

Frequency of Undiagnosed Hypoxia in Patients

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ABSTRACT

Aim: To determine frequency of undiagnosed hypoxia in pts which was medically sick admitted in chest wards.

Study design: Cross-sectional.

Place and duration of study: Department of Medicine, Social Security Hospital, Multan Road Lahore from 1st January 2020 to 30th June 2020.

Methodology: Two hundred and ninety patients were included in this study. Patients detailed demographics age, sex, and body mass index were recorded after taking written consent and admitted in chest wards. Presented patients were aged between 20-70 years. Pulse oximeter was used to measure the oxygen saturation levels. Mean time of hospitalization was also measured.

Results: There were 170(60%) males and 120(40%) females with mean age of the patients were 40.78±18.64 years. Mean BMI was 27.78±12.64 kg/m². Majority of the patients 160(55.17%) were from the age group 35-70 years. Calculated oxygen saturation rate was 91.98±9.42% in which minimum rate was 80% and the maximum rate was 105%. Mean heart rate was 92.96±19.20 per minute. Patients were admitted due to tuberculosis were 102(35.17%), patients with chronic pulmonary disease were 70 (24.17%), patients with pleural effusion were 30(10.34%) and the patients of asthma were 20(6.9%). In this study hypoxia was observed in 44 (15.17%) patients and was absent in 246 (84.83%) patients.

Conclusion: The frequency of hypoxia was most prevalent in male patients with increasing age as compared to females and in chronic obstructive pulmonary disease patients, it was observed more commonly.

Keywords: Pulse oximeter, Oxygen saturation, Undiagnosed hypoxia

INTRODUCTION

Hypoxia is the illness that denies a sufficient supply of oxygen to the body or body region. In the event of an immediate oxygen therapy, hypoxia can signify critical conditions. Undiagnosed hypoxia can prove fatal and tissue hypoxia can be successfully treated early. Pulse oximetry is a technology routinely used in high-income countries for the diagnosis of hypoxia. Pulse oximetry has proven more successful in large-scale experiments than a clinical hypoxia detection¹ and has been shown to be the fifth critical signal in patients of all ages in developed countries².

In emergency triage pulse oximetry was also shown to cut costs in hospital through the fact that workers can more effectively target oxygen treatment. Regrettably, in resource-limited clinical situations pulse oximetry is often not usable. In general, however, the influence of pulse oximetry in resource constrained settings is scarce in literature and there remain largely unknown prevalence of hypoxia amongst adults in low income countries. Clinics with pneumonia, extreme asthma, chronic bronchitis, myocardial infarction, pulmonary edema and post-operative states are critical for oxygen treatment. In admitted patients several reports have demonstrated unknown hypoxia^{3,4}. On the basis of clinical review, oxygen is also administered in most hospitals. It may not be a precise and effective solution. Oximetry in some areas remains unused, although

it is usable. The aim of our research is to evaluate with the aid of Pulse Oximeter the hypoxia prevalence in patients admitted to the medical department.

The diagnosis of hypoxemia could be turned into low-resource conditions by pulse oxymetry, effective and efficient use of oxygen, prompt referral decisions made easier, treatment failure rates reduced and health-care charges lowered.⁵ The fifth vital sign in patients of all ages of pulse oximetry is well known in developing countries. In several researches carried out in Papua New Guinea pulse oximeter and oxygen concentrators have already shown that their gain has led to a reduction in mortality⁶⁻⁸ in paediatric pneumonia by using continuous training. Pulse oximetry is a routine technique used in high-income countries to diagnose hypoxemia⁹ and is found to be more accurate in large trials than in the hypoxemia evaluation.¹⁰ Pulse oximeter is not available in all hospitals in Pakistan, and where available it is not normal to use pulse oximeters in suspected hypoxia patients, instead additional oxygen is provided, which correctly hypoxidises, but which remains concealed from underlying severe disease. The disease will drag this patient into a complication or overwhelmed stage. Countries such as Pakistan cannot tolerate this additional strain of disease complications.

If patients admitted are regularly screened for pulse-oximeter hypoxia, this additional country economic burden can be minimized and death and morbidity can easily be reduced. Undiagnosed hypoxemia in hospitalizations with a prevalence of 7.8% was recorded in the previous study in

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Zambia. The results of this study will also help our local researchers plan their further studies on this subject.

MATERIALS AND METHODS

The research was conducted in Department of Medicine, Social Security Hospital, Multan Road Lahore from 1st January 2020 to 30th June 2020 and comprised 290 patients. Patients detailed demographics age, sex and body mass index were recorded after taking written consent. Patients with septicemia, peripheral vascular disease, shock and congestive cardiac failure and those were not agreed was excluded from this study. At the beginning, pulse oximeters were used to measure the level of oxygen saturation. The right index finger was applied to pulse oximeter and the saturation level was registered when the shape of the wave was of a high quality and 5s stable. SpO₂ was taken as a warning of two imminent hypoxia, less than 90 percent. The Chi-square trial, which had an effect on the prevalence of undiagnosed hypoxic, was conducted after stratification (at a significance level of 0.05-95% CI). Mean time of hospitalization was also measured complete data was analyzed by SPSS 24.0 version.

