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CLINICAL RESEARCH DEPARTMENT

The Clinical Research Department (CRD) oversees all research projects at the Lung Center of the Philippines (LCP). It receives, evaluates and coordinates all research activities. It establishes policies and guidelines for the development, writing, presentation and approval of research proposals. Thru its Technical Review Board (TRB), it provides guidance and technical expertise on protocol development, including sample size calculation and statistical analysis plan. It spearheads institutional researches and coordinates with other national and international agencies for clinical trials, student undergraduate and graduate research, and collaborative research. It runs the TB Research Team at the LCP's National Center for Pulmonary Research (NCPR) as well as spearheads the Lung Cancer Registry to gather and collate the comprehensive local data on pulmonary tuberculosis and lung cancer, respectively. It maintains the Clinical Research Facility (CRF), an establishment that provides room, space and storage facilities for clinical trials and research.

The CRD publishes the Scientific Proceedings, the official journal of the LCP, to share local relevant educational material in the field of pulmonary medicine. The Scientific Proceedings Journal publishes original clinical investigations, epidemiological studies, case reports, review articles, evaluation of diagnostic and surgical techniques, and latest updates on management guidelines.

In 2019, the CRD started to align with the vision and strategic direction of the LCP on research. The current challenges involve providing resources to support priority programs and projects with other departments to undertake institutional research on advanced procedures to support new clinical pathways, programs and policies and contribute to impact healthy lungs and healthy environment.

The department likewise is aligned with the National Unified Health Research Agenda 2021–2025 on [1] responsive health system [2] research to enhance and extend healthy lives [3] holistic approaches to health and wellness [4] health resiliency [5] global competitiveness and innovation in health and [6] research in equity and health.

In order to achieve these proposed strategic directions, the CRD reviews its accomplishment using the perspectives of the Balanced Scorecard in [1] learning and growth [2] internal business processes [3] customer satisfaction and [4] financial perspective. From these perspectives, the CRD hopes to monitor the outcomes of all action plans and to evaluate the implementation of such plans.

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Registration of researches to be conducted at the LCP : processes all applications for Institutional Research, Clinical Trials, Student Undergraduate Research, Graduate Research and Collaborative Research.

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Scientific Proceedings

CONTENTS

Finding Your Inspiration
(amidst an environment of work and requirements)

Jubert P. Benedicto, MD, FPCCP
Editor-in-Chief

We are all busy. Our clinical work and administrative responsibilities do not stop. A lot of times, they are overwhelming and tend to overtake our schedules. Yes, we all wish for more time with family and "me time" seem to be always elusive. So, how can we allot the appropriate time for research? To think of good topics worth pursuing, to actually complete them, do the write ups, present them in scientific gatherings, and publish them...? You are wise if you can answer these dilemmas.

I always ask those questions each time the *Scientific Proceedings* is due to come out. I, too, dread deadlines. I do not like the idea of someone constantly nagging me to submit my work so that an issue will come out on time. I always look at my other tasks and justify to myself that there are just more important things to do. This particular task can wait. Most of the time, that will just be wishful thinking.

A lot of interventions are already being implemented in some hospitals to address the above relevant issue. Primarily, it is recommended and being pushed to assure trainees of a "free time" for them to be able to concentrate on research outputs. The main idea is for such periods to be deliberately interwoven into their training program. This time will be solely utilized for research activities- crafting ideas and turning them into actual protocols, data gathering and analysis, meetings with research advisers, and related matters. This was conceived to be injected at strategic points into the program. Good idea. However, the realities will not always be encouraging. I am aware that these periods are not maximized as far as the trainees' research progress is concerned. It is being used more for breaks and "vacation time." It is used more to catch up on other training related matters like reading up on clinical topics and administrative works. Honestly, I am uncertain if this idea was actually achieving its main intention in the first place. However, I also know that some trainees are utilizing this to have some research work done. *Nagagamit din naman sa tamang paraan*. So, maybe we need more time and monitoring to assess if this idea is worth maintaining or even further developing.

One may be inspired if they have research mentors to guide them through the entire process. I laud the Clinical Research Department in introducing this innovation. Identifying potential role models for trainees will certainly be a huge factor as they navigate the research track. Having persons who have "been there, done that" will be a tremendous boost to hopefully encourage them that what they are embarking on can actually be done until publication. That all their efforts and energy will be worth it and the outcome will truly be a source of pride and unique achievement. Mentors will have a significant impact on the lives of these budding researchers. They may uncover some hidden talent or passion for research in the trainee. Their "research bone or DNA" may be awaken. Hmmmmm... why not? Majority of the established investigators I know started out this way. They needed some spark that may ignite their research alter ego. I am extremely interested to pursue and support this idea. It is worth the investment.

For me, inspiration for seeing your research through can be found in the things which are already in front of us:

- Seeing others actually finish their research, including witnessing their presentation, and reading their published work. *Kung kaya nang iba, kaya ko rin dapat*.
- Encountering a clinical scenario then you begin to ask a lot of questions. All the "why's" and "how's." An inquisitive mind may be the start of something phenomenal.
- Attending a scientific conference and witnessing firsthand from the presenter matters that you actually thought of... but actually, failed to pursue. *Di ba, sayang...? Nakapanghihinayang*.
- Look at the research awards displayed in your institution. The ones posted on the walls. The trophies and plaques in the display cabinets. Behind those items are the hard grind and persistence of those winners. I always find those things inspiring. What is doubly inspiring is the story behind those awards.
- Look at the other people that are traversing similar pathways. You are being looked at as a possible "idol" in research. Be inspired to deliver because you also owe it to them. Unknowingly, you are being seen as a role model.

Inspirations abound. One just has to be ready and observant. We can even create our own motivation for churning out a relevant work. You can always revisit that inner passion why you began doing research and hopefully was seeing it beyond just being a "requirement."

Be inspired. Deliver more than what is expected from you. We need your research.

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ORIGINAL ARTICLE

EFFICACY AND SAFETY OF BUTAMIRATE CITRATE AS PRE-MEDICATION TO ALLEVIATE POST-BRONCHOSCOPY COUGH: A DOUBLE-BLIND RANDOMIZED PLACEBO-CONTROLLED TRIAL

Paul Justin S. Dizon, MD, DPBA, Ma. Stephanie G. Balaoing, MD, DPBA, Lizbeth G. Jacaban, MD, DPBA
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ABSTRACT

Background. Post-bronchoscopy cough is a common complication after fiberoptic bronchoscopy procedure despite the use of several medications and technique to suppress it.

Objective. This study aimed to evaluate the efficacy and safety of butamirate citrate, a centrally acting antitussive, in alleviating post-bronchoscopy cough.

Methodology. Patients scheduled for fiberoptic bronchoscopy under total intravenous anesthesia with controlled ventilation using laryngeal mask airway were randomized to receive butamirate citrate 2 hours prior to the procedure or a similar looking placebo tablet. Severity of cough was evaluated by the outcome assessor using a modified cough severity score at the 1st, 6th and 12th hour post-bronchoscopy and the patient's discomfort using visual analogue score (VAS) which was determined by the participants. The heart rate, blood pressure, and oxygen saturation were also assessed including the adverse events of medications.

Results. A total of eighty-four (84) patients scheduled for fiberoptic bronchoscopy under total intravenous anesthesia with controlled ventilation using laryngeal mask airway were randomly allocated in a double-blind, parallel-group trial. Forty-two (42) patients received butamirate citrate 2 hours prior to the procedure and the other thirty-four (34) patients received a similar looking placebo tablet. Eight (8) participants were withdrawn from the study. Based on the intention-to-treat analysis, median cough severity score was significantly lower in the butamirate group at the 1st (p= 0.0291) and 12th hour (p=0.0366) post- bronchoscopy. Higher proportion of patients in butamirate citrate group had no cough and it was statistically significant at the 12th hour (p=0.032). Patient's discomfort based on VAS, median change in systolic blood pressure and mean change heart rate were not significantly different from the two groups. Oxygen saturations of all patients were normal. One patient had nausea, and another presented with urticaria in the butamirate group but not significantly different with placebo.

Conclusion. Butamirate citrate is efficacious and safe as a premedication in alleviating post-bronchoscopy cough in patient undergoing FOB under total intravenous anesthesia with controlled ventilation using laryngeal mask airway based on the modified cough severity score, but it does not affect patient's discomfort, heart rate and blood pressure.

Keywords: butamirate citrate, post-bronchoscopy cough, fiberoptic bronchoscopy

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INTRODUCTION

Flexible fiberoptic bronchoscopy (FOB) is both a diagnostic and therapeutic procedure that is commonly performed to identify and treat abnormalities in the airways such as malignancy, infection, or inflammation.[1] Although considered to be safe, it is not without complications and discomfort.[2,3] Post-bronchoscopy cough was studied in two papers with an incidence of 10.8% and 55.7%.[3,4] In the study by Dang et al. post-procedural cough may present within 4 hours and up to 48 hours post procedure.[3]

There were limited studies that focus on post-procedural cough. One study investigated premedication with dextromethorphan, a centrally acting antitussive, and showed to suppress cough after FOB. This is not readily available in our institution and is a derivative of codeine.[5]

Of note, there is no standard treatment that is currently used for post-bronchoscopy cough.

A commonly used cough suppressant that is safe and readily available is butamirate citrate. It directly acts on the cough receptors in the brainstem and not related to opioids. It is readily absorbed with a peak plasma concentration within 1 hour and with a long duration of action of up to 12 hours. The adverse reactions that are considered to be rare are drowsiness, nausea, diarrhea, and urticaria.[6–9]

The purpose of this randomized, double-blind, placebo-controlled study is to determine if butamirate citrate premedication efficacious and safe in relieving post-bronchoscopy cough in patients undergoing FOB in an established conventional anesthesia technique in our institution. If proven effective and safe, butamirate citrate may be part of the medications to be given preoperatively. This study followed the Consort 2025 guidelines for reporting randomized clinical trials.

METHODOLOGY

The study was a randomized, double-blind, parallel-group trial. Study site was Lung Center of the Philippines, a Department of Health designated national specialty center for the diagnosis and management of lung and chest diseases. Bronchoscopic procedures, being facilitated by pulmonologists and thoracic surgeons, are done under general anesthesia by the thoracic anesthesiologists. Study duration was 5 months (May 2024 to September 2024).

Adult patients > 19 years-old who were scheduled for fiberoptic bronchoscopy under total intravenous anesthesia with controlled ventilation using laryngeal mask airway were recruited and properly screened by the Principal Investigator. Patients who have 1)known allergy to butamirate citrate; 2) pregnant and breastfeeding mother; 3) known case of liver cirrhosis and renal failure 4) concurrent expectorant medications 6) more invasive procedures such as cryoablation therapy, intralesional cisplatin injection, and rigid bronchoscopy 7) high aspiration risk 8) small mouth opening and patients with oropharyngeal abnormalities which could make the insertion of the LMA difficult were excluded from the study. Withdrawal criteria were as follows: 1) Patient refused to continue participation, 2) Cancelled FOB procedure, 2) sudden hemodynamic instability or other inciting event during the procedure (eg. myocardial infarction, stroke, aspiration, bleeding), 4) conversion to rigid bronchoscopy 5) conversion from laryngeal mask airway to endotracheal tube.

PASS 2021 software was used to calculate the minimum sample size required. Specifying a minimum clinically significant difference of 3 in cough severity and alpha set at 0.05, a minimum of 66 patients—33 per group—are needed to achieve 90% statistical power. Sample size was increased to 84—42 per group—to account for 20% potential dropout.

Those who fulfilled all the inclusion criteria and none of the exclusion criteria and has voluntarily signed in the informed consent were considered eligible. After assignment of a specific patient code, an independent researcher not involved in any other study procedure generated an allocation schedule which contains a list of patient numbers randomly assigned in a 1:1 ratio into two treatment groups: butamirate citrate and placebo. The independent researcher prepared opaque envelopes containing the either butamirate citrate tablet or placebo which were labelled with numbers. The treatment allocation was concealed from all patients, personnel who will perform the procedure, and outcome assessors.

Patients assigned to treatment group received Butamirate citrate sustained-release tablet 50mg tablet (Sinecod Forte, Novartis Saglik, Gida Ve Tarim Urunleri San. Tic. A.S. distributed by GSK Philippines). Patients assigned to placebo group received a similar looking tablet produced by Herbanext Laboratories, Inc, Negros Occidental in a cGMP manufacturing facility. The medications were given 2 hours prior to the procedure with minimal sips of water.

Once the patient arrived at the bronchoscopy unit, standard monitors were attached. Patients were induced with placement of laryngeal mask airway (LMA) ProtectorTM. Patients were maintained with total intravenous anesthesia using propofol. After the procedure, the LMA was removed, and nasal cannula or face mask was used for oxygen support. Patients were then transferred to the PACU.

Primary outcomes were (1) the severity of cough, assessed by the outcome assessors who were the anesthesia fellow-in-charge and/or the nurse-in-charge using the modified cough severity score which was derived from the simplified cough score (SCS) developed by the Respiratory Branch of Chinese Medical Association as a tool for evaluating the severity of cough (Figure 1), and (2) patient's discomfort which was self-evaluated by the patient using the VAS score (Figure 2).[10] Secondary outcomes were the heart rate, systolic blood pressure, oxygen saturation, and adverse

events of medications. The patients were assessed at the 1st, 6th and 12th hour post-procedure.

Data were encoded in MS Excel by the researcher. Stata MP version 17 software was used for data processing and analysis. Continuous variables were presented as mean (standard deviation/SD) and median (interquartile range/IQR) depending on the data distribution. Mann Whitney U test was used to compare the modified cough severity score and change in systolic blood pressure between the two groups, while independent t test was used to compare the change in heart rate. Change in systolic blood pressure and heart rate was also categorized (no change/increased/decreased), and comparison between the two groups was done using Fisher's Exact test. Fisher's Exact test was also used to compare patient's discomfort based of VAS score, proportion of patients presenting with no cough and desaturation, and adverse effects. Multiple linear regression analysis was also performed for the primary outcome (i.e., cough severity) to control for the effect of the significant confounder (i.e., bronchoscopy procedure). All randomized patients were included in the intention-to-treat analysis, and mode imputation was performed for modified cough severity score and patient's discomfort based on VAS score. P values ≤0.05 were considered statistically significant.

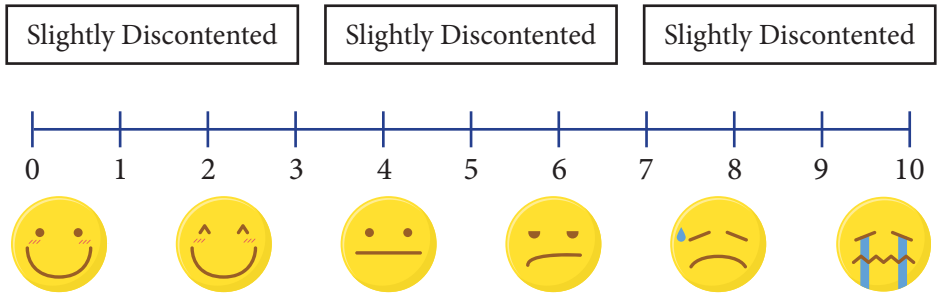

Figure 1. *Modified Cough Severity Score used to assess cough severity*

Modified Cough Severity Score	
0	No cough
1	Occasional cough for short periods
2	Frequent cough which interferes with recovery
3	Distressing coughs, which seriously affects recovery

Figure 2. *Visual Analog Scale used to assess patient's discomfort*

ETHICAL CONSIDERATIONS

This study was approved for implementation by the Lung Center of the Philippines Institutional Ethics Review Board (LCP IERB Code: LCP-AF-002-2024). Informed consent was taken to affirm voluntary participation before enrolment of participants. Patients were also reminded that they may refuse to participate or continue participation without any negative consequence to the care they will receive from LCP.

RESULTS

There are 107 patients scheduled for bronchoscopy under under total intravenous anesthesia with controlled ventilation using laryngeal mask airway from May 2024 to September 2024. Twenty-three were excluded due to not meeting inclusion criteria (n = 8), declined to participate (n = 3), BMI > 35 (n=4), renal failure (n=2), Cisplatin injection (n=4) and for rigid bronchoscopy (n=2).

A total of 84 patients were enrolled in the study—44 in the butamirate citrate group and 40 in the placebo group. Eight patients were withdrawn—2 from butamirate and 6 from placebo group. Two from placebo group refused to continue participation and the remaining six patients were converted to endotracheal tube.

The median age of all patients was 58.5 [IQR: 44.5-65; Range: 22-70 years]. Fifty two percent were 19 to 59 years old and 57% were males. Most patients presented with chronic cough both in butamirate citrate group (89%) and placebo group (92%). The examination time is usually longer for both groups which is equal to more than 60 minutes.

No significant difference was observed between the two groups except bronchoscopy procedure as shown in Table 1. More patients in the placebo group underwent cryobiopsy (33%) in the placebo group as compared to the butamirate group (11%). It is also noted that no patients assigned to

placebo underwent bronchial washing and 4 (9%) in the butamirate group.

INTENTION–TO–TREAT (ITT) ANALYSIS

The median cough severity score was significantly lower in the butamirate group at the 1st (p=0.0291) and 12th hour (p=0.0366) post bronchoscopy. Higher proportion of patients in butamirate citrate group had no cough and it is statistically significant at the 12th hour (p=0.032).

When controlled for the confounding effect of bronchoscopy procedure, the results were not statistically significant at 1st (p=0.17, p=0.380), 6th (p=0.10, p=0.569), and 12th (p=0.09, p=0.510) hour.

Patient discomfort based on VAS did not significantly differ between the two groups at 1st, 6th and 12th hour Median change in SBP was not significantly different between the two groups at 1st, 6th and 12th hour even when categorized. Mean change in HR was not significantly different between the two groups at 1st, 6th and 12th hour even when categorized. All patients in both groups had normal O2 saturation at 1st, 6th and 12th hour, thus, no comparison was done.

For the adverse effects, per-protocol analysis was used. A total of 76 participants were included, excluding 8 patients withdrawn from the study due to conversion to endotracheal tube and refusal to continue participation. There was no significant difference between the two groups in any of the adverse effects as shown in Table 3.

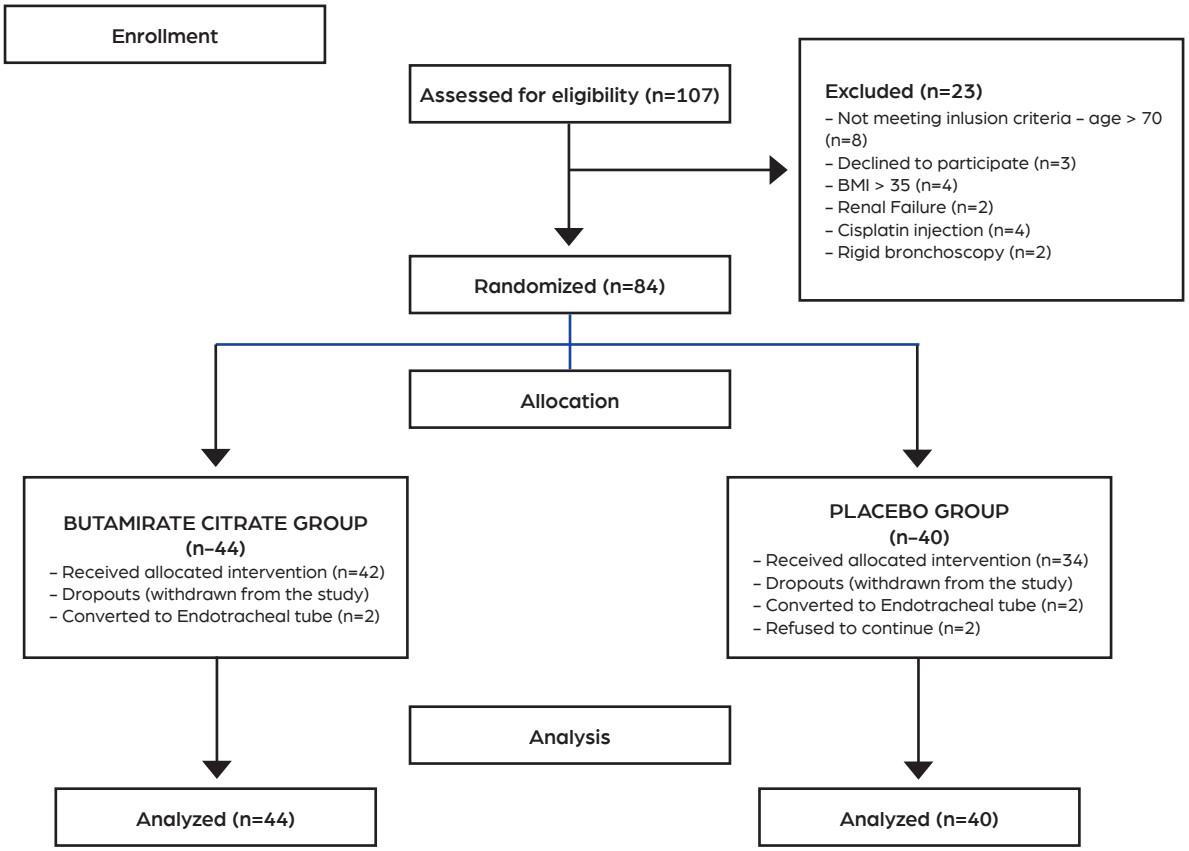

Figure 3. *CONSORT Study flow diagram*

Table 1. *Baseline characteristics of patients: butamirate citrate vs. placebo (n=84)*

	BUTAMIRATE CITRATE (n=44) n (%) Median [IQR]	PLACEBO (n=40) n (%) Median [IQR]	P VALUE
Age (in years), median	60 [IQR: 51, 67]	56 [IQR: 42.5, 64.5]	0.1176[a]
19–59 years old	21 (48)	23 (58)	0.370[b]
60–70 years old	23 (52)	17 (42)	
Sex			
Female	17 (39)	19 (47)	0.412[b]
Male	27 (61)	21 (53)	
Chronic cough			
No	5 (11)	3 (8)	0.715[c]
Yes	39 (89)	37 (92)	
Examination time			
Short procedure	10 (23)	3 (8)	0.054[b]
Long procedure	34 (77)	37 (92)	
Bronchoscopy procedure			
Endobronchial forceps biopsy	10 (23)	3 (8)	0.009*[c]
Bronchial washing	4 (9)	0	
EBUS with TBNA	18 (41)	22 (55)	
Cryobiopsy	5 (11)	13 (33)	
BAL	4 (9)	1 (2)	
Radial EBUS	3 (7)	1 (2)	

[a]Mann Whitney U test; [b]Chi square test; [c]Fisher's Exact test
**Statistically significant based on P value =<0.05*

Table 2. *Efficacy measures: butamirate citrate vs. placebo (n=84)*

	BUTAMIRATE CITRATE (n=44) n (%) Mean ± SD Median [IQR]	PLACEBO (n=40) n (%) Mean ± SD Median [IQR]	P VALUE
Severity of cough based on modified cough severity score, median			
1st hour	1 [IQR 1, 2]	2 [IQR: 1, 2]	0.0291*a
6th hour	1 [IQR: 0, 2]	1 [IQR: 1, 2]	0.1549a
12th hour	1 [IQR: 0, 1]	1 [IQR: 1, 1]	0.0366*a
No cough, %yes			
1st hour	10 (23)	3 (8)	0.054b
6th hour	12 (27)	5 (13)	0.092b
12th hour	17 (39)	7 (18)	0.032*b
Patient discomfort based on VAS at 1st hour	13 (30)	10 (25)	0.641b
Patient discomfort based on VAS at 6th hour	5 (11)	7 (18)	0.422b
Patient discomfort based on VAS at 12th hour	5 (11)	5 (12)	1.000c

	BUTAMIRATE CITRATE (n=44) n (%) Mean ± SD Median [IQR]	PLACEBO (n=40) n (%) Mean ± SD Median [IQR]	P VALUE
Change in SBP, median			
1st hour	3 [IQR: –5, 13]	0 [IQR: –5, 15]	0.8566[a]
No change	1 (2)	0	0.271[c]
Decreased	16 (36)	20 (50)	
Increased	27 (61)	20 (50)	
6th hour	–1.5 [IQR: –9.5, 5]	–2.5 [IQR: –10, 1.5]	0.3826[a]
No change	2 (4)	2 (5)	0.657[c]
Decreased	24 (55)	26 (65)	
Increased	18 (41)	12 (30)	
12th hour	–5 [IQR: –10, 2.5]	–7.5 [IQR: –13, –1.5]	0.1566[a]
No change	1 (2)	2 (5)	0.162[c]
Decreased	29 (66)	32 (80)	
Increased	14 (32)	6 (15)	
Change in HR, mean			
1st hour	3.1 ± 9.5	4.9 ± 11.4	0.4439[d]
Decreased	16 (36)	13 (32)	0.710[b]
Increased	28 (64)	27 (68)	
6th hour	1.0 ± 8.5	1.1 ± 10.9	0.9634[d]
No change	1 (2)	2 (5)	0.801[c]
Decreased	21 (48)	17 (43)	
Increased	22 (50)	21 (52)	
12th hour	–0.2 ± 8.5	–2.7 ± 9.0	0.1922[d]
No change	2 (4)	1 (3)	1.000[c]
Decreased	25 (57)	24 (60)	
Increased	17 (39)	15 (37)	
Oxygen saturation at 1st hour			
Normal saturation	44 (100)	40 (100)	
Desaturation	0	0	
Oxygen saturation at 6th hour			
Normal saturation	44 (100)	40 (100)	
Desaturation	0	0	
Oxygen saturation at 12th hour			
Normal saturation	44 (100)	40 (100)	
Desaturation	0	0	

[a]Mann Whitney U test; [b]Chi square test; [c]Fisher's Exact test; [d]Independent t test
**Statistically significant based on P value =<0.05*

Table 3. *Adverse effects: butamirate citrate vs. placebo (n=76)**

	BUTAMIRATE CITRATE (n=42) n (%)	PLACEBO (n=34) n (%)	P VALUE
Nausea	1 (2)	3 (9)	0.319[a]
Drowsiness	0	0	-
Diarrhea	0	0	-
Urticaria	1 (2)	0	1.000[a]

[a]*Fisher's Exact test*
** A total of 76 patients was included in the per-protocol analysis, excluding 8 participants who were withdrawn from the study due to conversion to endotracheal tube and refusal to continue participation.*

DISCUSSION

This study showed that patients given Butamirate citrate pre-bronchoscopy reported significantly lower cough severity on the 1st and 12th hour post-procedure and significantly higher percentage reporting without cough 12hrs post-procedure. There is no significant difference in the systolic blood pressure, heart rate, and occurrence of adverse events between the two groups.

