IMPACT OF PHARMACEUTICAL INTERVENTION ON INHALATION TECHNIQUE

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ABSTRACT

The study carried out presents causes of poor compliance among the patients using inhaler devices. Evaluation of the patient's prior knowledge and practice of using inhalers and the improvement on using inhalers after counseling intervention through standard guidelines were the outcome measures of this study. It was hypothesized that pharmaceutical intervention gives better outcome. There was lesser compliance and lesser improvement in inhalation technique score in females than in males and further more the female patients falling under the resting category were mostly above the age of 60 years. Comparing the mean scores and mean improvement before and after counseling in rotahaler users, it was observed that there was 62.25% improvement in discharged patients 57.75% improvement in outpatients after counseling 47.87% improvement in inpatients after first counseling 80.12% improvement after second counseling. In the case of MDI users, there was 63.30% improvement after counseling. From the follow up (second counseling) in inpatients it was evident that as the number of counseling was increased, there was an increase in improvement in mean score, decrease in numbers of critical point missing, increase in compliance of patients to inhalation techniques and ultimately there were better outcome.

KEY WORDS: Counseling, Pharmaceutical**,** Intervention, Impact**,** Metered dose, Dry powder inhaler

INTRODUCTION

Chronic Pulmonary Obstructive Disease (COPD) is a major cause of death and illness throughout the world. It is the 4th leading Cause of death in the U.S. and the world [5] COPD is expected to be ranked 5th global burden by 2020 according to reports of WHO and World Bank. COPD results primarily from smoking tobacco [1]. Although different aspects of indoor air pollution such as combustion of biomass or wood smoke may be relevant to the development of obstructive lung disease [3-6], globally, cigarette smoking is the most important environmental risk that contributes to COPD [8].

According to World Health Organization, Nepal has an estimate 1.5 to 2 million asthmatics out of a total population of 25 million. It has also among the highest incidence of smoking related deaths [7]. Chronic bronchitis, emphysema, and corpulmonale disease conditions continue to plague Nepal especially in the hill and mountain regions where the atmosphere is supposed to be unpolluted. One of the main reasons for this has been smoke in the homes due to open fireplaces with no functioning chimney [10]. In Nepal, among female nonsmokers and smokers and past smokers, chronic bronchitis was significantly associated with increasing

exposure to domestic smoke [10]. In Nepal, a high prevalence of COPD is reported and many patients suffering are mostly illiterate and poor economical status. [9,10].

MATERIAL AND METHOD
Study design:
The study was a prospective, interventional one and the sampling technique used was of census method. The target population of this study was diagnosed male and female patients meeting the set criteria. The sample size of the study was ninety-three subjects visiting Dhulikhel Hospital, Dhulikhel, Nepal. An encounter form was developed which included few open and closed ended questionnaire followed by pre-defined score sheet of Rotahaler and MDI (Annex I, II and III). Newly diagnosed cases of inpatients, discharged patients and out patients meeting the set criteria were encountered and interviewed followed by observation through scoring of their practice in the use of Rotahaler and MDI. Immediate intervention to improve the technique was done through counseling on the basis of the standard technique of using Rotahaler and MDI (Annex II and III) followed by observation on improvement through scoring. For the purpose of counseling with better compliance, patients were demonstrated with placebo MDI and Rotahaler manufactured and provided by M/s. Cipla India Limited.

RESULTS AND DISCUSSION
Patient Categorization:
Figure 4.1 shows that about one half (49%) of the total population was discharged patients and from the remaining half, outpatients were 38% and inpatients were 13%. Majority of the patients who were admitted to inpatient ward were having acute exacerbation, so nebulizations were prescribed rather than MDI or DPI. Only at the time of discharge, they were prescribed with inhaler, mostly DPI (rotacaps). That's why discharged patients were found almost half of the total population. Only very few of the admitted patients got relief within one or two days of admission and their medication was changed to rotacaps instead of continuing nebulization, so the number of inpatients were very less.

Diseases Categorization:
Figure 4.2 shows that about one half (50%) of the total population were suffering from COPD and from the remaining one half, 33% were COPD with corpulmonale and 17% had asthma. The higher number of COPD patients were due to the majority of the patients (80%) were smokers and also according to the study of US Dept. of Health and Human Services, 1984 "globally cigarette smoking is the most important environmental risk that contributes to COPD" [8] and according to the Sharon Parmet et al study "Smoking causes about 80 percent to 90 percent of COPD cases" [13].

