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INDICATIONS FOR SPIROMETRY AT A TERTIARY HOSPITAL IN SOUTH EAST, NIGERIA

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ABSTRACT

Background: Spirometry evaluation of ventilatory functions plays a critical role in the diagnosis, differentiation and management of respiratory illness such as asthma, chronic obstructive pulmonary disease and restrictive lung disorders. It appears to be underutilized especially by most primary care physicians.

Aim: This study was aimed at determining the indications for spirometry at a tertiary health institution in Nigeria and to determine the source of referral of the patients.

Methods: Clinical and anthropometric data of all subjects who underwent spirometry at the University of Nigeria Teaching Hospital, Enugu, Nigeria over a three year period were retrieved from the records book and analyzed to determine the sex distribution, age distribution, indication for the procedure, and source of referral.

Results: A total of fifty two patients had the procedure over a three year period (Jan 2004-Dec 2006). The male to female ratio was 1: 1.08. Their ages ranged from 5 to 85 years of age with a mean age of 42.31±20.50years. The commonest indication for spirometry during the study period was Bronchial asthma followed by Chronic Obstructive Pulmonary disease (COPD). Most of the patients were referred by the respiratory unit performing the procedure followed by the surgical units and no referral came from the neighbouring peripheral hospitals.

Conclusion: Bronchial Asthma is the commonest indication for the use of spirometry. There is poor referral from the peripheral primary care centers. Primary care general physicians and surgeons should be encouraged to use of spirometry.

Key Words: Spirometry, Nigeria, bronchial asthma, COPD. *(Accepted 11 March 2008)*

INTRODUCTION

Spirometry is a physiological test that measures how an individual inhales or exhales volumes of air as a function of time.[1] It is a relatively cheap and non invasive test of lung function.Simply put it is a timed measurement of dynamic lung volumes and capacities during forced expiration and inspiration to quantify how effectively and quickly the lungs can be emptied and filled.[2] Spirometric evaluation of ventilatory function plays a critical role in the diagnosis, differentiation and management of respiratory illness such as asthma, chronic obstructive pulmonary disease and restrictive lung disorders. It is important in the assessment of lung health in those exposed to occupational and environmental hazards and for risk assessment prior to surgery. Spirometry is invaluable as a screening test of general respiratory health in the same way that blood pressure provides important information about general cardiovascular health.[1] It is also important in monitoring of respiratory illnesses, evaluation of disability/impairment of the respiratory system, and in public health assessment.Systematic use of ventilatory assessment both in the clinic and with patient self monitoring of peak flow rate and Forced expiratory volume in one second (FEV_1) has the capacity to improve patient understanding, confidence in self management, and quality of life for those with lung disease. Recent management guidelines for asthma and COPD recommend regular use of spirometry for the diagnosis and management of these disorders.[3] With the development of easy-to-use office-based portable spirometers, an increasing number of physicians have ready access to spirometry in the developed countries. Physicians who care for patients with pulmonary disease must understand basic pulmonary function testing like spirometry. Physicians should however remember that spirometry requires cooperation between the examiner and the subject and the results obtained will depend on technical and personal factors. Spirometry on its own does not lead clinicians directly to an aetiological diagnosis. Abnormalities in spirometry measurements will be detected more easily if variability between results is

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diminished together with improvement in accuracy.Interpretation of spirometry results requires adherence to guidelines to avoid much errors as differences in interpretations have been observed between chest physicians on one side and between chest physicians and general care physicians on the other side.[4] The clinician wishing to employ a spirometer in the office must be aware of the equipment available and the current standards for validating and maintaining such equipment.[5] Despite the ever increasing demand in the use of spirometry in the assessment of pulmonary conditions, it does appear that the request for this simple clinical measurement is still low in the developing countries as literature search showed paucity of data on the works done in this area as previous works were mainly dissertations for fellowship awards. Studies on the use of spirometry in health institutions are scarce in this sub region.We retrospectively studied the spirometry records of the Respiratory unit, University of Nigeria Teaching Hospital Enugu (UNTH) with a view to determining the indications for spirometry at this center together with demographic characteristics of subjects that underwent the procedure.

PATIENTS, MATERIALS AND METHODS

The University of Nigeria Teaching Hospital Enugu is a 760-bed facility that serves as a tertiary level referral center for mainly the South East of Nigeria though it receives patients from other parts of the country. The South East Nigeria is principally a rain forest region with the population principally engaged in agriculture, public /civil service and commerce/trading activities. The hospital recently acquired a portable spirometer (*Spirovit SP-1, SCHILLER-AG, AH gasse 68, post fach, 6340 Barr, Switzerland).* The spirometry was done by two respiratory physicians throughout the study period.
Clinical and anthropometric data of all subjects who underwent spirometry at the center was retrieved from the records book and analyzed to determine the sex distribution, age distribution, indication for the procedure, and source of referral.