Post-bronchoscopy cough is still a common complication of FOB with an incidence of 10.8% to 55.7% and this could present within 4 hours and up to 48 hours post procedure.[2-4] There are already several studies that address cough during bronchoscopy but few studies that focuses on post-bronchoscopy cough.[4] In our practice, we utilize general anesthesia with the use of propofol, midazolam, opioids, muscle relaxants and instillation of lidocaine endobronchial to inhibit the cough reflex during the procedure. General anesthesia provided a peaceful procedure for the bronchoscopists, less anxiety to the patient, inhibition of cough and less desaturations with similar experience to the study of Rafaat et al. which compared general anesthesia versus local anesthesia with conscious sedation.[11] However, this does not address the postprocedural cough that the patient might experience after FOB.

In a study by Scwarz et al., they investigated the benefits of dextromethorphan, a centrally acting antitussive, and found out that it significantly reduces cough within 6 hours and up to the next morning after the procedure.[5] This is not, however, available in our locality. A similar centrally acting antitussive that is safe, affordable, and readily available with a long elimination half-life of 13 hours is butamirate citrate. It is structurally not related to opioids and non-sedating. It also exerts non-specific anticholinergic and bronchodilator effects.[6-9] We believe this is the first study to determine if it is safe and efficacious in alleviating pos-bronchoscopy cough based on the cough severity score, patient's discomfort, monitor measurements and adverse effects.

We used the modified cough severity score, derived from the simplified cough score (SCS) developed by the Respiratory Branch of Chinese Medical Association as a tool for evaluating the severity of cough, to assess the impact of cough during recovery of the patient at the 1st, 6th and 12th hour post-procedure as based on the duration of butamirate citrate and this was evaluated by the outcome assessor.[10] The modified cough severity score consists of 4 points where 0=no cough, 1=occasional cough for short periods, 2=frequent cough which interferes with recovery and 3=distressing cough, which seriously affects recovery. The result showed that the severity of cough is significantly lower in butamirate citrate group as compared to the placebo group at the 1st hour (p=0.0291)and 12th (p=0.0366) hour post procedure. Median cough severity is 1 (IQR 1,2) for butamirate citrate group and 2 (IQR 1,2) for placebo at the 1st hour while the median score of butamirate group is 1 (IQR 0,1) compared to placebo 1 (IQR 1,1) at the 12th hour. Patients in the butamirate group had a higher proportion with modified cough severity score of 0 compared to the placebo group and this is statistically significant at the 12th hour.

Patient's discomfort was also assessed using the 11-point Visual Analogue Scale (VAS) where zero indicates satisfied and 10 denotes very discontented.[10] This is further categorized to satisfied for VAS 0-3, slightly discontented for VAS 4-7 and very discontented for VAS 8-10. Based on the results, patients from both butamirate and placebo group were satisfied and there is no significant difference between the two groups. As mentioned, post-bronchoscopy cough is just one of the possible complications. Other complications of bronchoscopy include sore throat, dysphagia, desaturations, bronchospasm, and malaise as enumerated by Leitin et al. and Ni YL et al. in their studies.[2,4] In our institution the anesthetic techniques we use during FOB is total intravenous anesthesia utilizing laryngeal mask airway as our airway device. This provided a peaceful procedure for both the bronchoscopist and patients. Additional medications such as paracetamol and benzydamine hydrochloride throat sprays were also given to reduce throat pain and dysphagia. This could explain that patients who underwent FOB in our institution were generally satisfied with their procedure.

Coughing may stimulate the autonomic nervous system causing an increase in both the heart rate and blood pressure of the patients.[13] Thus, the changes in the heart rate and blood pressures were analyzed between the two groups. The result showed that the heart rate and blood pressure did not differ significantly. This is also similar to the study of Schwarz, et al. which showed there were no significant changes in the heart rate, blood pressure

and even oxygen saturation in patients who received dextromethorphan and placebo.[5] This could possibly be the effect of anesthesia and other medications given to the patient such as paracetamol and benzydamine throat spray that could alleviate discomfort after the procedure.

With regards to the adverse effects, there was no significant difference between the butamirate and placebo group. Based on the study of Learski et al. the incidence of the possible side effects is 0.5 to 1%.6 In our study, only 1 patient presented with nausea (2%) and another with urticaria (2%) in the butamirate group while 3 patients (9%) in the placebo group had nausea. These patients did not require any interventions, and these adverse effects could also be attributed to the side effects of anesthesia.

CONCLUSION

Butamirate citrate is efficacious and safe as a premedication in alleviating post-bronchoscopy cough in patient undergoing FOB under total intravenous anesthesia with controlled ventilation using laryngeal mask airway based on the modified cough severity score, but it does not affect patient's discomfort, heart rate and blood pressure.

LIMITATIONS OF THE STUDY

The study determined only the alleviation of cough up to 12 hours post-bronchoscopy mainly based on the duration of butamirate citrate. Other complications of FOB such as sore throat, bleeding, and pneumothorax were not included in the study. The anesthesia used was the conventional technique in our hospital and this may be different from other institutions.

There is a significant difference in the bronchoscopy procedures, thus, multiple linear regression analysis was performed for the primary outcome to control for the effect of the significant confounder. It was noted that the results were not statistically significant at the 1st (p=0.17, p=0.380), 6th (p=0.10, p=0.569), and 12th (p=0.09, p=0.510) hour.

RECOMMENDATIONS

We recommend the use of butamirate citrate as pre-anesthetic medications of patients scheduled for FOB if not contraindicated such as allergies, concomitant expectorant use, liver, and renal failure. The use of butamirate may be continued up to 48 hours considering post-bronchoscopy cough persist up to 2 days.

For future studies, larger sample sizes are needed to improve statistical power to determine if there is really a non-significant association between bronchoscopy procedures and post-bronchoscopy cough.

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CONFLICT OF INTEREST

The investigators have no conflict of interest to declare.

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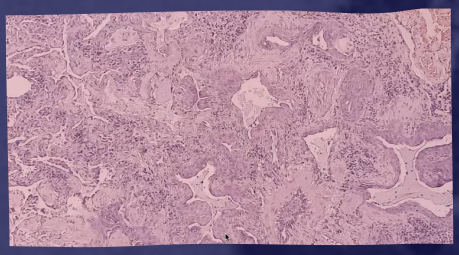

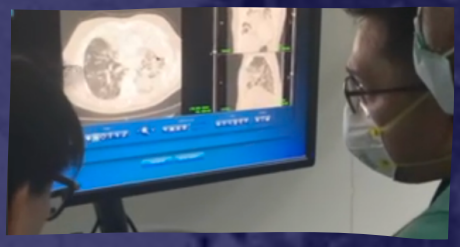

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ORIGINAL ARTICLE

FACTORS ASSOCIATED WITH INTUBATION IN PATIENTS WITH CENTRAL AIRWAY OBSTRUCTION CAUSED BY TUMORS: A SINGLE–CENTER, RETROSPECTIVE COHORT STUDY

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ABSTRACT

Background. This single–center retrospective cohort study aimed to identify factors associated with intubation among patients with central airway obstruction (CAO) caused by tumors in the Lung Center of the Philippines.

Objectives. The primary aim is to identify the key variables contributing to the need for intubation in this patient population, thereby enhancing clinical understanding and potentially improving airway management strategies for individuals with CAO caused by tumors.

Methodology. Data from patients admitted to the Lung Center of the Philippines from 2015 to 2023 and with a diagnosis of neck, lung, or intrathoracic tumors causing CAO were retrospectively analyzed. Potential factors including age, sex, type, degree, location, degree, and type of obstruction, tissue diagnosis, and treatment received were assessed.

Results. Of 178 CAO patients, 37.08% required intubation during their hospital stay. Delayed intubation (88%) and an armored endotracheal tube (53%) were utilized in intubating these patients. Labored breathing (74%) and desaturation (73%) were prevalent symptoms. Univariable analysis revealed that the type of obstruction was significantly associated with intubation, with extraluminal obstruction and mixed obstruction, showing increased odds (OR 2.07 and OR 7.02, respectively) compared to endoluminal obstruction.

Conclusion. This study revealed labored breathing and desaturation as the most common symptoms in intubated CAO subjects. Univariable analysis showed that the type of obstruction was significantly associated with the need for intubation. Compared to those with endoluminal obstruction, patients with extraluminal obstruction had two times higher odds of intubation. In contrast, those with mixed obstruction had seven times higher odds. Multivariable analysis showed that the type of obstruction was the only statistically significant variable associated with the need for intubation.

Keywords: central airway obstruction, intubation, tumors, retrospective study, predictors

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INTRODUCTION

Central airway obstruction (CAO) is a severe condition that can occur due to compression of the airways, such as the trachea, mainstem bronchi, bronchus intermedius, or lobar bronchi. It may be caused by malignant or benign conditions, including lung cancer which is the most identified cause. CAO can lead to decreased airflow, compromised oxygenation, and significant health problems, and may affect both children and adults.[1,2] Prompt and effective management of CAO is critical for optimizing patient outcomes and preventing potentially life-threatening consequences. One crucial part of CAO management is assessing the necessity for intubation which is essential in airway management and stabilization.[3,4] Identifying predictors that can assist physicians in anticipating the need for intubation in CAO patients is critical for timely interventions and improved patient outcomes.[5]

More research is needed on the factors influencing the decision to intubate patients with CAO, mainly when the obstruction is caused by tumor growth. More specifically, more studies are needed on emergency intubation in CAO patients when other means of airway management such as mechanical debulking or laser therapy via rigid bronchoscopy; balloon dilation, cryotherapy, or tumor ablation via flexible bronchoscopy; and airway stent placement are not immediately available, and intubation becomes the only way to secure the airway.

Prior studies such as those from the AQuIRE (American College of Chest Physicians Quality Improvement Registry, Evaluation, and Education) registry have demonstrated increased complication and mortality rates in urgent or emergent bronchoscopic procedures for malignant CAO. However, they do not explicitly examine the clinical or anatomical factors that lead to emergency intubation.[3,4] Moreover, while therapeutic bronchoscopy has shown benefit in symptom relief and functional improvement, the existing literature largely focuses on post-procedural outcomes rather than the decision-making process preceding airway management. Current guidelines endorse multidisciplinary, multimodal approaches but acknowledge a low certainty of evidence for many recommendations. To date, no study has systematically explored which patient-specific or tumor-related characteristics are associated with the need for intubation in patients presenting with malignant CAO. Addressing this gap is critical to inform early triage, optimize outcomes, and guide emergency airway management decisions.

At the Lung Center of the Philippines, clinicians often face situations where CAO patients require emergency intubation due to the lack of immediate access to alternative airway management interventions. In these critical scenarios, deciding to intubate is crucial to ensure patient safety and prevent adverse outcomes related to airway compromise. However, the absence of established protocols or guidelines tailored to these specific circumstances leads to clinical uncertainty and variability in practice.

Addressing this research gap is essential for improving the standard of care for CAO patients, especially in emergencies where intubation is the only way to secure the airway. By identifying the factors associated with the need for emergency intubation in such cases, clinicians can develop more effective risk assessment strategies and standardized protocols for prompt and appropriate airway management.[5] Thus, this research undertook a single-center, retrospective cohort study that determined the factors associated with the need for intubation in patients with critical airway obstruction (CAO), focusing on tumors as the cause of CAO in patients admitted at the Lung Center of the Philippines.

METHODOLOGY

Study Design

The study had a retrospective cohort design that included CAO patients admitted to the Lung Center of the Philippines between January 2015 and November 30, 2023.

Study Setting

This study was conducted at the Lung Center of the Philippines from December 15, 2023, to February 15, 2024. The authors accessed the patient's data through the Data Management and Analysis System (DMAS) website using the hospital's computer.

Inclusion and exclusion criteria

This study included patients of all ages, both pay and service patients, who had been diagnosed with airway thoracic tumors causing central airway obstruction (CAO) by a pulmonologist or thoracic and cardiovascular surgeon (TCVS). CAO was diagnosed based on CT scan imaging or bronchoscopic findings from January 2015 to November 30, 2023. Airway obstruction at or above the level of the main bronchi resulting from tumors were taken into consideration. Patients were excluded if their medical records were unavailable or incomplete.

Sample Size and Sampling Methodology

PASS 2021 software for multiple regression was used to calculate the minimum sample size requirement. Using multiple logistic regression analysis, a minimum of 174 patients achieves 90% statistical power, with at most 15 factors assuming a medium effect size (Cohen's f2=0.15) and alpha set at 0.05.

Study Procedure

The study began by submitting a protocol to the Technical Review Board of the Lung Center of the Philippines for

approval. Permission was obtained from the Institutional Ethics Review Board of the Lung Center of the Philippines to conduct the study.

Data collection started after obtaining Ethics approval and continued until the required number of subjects was attained. Patient charts were the primary data source, and information such as age, sex, and diagnostic details were recorded in a data collection form. Imaging results provided additional data on obstruction type, degree, and location.

The study enrolled patients admitted to pulmonary, thoracic, and cardiovascular surgery services between January 2015 and November 30, 2023, with diagnoses of neck, lung, or intrathoracic tumors causing central airway obstruction (CAO). The primary data sources were comprehensive medical records in the Data Management and Analysis System (DMAS). We identified eligible patients involved using specific keywords in clinical notes and criteria consistent with the study's inclusion criteria.

Patients diagnosed with neck, lung, or intrathoracic tumors, focusing on those with CAO, were identified. Parameters such as the type, location, and degree of obstruction were recorded, with the degree categorized based on CT scan results or bronchoscopic findings.

Study Procedures

This study enrolled patients admitted to the pulmonary, thoracic, or cardiovascular surgery services between January 2015 and November 30, 2023, who were diagnosed with central airway obstruction (CAO) secondary to neck, lung, or intrathoracic tumors. Eligible patients were identified through a retrospective review of comprehensive electronic medical records in the Data Management and Analysis System (DMAS), using keyword searches and criteria aligned with the study's inclusion parameters.

CAO was diagnosed based on clinical assessments supported by CT scan findings and/or bronchoscopic evidence of obstruction at the level of the trachea or main bronchi. Patients were included if CT scan or bronchoscopic findings indicated central airway obstruction, as documented in clinical records. There must be evidence of at least 50% luminal narrowing of the trachea or main bronchi, as interpreted by radiologic or bronchoscopic assessment, and confirmed by the attending physician's clinical judgment. Either modality was accepted as diagnostic confirmation, consistent with standard clinical practice.

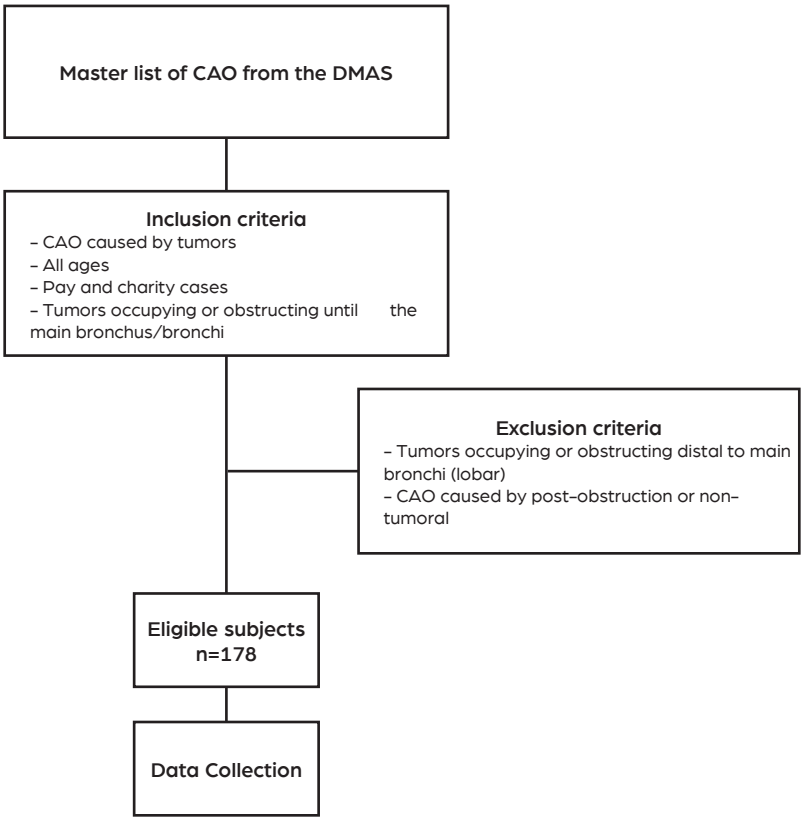

Figure 1. *Selection of study participants.*

Study Outcome

The study outcome was intubation defined as intubation that was requested after CAO diagnosis by the attending physician, with or without referral to the anesthesiology department, based on medical charts.

The "need" for intubation is based solely on information available within the medical records at the time of CAO diagnosis, such as clinical symptoms, imaging reports, respiratory distress documentation, main service referral, and orders for intubation.

DATA MANAGEMENT AND STATISTICAL ANALYSIS

Data were encoded in MS Excel. Stata MP version 17 software was used for data processing and analysis. Shapiro Wilk's test was used to assess the normality of data. Continuous variables (i.e., age, degree of obstruction) were presented as median (interquartile range/IQR) due to the non-normal data distribution. Categorical variables (i.e., age category, sex, classification, type of obstruction, location of obstruction, tissue diagnosis, and treatment received) were expressed as frequencies and percentages. Comparison of variables between patients who needed and did not need intubation was performed using the Whitney U test for continuous variables and the Chi-Square or Fisher's Exact test for categorical variables.

Logistic regression analysis with Fifth's bias correction was conducted to determine the factors associated with the need for intubation. Simple logistic regression was performed, and variables with $p<0.20$ were included in the model. Model building was done using multiple logistic regression analysis with a backward elimination technique. P values ≤0.05 were considered statistically significant. Missing data were neither replaced nor estimated.

ETHICAL CONSIDERATIONS

This study was approved by the Institutional Ethics Review Board of the Lung Center of the Philippines. Informed consent was waived due to its retrospective design. All data were de-identified, securely stored, and accessed only by authorized personnel. Procedures adhered to the Declaration of Helsinki and applicable ethical standards.

RESULTS

A total of 178 patients met the inclusion criteria. Of these, 66 patients (37.08%; 95% CI: 29.97-44.62%) required intubation. Among intubated patients, 88% (n=58) underwent delayed intubation, while 12% (n=8) underwent preemptive intubation. Armored endotracheal tubes were used in 53% (n=35) of cases. Preemptive intubation was performed based on clinician judgment due to progressive orthopnea, imaging findings, or anticipated airway compromise for procedures under sedation.

Symptoms commonly noted immediately prior to intubation included labored breathing (74.24%), desaturation (72.73%), orthopnea (31.82%), decreased sensorium (27.27%), speaking in phrases or sentences (24.24%), stridor (21.21%), hoarseness (7.58%), and hemoptysis (4.55%). Most symptoms were cited as key reasons for proceeding with intubation. Symptom documentation among non-intubated patients was limited, which restricts direct comparison and represents a limitation.

The demographic and clinical profile of patients with central airway obstruction (CAO) is shown in Table 1, comparing those who required intubation and those who did not. A total of 178 patients met the inclusion criteria. Of these, 66 patients required intubation. The median age of CAO patients was 57 years, ranging from 2 to 92 years, with more than half falling between 18 and 60 years. There was no significant difference in age distribution between the two groups. Additionally, most CAO patients were male, with no significant gender disparity observed between those who required intubation and those who did not. As to the type of obstruction, mixed obstruction was observed in only 6% of cases, but a higher proportion of intubated patients had mixed and extraluminal obstruction in intubated subjects compared to non-intubated patients.

Regarding the degree of obstruction, the median measurement based on CT scans was 1.2 mm, ranging from 0 to 8 mm, with no significant difference observed between intubated and non-intubated groups. Similarly, the median degree of obstruction based on bronchoscopy was 90%, ranging from 0 to 100%, with no significant variation between the two groups.

Bronchial obstruction was the most common location of obstruction among CAO patients, with the proportion of patients with carinal obstruction being significantly different between intubated and non-intubated patients. A higher proportion of intubated patients had carinal obstruction compared to those who did not require intubation.

Table 1. *Demographic, tumor, and treatment profile of participants*

	ALL PATIENTS (n=178)	NEED FOR INTUBATION		P VALUE
		YES (n=66)	NO (n=112)	
Age (in years), median (IQR)	57 [IQR: 37–67]	58 [IQR: 37–68]	56 [IQR: 35–66]	0.5809[a]
<18 (n, %)	6 (3)	2 (3)	4 (4)	1.000[b]
18– 60 (n, %)	100 (56)	37 (56)	63 (56)	
>60 (n, %)	72 (41)	27 (41)	45 (40)	
Sex (n, %)				
Male	123 (69)	48 (73)	75 (67)	0.422[c]
Female	55 (31)	18 (27)	37 (33)	
Type of obstruction (n, %)				
Endoluminal	71 (40)	18 (27)	53 (47)	0.004*[c]
Extraluminal	96 (54)	40 (61)	56 (50)	
Mixed	11 (6)	8 (12)	3 (3)	
Degree of obstruction, median (IQR)				
Based on CT (in mm)	1.2 [IQR: 0–4.2]	2 [IQR: 0–4.6]	1 [IQR: 0–4]	0.4222[a]
Based on bronchoscopy (in %) [n=28]	90 [IQR: 80–96.5]	90 [IQR: 80–95]	90 [IQR: 90–98]	0.2192[a]
Location of obstruction, (n, %)				
Tracheal	1 (1)	0	1 (1)	1.000[b]
Proximal	9 (5)	2 (3)	7 (6)	0.488[b]
Distal	32 (18)	16 (24)	16 (14)	0.095[c]
Middle third	12 (7)	3 (5)	9 (8)	0.539[b]
Carinal	28 (16)	15 (23)	13 (12)	0.049*[c]
Bronchial	144 (81)	56 (85)	88 (79)	0.303[c]
Tissue diagnosis (n, %)				
Benign	7 (4)	2 (3)	5 (4)	1.000[b]
Malignant	171 (96)	64 (97)	107 (96)	
Treatment received (n, %)				
Radiotherapy	20 (11)	6 (9)	14 (13)	0.487[b]
Surgical intervention	0	0	0	–
Interventional Bronchoscopy	28 (16)	12 (18)	16 (14)	0.490[b]

[a]Mann Whitney U test; [b]Fisher's Exact test; [c]Chi Square test
**Statistically significant*

Table 2 summarizes the timing of intubation, and the prevalence of key symptoms observed in patients who required intubation. A substantial majority (88%) underwent delayed intubation, typically after the onset of overt respiratory symptoms. Only a small proportion (12%) received preemptive intubation, often based on imaging findings or progressive clinical deterioration. Labored breathing and desaturation were the most frequently observed symptoms, affecting over 70% of intubated patients. Orthopnea, altered mental status (decreased sensorium), and stridor were also notable but less common.

Table 2. *Timing and Symptoms in Intubated Patients (n=66)*

Variable	Frequency (n, %)
Preemptive Intubation	8 (12.12)
Delayed Intubation	58 (87.88)
Labored Breathing	49 (74.24)
Desaturation	48 (72.73)
Orthopnea	21 (31.82)
Decreased Sensorium	18 (27.27)
Stridor	14 (21.21)

Table 3. *Factors associated with the need for intubation among CAO patients (n=178)*

	CRUDE OR (95% CI)	P VALUE	ADJUSTED OR (95% CI)	P VALUE
Age (in years)				
<18	Ref	Ref	-	-
18- 60	1.06 (0.22-5.25)	0.940	-	-
>60	1.09 (0.22-5.48)	0.919	-	-
Sex				
Female	Ref	Ref	-	-
Male	1.30 (0.67-2.53)	0.435	-	-
Type of obstruction				
Endoluminal	Ref	Ref	Ref	Ref
Extraluminal	2.07 (1.07-4.03)	0.032*	2.07 (1.07-4.03)	0.032*
Mixed	7.02 (1.82-27.16)	0.005*	7.02 (1.82-27.16)	0.005*
Degree of obstruction (in mm)	1.03 (0.91-1.17)	0.609	-	-
Location of obstruction, %yes (Ref: No)				
Tracheal	0.56 (0.02-13.92)	0.723	-	-
Proximal	0.55 (0.13-2.36)	0.417	-	-
Distal	1.91 (0.89-4.10)	0.096	-	-
Middle third	0.60 (0.17-2.13)	0.429	-	-
Carinal	2.22 (0.99-4.95)	0.052	-	-
Bronchial	1.49 (0.67-3.30)	0.327	-	-
Tissue diagnosis				
Benign	Ref	Ref	-	-
Malignant	1.32 (0.29-6.07)	0.721	-	-
Treatment received (Ref: No)				
Radiotherapy	0.73 (0.27-1.94)	0.528	-	-
Interventional Bronchoscopy	1.34 (0.60-3.00)	0.475	-	-

[a]*Mann Whitney U test;* [b]*Fisher's Exact test;* [c]*Chi Square test*
**Statistically significant*

As seen in Table 3, univariable analysis showed that the type of obstruction was significantly associated with the need for intubation. Compared to those with intraluminal obstruction, patients with extraluminal obstruction had two times higher odds of intubation. In contrast, those with mixed obstruction had seven times higher odds. Multivariable analysis showed that the type of obstruction was the only statistically significant variable associated with the need for intubation.

DISCUSSION

This study examined 178 patients with central airway obstruction (CAO) caused by tumors and found that 37.08% required intubation. The need for intubation was significantly associated with mixed-type and extraluminal obstruction as well as carinal involvement. Labored breathing and desaturation were the most observed symptoms among intubated patients and the majority underwent delayed intubation defined as occurring after the onset of respiratory distress. These findings contribute to the limited body of evidence identifying early predictors of airway compromise in malignant CAO.

The results are consistent with previous studies highlighting respiratory distress as a common presentation in CAO. Daneshvar et al. reported breathlessness in 61% of patients with lung cancer-related CAO while Giovacchini et al. found dyspnea present in 98.4% of CAO patients, although neither study linked these symptoms with intubation events.[5,6] This study adds to current literature by specifically correlating symptom patterns with actual airway intervention. Labored breathing and desaturation in this cohort were not only prevalent but also temporally associated with intubation, emphasizing their role as critical warning signs.

Mixed-type and extraluminal obstructions were significantly more likely to require intubation compared to endoluminal masses. These findings are supported by prior observations in cases of bulky thoracic tumors and anterior mediastinal masses where external compression on the airway has been shown to increase the risk of positional airway collapse and dynamic obstruction, particularly during sedation or anesthesia induction.[8,9] Extraluminal obstruction may compress multiple airway levels, limiting compensatory ventilation and increasing the need for urgent airway stabilization. In contrast, endoluminal lesions may be more distal or focal allowing for temporary preservation of airflow especially when affecting non-critical areas such as the lobar bronchi.

