



Comparison of Asthma Control Test and GINA based assessment in Nepalese population: A cross-sectional study.

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ABSTRACT

Introduction: Asthma has a high age adjusted mortality in low- and middle-income countries like Nepal, which is preventable. Asthma control test (ACT) and GINA based assessment are the two most used tools to monitor effectiveness of the treatment. Utility these tools have not been evaluated in patients with asthma in Nepal.

Objective: This study aims to compare the agreement between ACT and GINA assessment tools in Nepalese population.

Methods: In a cross-sectional observational study, patients aged more than 18 years diagnosed as asthma at least three months prior were included. Active smokers and those with concomitant other respiratory disorder were excluded. ACT translated to native Nepali language was self-administered by the patient. GINA assessment of asthma control was recorded by the physician. Patients were classified as having well controlled, partially controlled and poorly controlled asthma by using both the tools. Spearman's correlation coefficient was used to evaluate the agreement between the ACT and GINA based classification.

Results: A total of 56 patients were included into the study. The mean age was 39 ± 12 years and the median duration of symptoms was 39.5 (IQR = 25.5-53.5) months. Using the GINA recommended asthma control tool, the number of patients with well controlled, partially controlled and poorly controlled asthma were 21 (38%), 24 (43%) and 11 (20%) respectively. Using the ACT scores, 35 (63%), 11 (20%) and 10 (18%) patients had well, partially, and poorly controlled asthma respectively. Both ACT and GINA score had a good agreement in classifying poorly controlled asthma. ACT and GINA scores had a weak positive yet statistically significant correlation (Spearman's rho = 0.752, p= 0.019).

Conclusions: ACT and GINA based assessment tools have good agreement to identify poorly controlled asthma in patients with asthma in Nepal.

Keywords: Asthma; Asthma Control Test; Bronchial Asthma; GINA Assessment of Asthma Control; Nepal.



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INTRODUCTION

Asthma is a heterogenous disease characterized by chronic airway inflammation and affects approximately 300 million people worldwide¹. Asthma mortality is still high in low and middle income countries like Nepal, most of which are preventable. Achieving a good level of asthma control with treatment is the most effective measure to reduce mortality. Monitoring during the treatment is usually done by patient self-assessment, clinical assessment, and minimally invasive

tests like spirometry, fractional exhaled nitric oxide (FENO) and sputum eosinophils^{1,2}. Several standardized tools are used to assess asthma control clinically. Asthma control test (ACT), Asthma control questionnaire (ACQ) and GINA

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assessment tests are the most commonly used, and have been validated in different population³⁻⁶.

There is a paucity of published literature on the burden of asthma and its impact in Nepal⁷⁻⁹. Nepal is ranked sixth in the world with an age adjusted mortality rate of approximately 30 per 100000¹⁰. Many patients remain untreated due to lack of access to quality health services in rural Nepal. On the contrary, physicians have to attend a large rush of patients in the respiratory clinics in cities. Although ACT and GINA score have not been formally compared or validated in our population, they continue to be the most commonly used methods to assess asthma control. This study aims to determine the utility and compare the ACT and GINA assessment tools in Nepalese population.

METHODS:

This cross-sectional observational study was conducted at Chest Clinic of National Academy of Medical Sciences, Bir Hospital from March 2024 to May 2024. Inclusion criteria were: patients aged more than 18 years, diagnosis of asthma at least 3 months prior, and a prescription of at least one inhaler medicine. Exclusion criteria were: non-compliance to inhalers, current smoking and presence of concomitant ILD, COPD or bronchiectasis. A written informed consent was obtained from all the participants. Demographic data including the age and gender, duration of asthma symptoms, medication use and FEV1 percent predicted were recorded in the proforma designed for the study.

Level of asthma control was assessed using two tools in each subject – ACT and GINA assessment tool. For the purpose of the study, the ACT was translated to native Nepali language to make it understandable to the participants (Figure 1). If a participant was unable to read or write facilitation was done by a family member. ACT comprised of five questions based on recall over the last four weeks, and each question had five responses scored 1 to 5. The total score was 25, with higher scores indicating good asthma control. Based on the ACT scores, patients were classified as well controlled (Score 20-25), partially controlled (Score 15-19) and poorly controlled (Score <15)⁶. The GINA assessment tool was administered by the physician and consisted of four questions recalled over the past four weeks with a “yes” scored 1 and “no” scored 0. Patients were classified as well controlled (Score 0), partially controlled (Score 1 or 2) and uncontrolled (Score 3 or 4)¹ according to their GINA scores. Data were entered and analysed using Microsoft® Excel ver 16.83 and presented as mean ± SD, median (IQR) or frequency (percentage). Spearman correlation coefficient was used to assess the strength and direction of association between ACT and GINA scores.

