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ORIGINAL RESEARCH ARTICLE

NURSES' COMPETENCY ON USE OF METERED DOSE INHALER

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ABSTRACT

Inhalation therapy is the most recommended and effiecient therapy for Bronchial Asthma and Chronic Obstructive Pulmonary Disease. Its therapeutic effect depends upon the competent inhaler technique.Thus the objective of this study was to findout the Nurses'competemcy on use of Metered-Dose Inhaler(MDI). Nurses working in emergency, intensive care unit and medicine wards and interested to participate in the study were selected as samples. They were asked to demonstrate the steps in placebo MDI and skill was measured with 9 steps observation checklist. Out of 50 respondents, majority (94%) were of age group 19-22 years old. None of them had edequate competency in use of MDI. Mean technical score was 3.72 . Only 6% of nurses performed most difficult and essential step that is to breath deeply and slowly during actuation. Nurses have poor competency in MDI use. Therefore formal inservice training on MDI use is elemental.

***Key words:** Competency, Metered-dose Inhaler, Nurse.*

INTRODUCTION

Asthma and chronic obstructive pulmonary disease(COPD) are common diseases of the airways and lungs that have a major impact on the health of the population (Broklebank et al.,2001).[1] Inhalation therapy is the most recommended and effiecient therapy for Asthma and COPD (Roopam Sehajpal, 2014).[2] Because, the administration of corticosteroids via inhalation could reduce the need for hospitalization of patients of asthma and COPD by 80%.A study identified that uncontrolled asthma and frequent Emergency Department visits were associated with improper use of device (HamdamAL-Jahadali, Anwar Ahmad, 2013).[3] There are various types of inhalation devices, but the cost effectiveness evidence favours pressurized Metered Dose Inhaler(pMDI) as a first line treatment in all patient with stable asthma unless, other specific reasons are identified (Broklebank et al., 2001).[1]

The MDI consists of a pressurized canister of medication in a plastic case with a mouthpiece. Pushing down on the canister causes the actuator to release a dose of medication (puff,which the patient then inhales through mouthpiece (how it works?). But its therapeutic benifit depends on sufficient deposition of drugs in the medium and small airways; which is largely determined by a competent inhaler technique. Yet studies have shown that many patients exibit poor technique with this device such as study in Jaipur, India revealed only 21.17% patients used device correctly (Roopam Sehajpal, 2014)[2] and in Brazil 94.2% of patients committed at least one error while using inhalation device (Moraes Souza, et. al, 2009).[4] Similarly in Nigeria 22.1% of patients completed all required steps of MDI use (Onyedum,2014).5 Therefore patient's education on MDI by medical personnel has been recommended (Hanania NA, 1994).[5]

Patients' ability to use an inhaler correctly depends largely on the skill and knowledge of whoever teaches them. As a healthcare provider, nurses play a significant role in patient's education. However, a study in Pakistan revealed that more than 30% of

nurses were not able to demonstrate the correct inhaling technique of MDI (Lalani, 2012)[6] and in Manipal Hospital, Nepal, nurses had poor score in MDI technique prior intervention (Kishore et al, 2008).[7] Therefore this study aims at finding out the technical competency of the nurses on the use of MDI in Chitwan Medical College Teaching Hospital (CMCTH) Chitwan.

METHODS

A descriptive study was conducted among nurses working in Emergeny, Intensive Care Unit and Medical wards of Chitwan Medical College (CMC), Chitwan, Nepal from 29 May to 13th June, 2011. Nurses who were interested to participate in the study, were given a placebo MDI and asked to demonstrate the technique. During demonstration, their competency in using MDI was measured with the NINE STEPS OBSERVATION Check list. Each nurse was evaluated individually and no oral instructions, prompts or critique was provided about inhalational techniques prior to or during the observations. The nurse was observed during each step and was given a score of 0 when the step was omitted (skipped) or demonstrated incorrectly and a score of 1 was given when the step was demonstrated correctly. Adequacy of inhalation technique was based on their ability to demonstrate all the essential steps and a total score of nine and those who were not demonstrating all the essential steps correctly were considered as having poor competency in inhalation technique. Data was analysed mannually and presented in frequencies and mean.

Ethical clearance was taken from the Chitwan Medical College Institution Review Commitee and verbal informed consent was taken from each participant prior to demonstration of MDI technique.

RESULTS

Majority (94%) of respondents were of age group 19-22 years old, 4 % were 23-26 years and 2 % were between 27-30 years old. Similarly 54% of respondents had got more than one year of work experience. Furthermore 38% from ICU, 32% were from Medicine and 30% were from emergency. None of them had trainining on MDI use.

Among the 9 steps of MDI, only few nurses performed essential steps. Only 6% of nurses performed the most difficult and essential step that is to begin breathing deeply and slowly during actuation (table 1). Out of 9 steps of MDI use, 40% of nurses performed only 3 steps correctly. None of them performed all the steps of MDI (table-2). Average skill score of nurses was 3.72.