Obstruction at the carina was notably more frequent in intubated patients. The carina is a critical anatomical junction that bifurcates airflow to both lungs and its involvement implies extensive central airway disease with higher physiological burden. This observation supports prior imaging studies which found that distal airway patency, when preserved, was associated with a lower need for intervention.[7] When the carina is compromised, airflow to both lungs may be severely reduced, resulting in rapid desaturation and necessitating immediate airway management.

The finding that 88% of intubated patients underwent delayed rather than preemptive intubation suggests a clinical gap in recognizing early airway risk. Although intubation is often considered a last resort due to concerns over technical difficulty or loss of spontaneous ventilation, the high incidence of late intubation in this cohort indicates missed opportunities for earlier intervention. Ost et al. through the AQuIRE registry reported significantly increased complication rates when therapeutic bronchoscopy or airway intervention was performed under emergency conditions.[3] These outcomes highlight the importance of timely decision-making before airway collapse occurs.

Clinical implications of these findings include the need for heightened vigilance in CAO patients presenting with mixed or carinal obstruction. In such cases, the presence of desaturation or increased work of breathing should prompt consideration for early ICU transfer, preparation for intubation or the standby presence of a bronchoscopy team. Current guidelines encourage multidisciplinary airway planning in CAO but acknowledge the low certainty of supporting evidence.[2] The present findings contribute objective criteria such as anatomical location and obstruction type that may inform structured protocols for triage and airway management.

This study offers a focused analysis on tumor-related CAO and introduces measurable predictors for intubation, a factor largely absent in previous retrospective studies. However, the study has limitations. The retrospective design relied heavily on chart documentation which may have introduced variability in symptom recording. Furthermore, the study did not evaluate inter-modality agreement between CT and bronchoscopy findings, nor did it standardize imaging interpretation across reviewers. These limitations suggest that prospective validation is needed.

Future research should aim to develop and validate a risk stratification tool incorporating obstruction type, carinal involvement and clinical symptoms. Such a tool could support early triage and reduce emergency interventions. Additionally, prospective trials comparing early versus delayed intubation in high-risk CAO populations may provide further insight into optimizing outcomes.

CONCLUSION

This study aimed to identify factors associated with the need for intubation in patients with central airway obstruction (CAO) caused by tumors. Our findings revealed that carinal obstruction was more frequent in intubated patients and that mixed type and extraluminal obstructions were significantly more likely to require intubation compared to endoluminal masses. The study had limitations in terms of its retrospective design, reliance on a review of records, and the absence of tests for inter-modality agreement in diagnosing CAO. Prospective validation is needed to provide more robust evidence and ultimately improve outcomes.

AUTHORSHIP

All authors have certified fulfillment of authorship criteria.

DISCLOSURE

All authors have no conflicts of interest to disclose.

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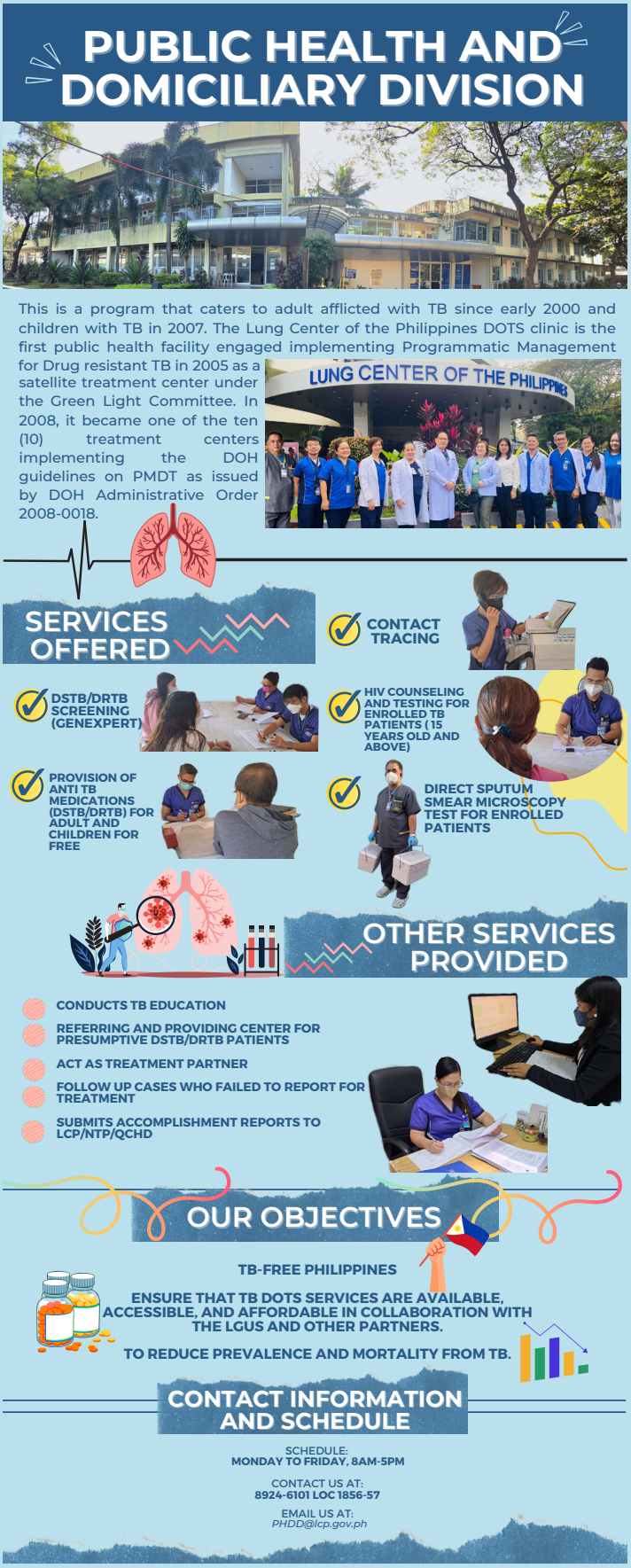

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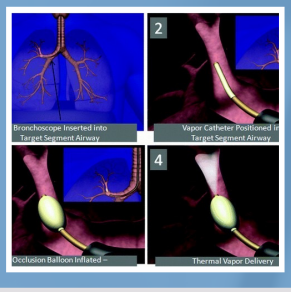

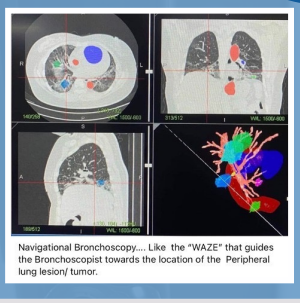

Navigational Bronchoscopy.... Like the "WAZE" that guides the Bronchoscopist towards the location of the Peripheral lung lesion/ tumor.

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Scientific Proceedings

ORIGINAL ARTICLE

COMPARISON OF THE EFFICACY OF IN-PERSON VS. VIRTUAL INHALER EDUCATION IN TERMS OF ADHERENCE, INHALER TECHNIQUE AND SYMPTOM CONTROL AMONG ASTHMA OPD PATIENTS: RANDOMIZED CONTROLLED TRIAL

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ABSTRACT

Background. Virtual inhaler education is increasingly being explored as a means of delivering asthma education in settings with limited access to healthcare, with the goal of reducing asthma exacerbations. As such, inhaler education has become a central focus in efforts to optimize treatment outcomes. This study aims to compare the efficacy of in-person versus virtual inhaler education, specifically in terms of correct technique retention and medication adherence.

Objectives. To compare and assess the efficacy of in-person inhaler education versus virtual inhaler education in improving correct technique retention, medication adherence and GINA symptom control tool assessment among asthma patients seen at the Lung Center of the Philippines Outpatient Department.

Methodology. A total of 39 asthma patients from the Outpatient Department of the Lung Center of the Philippines (LCP) were enrolled in a randomized clinical trial conducted from December 2023 to February 2024. Participants were followed for four weeks, during which asthma symptom control, medication adherence, and inhaler technique retention were assessed. Data were analyzed using the Mann-Whitney U test for between-group comparisons and the Friedman test for within-group changes over time.

Results. Demographics between the two groups were largely similar with no significant differences in age (p=0.696), gender (p=1.000), height (p=0.287), weight (p=0.091), BMI (p=0.124), educational attainment (p=0.744), or inhaler type usage (p=0.483). Findings suggest that both groups yielded comparable results in enhancing asthma symptom control. However, it was not statistically significant after 4 weeks (P-value=0.373-in-person inhaler group; P-value=0.203-virtual inhaler group). Virtual healthcare delivery is potentially effective in providing asthma education. In-person education consistently resulted in significantly lower scores in the adherence questionnaire indicating better adherence compared to virtual (P=0.032). Lastly, it was noted that both groups exemplified improvement in correct technique with P-value=0.003 for the in-person group and P-value=0.001 for the virtual group.

Conclusion. Virtual education is non-inferior to in-person education in asthma control and correct technique retention while in-person education is more effective in promoting adherence.

Keywords: Virtual inhaler education, asthma symptom control, medication adherence, correct technique retention, GINA symptom control, inhaler technique

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INTRODUCTION

Asthma is a chronic and prevalent respiratory disease which causes significant burden, disability and mortality and can have significant emotional, social and financial impacts.[1] There are several factors that can result to inadequate asthma control. One such factor is non-adherence to proper inhaler technique which will lead to frequent exacerbations and worse, eventual death. According to GINA 2024, asthma affects approximately 10.4% of the global population, with a prevalence rate of 504.28 per 100,000 people in young adults, as observed from 1990 to 2019. In addition, according to the National Nutrition and Health Survey (NNHeS), the overall prevalence of adult asthma in the Philippines is approximately 8.7%.

Meanwhile, inhaled therapy is considered as the cornerstone treatment in asthma wherein the medication is delivered directly in the lungs for optimal efficacy and safety. However, up to 94% of patients with asthma and COPD do not use their inhalers correctly, and they often need multiple education sessions to maintain their adherence to the proper technique.[2]

In view of this, efforts in the improvement of adherence to guidelines in inhaler techniques had been developing over the years. Many people cannot use inhalers properly hence proper technique should be taught in order to achieve asthma control. To address the problem, a virtual teach-to-goal intervention was designed to facilitate patient's adherence to the medication. In-person teach-to-goal technique had been demonstrated to help improve the adherence of patients in the proper way of using their inhalers.[3]

In the midst of the pandemic, face to face activities had been limited due to safety precautions. Hence, a shift from in-person to virtual teach-to-goal technique is now being tested and explored. Because the association between COVID-19 severity and chronic medical conditions such as asthma has been suggested, a common concern during the pandemic is the risk that in-person asthma education program poses.[4]

Locally, the Lung Center of the Philippines Asthma Club established virtual asthma education to minimize the covid risk of its asthma patients and educators. With the virtual inhaler technique, the overall cost will be lessened especially for patients living far away from hospitals. This would allow them to improve their medication use skills even if they are not able to attend the in-person inhaler technique sessions.

Knowledge of proper inhaler technique has a vital role in effective asthma treatment. Hence, effort in helping patients perform the correct technique is evolving. Traditional face-to-face education has been proven effective in improving asthma control.[5] However, it was deemed time-consuming, costly, and often laborious. Hence, a newly developed video-based inhaler technique education method was evaluated and was found to be a suitable substitute for face-to-face education on inhaler technique (dry powder inhalation capsule) in patients with stable asthma, particularly in elderly patients and patients with well-controlled asthma as demonstrated in the study of Park et. al. in 2018.

In 2015, Van den Wijngaart et al. conducted research among asthmatic children regarding virtual asthma clinic. They noted a significantly higher ACT scores in the virtual asthma clinic (VAC) group than in the control group (p=0.02). Within the VAC group, both asthma control (p=0.03) and quality of life improved significantly (p=0.04). They were able to conclude that virtual asthma clinics reduced the visits to the outpatient clinic by 50% whilst improving asthma control and quality of life among asthmatic children proving that virtual asthma clinics are non-inferior to the in-patient hospital consults.[6]

Another study done by Gregoriano et. al. 2018 emphasized the importance of correct inhalation of prescribed medication. In their study, incorrect inhalation technique ranged from 0 to 53% depending on the type of inhaler. COPD patients with incorrect device application had a higher CAT sum score compared to those with a correct device application (P=0.02). However, there was no significance found in asthma patients.[7]

Shiva and Valizadeh (2018) also did a study, this time using telegram based virtual education comparing it to in person education in adolescents with mild to moderate asthma. The RTC showed that there was no statistically significant difference between the groups in terms of the mean score for the quality of life and its domains.[8]

In the GINA guidelines 2022, there are categories in assessing the asthma control: 1) simple screening tool, 2) categorical symptom control tools and 3) numerical asthma control tools (ACQ and ACT scores). On the other hand, the Asthma APGAR tool and the consensus-based Royal College of Physicians (RCP) Three Questions' tool are considered as categorical symptom control tools being used in primary care setting.[9] Lastly, numerical asthma control tools for assessing symptom control are the asthma control questionnaire (ACQ) and asthma control test (ACT). ACQ scores range from 0-6 (higher scores mean worse) which include five symptom questions and has three versions (ACQ-5, ACQ-6 and ACQ-7).

The Asthma Control Test (ACT) has been validated to be of significant use in trials and in clinical practice. ACT is a self-administered tool for identifying poorly controlled asthma. It is a 5-item questionnaire with a 4-week recall on symptoms and daily functioning. The scores range from 5 (poor control of asthma) to 25 (complete control of asthma) with higher scores corresponding to greater asthma control. An ACT score of more than 19 means a well-controlled asthma. Hence, this is an appropriate measure of asthma control as stated in the study of van Djik et al. (2020).[10]

Indeed, improving asthma control by doing inhaler education is an important component in the overall asthma management. Hence, developing effective strategies with lower total cost, less effort and time-saving features, while taking advantage of advanced technology (virtual platform) are being explored and carried out.

The study aims to assess and compare the efficacy of in-person versus virtual inhaler education regarding correct technique retention, medication adherence and symptom control among asthma OPD patients.

General Objectives

The researchers aim to accomplish this general objective: To compare the efficacy of in-person vs. virtual inhaler education in terms of medication adherence and inhaler technique retention among asthmatic patients seen in the LCP OPD.

Specific Objectives

The researchers aim to assess the efficacy of in-person inhaler education versus virtual inhaler education in terms of correct technique retention, medication adherence and GINA symptom control tool assessment among asthma patients seen at LCP OPD.

The researchers also hypothesized that there is no significant difference in medication adherence, inhaler technique retention and symptom control between in-person and virtual inhaler education among OPD asthmatic patients.

METHODOLOGY

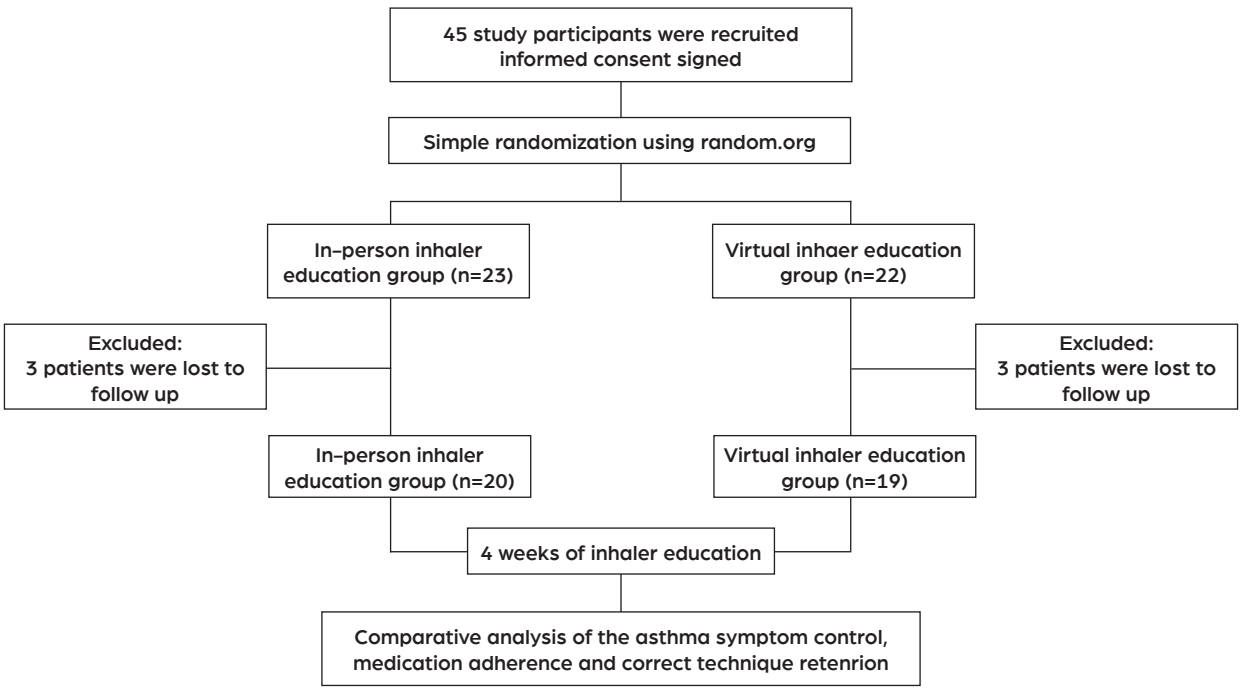
Selection of Subjects

Newly diagnosed patients and new members of the LCP asthma club with uncontrolled or partly controlled asthma seen at LCP OPD deemed eligible as stated in the inclusion criteria and who were willing to participate were included in the randomized clinical trial from December 2023-February 2024. At the charity OPD during Asthma clinic (every Tuesdays and Thursdays), the researchers get notified by the Pulmonary Fellows regarding the eligible patients. New patients from the Asthma Club were also included. After each club session, patients were interviewed and recruited, then the researchers screened the patients if deemed eligible following the inclusion-exclusion criteria. Informed consent was explained and was given to the patients prior to inclusion in the study. Patients who were lost to follow up were excluded from the analysis.

Enlistment and Randomization

Once patients were screened and deemed eligible to participate and informed consent has been signed, two groups were identified such as the experimental group and control group. Asthma patients at the outpatient department were assigned using simple randomization. An electronic randomizer was used to randomize patients into the control group (in-person inhaler education group) and experimental group (virtual inhaler group). A third party randomized the patients into the two groups. Odd numbers were assigned to the in-person group and the even numbers was assigned to the virtual group using the random.org electronic randomizer. This is to ensure that any observed differences between groups are not due to pre-existing differences, reducing the potential for the control group to be disadvantaged.

Figure 1. *CONSORT flow diagram (n=39)*



Inclusion criteria. Physician-diagnosed asthma patients either by history of typical variable respiratory symptoms (wheeze, shortness of breath, chest tightness and cough), pulmonary function test with pre- and post-bronchodilator test (defined as increase in FEV1 of 12% and >200 mL (greater confidence if increase is 15% and >400 mL with FEV1/FVC value of less than the lower limit of normal (<0.75-0.80) or peak flow test defined as average daily diurnal PEF variability >10% in two weeks), aged 19 years old and above who were prescribed with a controller in the form of an inhaler medication, have not attended any asthma education and are being managed and seen at LCP OPD and is living in Metro Manila and who are able to gain access on the internet and are able to effectively use the internet (skilled to use the internet or with supervision of a skilled one) will be included in the study.

Exclusion criteria. Pregnant patients, patients with diagnosed case or known to have any long-standing structural lung problem such as pulmonary tuberculosis, chronic obstructive pulmonary disease (COPD), destroyed or non-viable lungs, pulmonary hypertension, bronchiectasis, and interstitial lung disease.

Conduct of Procedure and Data Collection

The patients were assessed by the researchers. The study and the procedures were explained to the study participants then informed consent form was signed. The patients joined the study. The asthma control was documented through the consensus-based GINA symptom control tool. Then the virtual and in-person inhaler education was done by the researchers to the patients. For the virtual group, the patients were provided with a 1-2 minute-long recorded videos on how to properly use the inhalers. On the other hand, in the in-person group, the researcher personally taught the patients via one-on-one session.

The teach-to-goal checklist was provided to document the proper technique by performing the steps correctly and was accomplished solely by the researcher after the study participants underwent the return demonstration. To ensure that both groups received the same instructions and inhaler education, the same researcher conducted the process. The patients used the prescribed inhalers by their physicians (Pulmonary Fellows at the OPD or private consultants depending on who saw the patient) and according to their preference.

Inhaler adherence questionnaires were provided which is composed of six validated questions that were answered by the participants. The score is 1 if there is nonadherence and the higher the score the more non adherent the patient. It is a valid tool to identify adult patients with asthma who are likely to be non-adherent with their daily prescribed inhaler. The in-person inhaler education participants had a total of 4 visits (once per week) for the whole duration of the study. For the virtual group, follow up for these participants was conducted thru video call follow up. After 4 weeks, the patients were assessed again by the correct technique retention by administering the teach-to-goal checklist, medication adherence, asthma control through the consensus-based GINA symptom control tool. Comparative analysis was done statistically to analyze the data and determine the significant difference between the two groups. Participants were followed up weekly, fostering increased rapport with researchers and enhancing their comfort level over time. This approach facilitated the observation of naturalistic behavior, as participants demonstrated their typical inhaler use in everyday situations.

Sample Size Determination

Assuming a level of significance of 0.05, a power of 80% and an effect size of 1.00 (Ramos et al., 2021), the required sample size to determine if there is a significant difference in the correct technique retention, medication adherence and symptom control through GINA symptom control tool among asthma patients of LCP OPD who received in-person inhaler education and virtual inhaler education is 34. Adjusting for 20% of the sampled patients that would refuse to join the study, the final sample size is 42.

Research Instruments

This study utilized a range of research instruments to evaluate the efficacy of in-person versus virtual inhaler education in asthma patients. These include a demographic and clinical characteristics form, the Inhaler Adherence Questionnaire (IAQ) to assess medication adherence, the Teach-to-Goal Return Demonstration Checklist to evaluate inhaler technique, and the GINA Symptom Control Tool to measure asthma symptom control. By employing these instruments, the study aimed to provide a comprehensive understanding of the impact of different educational approaches on asthma management outcomes.

Statistical Analysis

Comparative analysis of the correct technique retention, medication adherence and the level of asthma symptom control using the consensus-based GINA symptom control tool before and after the administration (4-week recall) of the inhaler education was done using the Mann-Whitney U (Wilcoxon rank-sum) test and Friedman test for repeated measure to analyze the data using SPSS Statistics version 26.

Ethical Considerations

This study was conducted in accordance with the National Ethical Guidelines for Research Involving Human Participants 2022. The study protocol was approved by the LCP-IERB Study Protocol Code LCP-PF-027-2023 prior to implementation. The safety of the participants was of utmost importance in the study. As such, voluntary consent was exercised by the participants without the intervention of force, fraud, deceit, duress, or other forms of

coercion. The informed consent contained the information regarding the study and was completely understood by the participants. In line with this, the participants were assured that the confidentiality of the results will be as important as having them agree with their involvement in the study.

RESULTS

Table 1 presents the demographic characteristics of asthma patients at an outpatient department (OPD), comparing those who attended in-person education versus virtual education. The average age of all patients was 60.64 years. There was no significant difference in age between in-person (60.10 years) and virtual (61.21 years) attendees (p = 0.696). The majority were female (35 out of 39 patients), with no significant difference in gender distribution between in-person and virtual attendees (p = 1.000). The average height of all patients was 154.51 cm. There was no significant difference in height between in-person and virtual attendees (p = 0.287). The average weight of all patients was 60.89 kg. There was no significant difference in weight between in-person and virtual attendees (p = 0.091). The average BMI of all patients was 25.36 kg/m^2. There was no significant difference in BMI between in-person and virtual attendees (p = 0.124). The majority had a high school education (20 out of 39 patients), followed by college education (14 out of 39 patients). There were no significant differences in educational attainment between in-person and virtual attendees (p = 0.744). The most used inhaler type was Symbicort Turbuhaler (21 out of 39 patients). There were no significant differences in inhaler type usage between in-person and virtual attendees (p = 0.483). About 69.23% of all patients had a family history of asthma. While there was a higher percentage of in-person attendees with a family history of asthma (80.00%), it was not statistically significant (p = 0.176). Around 48.72% of all patients had a family history of allergies or atopy.

Table 1. *Demographic characteristics of asthma patients at LCP OPD, n=39*

Parameter	Value			*P*-Value
	Total n=39	In-Person Inhaler Education n=20	Virtual Inhaler Education n=19	
Age in years	60.64 (8.71)	60.10 (7.20)	61.21 (10.24)	0.696
Gender, mean (SD)				
Male	4 (10.26)	2 (10.00)	2 (10.53)	1.000
Female	35 (89.74)	18 (90.00)	17 (89.47)	
Height in cm	154.51 (7.80)	153.20 (9.01)	155.89 (6.23)	0.287
Weight in kg	60.89 (13.85)	57.24 (13.66)	64.74 (13.33)	0.091
BMI in kg/m2	25.36 (4.68)	24.23 (4.62)	26.55 (4.57)	0.124
Educational Attainment, mean (SD)				
Elementary	5 (12.82)	3 (15.00)	2 (10.53)	0.744
High School	20 (51.28)	11 (55.00)	9 (47.37)	
College	14 (35.90)	6 (30.00)	8 (42.11)	
Inhaler Type Used, mean (SD)				
Symbicort TurbuhalerR	21 (53.85)	10 (50.00)	11 (57.89)	0.483
Saltrol MDIR	1 (2.56)	1 (5.00)	0 (0.00)	
SeretideR Diskus	5 (12.82)	4 (20.00)	1 (5.26)	
SeretideR MDI	11 (28.21)	5 (25.00)	6 (31.58)	
Symbicort RapihalerR	1 (2.56)	0 (0.00)	1 (5.26)	
Family History of Asthma	27 (69.23)	16 (80.00)	11 (57.89)	0.176
Family History of Allergies/Atopy	19 (48.72)	14 (70.00)	5 (26.32)	0.010 *
Smoking Status				
Non-Smoker	38 (97.44)	20 (100.00)	18 (94.74)	0.487
Previous Smoker	1 (2.56)	0 (0.00)	1 (5.26)	
Smoker	0 (0.00)	0 (0.00)	0 (0.00)	

Note: Values are presented in frequency (percentage) unless otherwise stated.

Interestingly, there was a significant difference in the distribution between in-person and virtual attendees, with a higher percentage of in-person attendees reporting a family history of allergies or atopy (70.00% compared to 26.32% in virtual attendees; p = 0.010). Most patients were non-smokers (97.44%). There was no significant difference in smoking status between in-person and virtual attendees. Thus, the demographic characteristics between in-person and virtual attendees were largely similar, with no significant differences observed in age, gender, height, weight, BMI, educational attainment, or inhaler type usage except in family history of allergies or atopy.