आस्थमा नियन्त्रण परीक्षण (ACT)

ACT रोगी केन्द्रित, पछिल्लो ४ हप्तामा लक्षणहरूको नियन्त्रणको स्व-मूल्याङ्कन हो। उतम उत्तर खोज्नुहोस्, नम्बर सर्कल गर्नुहोस् र कुल स्कोर थप्नुहोस्।

क) पछिल्लो ४ हप्तामा, तपाईंको दमले तपाईंलाई नियमित घर वा अफिस को काम, स्कूल वा कलेज जानबाट कती समय रोक्थ्यो ?

१. दिनदिनै जसो २. धेरै जसो ३. कहिलेकाही ४. धेरै कम

५. रोकेन

ख) पछिल्लो ४ हप्तामा, तपाईंलाई कति पटक सास फेर्न गाह्रो भएको छ ?

१. जती खेर पनि २. दिनमा एक पटक ३. हप्तामा ३-६ पटक

४. हप्तामा एक दुई पटक ५. पटकै छैन

ग) पछिल्लो ४ हप्तामा, तपाईंको दमका लक्षणहरू (घ्यार्-घ्यार, खोकी लाग्ने, सास फेर्न गाह्रो हुने, छातीमा कसाइ वा दुखाइ) ले तपाईं राति वा एका-बिहानै कति पटक ब्युँझनुभयो ?

१. हप्तामा ४ पटक भन्दा बढी २. हप्तामा २-३ पटक ३. हप्तामा एक पटक

४. कहिलेकाही मात्र ५. परेन

घ) पछिल्लो ४ हप्तामा, तपाईंले आफ्नो आवश्यक परेको बेला तान्ने अतिरिक्त औषधि कति पटक प्रयोग गर्नुभयो ?

१. दिनमा ३ पटक वा बढी २. दिनमा १-२ पटक ३. हप्तामा २-३ पटक

४. हप्तामा एक पटक वा कम ५. परेन

ङ) तपाईंले पछिल्लो ४ हप्तामा आफ्नो दम नियन्त्रणलाई कसरी मूल्याङ्कन गर्नुहुन्छ ?

१. छैन, जस्ताको तस्तै छ २. अलिअली होकी जस्तो मात्र ३. हल्का चाही भएको छ

४. राम्रो भएको छ ५. अहिले एकदम ठीक छु

Figure 1: ACT tool: The version translated in the native Nepali language used for the study

RESULTS:

During the study period, of the 114 patients screened, 56 patients were included into the study. The mean age was 39 ± 12 years and nearly two-thirds were females. The median duration of asthma symptoms were 39.5 months (IQR = 25.5-53.5). The mean ACT score was 19.5 ± 4.5. The baseline characters of the patients are depicted in table 1.

Table 1: Baseline characters of patients included in the study

Variable	Value
Total number	56 (100%)
Mean Age	39 ± 12 years
Gender	
Male	19 (34%)
Female	37 (66%)
Duration of asthma symptoms	39.5 months (IQR = 25.5-53.5)
ACT score	19.5 ± 4.5
Medication use	
Dry powder inhaler	36 (64%)
Metered dose inhaler	18 (32%)
Nebulizer	2 (4%)
Mean FEV1 (%Predicted)	81 ± 18 % Predicted

When classified based on GINA recommended asthma control tool, the number of patients with well controlled, partially

controlled and poorly controlled asthma were 21 (38%), 24 (43%) and 11 (20%) respectively. When ACT scores were assessed, 35 (63%) had well controlled, 11 (20%) had partially controlled and 10(18%) had poorly controlled asthma (Figure 2). GINA score classified lesser number of patients as well controlled and more number of patient as partially controlled when compared to the ACT scores. However, both ACT and GINA score had a good agreement in classifying poorly controlled asthma in our study. Ten patients were classified as poorly controlled by ACT and 11 patients by GINA score. (Figure 3). ACT and GINA scores had a weak positive yet statistically significant correlation (Spearman’s rho = 0.752, p= 0.019). The correlation statistics are depicted in table 2.