RESULTS

One hundred and seventy (60%) patients were males and 120(40%) patients were females. Mean age of the patients were 40.78±18.64 years. Mean BMI was 27.78±12.64kg/m². Mean hospitalization of patients were 4.73±2.79 days. Mean heart rate was 92.96±19.20 per minute. The oxygen saturation rate was 91.98±9.42% in which minimum rate was 80% and the maximum rate was 105% (Table 1).

Table 1: Demographic information of the patients (n=290)

Variables	No.	%
Gender		
Males	170	60.0
Females	120	40.0
Mean age	40.78±18.64	
Mean BMI	27.78±12.64	
Hospitalization		
Mean Duration(days)	4.73±2.79	
Mean heart rate(per minute)	92.96±19.20	
Mean Saturation rate (oxygen)	91.98±9.42	

Table 2: Distribution of patients with recorded diseases (n=290)

Disease	No.	%
Tuberculosis	102	35.17
Chronic pulmonary	70	24.17
Pleural effusion	30	10.34
Asthma	20	6.9
Pulmonary embolism	14	4.83
Pneumonia	14	4.83
Interstitial lung disease	40	13.8

Table 3: Frequency of undiagnosed hypoxia

Undiagnosed hypoxia	Yes	No
Hypoxia	44 (15.17%)	246 (84.83%)
Male	32(11.03%)	138(47.59%)
Female	12(4.14%)	108 (37.24%)
Oxygen Saturation level	87.21±1.79%	94.74±3.27%

P<0.05

The number of admitted patients due to tuberculosis was 102(35.17%), patients with chronic pulmonary disease were 70(24.17%), patients with pleural effusion were 30(10.34%), the patients of asthma were 20(6.9%), patients of pulmonary embolism and pneumonia was same 14(4.83%) and the patients of Interstitial lung disease was 40(13.8%) [Table 2].

The undiagnosed hypoxia was observed in 44(15.17%) patients and was absent in 246(84.83%) patients. Male was higher in number 32(72.73%) as compared to females of hypoxic patients 12(27.27%). Mean oxygen saturation level was measured in these patients were 87.21±1.79% and those patients with absent hypoxia had saturation level 94.74±3.27% with p<0.05 (Table 3).

DISCUSSION

Hypoxia is a common entity that is often undiagnosed, untreated and unnoticed in admitted patients. A reliable indicator to measure the oxygenation status of these patients has been identified, although some limitations such as low heart performance, anaemic and CO retention have been demonstrated. Different hypoxia rates from 7.8% to 40% from different population subsets of 14 have been recorded. Higher levels of hypoxia in stroke 16 are reported¹¹.

Mean age of the patients were 40.78±18.64 years and mean BMI was 27.78±12.64. Majority of the patients 160 (55.17%) were from the age group 35-70 years. These results were similar to the previous studies conducted by Tariq et al.¹² The oxygen saturation rate was 91.98±9.42% in which minimum rate was 80% and the maximum rate was 105%. Mean heart rate was 92.96±19.20 per minute. In our study hypoxia was calculated in 44(15.17%) patients and this was comparable to the previous study conducted by Yarmal et al¹³ presented that out of 648 patients, 102 (15.74%) were hypoxic.

Oxygen saturation level above then 90% was reported by previous many authors¹⁴⁻¹⁶. In our study, calculated oxygen saturation rate was 91.98±9.42% in which minimum rate was 80% and the maximum rate was 105%. In admitted patient in hospitals including all specialties, most of the research performed on the subject was carried out while our study consisted only of chest patients. Other researches of patients admitted to various wards have reported different frequencies of hypoxia. In our study, frequency of admitted patients due to tuberculosis was 102(35.17%), patients with chronic pulmonary disease were 70(24.17%), patients with pleural effusion were 30(10.34%) and the patients of asthma were 20(6.9%). In this study hypoxia was observed in 44 (15.17%) patients and was absent in 246 (84.83%) patients.

The hypoxia was higher in males, 32(72.73%) as compared to females 12(27.27%) and these results showed resemblance to the previous studies conducted by Foran et al¹⁴ and Wandt et al¹⁶. Majority of the patients 160(55.17%) were from the age group 35-70 years. The results of our study comply with those of the countries mentioned. The findings have shown that hypoxia is not diagnosed with sufficient frequency in our population.

CONCLUSION

The frequency of hypoxia was most prevalent in male patients with increasing age as compared to females. In chronic obstructive pulmonary disease patients it was observed more commonly.

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