Table 2 shows the comparative analysis of asthma symptom control utilizing the Consensus-based GINA Symptom Control Tool following a 4-week inhaler education program. It is revealed that there are no significant differences between patients who underwent in-person inhaler technique sessions and those who participated virtually (P=0.897).

Table 2. *The comparative analysis of asthma symptom control of asthma patients using the consensus-based GINA symptom control tool after 4-week inhaler education, n=39*

Asthma Symptom Control	In-Person Inhaler Technique n = 20	Virtual Inhaler Technique n = 19	P-Value [1]
Baseline	2.00 (0.25)	2.00 (0.00)	0.238
After 1 Week	2.00 (1.00)	2.00 (0.00)	0.747
After 2 Weeks	2.00 (1.00)	2.00 (1.00)	0.930
After 3 Weeks	2.00 (1.00)	2.00 (1.00)	0.621
After 4 Weeks	1.00 (1.00)	1.00 (1.00)	0.897
P-Value 2	0.373	0.203	

*Note: Values are presented in median (interquartile range); Code: 3 – Uncontrolled, 2 – Partly Controlled, and 1 – Controlled; * Significant at 0.05 using [1]Mann-Whitney U (Wilcoxon rank-sum) test and using [2]Friedman test for repeated-measures.*

Table 3. *The comparative analysis of medication adherence of asthma patients at LCP OPD in a 4-week inhaler education, n=39*

Medication Adherence	In-Person Inhaler Technique n = 20	Virtual Inhaler Technique n = 19	P-Value [1]
Baseline	1.00 (1.00)	2.00 (2.00)	0.063
After 1 Week	1.00 (1.00)	1.00 (1.50)	0.012 *
After 2 Weeks	0.00 (1.00)	1.00 (1.50)	0.013 *
After 3 Weeks	0.00 (0.00)	1.00 (1.00)	0.004 *
After 4 Weeks	0.00 (0.00)	0.00 (1.00)	0.032 *
P-Value 2	<0.001 *	<0.001 *	

*Note: Values are presented in median (interquartile range); 0 indicates adherence and >0 indicates non-adherence; * Significant at 0.05 using [1]Mann-Whitney U (Wilcoxon rank-sum) test and using [2]Friedman test for repeated-measure.*

Table 3 shows the comparative analysis of medication adherence among asthma patients undergoing a 4-week inhaler education program. The analysis unveiled significant differences between in-person and virtual inhaler techniques. In-person inhaler technique sessions consistently resulted in significantly lower scores in the adherence questionnaire indicating better adherence compared to virtual sessions throughout the duration of the program (P=0.032). This suggests that in-person inhaler education may be more effective in promoting medication adherence among asthma patients. However, it is essential to note that both groups showed improvements in adherence over time, albeit with differences favoring the in-person approach (P<0.001).

Table 4. *The comparative analysis of correct technique retention of asthma patients at LCP OPD in a 4-week inhaler education, n=39*

Correct Technique Retention	In-Person Inhaler Technique n = 20	Virtual Inhaler Technique n = 19	P-Value [1]
Baseline	2.00 (1.00)	2.00 (1.00)	0.696
After 1 Week	1.00 (1.00)	1.00 (1.00)	0.919
After 2 Weeks	1.00 (0.00)	1.00 (0.00)	0.979
After 3 Weeks	1.00 (0.00)	1.00 (0.00)	0.992
After 4 Weeks	1.00 (0.00)	1.00 (0.00)	0.992
P-Value 2	0.003 *	0.001 *	

*Note: Values are presented in median (interquartile range); lower scores are better. * Significant at 0.05 using [1]Mann-Whitney U (Wilcoxon rank-sum) test and using [2]Friedman test for repeated-measures.*

Table 4 shows comparative analysis of correct technique retention among asthma patients participating in a 4-week inhaler education program. The analysis revealed consistent and comparable outcomes between in-person and virtual inhaler techniques. Throughout the study period, both groups demonstrated significant improvement in median scores for correct technique retention, with no significant differences observed between the in-person and virtual sessions at any time point. This suggests that both modes of delivery were equally effective in maintaining correct inhaler technique among the participants. These findings underscore the feasibility and efficacy of virtual inhaler education programs, providing a viable alternative to traditional in-person sessions for ensuring proper technique retention in asthma management.

DISCUSSION

Education on inhaler technique is critical for effective asthma treatment. However, traditionally used face-to-face education is time consuming and relatively costly. Virtual inhaler technique education is non-inferior to in-person education in terms of cognitive learning and knowledge of asthmatic patients, improvement in inhaler techniques, and asthma control.[11]

In-person and virtual educational interventions yielded comparable results in enhancing asthma symptom control (Table 2). Initially, patients were categorized as partly controlled. After 4 week-period of inhaler education, asthma symptom control scores improved. However, it was not statistically significant for both groups with a P value-0.373 for in-person inhaler group and P value-0.203 for virtual inhaler group after 4 weeks (Table 2).

Over the course of the study, from baseline to the end of 4 weeks, median symptom control scores remained consistent within each group, indicating stable asthma management outcomes. These findings suggest that in-person and virtual educational interventions yielded comparable results in enhancing asthma symptom control. This highlights the potential effectiveness and feasibility of virtual healthcare delivery in providing education and support for asthma management, particularly in contexts where in-person interactions may be limited. Virtual inhaler education can be an alternative to in-person inhaler education in providing proper learning to acquire skills and knowledge in correct technique retention and in promoting inhaler adherence among asthma patients.

It was reported that medication adherence is a major problem in asthma control with reported nonadherence rates of 30-70% hence improvement in patient adherence to medication may result to good or excellent asthma control lowering exacerbation risks thereby improving the quality of life of asthma patients.[12] In this study, it was found out that patients who attended the in-person inhaler education are more adherent in using their inhalers than those who had the virtual inhaler education in a 4-week observational period (p=0.032) (Table 3). In general, major reasons of non-adherence is the cost of the inhaler devices. Patients reported that they tend to minimize using the inhaler to make it last longer. They also tend to use the inhaler less than the doctor prescribes when they have no symptoms. Some also verbalized that due to their work schedules, they tend to forget to use their inhalers. However, non-adherence on the virtual group may be due to misunderstanding of the instructions and complacency that they already know the technique because they already had the video material. Also, during the virtual inhaler education, there is a limited personal interaction between the clinician and the patient hence the patient may have fair supervision and limited time to ask questions to clarify steps. Another reason is the access to the internet, some patients had faulty internet connections that may contribute to lesser acquisition of knowledge regarding inhaler education. Indeed, medication adherence can significantly lower the risk of exacerbation which is reflective in this study because there was a stability in the asthma severity status exemplified by the GINA symptom control assessment tool (Table 2) and good adherence is associated with lower risk of severe asthma exacerbations but they recommended standardized methodology to assess the adherence and exacerbations and consider inhaler competence.[13]

In this study, there were 4 different types of inhalers used Salmeterol/Fluticasone metered-dose-inhaler and Budesonide/Formoterol rapihaler, Budesonide/Formoterol turbuhaler and Salmeterol/Fluticasone diskus according to patient's medication and preference. Most of the critical

errors identified were failure to do the tight sealing of the lips, failure to breath out gently to empty the lungs, and failure to hold breath for 5–10 seconds. However, the patients had improvement in the correct technique retention as evidenced by the lesser trials doing the teach-to-goal checklist. It was noted that during the 4-week inhaler education period, both groups exemplified improvement in the correct technique retention with a P value–0.003 for the in-person inhaler group and P value–0.001 for the virtual inhaler group. However, the two groups had no significant difference in the correct technique retention after 4 weeks (P=0.992) (Table 4). Hence, virtual inhaler education is non-inferior to in-person inhaler education in terms of delivering correct technique retention among asthma patients. The identified errors in the teach to goal checklist were also the critical errors identified in a study done by Price et al. (2013) wherein they identified common errors and barriers in inhaler competence among asthma patients.[14] They suggested technological innovation and educational interventions including improving healthcare professional and patient inhaler knowledge and skills through web-based tutorial, multimedia presentations and physical demonstrations–all involving virtual and in-person inhaler education.

CONCLUSION

Virtual inhaler education is non-inferior to in-person inhaler education in terms of asthma control and correct technique retention. However, in-person inhaler education is still more effective in promoting medication adherence among asthma patients. Indeed, virtual inhaler education can be an alternative avenue in promoting asthma care in the most convenient way possible especially for patients who have limited access to healthcare to reduce exacerbations leading to lower cost and improvement of quality of life. Increasing the study population and extending the experimental period to more than 4 weeks are recommended to further analyze the asthma symptom control, continued consistent correct technique retention and maintained adherence.

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APPENDIX

A. TEACH-TO-GOAL RETURN DEMONSTRATION CHECKLIST

a. Teach to Goal Script: Turbuhaler

Instructions:

1. Demonstrate first each step correctly (use script to guide you)
2. Then have them return demo the steps themselves, using checklist below, check for errors. (Trial 1)
3. Work on the steps with error until the patient gets it correctly
4. Return demo, using check list below, check for errors (Trial 2)
5. Fine tune the steps with errors
6. Return demo, using check list below, check for errors (Trial 3)
7. Congratulate the participant/patient

	Trial 1	Trial 2	Trial 3
1. **Unscrew and remove cover**			
2. **Check dose counter**. Your patient may be inhaling an empty device. So have them check each time.			
3. **Hold inhaler upright while twisting grip**.			
4. **Twist the grip around** (counterclockwise) and twist back until you hear a click.			
5. **Breathe out gently away from the device.** It's important not to breathe into the device as you may blow the medicine out of the device.			
6. **Put mouthpiece between teeth without biting and close lips to make a good seal.** Make sure the tongue is not blocking the mouthpiece. Hold the inhaler horizontally and tilt head a little backwards to straighten up the upper airway.			
7. **Breathe in strongly and deeply.** Remember, the dry powder will not fly on its own, your breath will have to suck it up from the device and breathe it into your lungs.			
8. **Hold breath for about 5 seconds** or as long as comfortable. This to allow the particles time to settle and deposit.			
9. **While holding breath, remove inhaler from mouth**.			
10. **Breathe out gently away from the inhaler**. Replace cover			

b. Teach to Goal Script: Diskus

Instructions:

1. Demonstrate first each step correctly (use script to guide you)
2. Then have them return demo the steps themselves, using checklist below, check for errors. (Trial 1)
3. Work on the steps with error until the patient gets it correctly
4. Return demo, using check list below, check for errors (Trial 2)
5. Fine tune the steps with errors
6. Return demo, using check list below, check for errors (Trial 3)
7. Congratulate the participant/patient

	Trial 1	Trial 2	Trial 3
1. **Check dose counter**. Your patient may be inhaling an empty device. So have them check each time			
2. **Open cover using thumb grip**			
3. **Hold inhaler horizontally, load dose by sliding lever until it clicks.**			
4. **Breathe out gently away from the device.** It's important not to breathe into the device as you may blow the medicine out of the device.			
5. **Put mouthpiece between teeth without biting and close lips to make a good seal.** Make sure the tongue is not blocking the mouthpiece. Hold the inhaler horizontally and tilt head a little backwards to straighten up the upper airway.			
6. **Breathe in strongly and deeply.** Remember, the dry powder will not fly on its own, your breath will have to suck it up from the device and breathe it into your lungs.			
7. **Hold breath for about 5 seconds** or as long as comfortable. This to allow the particles time to settle and deposit.			
8. **While holding breath, remove inhaler from mouth**			
9. **Breathe out gently away from the inhaler**.			
10. Close cover to click shut.			

c. Teach to Goal Script: pMDI

Instructions:

1. Demonstrate first each step correctly (use script to guide you)
2. Then have them return demo the steps themselves, using checklist below, check for errors. (Trial 1)
3. Work on the steps with error until the patient gets it correctly
4. Return demo, using check list below, check for errors (Trial 2)
5. Fine tune the steps with errors
6. Return demo, using check list below, check for errors (Trial 3)
7. Congratulate the participant/patient

	Trial 1	Trial 2	Trial 3
1. **Remove cover** – That is a no brainer. But it can happen.			
2. **Check dose counter** (if applicable) You may be inhaling an empty pMDI. So, make sure you check the dose counter each time.			
3. **Hold inhaler upright and shake well**. The inhaler contents are a mixture of the medicine and a propellent. You have to shake it to make sure you get the right amount of each. Otherwise, you may get too much or too little of the medicine. So, shake it vigorously about 10 times.			
4. **Breathe out gently away from the device.** It's important not to breathe out too forcefully or empty the lungs completely as it may cause airway collapse when the patient breathes in			
5. **Put mouthpiece between teeth without biting and close lips to make a good seal.** Make sure the tongue is not blocking the mouthpiece. Make sure that the medicine will not escape from your lips. Tilt head a little backwards to straighten up the upper airway.			
6. **Start breathing in slowly through the mouth and at the same time press down firmly on the canister.** Getting the timing right is important. If you press too late, your breath will not contain any medicine. If you press too early, before you start breathing, then you will just lose the medicine in the air.			
7. **Keep breathing on slowly and deeply**. Remember, the particles of the pMDI spray have its own speed. You only need to guide them into your breath so that the particles can penetrate deeply into the lungs. Otherwise, if you breathe too fast, then the particles will just impact in your throat.			
8. **Hold breath for about 5 seconds** or as long as comfortable. This to allow the particles time settle and deposit.			
9. **While holding breath, remove inhaler from mouth**.			
10. **Breathe out gently away from the inhaler**. **Replace cover.**			

d. Teach to Goal Script: Rapihaler

Instructions:

1. Demonstrate first each step correctly (use script to guide you)
2. Then have them return demo the steps themselves, using checklist below, check for errors. (Trial 1)
3. Work on the steps with error until the patient gets it correctly
4. Return demo, using check list below, check for errors (Trial 2)
5. Fine tune the steps with errors
6. Return demo, using check list below, check for errors (Trial 3)
7. Congratulate the participant/patient

	Trial 1	Trial 2	Trial 3
1. **Check dose counter**. Your patient may be inhaling an empty device. So have them check each time. **Remove cover.**			
2. **Shake the device.**			
3. **Breathe out gently away from the device.** It's important not to breathe into the device as you may blow the medicine out of the device.			
4. **Seal your lips around the mouthpiece.** Make sure the tongue is not blocking the mouthpiece. Hold the inhaler horizontally and tilt head a little backwards to straighten up the upper airway.			
5. **Inhale slowly and deeply.**			
6. **Hold breath for 5-10 seconds.**			
7. **Exhale gently away from the device.**			
8. **Close the device.**			
9. **Gargle after use.**			

B. Inhaler Adherence Questionnaire:

- Have you at times been careless about using your inhaler?
- Have you ever forgotten to use your inhaler?
- Have you ever stopped using your inhaler because you felt better?
- Have you ever stopped using your inhaler because you felt worse?
- Have you ever used your inhaler less than the doctor prescribed because you felt better?
- Have you ever used your inhaler more than the doctor prescribed because you felt you were having an attack?

C. GINA symptom control tool

Box 2-2. GINA assessment of asthma control in adults, adolescents and children 6–11 years

A. Asthma symptom control		Level of asthma symptom control		
In the past 4 weeks, has the patient had:		**Well controlled**	**Partly controlled**	**Uncontrolled**
• Daytime asthma symptoms more than twice/week?	Yes☐ No☐	None of these	1–2 of these	3–4 of these
• Any night waking due to asthma?	Yes☐ No☐			
• SABA reliever for symptoms more than twice/week?*	Yes☐ No☐			
• Any activity limitation due to asthma?	Yes☐ No☐			

Legend: SABA, short-acting beta agonist

D. INFORMED CONSENT

Patient Information and Informed Consent Form
(ENGLISH VERSION)

You are being invited to participate voluntarily in the study entitled Comparison of the Efficacy of In-person vs. Virtual Inhaler Education in Terms of Adherence and Inhaler Technique Among Asthma OPD Patients: Randomized Controlled Trial under the supervision of Dr. Diego A. Estigoy and Dr. Domina Flor L. Gamboa.

Before you agree to join in this study, you need to know the risks and benefits so you can make an informed decision. This process is known as "informed consent".

This consent form tells you about the study that you may wish to join. Please read the information carefully and discuss it with anyone you want. This may include a friend or a relative. If you have questions, please ask the Study Doctor or study staff to answer them.

The objective of the study is to compare the efficacy of in-person vs. virtual inhaler education in terms of medication adherence and inhaler technique retention among asthmatic patients seen in the LCP OPD.
The number of study participants is 42.

The duration of your participation in the study will be 4 weeks (28 days).

In this study you will either be in the virtual inhaler education group or in the in-person inhaler education group. You have an "equal" or 50 % chance (like flipping a coin or randomizing electronically) of being in the two groups.

Your responsibilities as a study subject includes:

1. Watch 1-2 minute-long videos showing the proper use of the inhalers if you will be assigned to the virtual group.

2. Attend and listen to the researcher who will teach the proper way of using the inhalers if you will be assigned to the in-person group.

3. Answer the adherence questionnaires that will be provided by the researchers. This is composed of six validated questions that will assess your adherence.

The study will be divided into two phases and the following phases will involve:

1. The pre-experimental phase or the baseline phase and will involve filling up of the information of the participants, history taking, recording the weight and height of study participants, and assessing the asthma control through the GINA (Global Initiative for Asthma) symptom control tool.

2. The experimental phase will cover a period of 4 weeks (28 days) wherein the study participants have already been randomly assigned into virtual and in-person groups. The virtual group will be given 1-2 minute-long videos showing the proper use of the inhalers. Whereas the in-person group will be taught by the same researcher in a one-on-one session. Then, a return demonstration will be done by the study participants for both groups.

The researchers may remove you from this study for any justified reason according to the protocol. Examples why you may have to stop some or all study-related activities are:

1. Staying in the study would be harmful.
2. You fail to follow up.
3. You fail to follow instructions.
4. You become pregnant.
5. The study is cancelled.

You may withdraw your consent from participation in this study at any time. It is important that you inform the researchers in writing. The researchers will continue to retain and use any research results that have already been collected for the study evaluation. No further study-related activities will take place. The choice to withdraw from research participation will not affect your medical care.

There are no risks in the study. The only possible inconvenience that the researchers foresee is possible transport inconvenience. You will be given any new information that may affect your willingness to start or continue in the study.

The benefits of participating in this study includes the possible improvement on the medication adherence and inhaler technique that may subsequently improve your asthma control.

There will be no monetary costs to you for participating in this study. You will not be charged for any amount for tests and procedures performed solely for research purposes. However, you will be given free snacks and inhalers during visits as compensation in participating in this study.

It is important that you follow carefully all the instructions given by the researchers regarding this study. If you become ill or are physically injured as a result of participation in this study, please contact the researchers right away to be taken care of.

Unless required by law, your name will not be disclosed outside the research clinic. Your name will be available only to the following people or agencies: the researchers and staff; and authorized representatives of the researchers and ethics committees. While participating in this study, the researchers will replace your name with a special code that identifies you.

Your participation in this study is voluntary and you may cancel this consent at any time and without any reason. If you do so, your participation in the study will end and the study staff will stop collecting information from you.

You have the right to review your Study Information and medical records and request changes to the Study Information if it is not correct. However, please note that during the study, access to Study Information may be limited if it weakens the integrity of the research. You may have access to the Study Information held by the researchers at the end of the study. Data and results of the study will be published and will be available for academic purposes.

You can call or ask questions anytime regarding this study. The contact person for further information or for inquiries are Dr. Diego Estigoy, 09286668973, and Dr. Domina Flor L. Gamboa, 09150175587.

This study has been approved for implementation by the Lung Center of the Philippines Institutional Ethics Review Board (LCPIERB). If you have questions related to your rights as a research subject, please contact LCPIERB.

Email: ierb@lcp.gov.ph
Telephone No.: (02) 8924-6101 local 4047/4048

I have read this document/had its contents explained to me. I understand the purpose of this study and what will happen to me in this study. I do freely give my consent to join in this study, as described to me in this document. I understand that I will receive a copy of this document as signed below.

By signing this consent form, I authorize the use, access, and sharing of my personal medical information as described in the section "Confidentiality and Authorization to collect, use and disclose Personal Medical Information". This consent is valid unless and until I revoke it.

Patient	Signature	Date
Legally authorized representative	Signature	Date
Principal Investigator	Signature	Date
Name of presenter of the document	Signature	Date

Impormasyon Sa Pasyente At Dokumento Ng Pagsang-Ayon

(TAGALOG VERSION)

Ikaw ay inaanyayahan na kusang loob na lumahok sa pananaliksik na pinamagatang Comparison of the Efficacy of In-person vs. Virtual Inhaler Education in Terms of Adherence and Inhaler Technique Among Asthma OPD Patients: Randomized Controlled Trial under the supervision of Dr. Diego A. Estigoy and Dr. Domina Flor L. Gamboa.

Bago po kayo pumayag na sumali sa pag-aaral na ito, kailangan po ninyong malaman ang mga panganib at mga benepisyo para kayo ay makagawa ng isang may kaalamang desisyon. Ang prosesong ito ay kilala bilang "may kaalamang pahintulot".

Ang kasulatan ng pahintulot na ito ay magsasabi sa inyo tungkol sa pag-aaral na maaaring nais ninyong salihan. Pakibasa pong mabuti ang impormasyon at pag-usapan ninyo ng sinuman na gusto ninyo. Maaari pong kabilang dito ang isang kaibigan o isang kamag-anak. Kung mayroon po kayong mga katanungan mangyaring hilingin sa Doktor ng Pag-aaral o tauhan ng pag-aaral na sagutin ang mga ito.

Ang layunin ng pananaliksik ay Masuri and bisa ng Virtual Asthma Inhaler Education kung ito ay inihambing sa In-person Inhaler Education sa mga Asthmatic na pasyente sa OPD.

Ang Bilang ng kasali sa pagaaral na ito ay 42.

Ang iyong paglahok sa pagaaral na ito ay tatagal ng apat na lingo (28 na araw).

Sa pag-aaral na ito kayo po ay maaring makalahok sa virtual group o sa in-person group. Mayroon po kayong "pantay" o 50% tsansa (tulad ng pagpitik ng barya) na mapasali sa magkabilang grupo.

Sa pag-aral na ito. kayo po ay inaasahan na:

1. Manood ng mga videos na may habang isa hanggang dalawang minuto kung saan ay mapapanood ang tamang paggamit ng mga inhalers.
2. Makinig sa doktor na magtuturo ng tamang paraan kung paano gamitin ang inhalers.
3. Sumagot ng "adherence questionnaires" na ibibigay ng mga mananaliksik.

Ang Doktor ng Pag-aaral ay maaari po kayong tanggalin mula sa pag-aaral na ito sa anumang makatwirang dahilan ayon sa protokol.

Mga halimbawa kung bakit maaaring kailangan ninyong itigil ang ilan o lahat ng mga gawaing may-kaugnayan sa pag-aaral:

1. Ang pananatili sa pag-aaral ay maaaring makasama.

2. Hindi po kayo nakabalik sa follow up.

3. Nabigo po kayong sundin ang mga tagubilin.

4. Kayo po ay nabuntis.

5. Ang pag-aaral ay nakansela.

Maari ninyo pong bawiin anginyong pahintulot mula sa partisipasyon sa pag-aaral na ito. Mahalaga po na ipaalam ninyo ito sa inyong Doktor ng Pag-aaral sa pamamagitan ng sulat. Ang inyong doktor ay patuloy na itatago at gagamitin ang anumang mga resulta ng pananaliksik na nakolekta na para pagpasiyahan ang pag-aaral. Wala nang karagdagang mga gawain na may kaugnayan sa pag-aaral ang magaganap. Ang kagustuhang bumitiw mula sa partisipasyon sa pananaliksik ay hindi makaka-apekto sa inyong medikal na pangangalaga.

Walang mga panganib ang umuugnay sa partisipasyon sa pag-aaral na ito.

Ang iyong pakinabang sa pagsali sa pagaaral na ito ay ang posibleng mapabuti ang iyong paggamit ng inhaler na magdudulot ng mabisang pagkontrol sa iyong asthma.

Walang magiging gastos na pera sa inyo sa pakikilahok sa pag-aaral na ito. Hindi po kayo sisingilin para sa (mga) inaaral na gamot o anumang mga pagsubok at mga pamamaraang isinagawa para lamang sa mga layunin ng pananaliksik. Kayo po ay bibigyan ng libreng “snacks” at inhalers sa kada follow up ninyo sa buong tagal ng pag-aaral.

Mahalaga na maingat ninyong sundin lahat ng mga tagubiling ibinibigay ng Doktor ng Pag-aaral at ng kanyang tauhan tungkol sa pag-aaral na ito. Kung kayo ay magkasakit o pisikal na mapinsala bilang resulta ng partisipasyon sa pag-aaral na ito, paki-kontak kaagad ang Doktor ng Pag-aaral upang malapatan ng kaukulang atensiyon.

Maliban kung kinakailangan ng batas, ang inyong pangalan ay hindi ibubunyag sa labas ng klinika ng pananaliksik. Ang inyong pangalan ay makukuha lamang ng sumusunod na mga tao o mga ahensya: ng Doktor ng Pag-aaral at ng tauhan; at awtorisadong mga kinatawan ng Doktor ng Pag-aaral; ethics committees o ng mga inspektor ng awtoridad na pangkalusugan,Habang kasali sa pag-aaral na ito, papalitan ng Doktor ng Pag-aaral ang inyong pangalan ng isang espesyal na pantukoy na kikilala sa inyo.

Ang inyong partisipasyon sa pag-aaral na ito ay kusang loob at maaari ninyong kanselahin ang inyong pahintulot sa anumang oras at nang walang anumang dahilan. Kung gawin nyo ito, ang inyong partisipasyon sa pag-aaral ay magtatapos at ang tauhan ng pag-aaral ay titigil sa pagkolekta ng impormasyon mula sa inyo.

May karapatan kayong pagbalik-aralan ang inyong Impormasyon ng Pag-aaral at mga medikal na tala at humiling ng mga pagbabago sa Impormasyon ng Pag-aaral kung ito ay hindi tama. Gayunpaman, pakitandaan na sa panahon ng pag-aaral, ang pagtingin sa Impormasyon ng Pag-aaral ay maaaring limitado kung ito ay nagpapahina sa integridad ng pananaliksik. Maaari ninyong matingnan ang Impormasyon ng Pag-aaral na hawak ng Doktor ng Pag-aaral sa katapusan ng pag-aaral. Ang mga datos ng pag-aaral na ito ay gagamitin at mailalathala para sa mga layuning pang-akademiko.