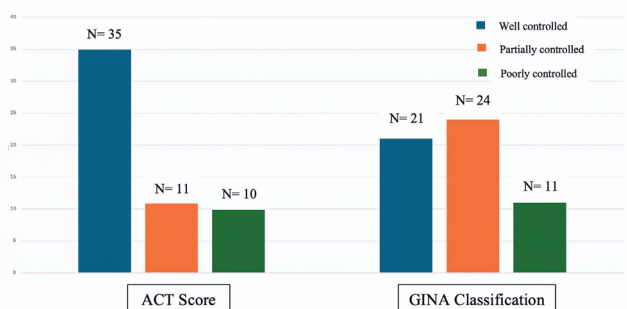


Figure2: Histogram showing the distribution of study participants based on ACT score and GINA classification

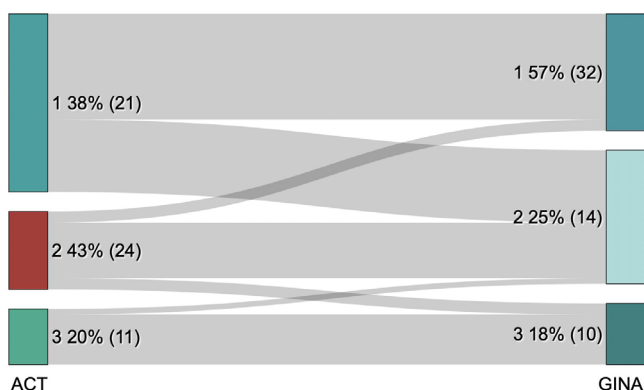


Figure 3: Sankey diagram showing reclassification of asthma control groups when two different methods (ACT vs GINA) were used

Table 2: Distribution of ACT scores vs GINA scores with correlation statistics.

		GINA Classification			Total	Spearman correlation
		Well controlled	Partially controlled	Poorly controlled		
ACT	Well controlled	19	13	0	35	rho=0.752 (p = 0.019)
	Partially controlled	2	10	2	11	
	Poorly controlled	0	1	9	10	
Total		21	24	11	56	

DISCUSSION:

Symptom control is central to the management of asthma. Assessment of control helps to identify patients at risk of poor outcome. ACT is a five-point recall based self administered questionnaire and GINA guidelines suggest assessment of symptom control by using a physician administered four-point questionnaire^{1,6}. Both the tools are simple, patient-centric, easy to use and validated for use in different population³⁻⁶. Both ACT and GINA score had a good agreement in classifying poorly controlled asthma in our study in Nepalese patients. Previous studies have reported similar findings in other population as well¹⁰⁻¹². Identification of poorly controlled or the uncontrolled asthma is of utmost importance, as timely interventions such as removing exposure or step-up in therapy can reduce the risk of exacerbation and mortality.

Previous studies also report only a moderate agreement between the GINA and ACT score in classifying well controlled and partially controlled asthma¹¹⁻¹³. In our study, the ACT classified more patients as well controlled compared to the GINA score. This may be due to various reasons. ACT is self-administered, has five specific questions and provides an option of scoring between 1 to 5 for each question. In contrast, GINA tool has four ‘yes’ or ‘no’ response questions which are less specific and is administered by a physician. Hence the GINA score may capture more patients with one or other symptoms which have not improved after initiation of treatment and capture more patients with uncontrolled asthma. Both GINA and ACT score also have some disadvantages. They are recall based, hence are unable to assess control over longer period of time. Both physicians and patients tend to over estimate the level of control when questionnaire based tools are used¹⁴.

Although Nepal is one of the countries with high asthma mortality, very few studies have evaluated the burden of the disease in Nepal⁷⁻¹⁰. The performance of tools for monitoring asthma control have not been evaluated in our population in the past. We compared the ACT tool with the GINA score. This is the first study of its kind, which compared the performance of these very important tools. GINA assessment tool is presumed to be gold standard for asthma control status. We used the ACT tool, translated to native Nepali language, for the purpose of our study. This was one of the strengths of the study because the available English language version of the ACT is understood by a very few of our patients. Since there was a good agreement between the two, we recommend the use of ACT translated in Nepali language in Nepal.

LIMITATION

Our study also has a few limitations. The study has a relatively small sample size, and the results may need to be validated in a larger cohort. We did not measure FENO levels or sputum eosinophils in our patients which are very useful to assess the level of control in asthma. Our center is a government owned, tertiary-level, referral hospital where most of the patients

are referred for difficult-to-treat asthma with severe disease and multiple comorbidities. We did not assess the disease severity in this study. Hence, there might have been an under-representation of mild asthma.

CONCLUSION:

ACT and GINA based assessment tools have good agreement to identify poorly controlled asthma in patients with asthma in Nepal. The Nepali language translated version of ACT score performed well when compared with GINA score and can be used in our patients.

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