24	17.5
	Widowed	2	1.5
Father's education	Can read and write	2	1.5
	Elementary	5	3.6
	Highschool	46	33.6

	College	84	61.3
Mother's education	Can read and write	2	1.5
	Elementary	14	10.2
	Highschool	48	35
	College	73	53.3
Total monthly income (ETB)	2,500-5,000	4	2.9
	5,000-10,000	61	44.5
	>10,000	72	52.6

5.2 Clinical characteristics

The most commonly affected activity reported by the participants was walking uphill/upstairs (35%), followed by running (26%) and soccer (23%) as seen in Figure 1. While the majority of the participants (74%) had mild asthma only 1.5% had severe asthma. Nearly two-thirds of the participants (64%) had well-controlled asthma whereas in around 4% of them, it was uncontrolled. In the vast majority of the participants (93%), asthma lasted for 12 months and above, as displayed in Table 2.

Figure 1 - Common affected activities in pediatric asthma patients on follow-up at SPHMMC from May 01-October 29, 2023 GC.

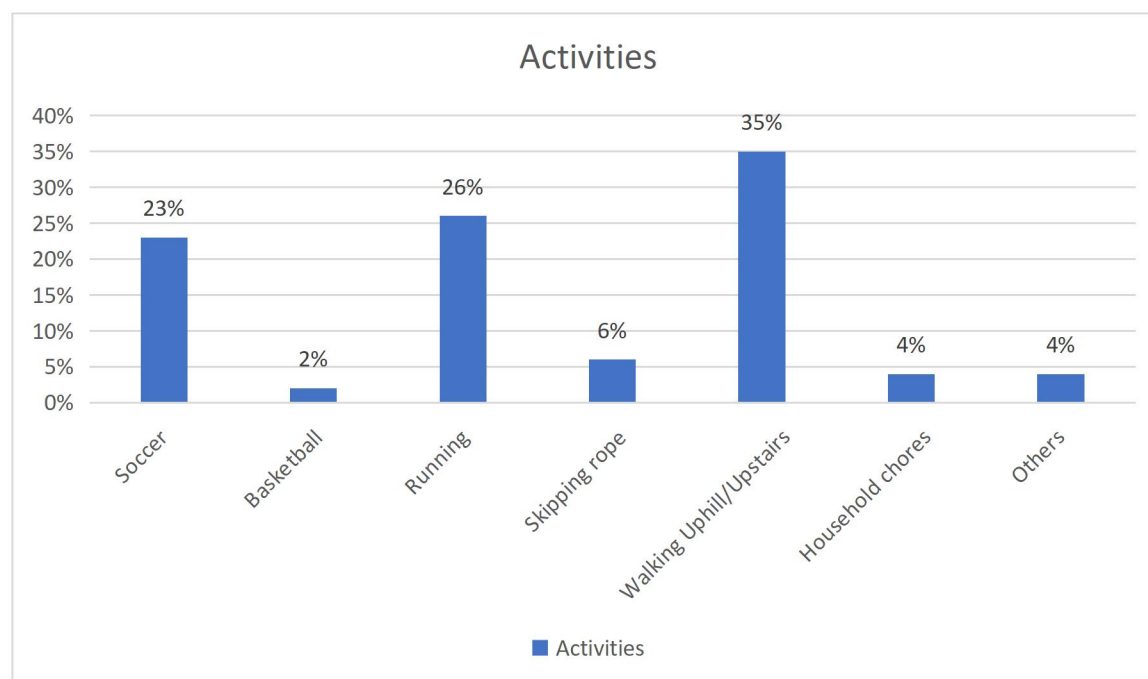


Table 2 – Clinical parameters among pediatric asthma patients on follow-up at SPHMMC from May 01-October 29, 2023 GC.