Maaari kang magtanong ng kahit anong oras hinggil sa pag-aaral na ito. Ang tatawagan at kakausapin ay si are Dr. Diego Estigoy, 09286668973, at Dr. Domina Flor L. Gamboa, 09150175587.

Ang pag-aaral na ito ay inaprubahan ng Lung Center of the Philippines Institutional Ethics Review Board (LCPIERB). Kung mayroon kayong mga katanungan kaugnay sa inyong mga karapatan bilang isang kalahok sa pananaliksik, paki-kontak po ang LCPIERB:

Email: ierb@lcp.gov.ph
Telephone No.: (02) 8924-6101 local 4047/4048

Nabasa ko ang dokumentong ito/naipaliwanag sa akin ang mga nilalaman nito. Naiintindihan ko ang layunin nitong pag-aaral at kung ano ang mangyayari sa akin sa pag-aaral na ito. Malaya kong ibinibigay

ang aking pahintulot na sumalisa pag-aaral na ito, gaya ng inilarawan sa akin sa dokumentong ito. Naiintindihan ko na tatanggap ako ng kopya ng dokumentong ito na pinirmahan sa ibaba.

Sa pagpirma sa kasulatan ng pahintulot na ito, pinahihintulutan ko ang paggamit, pagtingin, at pagbabahagi ng aking personal na medical na impormasyon gaya ng inilarawan sa seksyong “Pagiging Lihim at Pahintulot na makolekta, magamit at maibunyagang Personal na Medikal na Impormasyon”. Ang pahintulot na ito ay may bisa maliban na lang at hanggang sa bawiin ko ito.

_____

Pangalan ng Pasyente/Petsa
(isatitik ang pangalan)

_____

Pangalan ng Kinatawang legal/Petsa
(legal na awtorisadong gumawa bilang personal nakinatawan sa pagpirma para kay [pangalan ng pasyente])

(isatitik ang pangalan)

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Pangalan ng Imbestigador/Petsa
(isatitik ang pangalan)

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Pangalan ng nagpahayag/Petsa
(nagpahayag/nagpaliwanag ng dokumento)
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ORIGINAL ARTICLE

RISK FACTORS FOR NON–SMALL CELL LUNG CANCER MORTALITY IN PATIENTS ADMITTED AT THE LUNG CENTER OF THE PHILIPPINES: A RETROSPECTIVE COHORT FROM 2000 TO 2008

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Corazon Adele F. Lavadia,[1] Maria Lourdes E. Amarillo, MPh[2]
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ABSTRACT

Objectives. This study aimed to determine the survival and the risk factors associated with mortality of patients with non–small cell lung cancer (NSCLC) in a single institution.

Methodology. This was a retrospective cohort study involving patients with NSCLC admitted at the Lung Center of the Philippines (LCP) from 2000 to 2008.

Results. This study included 3,439 patients with NSCLC; 76% of whom were stage IIIB or higher at first admission. Survival time followed a generalized-gamma distribution with a median survival time of 121 days (25th and 75th percentile: 42 and 319 days, respectively). The patients diagnosed, received chemotherapy or radiotherapy at LCP was associated with higher survival. Poorer survival was observed among males, smokers, residents of the National Capital Region, patients with metastasis, previous surgery or radiotherapy elsewhere, and patients with pneumonia and COPD. The receipt of chemotherapy and diagnosis at an early stage showed the highest survival.

Conclusion. Among patients with NSCLC in this cohort, the median survival was four months. Receiving chemotherapy and diagnosis at an early stage yielded the highest probability of survival.

Keywords: survival, lung cancer, risk factors, non–small cell lung cancer, Philippines

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INTRODUCTION

Lung cancer is one of the most common cancers among Filipinos, accounting for 12.2% of all cancer cases, second only to breast cancer, and is also the deadliest, the cause of 17.9% of all cancer deaths in 2018. The number of lung cancer cases are expected continue to increase and is predicted to reach 33,185 cases in 2040, almost double of cases recorded in 2018.[1] It also poses a huge economic burden to the country. Estimates of the total economic burden of lung cancer for the Philippines in 2015 was around 50,977 DALYs or disability adjusted life-years, mainly due to premature deaths.[2]

Over the past few decades, there has been significant progress in the management of lung cancer, including the introduction of national guidelines and polices, improvement in the diagnostic procedures and introduction of new treatments, with recent studies reporting a global trend towards improved survival in patients with lung cancer.[3-7]

Several studies have investigated the survival and prognostic factors of lung cancer patients in developing countries, with age, sex, stage, histopathology, performance status and treatment modalities showing varying effects on lung cancer survival.[8-10]

There is a paucity of data on the survival rates of lung cancer patients in the Philippines. Available data from Ngelangel et al. in 2002 showed one-year, three-year and five-year lung cancer survival rates of 27%, 11.1% and 7.2%, respectively.[11]

The present study aimed to describe survival rates and determine prognostic factors from the Lung Cancer Registry of the Lung Center of the Philippines, a national specialty center for lung and chest diseases where the biggest number of outpatient consultations and hospital admissions are due to patients with lung cancer. The findings hope to help clinicians in identifying strategies and modalities that may improve treatment outcomes and policy makers in improving access of patients to medical care and maximizing available resources for cancer care in the institution.

METHODOLOGY

Study design and setting

This was a retrospective cohort study among patients with non-small cell lung cancer (NSCLC) registered at the Lung Center of the Philippines.

Study Population

All histologically confirmed NSCLC diagnosed and/or treated at the Lung Center of the Philippines (LCP) between 2000-2008 were included. The patients with lung metastasis from other non-pulmonary malignancy and with missing and incomplete data were excluded in the survival analysis.

Data Collection

Only patients with histopathologically confirmed non-small cell carcinoma and staged according to the 7th edition of TNM staging were included in the study. Information on the clinico-demographic characteristics including smoking status, alcohol intake status, family history, co-morbidities, number of admissions, previous treatment elsewhere, site of metastasis, management (diagnostic procedure, supportive care, surgical resection, radiotherapy, chemotherapy and palliative care) and vital status of patients upon discharge were extracted from the chart. Diagnostic procedures include biopsy, computed tomographic (CT) scan, thoracentesis, thoracoscopy, cytology, thoracoscopy, mediastinoscopy, and thoracotomy. Supportive care consisted of blood transfusion, dialysis, intubation, mechanical ventilation, nasogastric tube insertion, oxygen inhalation and nutritional support. Information on re-admissions of the patients was also collected. Mortality of patients who were discharged alive in the last admission was verified at the National Statistics Office (NSO).

Data Handling and Analysis

Data were encoded via Epi InfoTM data entry program. Data quality assurance procedures were performed before analysis.

Descriptive statistics such as the mean and standard deviation of quantitative variables were computed. Frequency and percentage distribution of categorical variables were also obtained.

The distribution of the survival time of lung cancer patients was determined using the Easy Fit program. The association of survival time and each potential factor for mortality was determined using Eta and Pearson correlation coefficients in STATA software. All variables with significant correlation with survival time were considered in the multivariable survival analysis. Some variables which were not statistically significant but were known to have an association with survival time were considered in the survival model.

The explanatory variables assessed in the survival analysis were age, sex, residence, occupation, smoking status, co-existing illness, lung cancer stage, presence of metastasis, number of admissions, and management including diagnostic maneuvers and previous or on-site treatments. Time-varying covariates considered in the analysis were age, pneumonia, cancer stage, resective surgery, radiotherapy and chemotherapy. Variables significantly interacting with the main exposure variable "smoking status" as well as other possible interactions of variables were evaluated. Potential confounders were also assessed in the analysis.

Likelihood ratio tests were performed to determine the significance of the explanatory variables with survival time at 5% level of significance. Assessment of the goodness-of-fit of the model was done using the Bayesian Information Criterion (BIC). Randomness of censored observations was ascertained using method by David Kleinbaum.[12]

Definition of Outcomes

Survival time was defined as the difference between the beginning date (date of first admission as lung cancer case at LCP) and the end date (date of death for in-hospital mortality). For those discharged alive but later verified as mortality at the PSA-NSO, the reported date in the death certificate is the end date. For those discharged alive and could not be verified as mortality by the PSA-NSO were considered as censored observations.

RESULTS

A total of 3,439 diagnosed non-small cell lung cancer patients admitted from year 2000-2008 were included in the study.

Demographic Profile

Table 1 shows that most of the lung cancer patients were males (n=2,431; 70.7%) and married (n=2,724, 79.2%). The mean age was 60.3 years (SD=11.2) with the majority 60 years and above (n=1,868; 54.3%). More than 80% of the NSCLC patients seen at LCP resided in the National Capital Region, Regions III and IVA. The majority of the patients were farmers (n=429; 12.5%).

Table 1. *Frequency and percentage distribution of the demographic characteristics of lung cancer patients.*

Demographic Characteristics (n=3,439)	Frequency	Percentage
Sex		
Male	2,431	70.7
Female	1,008	29.3
Total	3,439	100.0
Age group (yrs)		
< 20	2	0.1
20-39	155	4.5
40-59	1,414	41.1
60 and above	1,868	54.3
Total	3,439	100.0
Civil Status		
Married	2724	79.2
Widow	455	13.2
Single	192	5.6
Separated	54	1.6
No information	14	0.4
Total	3,439	100.0
Top 3 Permanent Address (by regions)		
National Capital Region (NCR)	1,493	43.4
Region III-CENTRAL LUZON	755	22.0
Region IVA-CALABARZON	638	18.6
Most frequent occupations[a]		
Unspecified	670	19.5
Unemployed	558	16.2
Field crop farmers	429	12.5
Pensioner, retired or disabled	323	9.4
Motor vehicle drivers	230	6.7
Housewife	187	5.4

[a]The collected information on occupation was coded and grouped using the Philippine Standard Occupational and Classification of 2007 (PSOC 2007).

Medical History

Table 2 shows that current smokers accounted for about half of the cohort (n=1,725). The mean number of pack years was 42.6 (SD=35.2). 26.5% of patients were non-smokers. Less than half of cases reported any alcohol intake, with around 16% classified as alcohol drinkers. A family history of any malignancy was present in 24.7% (n=848). The most common co-existing illnesses were pulmonary tuberculosis (n=1,030; n=30%), hypertension (n=616; 17.9%), and pneumonia (n=520; 15.1%).

Table 2. *Frequency and percentage distribution of the history of lung cancer patients.*

History	Frequency	Percentage
Smoking status		
Smoker	1,725	50.2
Non-smoker	912	26.5
Ex-smoker	738	21.5
No information	46	1.3
Occasional smoker	18	0.5
TOTAL	3,439	100.0
Alcohol intake status		
Non-alcohol drinker	994	28.9
Occasional drinker	973	28.3
No information	657	19.1
Alcohol drinker	564	16.4
Previous alcohol drinker	251	7.3
TOTAL	3,439	100.0
Family history		
Hypertension	1,171	34.1
No Illness	927	27.0
Malignancy	848	24.7
PTB	726	21.1
Asthma	674	19.6
Co-existing illnesses		
No co-existing illness	1,130	32.9
Pulmonary tuberculosis	1,030	30.0
Hypertension	616	17.9
Pneumonia	520	15.1
COPD	423	12.3

Histologic Type, Cancer Stage and Treatment

Table 3 shows that the most common histologic type of non-small cell carcinoma was adenocarcinoma (n=1,648; 47.9%), followed by unspecified NSCLC (n=1,033; 30.0%), and squamous cell carcinoma (n=701; 20.4%). The majority of the patients were diagnosed in the advanced or metastatic stage of disease (n=2,977; 89.6%) on admission with only 13.1% (n=448) first seen in Stages I or II. Diagnostic procedures were performed in 79.3% (n=2,728), with resective surgery done in only 4.5% (n=155). Palliative care, chemotherapy and radiotherapy were provided in 30.4% (n=1,045), 24.8% (n=854) and 13.4% (n=459), respectively.

Table 3. *Frequency and percentage distribution of information on admission of lung cancer patients.*

Information on Admission	Frequency	Percentage
Histopathology:		
Adenocarcinoma	1,648	47.9
Unspecified NSCLC	1,033	30.0
Squamous	701	20.4
Large Cell	31	0.9
Adenosquamous	21	0.6
Others	5	0.1
Staging		
IA	15	0.4
IB	281	8.2
IIA	2	0.1
IIB	150	4.4
IIIA	391	11.4
IIIB	264	7.7
IVA	1,668	48.5
IVB	654	19.0
No Information	14	0.4
Total	3,439	100.0
Management		
Diagnostic	2,728	79.3
Palliative care	1,045	30.4
Chemotherapy	854	24.8
Supportive care	840	24.4
Radiotherapy	459	13.4
Resective surgery	155	4.5

Survival Analysis

About 72.2% of lung cancer patients in this study were recorded as mortality. The median survival time was 121 days or approximately 4 months. The incidence rate was 0.0038, which means that 38 people are expected to die of lung cancer per 10,000 person-days.

In the simple analysis, significant variable age was quadratic in nature but had no significant increase or decrease in the survival time per unit increase in age. Using the smoking status as an exposure variable for test for confounding, it was determined that there was no confounder. Backward selection procedure was done to determine which variables will be included in the final model. The interacting variables age by palliative care, and resective surgery by histology were not significant and thus were removed from the model. Sex, malignancy, and alcohol intake status were also removed from the model but in the final model, sex was later retained since it is a known confounder. Comparing the two resulting model, the backward strategy and the one with forced variables using the Bayesian Information Criterion, the model with forced variables was chosen as the final model since it has lower BIC (BIC=8647.794) than the full model (BIC=8757.32).

Table 4 shows the variables that were included in the final generalized-gamma model. The p-values were compared at 5% level of significance. In categorical variables, time ratio was defined as the proportion of survival time between the categories of the variable and the reference category. In continuous variables, time ratio indicates whether the survival time of a particular event increases, decreases or remains constant.[13]

Table 4. *Risk factors for lung cancer survival.*

Risk factors	Time Ratio	Standard Error	z	P-value	Over-all P-values	95% Confidence Interval
Age per admission	1.03	0.02	1.58	0.1140	0.0000	[0.9931, 1.0664]
Age per admission*Age per admission	1.00	0.00	-0.94	0.3470		[0.9996, 1.0002]
Sex (0=Female, 1=Male)	0.76	0.09	-2.20	0.0280	0.0280	[0.5983, 0.9711]
Residence (0=Other regions, 1=NCR)	0.89	0.05	-2.14	0.0320	0.0320	[0.7964, 0.9899]
Smoking status (0=Non-smoker, 1=Smoker)	0.74	0.06	-3.60	0.0000	0.0000	[0.6271, 0.8715]
Pneumonia (0=No, 1=Yes)	0.73	0.07	-3.28	0.0010	0.0010	[0.6082, 0.8823]
PTB (0=No, 1=Yes)	0.99	0.06	-0.23	0.8200	0.8200	[0.8666, 1.1200]
COPD (0=No, 1=Yes)	0.74	0.08	-2.79	0.0050	0.0050	[0.5957, 0.9134]
Presence of metastasis (0=No, 1=Yes)	0.69	0.08	-3.01	0.0030	0.0030	[0.5482, 0.8804]
Number of admissions	1.17	0.02	9.71	0.0000	0.0000	[1.1325, 1.2061]
Previous surgery elsewhere (0=No, 1=Yes)	0.71	0.10	-2.48	0.0130	0.0130	[0.5429, 0.9306]
Previous chemotherapy elsewhere (0=No, 1=Yes)	0.97	0.21	-0.14	0.8870	0.8870	[0.6317, 1.4874]
Previous radiotherapy elsewhere (0=No, 1=Yes)	0.62	0.14	-2.10	0.0350	0.0350	[0.3961, 0.9676]
Previous other treatment elsewhere (0=No, 1=Yes)	1.06	0.13	0.48	0.6340	0.6340	[0.8312, 1.3547]

NSCLC: Squamous	0.74	0.14	−1.55	0.1220		[0.5101, 1.0826]
NSCLC: Adenocarcinoma	0.94	0.11	−0.54	0.5880	0.2772	[0.7481, 1.1787]
NSCLC: Others	1.68	0.83	1.05	0.2940		[0.6381, 4.4164]
Stage IIA and IIB	0.76	0.15	−1.37	0.1700		[0.5056, 1.1279]
Stage IIIA	0.64	0.11	−2.61	0.0090		[0.4615, 0.8961]
Stage IIIB	0.33	0.06	−6.02	0.0000	0.0000	[0.2313, 0.4746]
Stage IVA	0.47	0.09	−4.08	0.0000		[0.3296, 0.6770]
Stage IVB	0.36	0.07	−5.62	0.0000		[0.2525, 0.5146]
Diagnostic procedure at LCP (0=No, 1=Yes)	1.26	0.09	3.08	0.0020	0.0020	[1.0863, 1.4525]
Supportive care at LCP (0=No, 1=Yes)	0.95	0.35	−0.14	0.8860	0.8860	[0.4588, 1.9599]
Palliative care at LCP (0=No, 1=Yes)	1.37	0.90	0.48	0.6330	0.6330	[0.3783, 4.9464]
Chemotherapy at LCP (0=No, 1=Yes)	29.69	7.67	13.12	0.0000	0.0000	[17.8884, 49.2709]
Surgery at LCP (0=No, 1=Yes)	1.90	0.67	1.83	0.0680	0.0680	[0.9542, 3.7995]
Radiotherapy at LCP (0=No, 1=Yes)	2.19	0.33	5.14	0.0000	0.0000	[1.6230, 2.9502]
COPD x PTB	1.49	0.24	2.44	0.0150	0.0150	[1.0812, 2.0501]
Stage IIA and IIB with supportive care	0.53	0.28	−1.20	0.2280		[0.1851, 1.4956]
Stage IIIA with supportive care	1.15	0.50	0.33	0.7430		[0.4941, 2.6873]
Stage IIIB with supportive care	0.87	0.39	−0.32	0.7520	0.0288	[0.3583, 2.0998]
Stage IVA with supportive care	0.57	0.22	−1.46	0.1440		[0.2722, 1.2082]
Stage IVB with supportive care	0.58	0.23	−1.40	0.1600		[0.2697, 1.2418]
Stage IIA and IIB with palliative care	2.87	2.67	1.14	0.2560		[0.4645, 17.7729]
Stage IIIA with palliative care	2.56	2.04	1.18	0.2400		[0.5347, 12.2322]
Stage IIIB with palliative care	2.39	2.07	1.01	0.3130	0.0035	[0.4389, 13.0615]
Stage IVA with palliative care	0.88	0.58	−0.19	0.8480		[0.2414, 3.2166]
Stage IVB with palliative care	0.65	0.43	−0.65	0.5150		[0.1750, 2.3965]

Male with squamous cell carcinoma	1.78	0.37	2.75	0.0060	0.0055	[1.1794, 2.6856]
Male with adenocarcinoma	1.41	0.19	2.49	0.0130		[1.0763, 1.8476]
Male with other NSCLC	0.51	0.28	–1.23	0.2210		[0.1698, 1.5055]
Constant	77.07	42.90	7.80	0.0000	0.0000	[25.8830, 229.4630]

A time ratio greater than 1 or significantly higher survival were seen with diagnostic procedure at LCP, number of admissions, radiotherapy at LCP, and chemotherapy at LCP. On the other hand, time ratios that are less than 1 such as seen with region of origin (NCR), males, smokers, presence of pneumonia and COPD, presence of metastasis, previous surgery elsewhere, and previous radiotherapy elsewhere showed significantly lower survival.

Table 5 demonstrates that there was high number of deaths during the first month up to 3 years while the survival probability decreased through time.

Table 5. *Life table of lung cancer patients at different time intervals.*

Time Interval	Number of subjects at the beginning	Number of deaths	Lost	Survival Probability	Standard Error	[95% Confidence Interval]
0–31 days (0–1 month)	9117	860	733	0.9017	0.0032	[0.8953, 0.9078]
31–90 days (1–3 months)	7524	1356	241	0.7366	0.0048	[0.7270, 0.7459]
90–180 days (3–6 months)	5927	1242	324	0.5779	0.0055	[0.5670, 0.5886]
180–365 days (6mos–1 yr)	4361	1639	340	0.3519	0.0055	[0.3411, 0.3627]
365–1095 days (1–3 years)	2382	1778	164	0.0799	0.0033	[0.0735, 0.0865]
1095–1825 days (3–5 years)	440	257	37	0.0312	0.0023	[0.0269, 0.0359]
1825–3650 days (5–10 years)	146	120	22	0.0035	0.0009	[0.0021, 0.0056]
3650 days–onwards (10 years onwards)	4	4	0	0.0000	.	.

With regards to treatment, the patients with stage IA and IB disease and those who underwent chemotherapy showed the highest survival probability (Figures 1–2, appendices F–G) and worst among untreated patients.

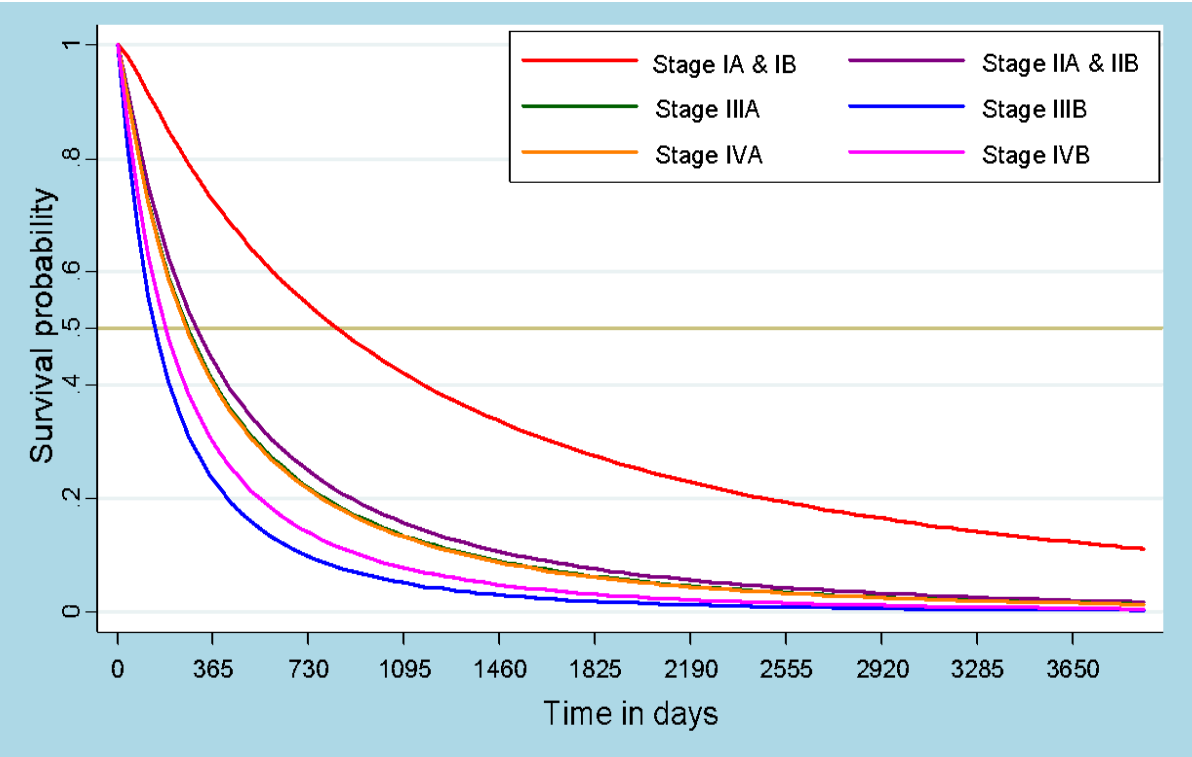

Figure 1. *Survival probability of lung cancer patients according to stage.*

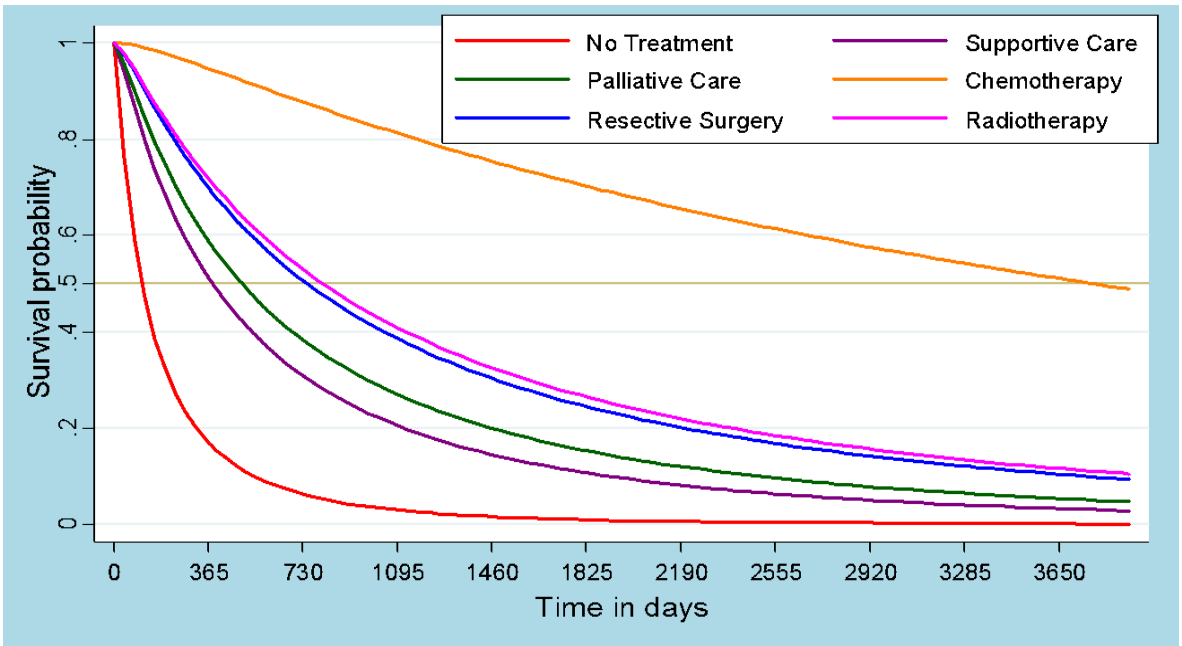

Figure 2. *Survival probability of lung cancer patients according to treatment.*

DISCUSSION

This study showed data for the period 2000 to 2009 from our institution's Lung Cancer Registry. The patient profile was consistent with existing literature, namely male–predominance (70.7%), and association with old age (54.3%) and smoking history (71.7%).