The second highest number of COPD with corpulmonale was found due to the higher numbers of COPD because COPD is one of the main risk factors for developing corpulmonale. According to Gale Encyclopedia of Medicine, corpulmonale, or pulmonary heart disease, occurs in 25% of patients with chronic obstructive pulmonary disease (COPD). In fact, about 85% of patients diagnosed with corpulmonale have COPD [12] and pulmonary hypertension, which develops late in the course of COPD (Stage IV: Very Severe COPD), is the major cardiovascular complication of COPD and is associated with the development of corpulmonale and a poor prognosis [11].

The lowest number of asthma was found because it mostly occurs in children and children have been excluded from this study. Literature also shows that although asthma affects people of all ages, it often starts in childhood and is more common in children than adults [14].

Sex Categorization:
Figure 4.3 shows that 56% of the total study population was female and 44% were males. The higher number of female was due to the higher percentage of female smoker than the male smoker and also due to genetical variation. According to National Center for Health Statistics, women have greater airway reactivity and experience faster decline in FEV_1, so may be at more risk than men. The gap between males and females has been narrowing, and the increased rates of females smoking cigarettes in the last 20–30 yrs. have been associated with steadily increasing rates of COPD in females [15]

Age Categorization:
Figure 4.4 shows that both males and females had more complications under the age of 51-70 years with the highest number under the age of 61-70 years and then male patients were drastically reduced while females were still significant up to the age 80 years. The highest prevalence of diseases at the age of 61-70 years were due to higher number of smokers during those age groups. Mostly females continued smoking up to the age of 75 years and normal aging also results in a decline in lung volume, with healthy nonsmokers losing about 20-30 ml/year. Lung volume loss in COPD patients who continue to smoke is more rapid, with losses of more than 60 ml/year. [16]

Literacy Categorization:
Figure 4.5 shows that 80% of the total population was illiterate and 20% were literate. The higher percentage of illiteracy was found to be associated with lower socio economic status of the patients. Literature shows that according to the studies conducted in the UK in the 1950's and 1960's, there is a clear social class gradient for COPD with it being more prevalent in the lower socioeconomic strata [18].

Smoking Categorization:
Figure 4.6 shows that 20% of the total populations were non-smoker and 80% were smoker, further more 54% were female smokers and 46%were male smokers.

Occupation Categorization:
Figure 4.7 shows that among the males, 66% were farmer, 27% were under resting and 7% were others and among the females 48% were cooking on woods, 48% were under resting and 4% were others.

Male farmers were highest in number while female farmers were the lowest because males were mostly involved in farming profession. Regarding the resting category, females were greater in number than males as shown in figure 4.5 the female patients were significant in numbers even beyond the age group of 61-70 years, and it is obvious that they must need rest in higher ages.

Almost half of the female patients were involved in cooking food using wood along with other household work because they were mostly from poor family in lower socioeconomic strata and studies also correlate that woman who cooks over a biomass fire has between two to four times more chance of suffering from COPD than a woman who remains unexposed.

WHO estimates that 22% of all COPD is caused by exposure to indoor smoke from biomass fires [17] so the above study supports the findings of higher prevalence of COPD in females.

Rotahaler technique score chart:
Figure 4.8 shows that out of total 8 scores for rotahaler (Annex II), inpatients got mean score of 0.42 and 4.25, discharged patients got mean score of 0.09 and 5.07 and outpatients got mean score of 0.48 and 5.1 before and after counseling respectively.

As regards the comparison of the mean scores before and after counseling, it was observed that there was 47.87% improvement in inpatients, 62.25% improvement in discharged patients and 57.75% improvement in outpatients after counseling and the test was significant at $P = 0.000$ (<0.05).

MDI technique score chart:
Figure 4.9 shows that out of total 10 scores for MDI (Annex III), which was prescribed only in outpatients, got mean score of 0.5 and 6.83 before and after counseling respectively.

In respect of comparing the mean scores before and after counseling, it was observed that there was 63.3% improvement after counseling and the test was significant at $P = 0.000$ (<0.05).

CONCLUSION
It was concluded that among the total population of the study, females were more prone to the respiratory problems and were more smoker than males. The mean age of the patients was 59.52 ±13.94 for female and 59.07 ± 8.039 for male. COPD was found in almost half of the total population and the second highest number was of COPD with corpulmonale and the least number for asthma. 80% of the patients were illiterate and further more females were higher in number. Males were mostly involved in farming and female 48.07% in cooking on wood and (48.07%) falling under the resting category. It was found that there was poor compliance and less improvement in inhalation technique score in the patients falling under the resting category and they were mostly above the age of 60 years.

Comparing the mean score before and after counseling in rotahaler users, there was 47.87% improvement in inpatients, 62.25% in discharged patients and 57.75% in outpatients after counseling. In the case of MDI users, there was 63.3% improvement after counseling.