Table 1: Steps of MDI Performed Correctly by the Respondents (n=50)

Steps Performed	Freq.	%
Test the MDI by spraying in to the air (priming)	5	10
*Shake the MDI vigorously	22	44
Remove the cap	50	100
*Exhale comfortably	5	10
*Place the mouthpiece properly sealed with lips	47	94
*Administer single puff	28	56
Begin to breathe deeply and slowly for 3-5 seconds during actuation	3	6
*Hold breath for 10 seconds after inhalation	4	8
Exhale slowly	21	42

*Essential steps

Table 2: Number of Steps Performed Correctly by the Respondents While Using the MDI(n=50)

No. of Steps performed	Frequency	Percentage
2	10	20
3	20	40
4	7	14
5	5	10
6	3	6
7	5	10
≥8	0	0

DISCUSSION

Introduction of MDI is a major innovation in the therapeutic management of the Bronchial Asthma and COPD. The device enables direct delivery of medication to the respiratory system. However as only 8.8% of the aerosolized dose reaches the small conducting airways and alveoli even with the proper use of MDI (Hussen D Ali, 2014).[8] So as educator, the nurses must have proper knowledge or adequate

skill about the matter that she is going to teach or demonstrate to the patient. But this study found that none of the nurses had adequate competency in use of MDI because none of them neither demonstrated essential steps nor all the 9 steps required in the correct use of MDI.This finding is consistent with the previous work by Kishore, et al., that none of the professionals could demonstrate all the 10 steps in preintervention assessment. Similar finding was found in Nigeria among the post basic nursing students (Desalu et al., ,2013)[9]. However study conducted in Iran among the physicians and nurses revealed that, only 6.93% performed all steps correctly (Nandi and Zeraati,2005).[10] But a study in Pakistan showed, 71% of nurses demonstrated correct inhalar technique before intervention (Lalani NS,2012).[6]

In this study, only 10 % of respondents tested the MDI by spraying it into the air, which demonstrates that the spray mechanism works and ensures that the medication hasn't accumulated, or to ensure that the puff being inhaled contains the intended dose of medication (Togger and Brenner,2001)11.In addition, MDI should be primed if it has not been used for 24-48 hours with chloroflurocarbon or 4-7 days with hudrofluroalkane(Fink and Rubin, 2005).[12]

Shaking the MDI is required to assure homogenous mixing of the various ingredients in the canister. Unless prescribed in the instruction, inhaler needs to be shaken for 5 seconds (Ali,2014)[8]. It is an essential step. This study found MDI was shaken vigorously by 44% of nurses which is consitent with the finiding in Oman among healthcare providers (41%) (Badar, 2001).[13]

Each step is designed in a way that optimum bioavailability would be achieved from administration of the drug. If a patient misses one of the essential steps or the steps needed for adequate therapy, it ends up with compromise in therapeutic success. Begining to breath slowly and deeply during actuation is the most essential step and also the most difficult step of MDI use. However this study identified only 6% of respondents performed the step correctly where as a study in Manipal hospital, Nepal showed 21.21% of nurses actuate during inspiration but none of them start to breath in slowley and deeply in preintervention assessment.[7] While a study in Ethiopia among the dispensers reported that 65.1% of participants skipped this essential step (D Ali, 2014).[8] Similarly a study conducted in Nigeria found that most common error made by subjects before interventon was the inability to coordinate breathing with time of pressing the inhaler canister (Desalu, et al., 2013).[9] Actuation one second prior to inhalation reduces inhaled mass by 90% and actuation late in the inspiratory cycle may fill the anatomical space with aerosol,which is then exhaled before it can enter the targeted airways (Fink and Rubin,2005).[12] Another frequently missed step in the study was holding breath for 10 seconds after inhalation, which allows the medication to reach target sites in the lung tissue(Togger and Brenner, 2001).[11] It was performed only by the 8% of nurses which was lower than findings of Kishore et al, (2008) that is 15.15% in preintervention assessment. However mostly performed essentials steps in this study were removal of cap (100%) and placing the mouthpiece between teeth & properly sealed with lips (94%). This percentage was higher than the study findings of Nigeria among post basic nursing students that is 55% and 57.5 % respectively in pre-interventional assessment.[9] Furthermore this study showed mean competency score of nurses was 3.72 which was consistent with the study in Nepal (Manipal Hospital), that is 3.99. However another study conducted in Ethopia, among pharmacists and druggists was found to be 4.34 and 4.28 by evaluater I and II respectively.[8]

CONCLUSION

For the nurses to teach and demonstrate the patients how to use MDI correctly, they themselves must have good knowledge and technical skill about its use. However, this study identified nurses' had poor competency in the correct use of MDI. Periodical education program regarding MDI use for healthcare professional would be beneficial.

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