Females comprised 29.3% of cases in our cohort. While females still comprise a minority of lung cancer cases, the incidence is rising steadily. Several observations suggest that important sex-related distinctions in lung cancer exist. These include differences in histologic distribution, prevalence in never–smokers, frequency of activating EGFR mutations, likelihood of DNA adduct accumulation, and survival outcomes. The common profile of females is that of younger age, non–smoker and higher proportion of adenocarcinomas compared to their male counterparts.[14–15]

A notable finding also is that 26.5% of the cohort were non–smokers. The World Health Organization estimates that 25% of lung cancer worldwide occurs in never smokers.[16] However, lung cancer in never smokers' proportions may vary widely. The percentage is probably closer to 10–15% in Western countries. Gender variations also exist with more than 50% in women in Southeast Asia, and approximately 2–6% in men in Western series.[17–19]

Only 4.6% of the patients were below 40 years old, confirming that lung cancer is quite rare in persons below 40 years of age. Studies have shown that lung cancer in the young are more likely to be females, with adenocarcinoma, non–smokers and with less co–morbidities compared to their older more counterparts.[20,21] However, young adults have no significant differences with the elderly in terms of clinical presentation, histology type, operability or stage of the disease, and proportion of genomic picture or actionable mutations.[22,23]

Galvez–Niño et al. showed a median survival time of 8.2 months in lung cancer patients 40 years or younger, with a range of 3 to 86 months.[20] Among lung cancer in 18–35 years old, Liu et al. showed a one–year over–all survival rate of 62.3%, and a three–year and five–year survival rate of 53.1%.[21] The poor prognostic factors were male sex, squamous cell type, stage IV and negative or unknown gene mutation status.[22]

It is also important to note 30% of cohort had a history of TB. There is evidence to suggest that tuberculosis (TB) may increase the risk of lung cancer through substantial and prolonged pulmonary inflammation, leading to host tissue damage, fibrosis, scar formation, and genetic alterations.[23] A recent meta–analysis reported tuberculosis to be associated with a 1.7–fold elevation in the risk of lung cancer.[24] The main hypothesis is that Mycobacterium tuberculosis causes chronic inflammation and thus promotes lung cancer.[25] Epidemiologic studies have revealed that TB is associated with an increased risk of lung cancer, especially adenocarcinoma.[26] The presence of TB may actually influence the course and prognosis of lung cancer. Patients diagnosed with lung cancer and active TB for more than half a year have a significantly better prognosis than those diagnosed within half a year. ECOG Performance Status and surgery might possibly affect the outcomes of patients with co–existent active TB and lung cancer.[27]

Adenocarcinoma was the predominant cell–type (47.9%) in the cohort. Adenocarcinoma is now the main histologic type, accounting for almost half of all the cases.[28,29] However, a significant percentage (30%) of the patients had unspecified NSCLC. If the tumor cannot be classified based on light microscopy alone, special studies such as immune–histochemistry and/or mucin stains are recommended to classify the tumor further as treatment and prognosis depends on the histology. It has been recommended that the use of the term NSCLC not otherwise specified should be minimized.[29]

The mortality rate of the enrolled cohort at the time of study was 72.2%. The incidence rate of mortality was 38 deaths per 10,000 person days. The median survival is days or 4 months. Survival probability at 6–12 months is 35%; 1–3 years is 8% and 3–5 years is 3%. The low rates of survival were likely due to the fact that 67.5% were diagnosed as Stage IV and only 13.1% at the early stage (Stage 1 and 2).

Data from CONCORD–3 show that for lung cancer patients diagnosed during 2010–2014, 5–year survival rate was below 10% in Thailand, Brazil, Bulgaria and India and between 10–20% in most countries.30 Data from a hospital–based lung cancer registry in Thailand (2013–2017) had a case–fatality rate of 86.0 per 100 person years. Using Kaplan–Meier the median survival time is 0.46 years or 5.51 months. Overall survival is 31.2% in 1 year; 12.9% in 3 years; and 10.2% in 5 years.[9] Survival rates, however, are improving in some countries. In a population–based study in Sweden, the over–all survival one– two– and five–year survival estimates increased between 1995 to 2016 from 38% to 53%, 21% to 37% and 14% to 24%.7 This indicates that current efforts aimed at increasing survival can be successful.

In this cohort, male sex, smoking history, concomitant pneumonia or COPD, presence of metastasis and previous surgery or radiotherapy elsewhere were associated with worse survival. Any treatment modality, even just supportive or palliative care was better than no treatment at all. Receiving chemotherapy prolonged survival. As expected, the highest survival was seen in Stages I and II, worst with Stage IV, emphasizing the crucial role of early diagnosis and appropriate treatment in lung cancer. Comparable data are available among Asian countries. A study in Thailand showed that sex, stage of the disease and histology were associated with survival in LC. After adjusting for sex, TNM stage and histologic type, multivariate analysis of their cohort also identified chemotherapy as an independent predictor of improved survival (adjusted HR = 0.48, 95%

CI: 0.42 to 0.55; P < 0.001.9 In a tertiary cancer care center in Bangladesh, lower survival was associated with older age, presence of any co-morbidity, poorer performance status and radiotherapy only. The receipt of combined radiotherapy and chemotherapy was associated with higher survival (HR=0.56, 95% CI 0.46, 0.65; p < 0.001).[10]

A major strength of the study is the large sample size–the largest cohort of reported cases of lung cancer in a single institution in the Philippines. As data were extracted from hospital records retrospectively, some information may have not been reported and maybe subject to recording bias. The study's single institution design limits its generalizability to other areas in the Philippines. The patients seen at the outpatient department were also excluded, which may be included in future research. Data on the molecular profile and the specific systemic treatment received may also be included in further research. Multi-center studies may also be conducted in the future.

CONCLUSION

This cohort of lung cancer cases from 2000 to 2009 had low a survival rate, with a median survival of only four months, likely due to the majority having the diagnosis made at the advanced stage of the disease. Based on the survival probability curves, chemotherapy and diagnosis at an early stage yielded the best probability of survival.

AUTHORSHIP

All authors have certified fulfillment of Scientific Proceedings authorship criteria.

DISCLOSURE OF CONFLICTS OF INTEREST

All authors have declared that they have no conflicts of interest.

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- -Viber Account

For the Virtual Session
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- -Pulse Oximeter
- -Digital Blood Pressure Apparatus
- -Cycle Pedometer
- -Incentive Spirometer (*optional)
- -Cycle Ergometer (*optional)

CONDITIONS RECOMMENDED FOR THE PROGRAM

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- BRONCHIECTASIS
- POST COVID-19
- INTERSTITIAL LUNG DISEASE
- PERIOPERATIVE REHAB
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ORIGINAL ARTICLE

AN APPLICATION ASSESSMENT AND COMPLIANCE OF NURSING PERSONNEL TOWARDS USE OF AIDET (ACKNOWLEDGE, INTRODUCE, DURATION, EXPLANATION AND THANK YOU) AS A COMMUNICATION TOOL FOR PATIENT CARE: A QUALITY IMPROVEMENT PROJECT

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ABSTRACT

Background. The AIDET is a communication model for healthcare professionals to help reduce stress from patients and relatives, enhance their cooperation, and improve their medical results. It represents five communication actions: Acknowledge, Introduce, Duration, Explanation, and Thank You.

Methodology. The Quality Improvement Strategy was rolled out for three consecutive months at a tertiary hospital in Quezon City, involving all nursing staff from both General Nursing Care Services and Special and Critical Nursing Care Services across inpatient units. The FOCUS framework was used and incorporated the AIDET communication tool to enhance processes and improve interactions with patients. The researchers used qualitative descriptive statistics to analyze the data and present results in percentages.

Results. The nursing staff's performance from May to July 2024 showed a mix of results in two key areas: nonverbal communication and AIDET skills. While there was a noticeable drop in exceptional nonverbal communication, the overall satisfactory performance in this area saw a significant increase. AIDET skills demonstrated in May did not carry over, as there was a marked decline in the following months. One major reason for the AIDET struggles, particularly among new hires, is the lack of hands-on experience.

During the three-month span, there was a decline in the percentage of nursing staff effectively using nonverbal cues, dropping from over 70% in May 2024, which clearly shows a downward trend. The number of staff performing at a satisfactory or high level made a significant leap, rising from 23.68% in May 2024 to 53.63% in July 2024. The percentage of staff needing improvement increased from less than 1% in May 2024 to 3.63% in July 2024. An AIDET competency score of 100% was achieved in May 2024; however, it fell to 95.77% in June 2024, with an acceptable recovery to 97.21% in July 2024. Although over 50% of the staff comprehend the purpose of AIDET, certain individuals, particularly new employees, face challenges in applying it effectively during interactions with patients and their families.

Conclusion. This initiative highlighted how the nursing staff were able to implement AIDET to improve communication with patients and their families, guided by the AIDET cue card.

Keywords: AIDET, communication, nursing personnel, quality improvement, communication tool, patient care

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INTRODUCTION

AIDET (Acknowledge, Introduce, Duration, Explanation, and Thank you) is a communication tool for healthcare professionals to interact with patients and families to reduce patient stress, enhance patient cooperation, and improve medical results. It is intended to keep patients informed and to create positive interactions.[1]

Developed by the Studer Group in 2005, it is a foundational approach to optimizing patient communication. This strategy is widely embraced by healthcare professionals, including nurses, physicians, technicians, food service personnel, administrators, and all staff members engaged in patient and family encounters. Its implementation spans the entire care continuum, from bedside interactions to other stages of care.[2]

Nursing practice heavily relies on effective communication, making it imperative for nurses to establish a positive connection with their patients. AIDET proves beneficial as it assists nurses in introducing themselves to clients and enhancing patient satisfaction and outcomes. By adhering to AIDE's straightforward steps, nurses can deliver improved patient care while alleviating anxiety. It is a blueprint for practical and policy-compliant interactions between healthcare professionals and their patients.

The AIDET goes beyond being a convenient acronym for communicating with patients and their families. It is a communication technique grounded in evidence that empowers healthcare providers to deliver superior and more efficient care. Numerous studies have proven that implementing the AIDET technique enhances patient satisfaction and improves medical outcomes.[3] Utilizing tools like AIDET fosters a culture of excellence within the medical staff. Based on the study, tools like AIDET translated improved patient outcomes and heightened satisfaction, thus genuinely perceiving the provision of high-quality care.[4]

Healthcare systems progressively shift towards performance-based models, emphasizing identifying innovative strategies to improve patient outcomes. These outcomes are inextricably linked to patient satisfaction. Nevertheless, a communication gap often results in patient experiences and satisfaction levels not meeting expectations. Therefore, effective communication is essential for healthcare professionals interacting with patients daily.[3]

The Institute for Healthcare Communication highlighted that research over the past thirty years demonstrates that a clinician's ability to articulate, actively listen and show empathy significantly influences patient satisfaction and the overall quality of care received.[5] Understanding the critical role of effective communication in advancing service standards within nursing departments and avoiding the misinterpretation of patient needs by nurses is fundamental to boosting patient satisfaction.[6]

In healthcare provision, health information communication is considered suitable when it adopts a patient-centered perspective. This approach involves using non-technical language, actively listening, and expressing empathy towards patients. Implementing the AIDET communication framework has been shown to promote patient-centered care effectively. This framework ensures that healthcare professionals and their teams actively listen, comprehend, and empathize with patients and their families.[7] When healthcare providers do not apply the AIDET framework, patients frequently feel insignificant, neglected, and uninformed.[8] The role of the AIDET communication model in diminishing anxiety and enhancing patient satisfaction with healthcare services indicated that patients experienced a notable reduction in anxiety when interacting with the use of AIDET. Integrating the AIDET communication model into nursing care during cataract daytime operations is crucial in alleviating patient anxiety and tension, ultimately improving their satisfaction with care.[9]

The AIDET framework has become a prevalent tool in training healthcare professionals in recent years. The AIDET tool provides a structured and focused approach to communication between healthcare professionals and patients.[10] The elements encompassed within AIDET serve as a concise reference for effectively interacting with individuals who may be anxious, worried, or feeling vulnerable.[11] Applying AIDET enhances patient satisfaction and yields positive outcomes in providing care within emergency departments and other critical care settings.[6,12] However, the studies fell short of elucidating the roles of nurses or the means for personal improvement.

Participants from the study of Madayag perceived AIDET as a valuable tool, especially for student nurses still navigating the complexities of patient communication. This aligns with, or perhaps even reflects, the philosophical concept of "being in the world". Interactions with others shape how we see the world and ourselves, just as we influence their perspectives. For these student nurses, AIDET provides a structured framework within which they can develop their communication skills and navigate the healthcare environment. Participants expressed that AIDET simplifies nurse-patient interactions and provides a structured blueprint for communication. They explained how AIDET "eases or makes the patient-nurse interaction simple and smoother" in their early stages of learning. Results showed that acknowledging patients through greetings, listening to their concerns, and including them in care discussions fostered a sense of empowerment. This suggests that using AIDET goes beyond simply following a framework; it allows student nurses to develop a more patient-centered approach.[13]

The importance of effective communication cannot be overstated for health professionals who engage with patients regularly. The AIDET communication framework—comprising Acknowledge, Introduce, Duration, Explanation, and Thank you—can significantly support the delivery

of patient-centered care. This approach enables clinical staff to foster meaningful patient communication and interactions.[14] Additional advantages obtained from utilizing the AIDET approach consist of approaching your patient with a welcoming and amiable attitude to build trust, provide reassurance, and uphold loyalty in the long term; the integration of this method within the facility can cultivate a culture centered on providing top-notch care.[15]

Barriers to effective communication between physicians and their patients in their study. Several factors, such as age, severity of the diagnosis, and withholding information, made patients less likely to participate in making clinical decisions about their health. Thus, it is important to create a mutually trusting relationship that will enhance the quality of care received by the patient.[16,17] Three challenges of ineffective communication were enumerated as follows: patient disconnection, transparency deficiency, and provider burnout. Poor communication can create a feeling of indifference and reduce a patient's motivation to maintain their well-being. On the other hand, AIDET addresses these challenges through personalized patient care, fostering treatment adherence, and reigniting the purpose of health care professionals.[18]

The purpose of this study is to assess the application of the AIDET (Acknowledge, Introduce, Duration, Explain, and Thank You) communication model and the compliance of nursing personnel during patient interactions.

METHODOLOGY

Context

The Quality Improvement Strategy was launched in May 2024 at a tertiary hospital in Quezon City that provides high-quality health services for the diagnosis and treatment of chest diseases. It involved all nursing personnel in the outpatient and inpatient units for both General Nursing Services and Special/Critical Care Nursing Services. The strategy has been evaluated for three months. The pandemic highlighted and exacerbated existing systemic problems in healthcare, such as communication gaps and staff burnout. The Nursing Service initiated quality improvement efforts in its aftermath to build a more resilient and coordinated health system. Moreover, patient complaints often point to poor communication, a lack of consideration from staff, long wait times, or insufficient information regarding their care. Improving nursing communication and responsiveness is a primary way to address these issues.

To determine the sources of the issue and highlight possible areas for enhancement, the PDSA (Plan-Do-Study-Act) model[24] and the FOCUS framework[22] were implemented, encompassing the following steps:

Find

In May 2024, the team assessed and surveyed the use of the AIDET assessment tool to communicate with patients and relatives. Results showed that more than 50% of the nursing personnel exceptionally identified the purpose of using the AIDET principle. However, the focus should be more on introduction and explanation, and some nursing personnel still need improvement in these criteria.

Organize

A team of nurse supervisors and head nurses has been designated to participate in the quality improvement initiative related to AIDET within the framework of the PDSA project.

Clarify

The first step involved familiarizing nursing personnel with AIDET as a valuable communication tool within the healthcare environment. Additionally, the objective is to integrate AIDET into nursing practice, particularly in interactions with patients and relatives. Nursing personnel were evaluated using the AIDET communication tool (see Appendix B) which is a self-made questionnaire validated by three experts in the field of nursing and two experts in the field of research and had undergone pilot testing with a Crohn Bach Alpha value of 0.86. This quality improvement strategy was also subsequently assessed over three months with the AIDET competency tool /guide card made in our institution, which included the following criteria:[23]

- ACKNOWLEDGE – provided eye contact, showed care and compassion
- INTRODUCE – Provide the health personnel's name and what they do
- DURATION – discussed the duration of the upcoming procedure and provided the length of time
- EXPLANATION – explained procedures and answered questions
- THANK YOU – thanked the patient and relative

Understand

The team used the Impact Effort Matrix for AIDET. It is a simple, direct tool that accelerates decision-making.[19]

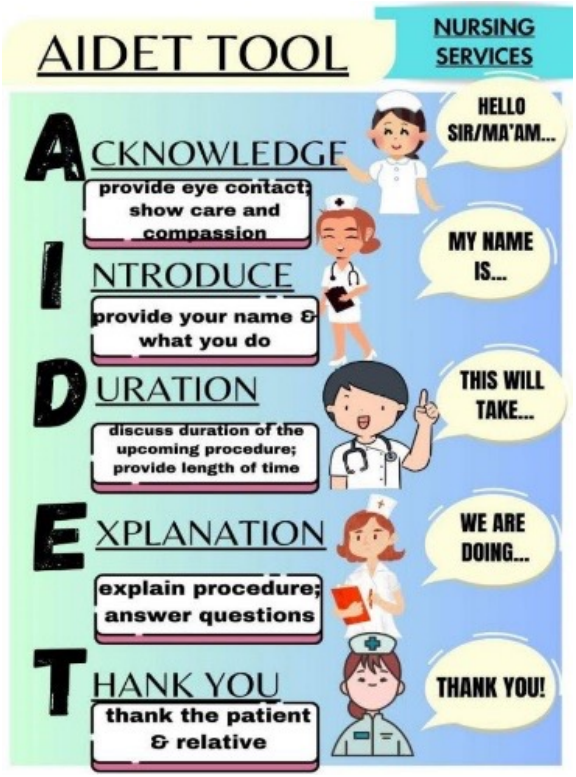

Figure 1. *A.I.D.E.T. Competency Tool/Guide Card*

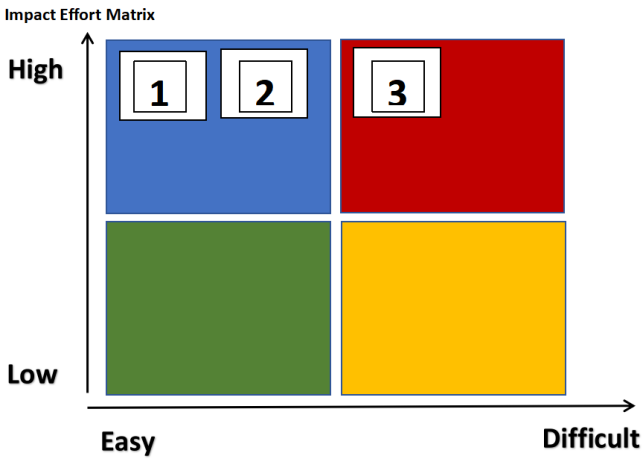

Figure 2. *Impact Effort Matrix*

Table 1. *Strategies for Impact Effort Matrix*

To enhance communication skills of nurses
Strategies: 1. Prepare AIDET guide card for each nursing personnel 2. Orient and discuss AIDET strategy to all nursing personnel 3. Evaluate AIDET compliance and communication outcomes

Using Table 1. as a guide for the Impact Effort Matrix (figure 2), Strategies 1, 2 and 3 were accordingly placed on their impact throughout the process.

The Impact Effort Matrix revealed that Strategies Nos. 1 and 2 had the most substantial impact on relatively straightforward actions. These strategies entailed preparing an AIDET guide card and facilitating the strategy by orienting and discussing it with all units. While evaluating compliance and communication outcomes may present difficulties, it will ultimately yield a high impact on the overall goal.

The subsequent step in the process is carrying out the plan. Before proceeding with its implementation, an information campaign targeting the stakeholders, namely all nursing personnel, all department heads, all head nurses, and all staff per unit, must be conducted. Gaining their support is paramount, and we should prioritize this principle above all. However, the long-term success of the change depends on obtaining compliance from all personnel with the "AIDET" project; the intervention will be adjusted accordingly to incorporate their recommendations.

Design

A prospective research design was put into action where a group of individuals is tracked over a set period to observe and record the outcomes. This approach is usually aimed at analyzing how different exposures relate to those outcomes.

Setting

The research took place at a specialized tertiary hospital focused on chest diseases in Quezon City, involving all nursing staff from both General Nursing and Special/Critical Care across outpatient and inpatient departments.

Participants

The study participants were nursing personnel, nurses, and nursing aides who have direct communication with patients and relatives regardless of age, employment status, and length of service.

Sampling

This quality improvement project utilized a simple random sampling technique. Nursing personnel, whether nurses or nursing attendants, will be assessed randomly by the respective evaluator, specifically during rounds before the shift begins.

Instrument

This study utilized three assessment methods for using AIDET to communicate: Simulation, Direct Observation, and Direct Question. Simulation is an effective strategy to improve patient satisfaction, increase compliance, and

promote retention of skills of nursing personnel wherein replicating real-life clinical scenarios in a safe, no-risk environment to test processes.[20] Direct observation is a standard assessment method in which nursing personnel are monitored and assessed while undergoing patient care and clinical activities. Evaluators collect information by watching activities and processes as they happen naturally in their clinical setting.[21] Moreover, direct questions were done during direct observations when there is a need for follow up questions.

Ethical Considerations

The research protocol and implementation were overseen by the Research Consultant in collaboration with the Department Managers and the Deputy Director of Nursing Services. The participants in the analysis of the summarized data were not recognizable.

Results and Discussion

The table below shows the position of all nursing personnel who participated in the use of AIDET from May to June 2024.

Table 2. *Position of nursing personnel who utilized AIDET from May to July 2024*

POSITION OF NURSING PERSONNEL	PERCENTAGE		
	MAY	JUNE	JULY
Nurse II Nurse I Nurse Job Order Nursing Attendant Medical Equipment Technicians	(n=68)18.94 (n=114)31.75 (n=76)21.17 (n=91)25.35 (n=10)2.78	(n=55) 23.21 (n=96)40.50 (n=6) 2.53 (n=68)28.69 (n=12) 5.06	(n=58)16.20 (n=100)27.93 (n=87)24.30 (n=108)30.17 (n=5)1.40
Total	(n=359)100%	(n=237)100%	(n=358)100%

Table 3. *Percent Distribution of Nursing Personnel per area of assignment (General Nursing Services/Special and Critical Care Nursing Services from May to July 2024)*

AREA OF ASSIGNMENT	MAY	JUNE	JULY
MICU	(n=21) 5.85%	0%	(n=23) 6.42%
RICU	(n=39)10.86%	0%	(n=38) 10.61%
PICU	(n=11) 3.06%	0%	(n=11) 3.07%
SICU	(n=18) 5.01%	0%	(n=2) 0.56%
HD	(n=10) 2.79%	(n=15) 6.35%	(n=15) 4.19%
FOB	(n=3) 0.84%	(=4) 1.59%	(n=3) 0.84%
STU	(n=27) 7.52%	(n=38) 15.87%	(n=31) 8.66%
ER	(n=14)3.90%	(n=26) 11.11%	(n=38) 10.61%
HOSPI	(n=23) 6.41%	(n=29)12.17%	(n=22) 6.14%
OPD	(n=5) 1.39%	0%	0%
OR	(n=30)8.36%	(n=26) 11.11%	0%
W2A	(n=21) 5.85%	(n=4) 1.59%	(n=24) 6.70%
W2B	(n=17) 4.73%	0%	(n=31) 8.66%
W3A	(n=17)4.73%	(n=16) 6.88%	(n=27) 7.54%
W3B	(n=21)5.85%	(n=10) 4.23%	(n=16) 4.47%
W3C	(n=29) 8.08%	(n=36) 15.34%	(n=95) 6.98%
W3D	(n=23) 6.41%	(n=25) 10.58%	(n=22) 6.14%
W4A	(n=13) 3.62%	0%	(n=25) 6.98%
AMOU	(n=7) 1.95%	0%	0%
APOU	(n=2) 0.56%	0%	(n=22) 0.55%
WOUNDCARE	(n=1) 0.28%	0%	(n=1) 0.28%
HBOT	(n=1) 0.28%	0%	(n=1) 0.28%
PHDD	(n=6) 1.67%	(n=8) 3.17%	0%
Total	(n=359)100%	(n=237)100%	(n=358)100%

Table 3 shows the distribution of nursing personnel who served as respondents of the Quality Improvement Project: AIDET from different areas of the General Nursing Services/ Critical and Special Nursing Services. STU, Hospitainer, and Ward 3C have the highest number of respondents for three months.

During the three-month period from May to July 2024, we saw some interesting trends in the percentage of nursing services provided across various wards. STU hit its peak in June 2024 at 15.87%, but then dipped slightly to 8.66% in July 2024, still keeping it among the top performers. Ward 3C also had a significant jump in June 2024, reaching 15.34%, while its service levels in May and July 2024 were more moderate. ER and Ward 3D consistently showed high percentages in both June 2024 and July 2024, highlighting a steady demand for nursing in those areas. RICU, on the other hand, had a stable performance with high percentages in May 2024 (10.86%) and July 2024 (10.61%), but it took a nosedive to 0% in June 2024. PICU and SICU maintained low but steady percentages throughout the three months, suggesting a minimal yet stable nursing presence. Conversely, some wards had little to no activity over several months. For example, OPD contributed a tiny percentage in May 2024 (1.39%) but then fell off completely afterward. AMOU through PHDD, especially Woundcare and Hyperbaric, consistently reported very low or zero percentages, which could mean either a lack of service demand or inactivity. Interestingly, several wards that were either inactive or had low percentages in May 2024—like HD, FOB, ER, Hospitainer, OR, Ward 3A, Ward 3C, and Ward 3D—saw significant increases in June 2024 and July 2024. This suggests a shift in nursing allocation or a rise in patient care needs during those months. In contrast, OR, which had relatively high percentages in May 2024 and June 2024, dropped to zero in July 2024. Overall, June 2024 stood out with sharp increases in nursing service concentration in certain wards, while May 2024 and July 2024 showed a more even distribution of services. These trends might reflect a strategic rotation or reallocation of nursing resources based on the changing needs of each ward over the three-month span.