Variables		Frequency (N)	Percent (%)
Level of asthma control	Well controlled	87	63.5
	Partly controlled	44	32.1
	Uncontrolled	6	4.4
Degree of asthma severity	Mild asthma	101	73.7
	Moderate asthma	34	24.8
	Severe asthma	2	1.5
Duration since diagnosis (in months)	6-12	10	7.3
	12-24	76	55.5
	>24	51	37.2

5.3 Overall QoL and its Domains

The most affected domain was the physical activity domain (32.8%), followed by the symptom domain (32.1%). The Emotion domain was the least affected among the participants (30.7%). Nearly one-third of the participants had a compromised overall Quality of Life (33%) and the mean QoL was 5.9 as seen in Table 3.

Table 3 – Overall QoL and its Domains among pediatric asthma patients on follow-up at SPHMMC from May 01-October 29, 2023 GC.

Variables		Frequency (N)	Percent (%)	Mean $\pm$ SD
Physical activity domain	No impairment	92	67.2	5.7 $\pm$ 2.0
	Moderate impairment	41	29.9	
	Severe impairment	4	2.9	
Symptom domain	No impairment	93	67.9	5.9 $\pm$ 1.7
	Moderate impairment	41	29.9	
	Severe impairment	3	2.2	
Emotion domain	No impairment	95	69.3	5.9 $\pm$ 1.9
	Moderate impairment	35	25.5	
	Severe impairment	7	5.2	
Overall Quality of life	No impairment	92	67.2	5.9 $\pm$ 1.8
	Moderate impairment	42	30.7	
	Severe impairment	3	2.2	

5.4 Factors associated with overall QoL

Initially, on the Bivariate correlation, there was significant correlation between asthma control, severity and duration with overall QoL ($P=0.000$), ($P=0.03$), ($P=0.000$).

Table 4 – Bivariate and Multivariate Binary logistic regression of selected factors associated with affected Overall QoL of pediatric asthma patients on follow-up at SPHMMC from May 01-October 29, 2023 GC.

Variables		Overall QoL outcome		Bivariate Analysis		Multivariate Analysis	
		Affected	Unaffected	COR 95% CI	P- Value	AOR 95% CI	P-Value
Age	7-12 years	28	54	1.15	0.693		
	13-17 years	17	38	(0.5-2.4)			
Sex	Male	25	55	0.84	0.630		
	Female	20	37	(0.4-1.7)			
Residence	Urban	41	85	0.84	0.796		
	Rural	4	7	(0.2-3.0)			
School Grade	Primary school	35	65	1.5	0.250		
	Highschool	10	25	(0.6-3.0)			
	Doesn't attend formal education	0	2				
Total monthly income	2,500-5,000	3	1	1.03	0.912		
	5,000-10,000	17	44	(0.5-1.9)			
	>10,000	25	47				
Asthma control	Uncontrolled	6	0	0	0.999	0	0.999
	Partly controlled	22	22	5.1 (2.5-10.4)	0.001	4.9 (2.6-6.1)	0.005
	Well controlled	17	70	1			
Asthma severity	Severe asthma	2	0	0	0.999	0	0.999
	Moderate asthma	14	20	2.1 (1.0-4.4)	0.040	0.3 (0.09-1.00)	0.050
	Mild asthma	29	72	1			
Duration since diagnosis	6-12 months	9	1	12.1 (4.2-20.3)	0.001	9.6 (7.0-11.2)	0.001
	12-24 months	31	45	8.09 (6.0-10.4)	0.001	6.2 (0.9-8.3)	0.020
	≥ 24 months	4	47	1			

Bivariate and Multivariate Analysis

Based on the Bivariate Binary logistic regression, school grade, Asthma control, severity and duration showed statistically significant association (Table 4). School grade showed significance, [$p=0.25$, COR- 1.5, 95% CI (0.6-3)], but since the CI range includes one, it is not considered statistically significant.

After adjusting the confounding factors with Multivariate Binary logistic regression, those who had partly controlled asthma were 4.9 times more likely to have an affected QoL as compared to the ones with well controlled asthma [95% CI (2.6-6.1); $p=0.005$]. There is a 70% decrease in the odds of affected QoL with moderate asthma as compared to severe asthma [AOR- 0.3, 95% CI (0.09-1), $p=0.05$]. when compared to those who were diagnosed with asthma ≥ 24 months back before the study, those diagnosed 6-12 months before the study had a statistically highly significant association with affected QoL [AOR- 9.6, 95% CI (7-11.2), $p=0.001$].