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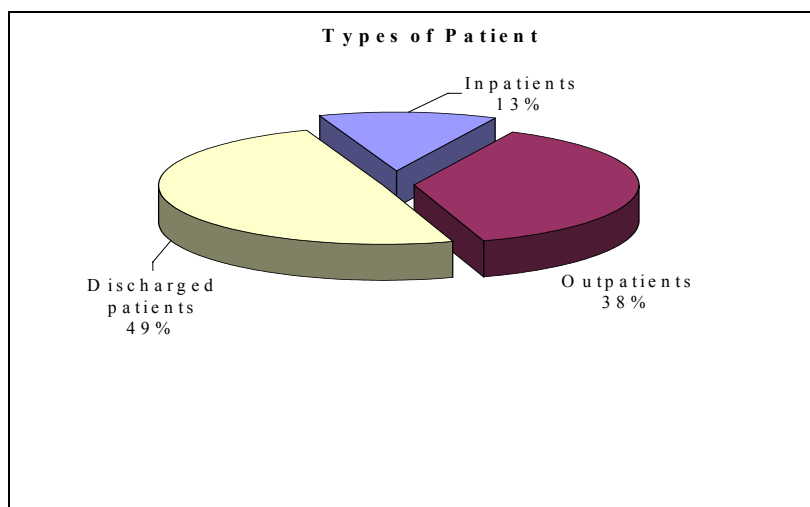14. www.nlm.nih.gov/cgi/medlineplus/leavemedplus.pl
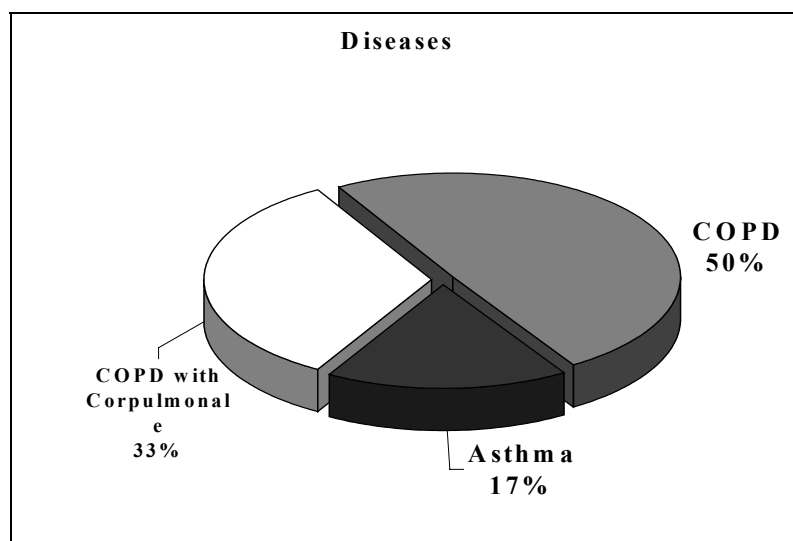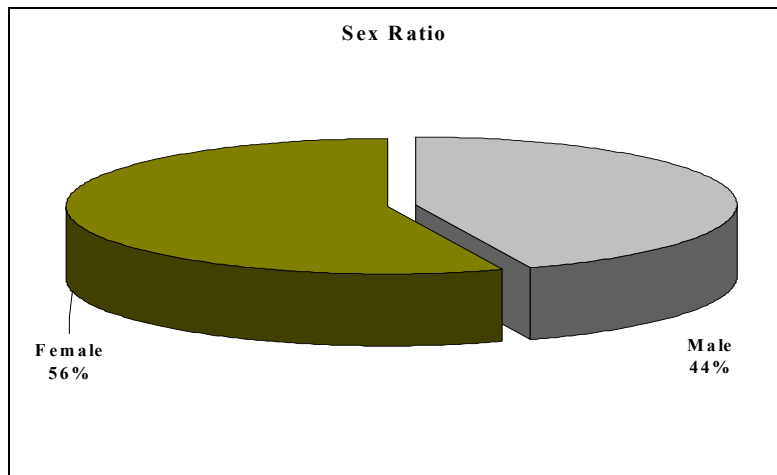
Fig.4.1 Patient Categorization