Table 4. *Utilization of the assessment keys for the five communication actions of AIDET from May to July 2024*

PERFORMANCE CRITERIA	ASSESSMENT KEY								
	MAY			JUNE			JULY		
	1	2	3	1	2	3	1	2	3
1. Identify the purpose of using the AIDET principle	1.67%	34.82%	63.51%	7.94%	47.09%	44.97%	3.35%	53.63%	43.02%
2. Utilize the AIDET principle	1.67%	34.82%	63.51%	3.17%	60.32%	36.51%	3.63%	54.75%	41.62%
ACKNOWLEDGE	1.11%	24.51%	74.37%	2.12%	49.74%	48.15%	1.68%	53.63%	44.69%
INTRODUCTION									
State name and role	5.57%	27.30%	67.13%	16.49%	45.74%	37.77%	8.94%	48.04%	43.02%
Able to manage self and/or another team member	4.50%	26.26%	69.34%	5.79%	52.63%	40.53%	4.47%	56.98%	37.71%
DURATION									
Give the patient a time expectation	1.95%	32.03%	66.02%	13.54%	48.44%	38.02%	6.98%	57.54%	34.64%
Keep patient informed as to the amount of time a process will take	2.79%	30.92%	66.30%	8.99%	52.38%	38.62%	5.86%	58.66%	35.47%
Include letting patients know if there is a wait time and time expectation	2.79%	32.03%	65.18%	9.04%	54.26%	36.70%	6.42%	58.38%	35.20%
EXPLANATION									
Keep the patient informed by explaining all procedures	1.95%	28.69%	69.36%	8.51%	51.06%	40.42%	3.07%	55.86%	41.06%
Assist patient in having clear expectations of what will be occurring	2.51%	25.35%	72.14%	8.99%	51.85%	39.15%	4.19%	57.82%	37.99%
THANK YOU									
Consistently thank the patient for his/her time	4.18%	25.91%	69.92%	6.88%	47.87%	45.50%	6.70%	50.83%	42.46%
Express appreciation	4.18%	28.97%	66.85%	18.62%	47.32%	34.02%	12.85%	50.28%	36.87%
Ask if there is anything else they can do for the patient	4.18%	26.46%	69.36%	8.46%	49.21%	42.33%	6.98%	53.91%	39.11%

The consistent application of AIDET aims to enhance patient satisfaction, reduce anxiety, build trust, and improve overall patient outcomes. Assessment keys are tools used to evaluate how effectively individuals (e.g. nursing staff) are utilizing each of these five communication actions during interactions. Table 3 shows the utilization of assessment key. These helps to identify if the initial connection was established effectively.

Table 3 shows the performance criteria for the five communication actions of the AIDET framework using the three assessment keys as follows:

- 1 – Needs Improvement
- 2 – Performs Well/Satisfactorily
- 3 – Exceptional

The percentages of nursing staff who effectively met each performance criterion are shown in Table 3. It's essential to conduct a monthly analysis to keep track of the immediate effects of a new Quality Improvement initiative. By implementing strategies like training staff on communication protocols, managers can use the monthly data to quickly evaluate if the protocol is being followed.

Most of the nursing personnel identified the purpose of the AIDET principle and utilized it to communicate with others. There is a noticeable downward trend for those who performed exceptionally, from 63.51% in May 2024 to 43.02% in July 2024, while those who needed improvement increased significantly for June 2024 to 7.94%. A steady increase can be seen for those nursing personnel who performed well/satisfactorily, from 34.82% to 53.63% in July 2024.

Results also show how the nursing personnel ACKNOWLEDGE the patients and their families. This indicates the current performance levels and the preferred assessment keys for evaluating the use of the AIDET principle. Initially, for May 2024, 74.37% performed exceptionally (smiled, made eye contact, and pleasantly greeted patients) on using AIDET

as a form of communication with patients and their families. However, there is a marked decrease to 49.74% in June 2024 and 44.69% in July 2024, but those who performed well/satisfactorily improved from 24.51% to 53.63%.

On the criteria of INTRODUCTION of oneself by stating their name and role to patients, there has been a decrease in some nursing personnel who acted exceptionally in the said criteria, from 67.13% at first to 43.02%. It can be deduced from the table that 27.63% performed well/satisfactorily for May 2024, up to 48.04% in July 2024. Those who needed improvement increased from 5.57% to 16.49% in June 2024 and down to 8.94% in July 2024. 69.3% performed exceptionally in May 2024 in managing oneself and another team member but declined to 37.71% in July 2024. There is an associated increase for those who performed well/satisfactorily from 26.26% in May to 56.98% in July 2024, while those who needed improvement are at their highest in June 2024 at 5.79%.

In general, data provided on the DURATION of procedures/processes done for patients showed that there had been a constant decrease in the nursing personnel's performance, exceptionally from time expectation to waiting time, from 65.18–66.02% in May 2024 down to 35.20–34.64% in July 2024. The highest percentage for those who needed improvement was noted in June at 8.99–13.54%.

Information regarding EXPLANATION of the procedures done for patients is also illustrated. While there was always a downward trend for nursing personnel who performed exceptionally from May 2024 to July 2024, there was an increase for those who performed well/satisfactorily. The percentage of those who needed improvement was usually at its peak in June 2024 but then decreased in July 2024.

Results also revealed how nursing personnel expressed gratitude to patients and families (THANK YOU). The results showed the following: for May 2024, 66.85–69.92%% were exceptional in consistently thanking the patients for their time, expressing their appreciation for choosing LCP, and offering help for the patients, but this percentage decreased in July 2024 to 36.87–42.46%. There has been an increase in June 2024 for those who performed well/satisfactorily from 25.91% to 53.91%.

The Assessment Key was evaluated in the following manner: Key 1: Needs Improvement. This suggests that the performance level was at the minimal acceptable standard, indicating that the essential elements of AIDET were present but required additional enhancement. Key 2: Performs Well/Satisfactorily. This reflects a strong and consistent adherence to the AIDET framework. The performance is robust, although it may lack the extraordinary characteristics associated with the highest rating. Key 3: Exceptional. This represents the top rating, signifying complete and outstanding compliance with the AIDET principle, possibly including an aspect of surpassing patient expectations.

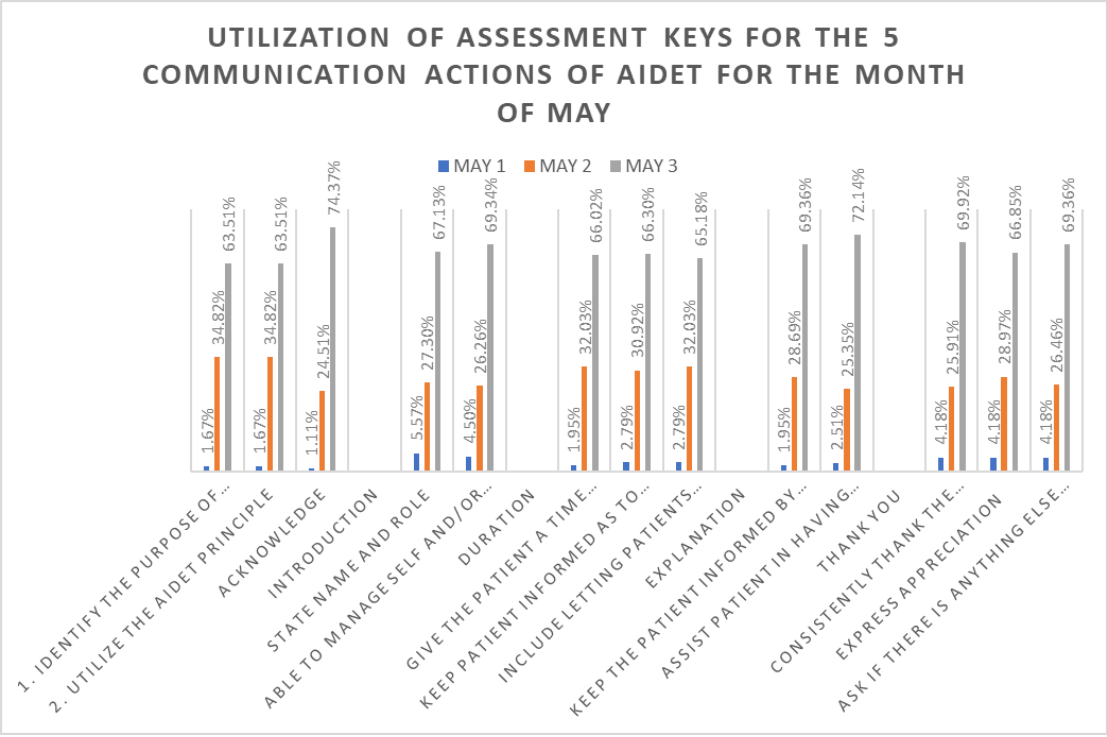

Figure 3. *Percentage of utilization of the assessment keys for the five communication actions of AIDET for the month of May 2024*

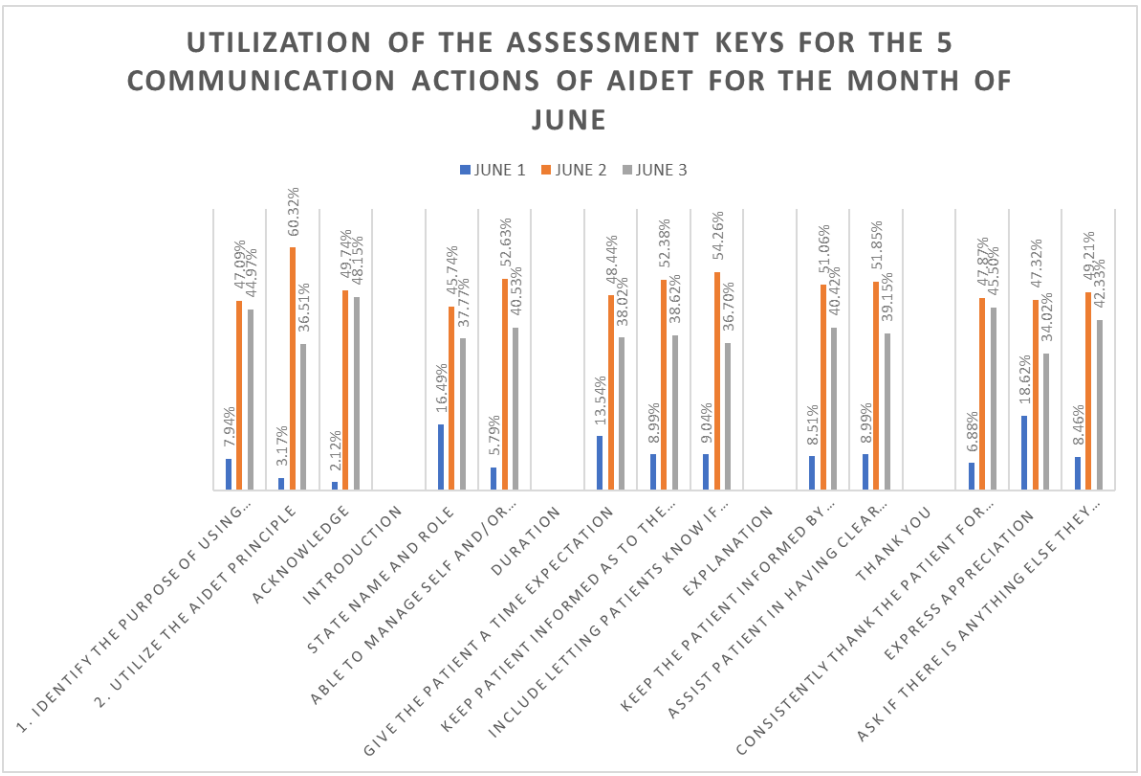

Figure 4. *Percentage of utilization of the assessment keys for the five communication actions of AIDET for the month of June 2024*

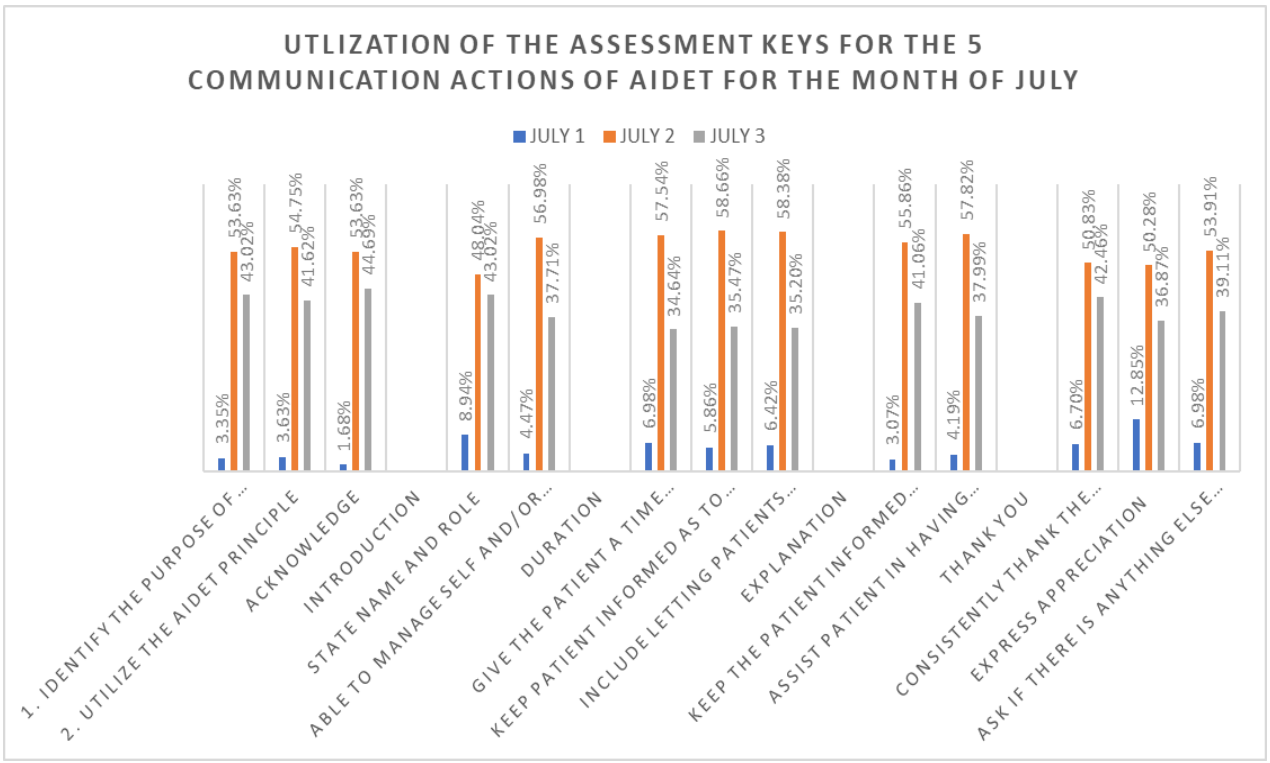

Figure 5. *Percentage of utilization of the assessment keys for the five communication actions of AIDET for the month of July 2024*

Table 5. *Utilization of the assessment methods for the five communication actions of AIDET from May 2024 to July 2024*

PERFORMANCE CRITERIA	ASSESSMENT METHOD								
	MAY			JUNE			JULY		
	S	DO	DQ	S	DO	DQ	S	DO	DQ
1. Identify the purpose of using the AIDET principle	7.80%	31.86%	60.34%	2.60%	72.92%	24.48%	1.67%	61.28%	37.05%
2. Utilize the AIDET principle	7.93%	52.41%	39.66%	2.09%	92.67%	5.24%	2.50%	67.78%	29.72%
ACKNOWLEDGE	10.73%	69.73%	19.54%	2.07%	95.85%	2.07%	6.98%	75.98%	17.32%
INTRODUCTION									
State name and role	10.81%	67.18%	22.01%	2.07%	95.85%	2.07%	7.24%	74.37%	18.38%
Able to manage self and/or another team member	11.20%	70.27%	18.53%	1.06%	97.35%	1.59%	7.80%	75.21%	1.70%
DURATION									
Give the patient a time expectation	9.74%	68.54%	21.72%	1.53%	94.39%	4.08%	7.78%	72.78%	19.44%
Keep patient informed as to the amount of time a process will take	10.11%	68.54%	21.35%	1.05%	95.81%	3.14%	2.22%	71.94%	20.26%
Include letting patients know if there is a wait time and time expectation	9.74%	64.79%	25.47%	3.11%	93.78%	3.11%	8.03%	72.30%	19.67%
EXPLANATION									
Keep the patient informed by explaining all procedures	10.86%	64.04%	25.09%	2.08%	95.31%	2.60%	8.06%	71.67%	2.03%
Assist patient in having clear expectations of what will be occurring	10.49%	67.42%	22.10`%	1.05%	96.32%	2.63%	7.80%	72.14%	20.22%
THANK YOU									
Consistently thank the patient for his/her time	9.02%	66.54%	24.44%	1.05%	96.84%	2.11%	7.24%	73.54%	19.22%
Express appreciation	9.26%	68.89%	21.85%	1.57%	96.34%	2.09%	7.80%	72.42%	19.78%
Ask if there is anything else they can do for the patient	8.99%	68.54%	22.47%	1.57%	96.34%	2.09%	8.06%	74.72%	17.22%

Table 5 shows the performance criteria for the five communication actions of the AIDET framework using the three assessment methods as follows:

- S – Simulation
- DO – Direct Observation
- DQ – Direct Question

Based on the table, direct observation was the commonly used assessment method by most nursing personnel, with the highest percentage in June 2024 at 97.35%.

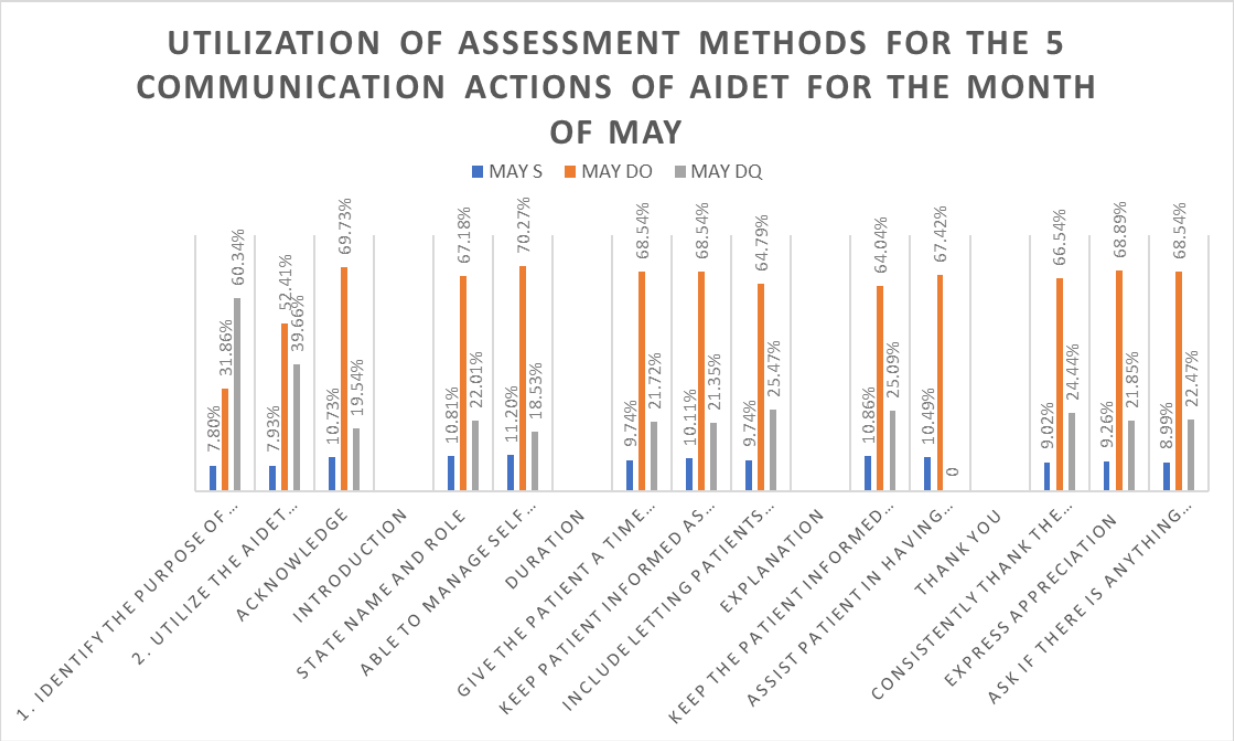

Figure 6. *Percentage of utilization of assessment methods for the five communication actions of AIDET for the month of May 2024*

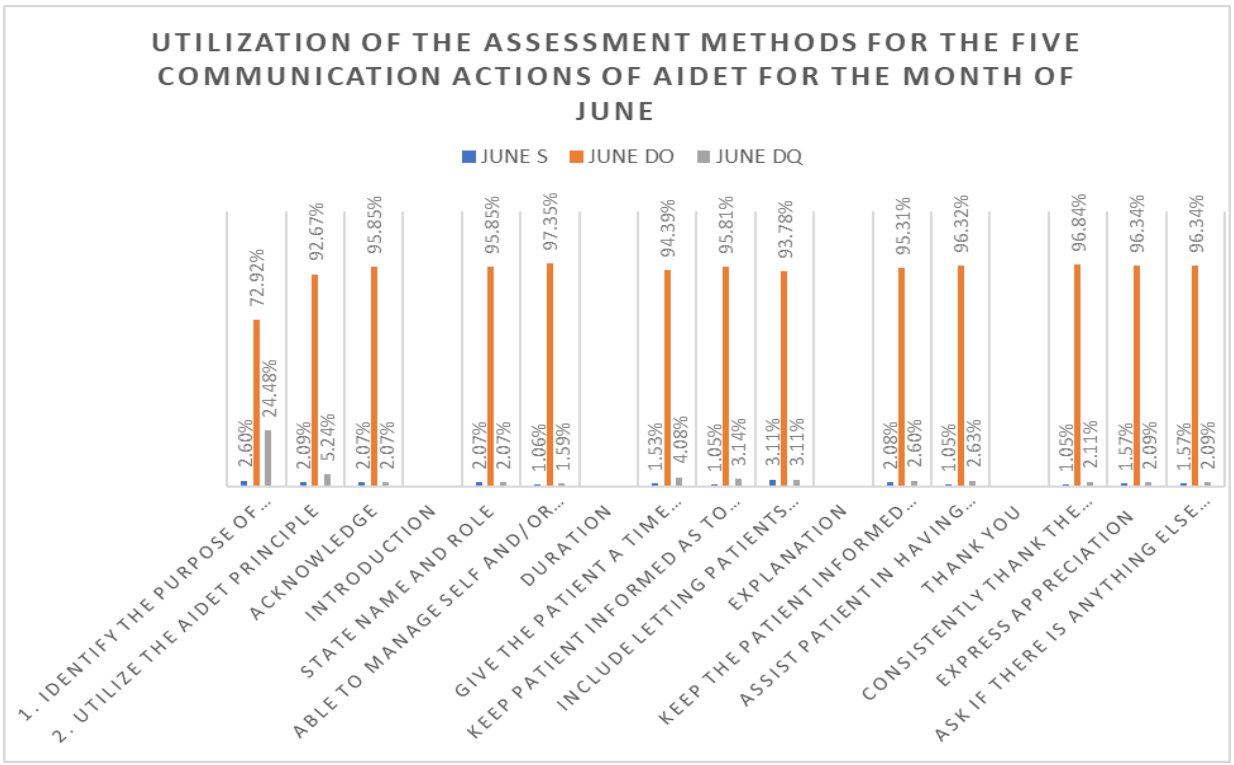

Figure 7. *Percentage of utilization of the assessment methods for five communications actions of AIDET for the month of June 2024*

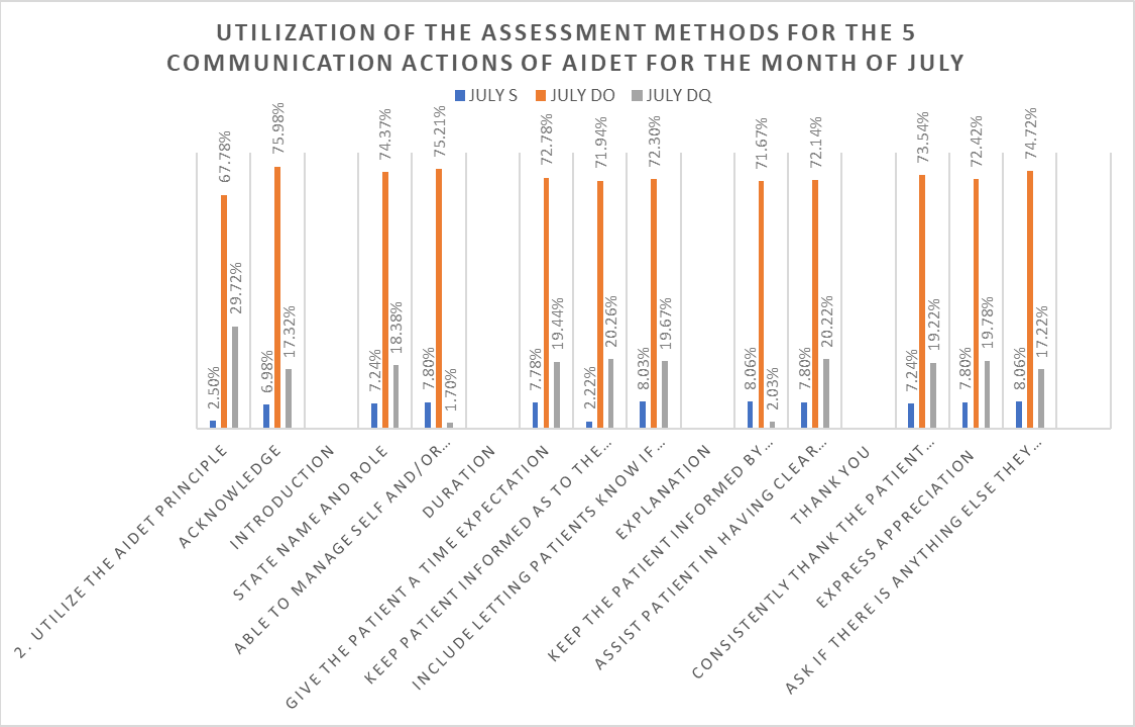

Figure 8. *Percentage of utilization of the assessment methods for the five communications actions of AIDET for the month of July 2024*

Table 6. *Nonverbal attributes of nursing personnel toward patients and families using the assessment keys*

NON-VERBAL ATTRIBUTES	ASSESSMENT KEY								
	MAY			JUNE			JULY		
	1	2	3	1	2	3	1	2	3
1. Friendly tone of voice and appropriate pace of speech	1.39%	25.10%	73.54%	2.64%	47.62%	49.74%	3.35%	47.49%	49.16%
2. Make eye contact	1.67%	23.96%	74.37%	1.59%	49.74%	48.68%	2.79%	53.07%	44.13%
3. Listen actively by nodding, not interrupting, and verifying the patient's statement	0.56%	23.68%	75.77%	1.06%	54.50%	44.44%	3.63%	53.63%	42.74%
4. Demonstrate confidence throughout the interaction	1.39%	27.02%	71.59%	5.29%	51.32%	43.39%	2.79%	52.51%	44.69%
5. Display a calm manner	0.84%	24.79%	74.37%	1.06%	51.32%	47.87%	2.79%	48.32%	48.88%

The percentage under the specified months for each nonverbal attribute represents the percentage of interactions where the specific nonverbal attribute was observed and met a satisfactory standard. There is a significant improvement in May 2024 for all attributes. There is dramatic jump from the first period to the second and especially the third period. This could indicate a rapid improvement in nurse nonverbal communication after implementing AIDET. By focusing on these specific nonverbal attributes, healthcare facilities can work to improve the overall patient experience, as nonverbal communication significantly impacts patient perception of care, trust, and satisfaction.