6. Discussion

The treatment of asthma should be multidimensional. It is not only related to control of symptoms but also the overall well-being of the child. Hence, controlling the main determinants might improve the QOL of these patients and help refine the management approach.

In this study, the mean QoL was 5.9. Furthermore, among the domains, the activity and symptom domains were more impaired than the emotion domain. A mean quality of life of 5.9 in the study population means that on average, children with asthma have a moderately impaired quality of life. This value of 5.9 was almost similar to a Nigerian study, where the overall QoL was 5.8[13]. A study done in Egypt[17], where the overall quality of life was 4.7, the study from Poland[18] also reported a score of 4.4. The report from a study in India[19], which is also a developing country like ours, documented an overall quality of life score of 4.6. The relatively higher mean QoL in this study could be attributed to the fact that more than two third of the participants had a well-controlled asthma, contributing to a better quality of life. Although all the studies mentioned above employed the same QoL assessment tool, they revealed varying degrees of impairment in the QoL among the studied children. This observation underscores the existence of multiple factors influencing the well-being of children with asthma.

One third of the participants in this study had an affected QoL. This is significantly lower than the study done in Nigeria [13] which revealed that 61% of the participants had an affected QoL; among which 41% of them had poorly controlled asthma. An Egyptian study [12] enrolled 230 asthmatic children from ages 7-17 years, stated that all of their patients had an affected QoL due to asthma. Around 40% of them had uncontrolled asthma and 42.6% of them had severe asthma. They reported that all of their participants had an affected QoL. One possible reason for this difference is that the patients in this study had less severe and more controlled asthma, which resulted in a better QoL.

The most affected domains were the activity and symptom domain, showing that asthmatic children felt more impaired in their daily physical activity. Similar to this study, a study conducted in Egypt in 2018 [17] reported that the activity and symptom domains were more affected in their study while the emotion domain was the least impaired, whereas a study done in Nigeria in 2022 [13] observed that the physical activity and the emotion domains were the most affected domains, with the symptom domain being least affected. Generally, this variation might imply that symptoms that cause limitation in their daily activities making them unable to play with their peers may also have a negative impact on the children emotionally; emphasizing the need for local studies to help with management.

The age, sex, residence, school grade, total monthly income, duration of asthma, asthma control and asthma severity were tested to determine the factors that were associated with the QoL. It was observed that asthma severity was significantly associated with the QoL, and Asthma control and duration were highly significantly associated with the QoL in children with asthma.

When seen in detail, those who have partly controlled asthma are 4.9 times highly likely to have affected overall quality of life as compared to the ones with well controlled asthma, with a high statistical significance of $p=0.005$ [95% CI (2.6-6.1)]. These results come parallel with a previous journal published by American Psychological Association[20] which found that children with controlled asthma reported better QOL than children with non-controlled asthma. A study done in Palestine in 2022[11] showed all three QoL domains were affected by uncontrolled asthma, with activity being the most affected. Similarly, other authors found that poor asthma control is associated with worsening the quality of life of the children involved[9, 10, 12]. The justification for this is that uncontrolled asthma is associated with more frequent

symptoms, and more limitations in physical activities that might exacerbate asthma attacks and have an emotional impact on the child.

This study revealed there is a 70% decrease in the odds of affected QoL with moderate asthma as compared to severe asthma [AOR- 0.3, 95% CI (0.09-1), $p=0.05$]. Similarly, An Egyptian journal published in 2023[21] reported there was a significant association between higher asthma severity scores and lower total PAQLQ scores (mainly symptom domain) among asthmatic children. A study conducted in Indonesia on asthmatic adolescents aged 12–14 years old[22], found significant associations between the total QoL score and asthma severity ($p<0.001$). This was also established in other multiple studies[3, 21] that the severity of asthma was related to child QOL both directly and indirectly.