RESULTS

A total of 52 subjects had spirometry at the center between January 2004 and December 2006. 5(9.6%), 14(26.9%), and 33(63.5%) patients had the procedure in the year 2004, 2005 and 2006 respectively. This is further shown in Table 1. There were 25 males and 27 females giving a male to female ratio of 1:1.08. The ages of the subjects ranged from 5years to 85 years with a mean age of 42.31±20.50years. Thirty two of the patients were either above fifty years age or between 21- 30 age range (Table 2). Their heights ranged from 146cm to 182cm with a mean height of 165.88±7.90cm.

The commonest indication for spirometry during the study period was Bronchial asthma accounting for 46.3% of all the requests followed by COPD/ Chronic Cough accounting for 19.3% of requests. Pre-operative spirometry assessment accounted for 17.3% of all the requests during the period. The other indications are as shown in Table 3. Forty (76.9%) of the request for spirometry were made by the respiratory unit, followed by the orthopaedic unit (7.7%). In 7.7% of the cases, the source of the referral was not recorded. (Refer to Table 4).

Table 1: **Frequency of Spirometry per Year of Study.**

Year of study	Number of Subjects	Percentage (%)
2004	5	9.6
2005	14	26.9
2006	33	63.5
Total	**52**	**100**

Table 2: **Age Distribution of the Subjects.**

Age distribution (years)	Number of subjects	Percentage (%)
<20	8	15.4
21-30	12	23.1
31-40	7	13.4
41-50	5	9.6
51-60	8	15.4
60 and above	12	23.1
Total	**52**	**100**

Table 3: **Indications for Spirometry.**

Indication	Number of subjects	Percentage %
Asthma	24	46.3
COPD/chronic cough	10	19.3
Pre-operative	9	17.3
Asbestosis	1	1.9
Pulmonary fibrosis	2	3.8
Systemic sclerosis	2	3.8
Dyspnoea	2	3.8
Not recorded	2	3.8
Total	**52**	**100**

Table 4: **Referral Source of the Subjects.**

Referral source	Number of Subjects	Percentage (%)
Respiratory unit	40	76.9
CTU	3	5.8
Orthopaedic hospital	4	7.7
Maxillofacial	1	1.9
Not recorded	4	7.7
Total	**52**	**100**

DISCUSSION

This study showed that both sexes have indications for spirometry with a slight female preponderance. The small number of patients studied so far may not allow useful conclusions to be made as regards to which sex has more indications for spirometry in these series. The study equally showed that all age groups have need for spirometric assessment with a mean age of 42.31+/-20.50 years which shows that the indications for spirometry spans across all ages. The fact that most of the subjects were either above fifty years of age (20 patients) or within 21-30 year age range may just reflect the age of occurrence of the two commonest indications in this series which were COPD and Bronchial asthma. The youngest patient was 5years old and this was in agreement with the results of earlier studies that show that spirometry can be performed in the very young under very careful supervision by trained staff.[6] There has been a steady increase in the request for the use of spirometry since the year 2004, showing increasing awareness from other units most especially the surgical units for pre operative assessment. Most requests were from the respiratory unit that carries out the procedure. This is equally in agreement with what was found elsewhere.[6] The most important observation here is that there were no requests from other medical units of the hospital and from other peripheral hospitals within the catchment's area of the tertiary hospital and we are aware that most respiratory illnesses requiring spirometry evaluation are managed in the peripheral hospitals by primary care physicians. This seemingly low rate of spirometry use among physicians caring for asthma patients has been reported earlier.[7, 8] The commonest indication for spirometry during the period of the study was Bronchial asthma followed by COPD. All the patients that had spirometry because of the above two indications had reversibility of airflow limitation assessment by pre and post inhalation bronchodilator tests of ventilatory function. This was important as the current guidelines for asthma and COPD definition and management involves demonstration of reversible or non reversible airflow limitation and the National Asthma Education and Prevention Program (NAEPP) recommends pulmonary function testing as part of asthma evaluation.[7] Earlier studies mainly outside the shores of Africa[7, 8] have shown low rate of spirometry use in the care of patients with respiratory diseases and the present study has further shown that our own environment is no exception.

Programmes that will stimulate and sensitize physicians on current guidelines regarding the use of spirometry in the management of Asthma and chronic obstructive airway diseases should be structured and encouraged.

Surgeons especially the Orthopaedic, Cardiothoracic and Maxillofacial surgeons should be aware of the use of spirometry especially in pre-operative assessment of ventilatory function before certain surgical procedures.

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