Fig.4.2 Diseases Categorization
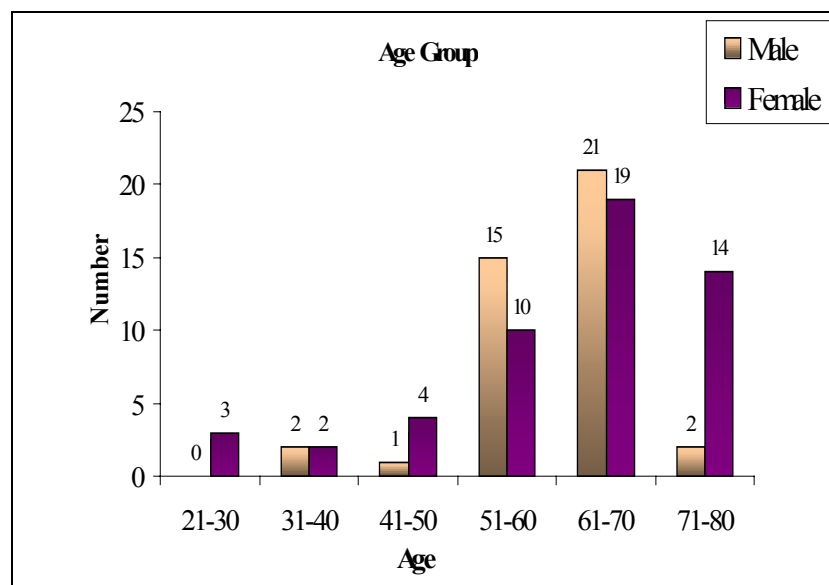
Fig.4.3 Sex Categorization
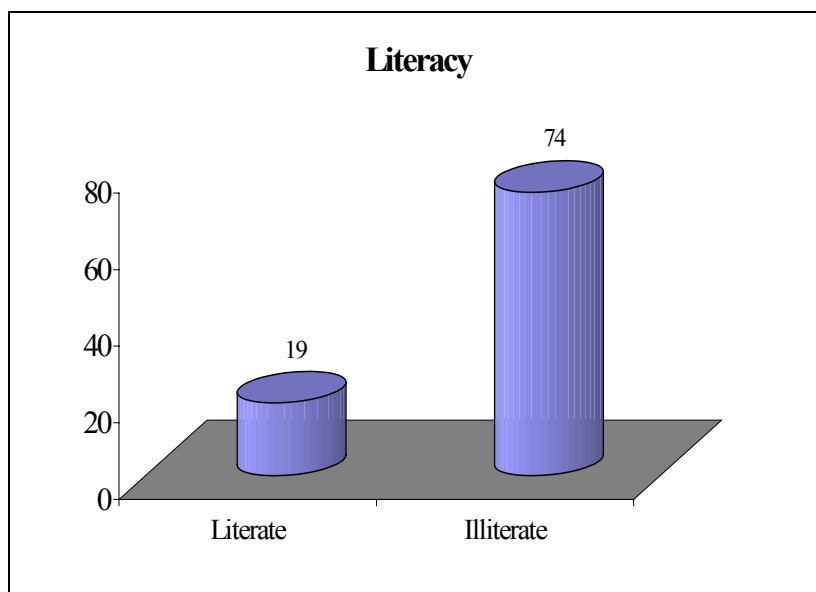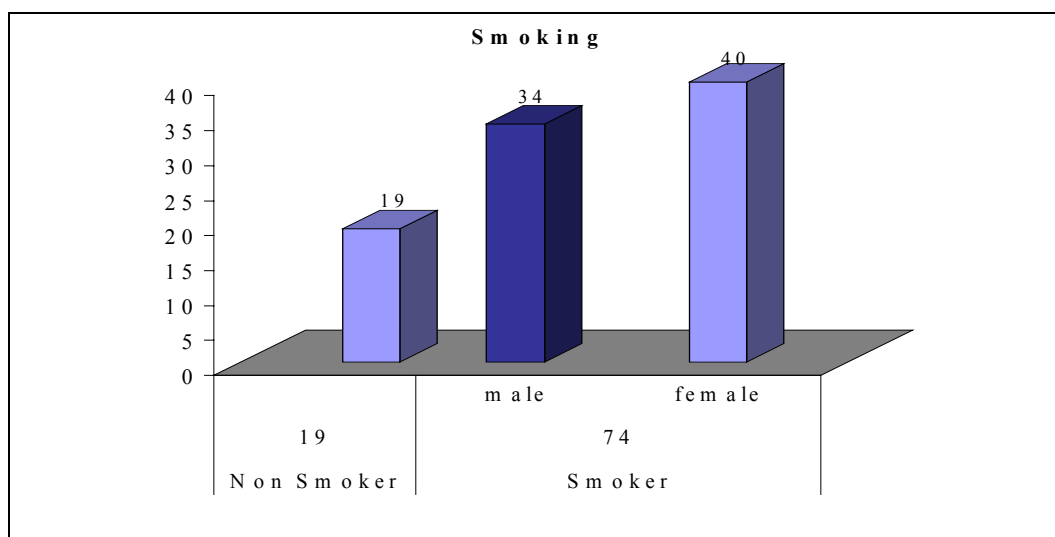