According to this study, asthmatic children whose disease duration was 6-12 months prior to time of study had a highly significant association and were 9.6 times likely to have affected QoL as compared to those whose disease duration was ≥ 24 months [$p = 0.001$, 95% CI (7-11.2)]. Similar to this result, a journal published on European Journal of Medical Research in 2009[23] which was conducted on 137 asthmatic children from Poland, showed that there was a weak, negative correlation between disease duration and quality of life, which lacks statistical significance ($r = -0.2$; $P = 0.22$). The possible explanation for this could be asthmatic children might develop a better understanding about the disease pattern, exacerbating factors and management as time goes on, hence improving their QoL.

7. Limitations of the study

Limitations of this study are the small sample size and the cross-sectional study design revealing associations rather than direct cause effect relationship of other variables on overall QoL. Additionally, since it is an institution-based study, it cannot be generalized to the general population. Therefore, large prospective cohort studies may be required to improve these shortcomings.

8. Conclusion and Recommendation

8.1 – Conclusion

Around one third of the study participants had impaired QoL. The physical activity and symptom domains were the most impaired. Asthma control, severity and duration since diagnosis were the factors significantly associated with the quality of life in these children.

8.2 – Recommendation

Evaluating the Quality of Life for children with asthma should be a routine part of their care. Based on this study, emphasizing on aiming for good asthma control will significantly improve QoL. In addition to the medical intervention, it is crucial to incorporate psychological support and counseling in the treatment of children with asthma.

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ANNEX

Annex 1. Information sheet

The purpose of this data collection tool is to capture data regarding the assessment of Quality of Life in asthmatic patients on follow-up in St. Paul Hospital. This structured data collection tool will use primary data from the participants of this study and it will take 15- 20 minutes to complete the data collection process and it will be collected by the trained data collectors. The tool has 3 sections socio-demographic, Asthma control level, and Quality of life assessment. The information gathered from the patients will be very important in the realization of this study and the name of the patient will not be recorded. Honest reports from the patient are valuable and it is very important to ensure the quality of data collection since it will be used for appropriate measures that will be taken.

Data collector name

Name of supervisor

Signature

Annex 2 – Questionnaire

A. SOCIODEMOGRAPHIC BACKGROUND	
1. Age	
6-8 years	
9-12 years	
13-16 years	
2. Sex	
Male	
Female	
3. Residence	
Urban	
Rural	
4. Religion	
Catholic	
Muslim	
Orthodox	
Protestant	
Others	
5. School Grade	
Grade 1-4	
Grade 5-8	
Grade 9-10	
Grade 11-12	
Doesn't attend formal education	
6. Parental marital status	
Single	
Married	
Divorced/Separated	
Widowed	
7. Paternal educational level	
Illiterate	
Can read and write	
Elementary	
Highschool	
College	
8. Maternal educational level	
Illiterate	
Can read and write	
Elementary	
Highschool	
College	
9. Total monthly income	

B. Level of Asthma Control		
Well controlled		
Partly controlled		
Uncontrolled		
C. Degree of Asthma Severity		
Mild Asthma		
Moderate Asthma		
Severe Asthma		
D. Duration Since Diagnosis		
6-12 months		
12-24 months		
≥24 months		
E. QUALITY OF LIFE		
I. ACTIVITIES		
1. Ball hockey 2. Baseball 3. Basketball 4. Dancing 5. Football 6. Playing at Recess 7. Playing with Pets 8. Playing with Friends 9. Riding a Bicycle 10. Running 11. Skipping Rope 12. Shopping	13. Sleeping 14. Soccer 15. Swimming 16. Volleyball 17. Walking 18. Walking Uphill 19. Walking Upstairs 20. Laughing 21. Studying 22. Doing Household Chores 23. Singing 24. Doing Crafts or Hobbies	25. Shouting 26. Gymnastics 27. Rollerblading 28. Skateboarding 29. Track and Field 30. Tobogganing 31. Skiing 32. Ice Skating 33. Climbing 34. Getting up in the Morning 35. Talking
Of the activities listed above, I want you to tell me which three bother you the most		
1-3. How much have you been bothered by your asthma doing activity _____ during the past week?		
a. Extremely bothered b. Very bothered c. Quite bothered d. Somewhat bothered e. Bothered a bit f. Hardly bothered at all g. Not bothered		
4. How often did you feel YOU COULDN'T KEEP UP WITH OTHERS because of your asthma during the past week?		
a. All the time b. Most of the time c. A good bit of the time d. Some of the time e. A little of the time f. Hardly any of the time g. None of the time		
5. Think about all the activities that you did during the past week. How much were you bothered by your asthma doing these activities?		
a. Extremely bothered b. Very bothered c. Quite bothered d. Somewhat bothered e. Bothered a bit		

f. Hardly bothered at all g. Not bothered
II. SYMPTOMS
6. how much did COUGHING bother you in the past week?
a. Extremely bothered b. Very bothered c. Quite bothered d. Somewhat bothered e. Bothered a bit f. Hardly bothered at all g. Not bothered
7. How often did your asthma make you feel TIRED during the past week?
a. All the time b. Most of the time c. A good bit of the time d. Some of the time e. A little of the time f. Hardly any of the time g. None of the time
8. How much did ASTHMA ATTACKS bother you during the past week?
a. Extremely bothered b. Very bothered c. Quite bothered d. Somewhat bothered e. Bothered a bit f. Hardly bothered at all g. Not bothered
9. How much did WHEEZING bother you during the past week?
a. Extremely bothered b. Very bothered c. Quite bothered d. Somewhat bothered e. Bothered a bit f. Hardly bothered at all g. Not bothered
10. How much did TIGHTNESS IN YOUR CHEST bother you during the past week?
a. Extremely bothered b. Very bothered c. Quite bothered d. Somewhat bothered e. Bothered a bit f. Hardly bothered at all g. Not bothered
11. How much did SHORTNESS OF BREATH bother you during the past week?
a. Extremely bothered b. Very bothered c. Quite bothered d. Somewhat bothered e. Bothered a bit f. Hardly bothered at all g. Not bothered

12. How often did your asthma WAKE YOU UP DURING THE NIGHT during the past week?
a. All the time b. Most of the time c. A good bit of the time d. Some of the time e. A little of the time f. Hardly any of the time g. None of the time
13. How often did you feel OUT OF BREATH during the past week?
a. All the time b. Most of the time c. A good bit of the time d. Some of the time e. A little of the time f. Hardly any of the time g. None of the time
14. How often did you have trouble SLEEPING AT NIGHT because of your asthma during the past week?
a. All the time b. Most of the time c. A good bit of the time d. Some of the time e. A little of the time f. Hardly any of the time g. None of the time
15. How often did you have difficulty taking a DEEP BREATH during the past week?
a. All the time b. Most of the time c. A good bit of the time d. Some of the time e. A little of the time f. Hardly any of the time g. None of the time
III. EMOTIONS
16. How often did your asthma make you feel FRUSTRATED during the past week?
a. All the time b. Most of the time c. A good bit of the time d. Some of the time e. A little of the time f. Hardly any of the time g. None of the time
17. How often did you feel WORRIED, CONCERNED OR TROUBLED because of your asthma during the past week?
a. All the time b. Most of the time c. A good bit of the time d. Some of the time e. A little of the time f. Hardly any of the time g. None of the time
18. How often did your asthma make you feel ANGRY during the past week?
a. All the time

b. Most of the time c. A good bit of the time d. Some of the time e. A little of the time f. Hardly any of the time g. None of the time
19. How often did you feel IRRITABLE (cranky) during the past week?
a. All the time b. Most of the time c. A good bit of the time d. Some of the time e. A little of the time f. Hardly any of the time g. None of the time
20. How often did you feel DIFFERENT or LEFT OUT because of your asthma during the past week?
a. All the time b. Most of the time c. A good bit of the time d. Some of the time e. A little of the time f. Hardly any of the time g. None of the time
21. How often did you feel FRUSTRATED BECAUSE YOU COULDN'T KEEP UP WITH OTHERS during the past week?
a. All the time b. Most of the time c. A good bit of the time d. Some of the time e. A little of the time f. Hardly any of the time g. None of the time
22. How often did you feel UNCOMFORTABLE because of your asthma during the past week?
a. All the time b. Most of the time c. A good bit of the time d. Some of the time e. A little of the time f. Hardly any of the time g. None of the time
23. How often did you feel FRIGHTENED BY AN ASTHMA ATTACK during the past week?
a. All the time b. Most of the time c. A good bit of the time d. Some of the time e. A little of the time f. Hardly any of the time g. None of the time