Fig.4.4 Age Categorization
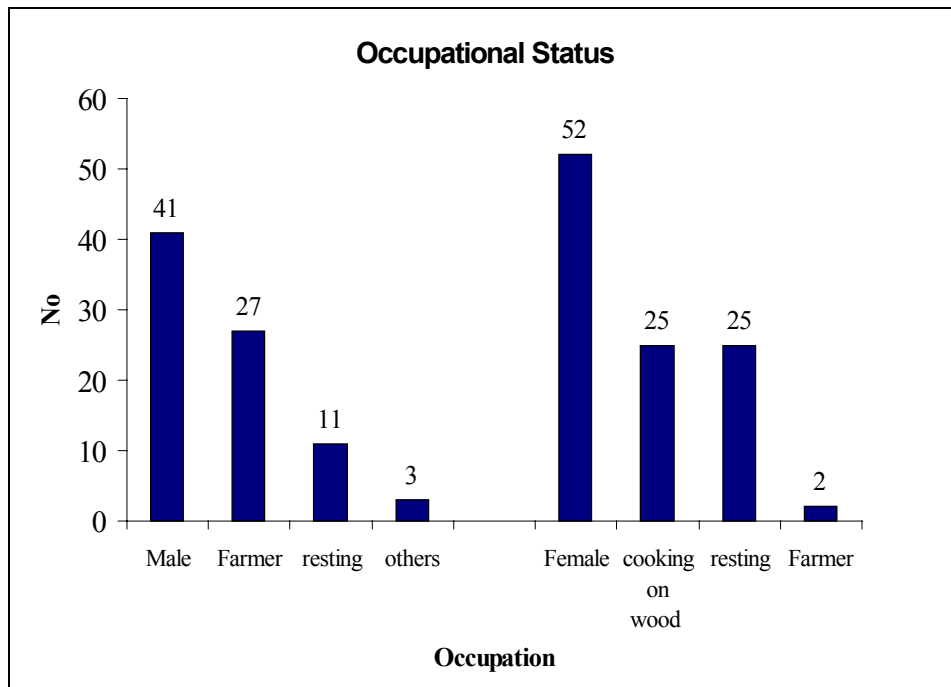
Fig. 4.5 Literacy Categorization

4.6 Smoking Categorization

Fig.4.7 Occupation Categorization
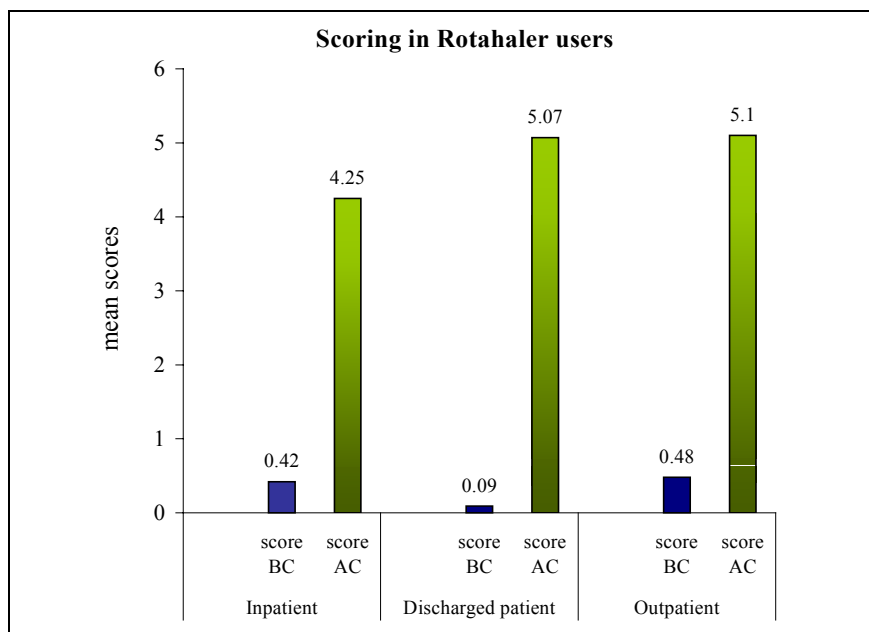
Fig.4.8 Rotahaler technique score chart

Scoring in MDI users

4.9 MDI technique score chart