Annex 3. GINA Assessment of asthma control in Children 6-11 years, adolescents and Adults

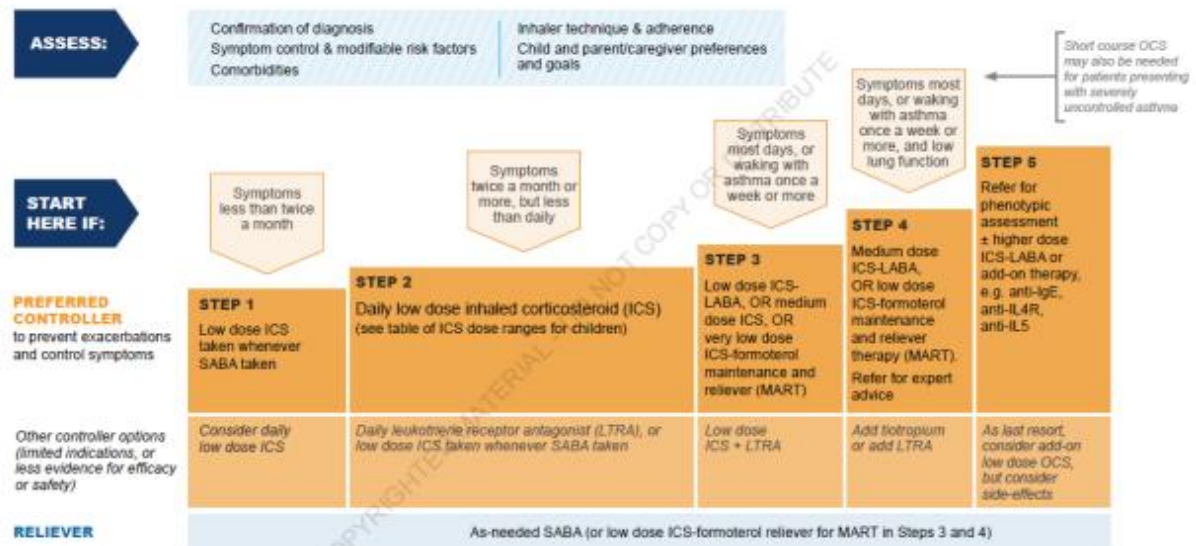
Box 2-2. GINA assessment of asthma control in adults, adolescents and children 6–11 years

A. Asthma symptom control		Level of asthma symptom control		
In the past 4 weeks, has the patient had:		Well controlled	Partly controlled	Uncontrolled
• Daytime asthma symptoms more than twice/week?	Yes ☐ No ☐	None of these	1–2 of these	3–4 of these
• Any night waking due to asthma?	Yes ☐ No ☐			
• SABA reliever for symptoms more than twice/week?*	Yes ☐ No ☐			
• Any activity limitation due to asthma?	Yes ☐ No ☐			
B. Risk factors for poor asthma outcomes				
Assess risk factors at diagnosis and periodically, particularly for patients experiencing exacerbations. Measure FEV₁ at start of treatment, after 3–6 months of controller treatment to record the patient's personal best lung function, then periodically for ongoing risk assessment. Having uncontrolled asthma symptoms is an important risk factor for exacerbations.⁹⁵ Additional potentially modifiable risk factors for flare-ups (exacerbations), even in patients with few symptoms[†] include: • Medications: high SABA use (≥3 x 200-dose canisters/year associated with increased risk of exacerbations;^{123,96} increased mortality particularly if ≥1 canister per month^{71,97}); inadequate ICS; not prescribed ICS; poor adherence;⁹⁸ incorrect inhaler technique⁹⁹ • Other medical conditions: obesity;^{100,101} chronic rhinosinusitis;¹⁰¹ GERD;¹⁰¹ confirmed food allergy;¹⁰² pregnancy¹⁰³ • Exposures: smoking;¹⁰⁴ e-cigarettes;¹⁰⁵ allergen exposure if sensitized;¹⁰⁴ air pollution¹⁰⁶⁻¹⁰⁸ • Context: major psychological or socioeconomic problems¹⁰⁹ • Lung function: low FEV₁, especially <60% predicted;^{104,110} high BD responsiveness^{101,111,112} • Type 2 inflammatory markers: higher blood eosinophils;^{101,113,114} elevated FeNO (in adults with allergic asthma taking ICS)¹¹⁵ Other major independent risk factors for flare-ups (exacerbations) • Ever intubated or in intensive care unit for asthma¹¹⁶ • ≥1 severe exacerbation in last 12 months^{117,118}				
Having any of these risk factors increases the patient's risk of exacerbations even if they have few asthma symptoms				

Annex 4. Initial treatment for children 6-11 years, adolescents and adults

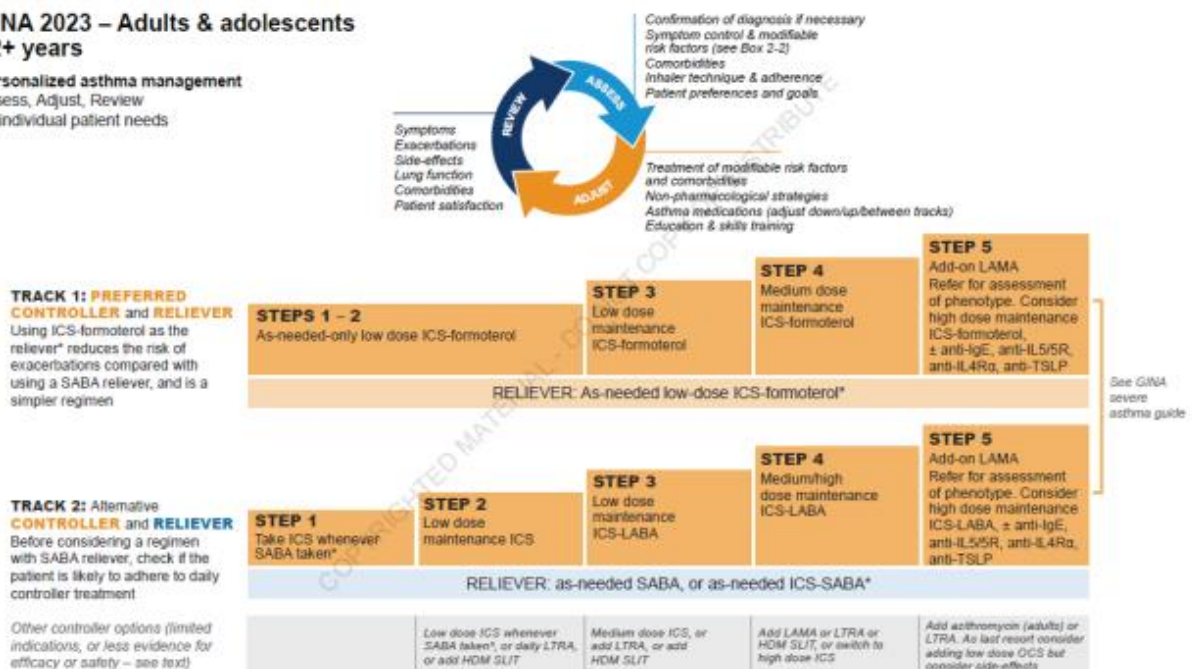
GINA 2023 – STARTING TREATMENT

Children 6–11 years with a diagnosis of asthma



GINA 2023 – Adults & adolescents 12+ years

Personalized asthma management
Assess, Adjust, Review
for individual patient needs



*Anti-inflammatory relievers (AIR)