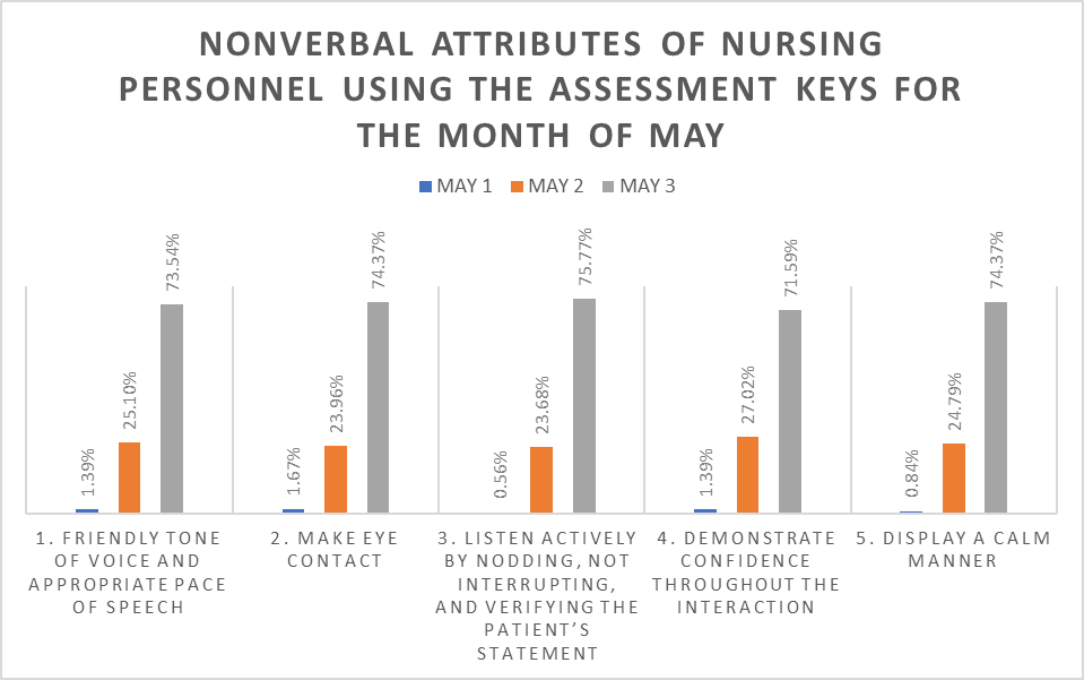

Figure 9. *Nonverbal attributes of nursing personnel toward patients and families using the assessment keys for the month of May 2024*

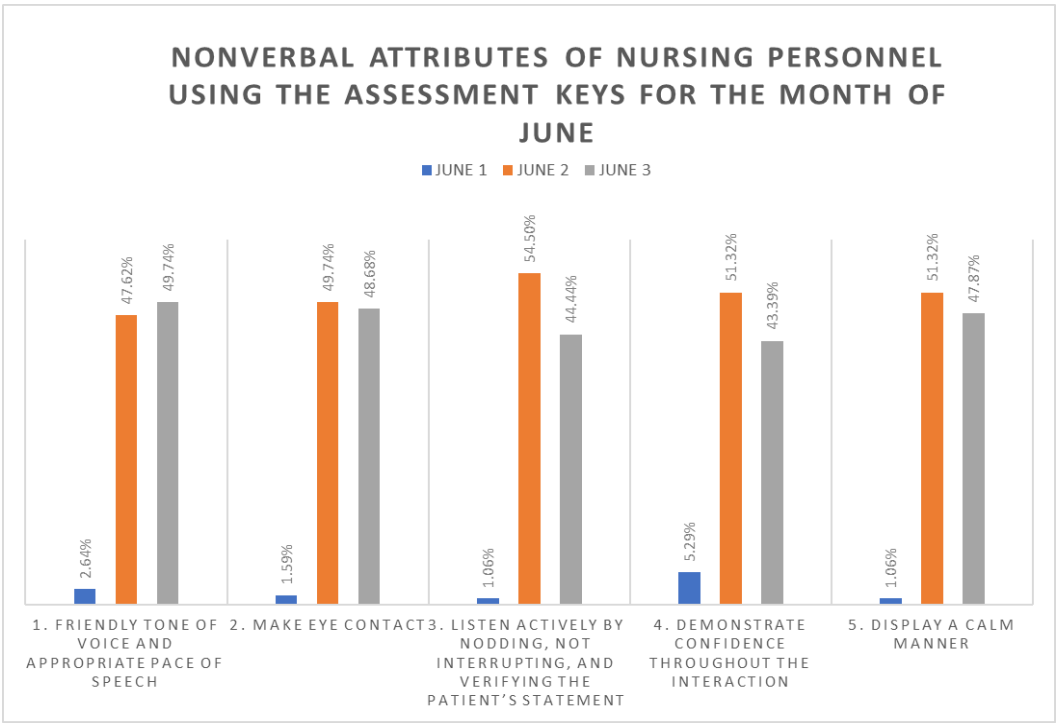

Figure 10. *Nonverbal attributes of nursing personnel toward patients and families using the assessment keys for the month of June 2024*

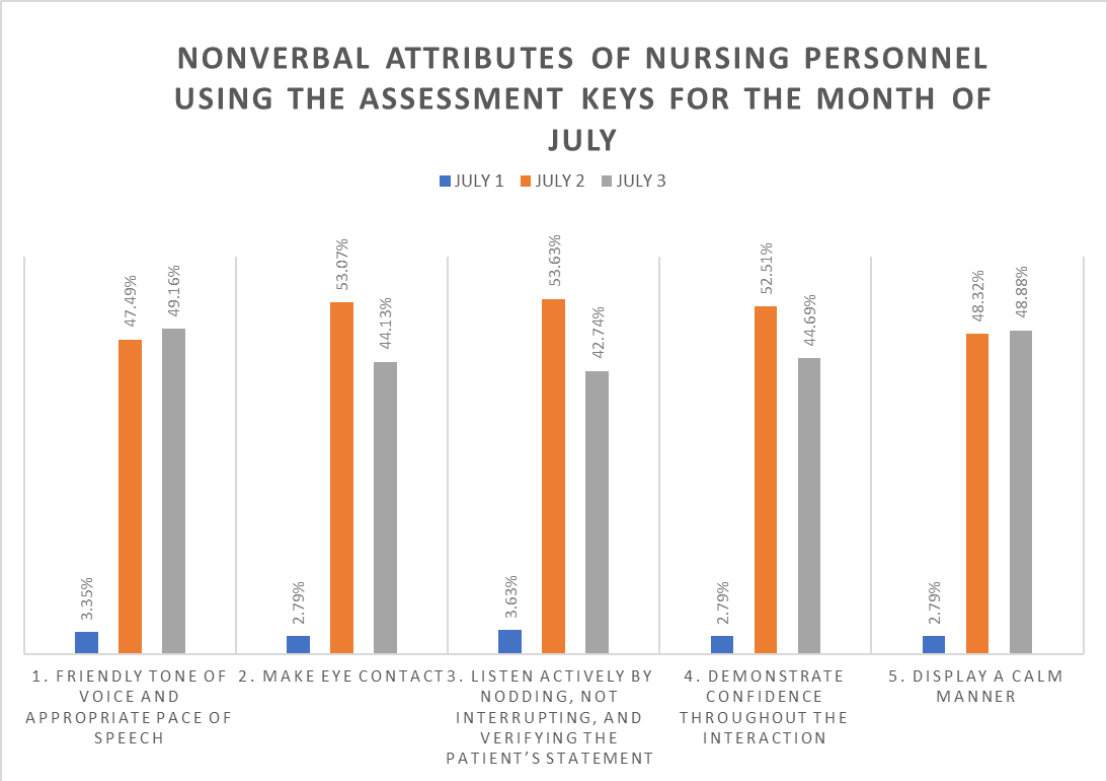

Figure 11. *Nonverbal attributes of nursing personnel toward patients and families using the assessment keys for the month of July 2024*

Table 7. *Nonverbal attributes of nursing personnel toward patients and families using the assessment methods*

NON-VERBAL ATTRIBUTES	ASSESSMENT METHOD								
	MAY			JUNE			JULY		
	S	DO	DQ	S	DO	DQ	S	DO	DQ
1. Friendly tone of voice and appropriate pace of speech	10.20%	74.51%	15.29%	1.06%	96.82%	2.12%	7.80%	74.65%	17.55%
2. Make eye contact	9.77%	75.00%	15.23%	1.06%	96.82%	2.12%	7.58%	75.56%	16.85%
3. Listen actively by nodding, not interrupting, and verifying the patient's statement	10.16%	74.61%	15.23%	1.05%	96.32%	2.63%	6.98%	75.70%	17.32%
4. Demonstrate confidence throughout the interaction	10.20%	74.51%	15.29%	0.53%	97.35%	2.12%	7.52%	75.21%	17.27%
5. Display a calm manner	10.16%	74.61%	15.23%	1.05%	96.82%	2.12%	8.06%	75.00%	16.94%

Table 7 presents the data on the evaluation of nonverbal communication skills of nursing staff that is divided into three distinct assessment methods. There is a consistent pattern across attributes and months. There is a notable improvement in June 2024 (around 96%) compared to May 2024 (around 74%) and July 2024 (around 75%). There is a peak in performance during June 2024 under direct observation. Self-Assessment (S) and Direct Questionnaire (DQ) remain low, with some minor fluctuations. Table 6 shows a significant discrepancy between what is directly observed (DO) and what is self-reported (S) or reported by patients/families (DQ). This discrepancy is essential for targeted interventions. If DO is high but DQ is low, nursing staff might be doing the right things when it comes to AIDET, but patients are not perceiving them effectively. Training might focus on making nonverbal cues more overt or consistent, or managing patient expectations. If S is consistently low, it could indicate a need for self-awareness training, or a refinement of the assessment tool.

Tables 6 and Table 7 show the NON-VERBAL ATTRIBUTES of the respondents to the patients and families. These attributes are enumerated as follows:

- Friendly tone of voice and appropriate pace of speech
- Made eye contact

- Listened actively by nodding, not interrupting, and verifying the patient's statement
- Demonstrated confidence throughout the interaction
- Displayed a calm manner

More than 70% of the nursing personnel were exceptional in using nonverbal cues in May 2024, but this further declined in the third month. However, the number of those who performed well/satisfactorily increased from 23.68% in May 2024 to 53.63% in July 2024. Less than 1% needed improvement in May 2024, but this increased to 3.63% in July 2024.

In May, 100% of the AIDET competency was achieved. However, in June 2024 and July 2024, the competency decreased to 95.77% and 97.21%, respectively. Overall, more than 50% of the nursing personnel can identify the purpose of the AIDET principle. However, evaluators commented that some nursing personnel, especially newly hired ones, are still in the orientation phase, adjusting to their area of assignment, and need more practice using AIDET to communicate with patients and families.

The result of this study shows similarity with the study of Panchuay and colleagues which is a Qualitative descriptive research with semi-structured interviews of fifteen emergency nurses in Thailand concerning the implementation of AIDET, which points out that nurses are capable of adopting AIDET and understanding its value in enhancing communication. Highlights the importance of ongoing training and its integration into routine tasks.[25] Moreover, in the Quasi-Experimental study of Fu and his group, the test group showed statistically higher care service satisfaction scores and significantly lower Self-Rating Anxiety Scale (SAS) scores. This illustrates the direct effect of AIDET on alleviating patient anxiety and enhancing satisfaction within a particular surgical setting. Advocates for its application in enhancing patient experience and overall well-being.[26] On the contrary, Hicks J. on his pre-post study using Press Ganey results shows no significant relationship between AIDET and patient satisfaction. However, a statistically significant outcome for patients recommending the hospital after AIDET implementation is shown. This points out that AIDET might not directly impact all specific satisfaction metrics. Hence, further studies considering responses of patients shall be considered to support the findings of this study.[27]

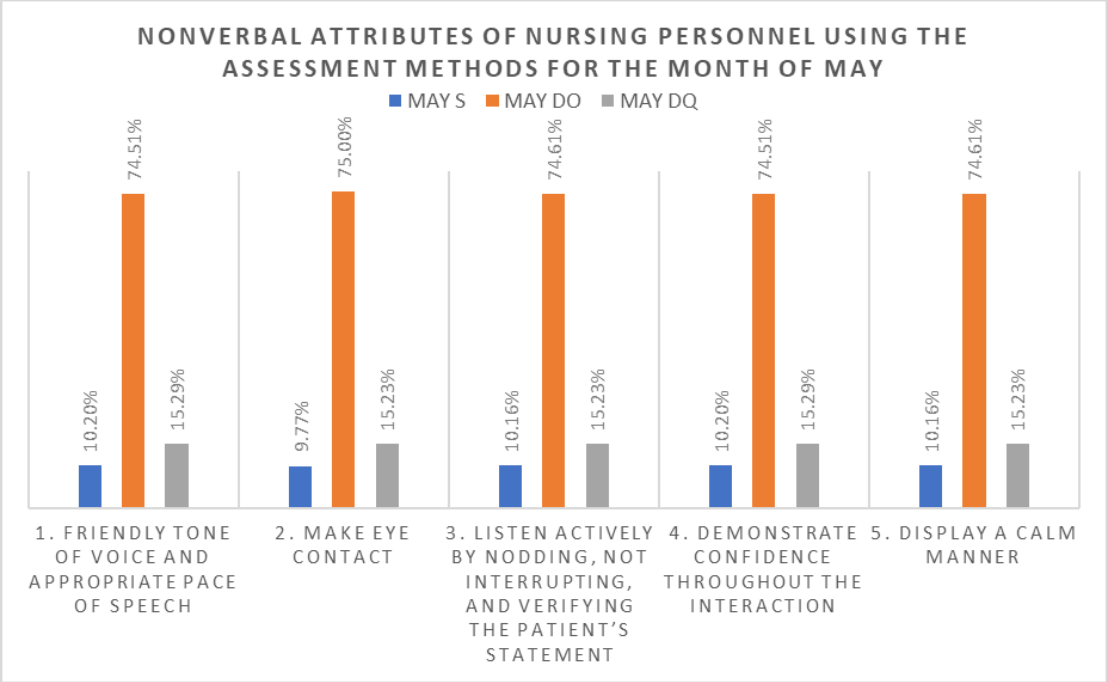

Figure 12. *Nonverbal attributes of nursing personnel toward patients and families using the assessment methods for the month of May 2024*

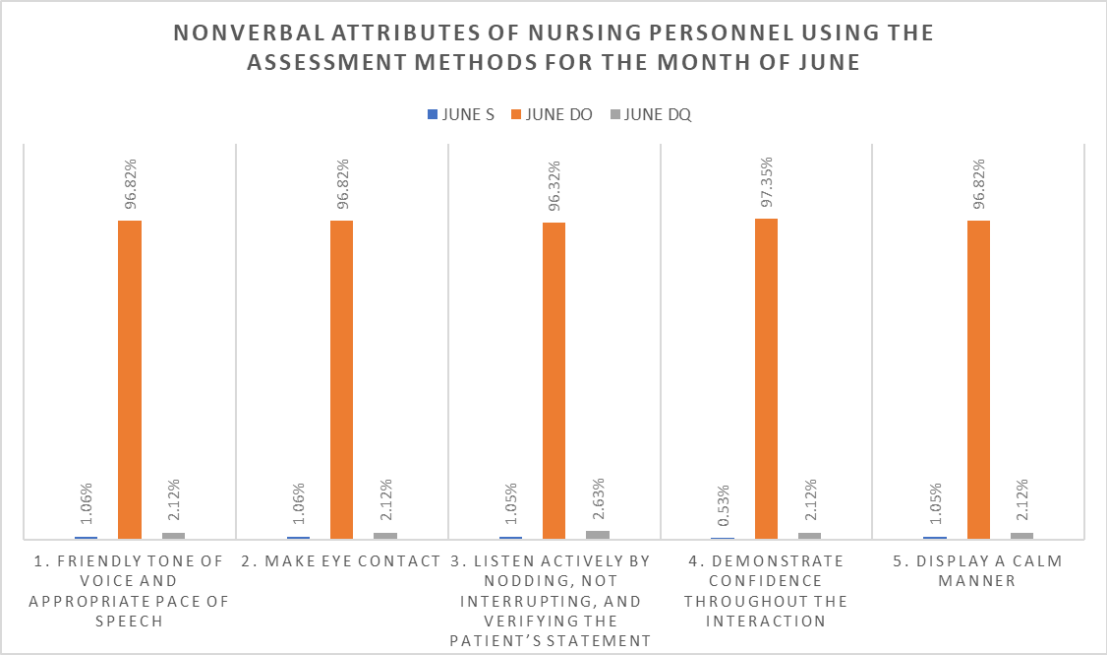

Figure 13. *Nonverbal attributes of nursing personnel toward patients and families using the assessment methods for the month of June 2024*

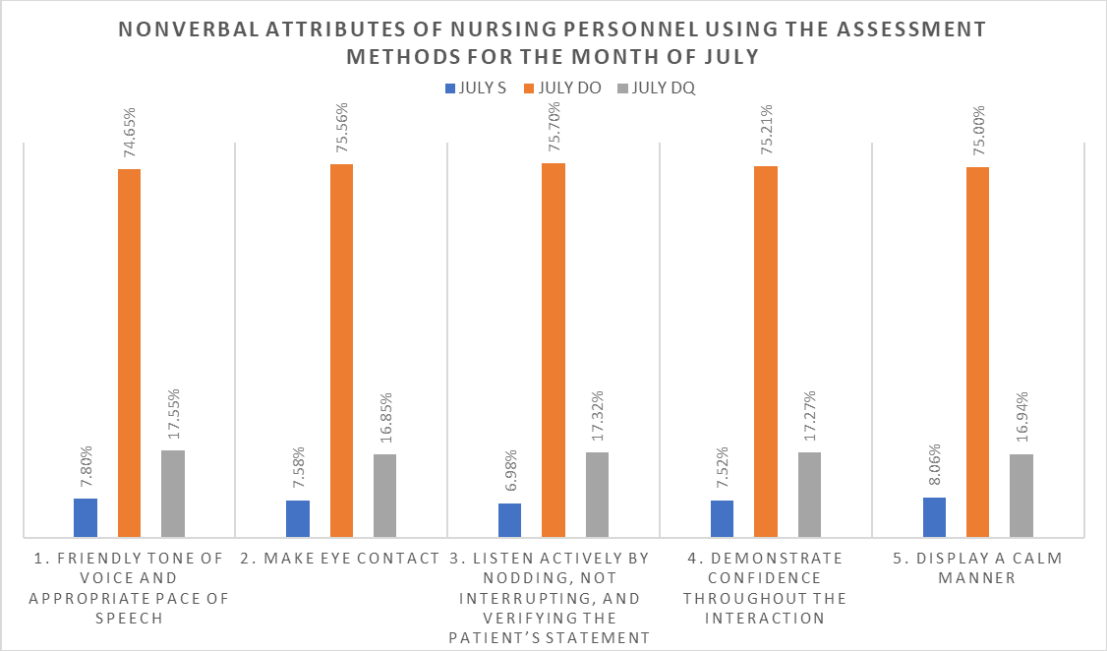

Figure 14. *Nonverbal attributes of nursing personnel toward patients and families using the assessment methods for the month of July 2024*

Conclusion

Over three months of monitoring the use of the AIDET competency tool, this project proved that all nursing personnel were willing to participate actively and utilize the five actions of AIDET in communicating with patients and families. However, 100% compliance was not adequately met in the second and third months of evaluation. Results also showed that some nursing personnel needed improvement in introducing themselves to patients and explaining the procedures to be done to them. To correct this, the AIDET guide card was provided for all, which served as a handy tool and assistance and recommended that continuous evaluation/monitoring of nursing personnel by head nurses and nurse supervisors and orientation of newly hired nursing personnel must be religiously done regarding AIDET as a tool for communication to help in promoting comprehensive, compassionate, and effective interaction with patients and families.

The researchers did not collect data on patient satisfaction to reduce intrusion and protect vulnerable populations. Additionally, the Quality Improvement Project (QIP) primarily focused on information obtained from the nursing staff. Therefore, it is advisable to conduct further studies that incorporate patient satisfaction levels to complement the data collected from nursing staff.

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Authorship

All authors have certified fulfillment of Scientific Proceedings authorship criteria.

Disclosure of Conflicts of Interest

All authors have no conflict of interest to show.

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Appendix A

First Test of Change	Person Responsible	When to be done	Where to be done
Execute **"AIDET"**	Nursing Service	April 2024	LCP
Tasks needed to set up this test of change	**Person Responsible**	**When to be done**	**Where to be done**
Prepare AIDET guide/ AIDET evaluation tool	As Directed (Nursing Personnel)	Immediately	LCP
Coordinate with Department Managers To introduce the strategy to all Head nurses	Nursing Department Head	After availability of AIDET card	LCP
Inform nursing personnel for compliance to AIDET strategy	All Nursing personnel	March 2024	All Units
Monitor Compliance to AIDET	Head Nurses	April – May 2024	All Units

Appendix B

LUNG CENTER OF THE PHILIPPINES
Quezon Avenue, Quezon City

NURSING SERVICES
AIDET COMPETENCY ASSESSMENT (FRONTLINE COMMUNICATION)

Name: _____ Position: _____ Area: _____

Competency Statement: LCP nursing personnel will consistently demonstrate proficiency in using AIDET when communicating with patients, families, peers, and managers.

Instructions: Complete the assessment and method portion of this document using the key on the right side. Record the completion of each performance criterion. The evaluator's signature validates the completion of each skill.	***Assessment Key***	
	1	Needs Improvement/Training
	2	Perform Well/Satisfactory
	3	Exceptional
	Assessment Methods	
	S	Simulation
	DO	Direct Observation
	DQ	Direct Questions

PERFORMANCE CRITERIA	**ASSESSMENT**			**METHODS**		
	1	**2**	**3**	**S**	**DO**	**DQ**
1. Identifies the purpose of using the AIDET principle						
2. Utilizes the AIDET principle to communicate with others, with a focus on patients and their families						
ACKNOWLEDGE the patient and companion						
• Smiles, makes eye contact, and greets them in a pleasant manner						
INTRODUCES self:						
• States name and role at Lung Center of the Philippines						
• Able to manage self and/or another team member						

DURATION:						
● Gives the patient a time expectation						
● Keeps the patient informed as to the amount of time a process will take						
● Includes letting them know if there is a wait time; gives time expectation of that wait						
EXPLANATION:						
● Keeps the patient informed by explaining all procedures						
● Assists patient in having clear expectations of what will be occurring						
THANK patient/companion						
● Consistently thank the patient for their time						
● Expresses appreciation that they have chosen Lung Center (if applicable)						
● Asks if there is anything else they can do for the patient before ending the interaction						
NON-VERBAL ATTRIBUTES	**1**	**2**	**3**	**S**	**DO**	**DQ**
● Friendly tone of voice and appropriate pace of speech						
● Makes eye contact						
● Active listening (nodding, no interrupting, confirming what they heard the customer say, etc.)						
● Demonstrated confidence throughout the interaction						
● Display a calm manner						
Was the Competency Met		**YES**			**NO**	
EVALUATOR COMMENTS						

Appendix C

AIDET Protocal

Submissions

All manuscript submissions to the **Scientific Proceedings** shall be online. The manuscript and other documentary requirements shall be e-mailed to scientificproceedings @lcp.gov.ph. A manuscript submission checklist (Form SPLCP-2021-ASC-001) is provided to guide the submission as to the journal's requirements.

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A cover letter addressed to the Editor-in-Chief of the **Scientific Proceedings** should be prepared, stating the complete title of the work, list of all authors, and the intention to submit to the **Scientific Proceedings**. The corresponding author with complete contact information (institutional mailing address, work telephone, fax number [if any], and work e-mail address) should be clearly indicated. Presentation of the study findings as an abstract or poster in previous conferences should be mentioned in the letter, to include information on the title and dates of the conference, as well as awards won, if any.

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The **Scientific Proceedings** Author Form (SPLCP-2021AF-001) includes a certification of fulfillment of authorship criteria for all authors listed, declaration of conformity to publication ethics and ethical standards for experiments on human/animal subjects and approval by the appropriate ethics committee, disclosure of conflicts of interest where existing, and agreement to copyright transfer. Complete names of the authors, title indicating the highest educational attainment (e.g., MD, MSc, PhD), and name and location of not more than one (1) institutional affiliation, should be indicated.

Ethical Review Board Approval

For all original articles, the authors shall submit a scanned copy of the ethical review board approval of the study performed on which the manuscript is based.

Informed Consent Form

For case reports, the authors shall submit a scanned copy of the written/informed consent for publication from the involved patient/subject. The **Scientific Proceedings** requires the use of its standard Informed Consent Form (SPLCP-2021-CF-001), duly accomplished and submitted with the other requirements. For case series whose patient data are reported in aggregate, informed consent is not required. However, if the case series includes patient details that contain individual information which make them identifiable (e.g., individual case histories, photos, x-rays, etc.), an informed consent form for publication must be submitted. In case the involved subject/s and/or relative/guardian can no longer be contacted after all means have been undertaken by the author, the author should state so in the cover letter with a description on the efforts made to secure consent.

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Case Reports and Case Series	Case reports or series focus on reportable cases encountered in practice, representing unusual or rare manifestations, presentations, or clinical course of disease. Case reports should not exceed 10 typewritten pages (8.5 x 11 in., 1 in. margins at both sides, double spaced, excluding tables, figures, illustrations and references) or 3,000 words.
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The title page should include:

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  Book

  Murray, PR, Rosenthal KS, Kobayashi GS, Pfaller MA. Medical microbiology. 4th ed. St. Louis: Mosby; 2002.

  Gilstrap LC 3rd, Cunningham FG, VanDorsten JP, editors. Operative obstetrics. 2nd ed. New York: McGrawHill; 2002.

  Website

  World Health Organization. Hospital infection control guidelines for severe acute respiratory syndrome. April 16, 2003: http://who.int/csr/sars/infectioncontrol/en (accessed April 24, 2003).

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MISSION

We provide high quality health services and state of the art facilities for the diagnosis and management of respiratory and chest diseases, and promotion of lung health for the Filipino people with excellence and compassion, regardless of creed, color, sex, socio-economic status, and political affiliation.

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Customer-focused
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Compassion
Creativity
Collaboration

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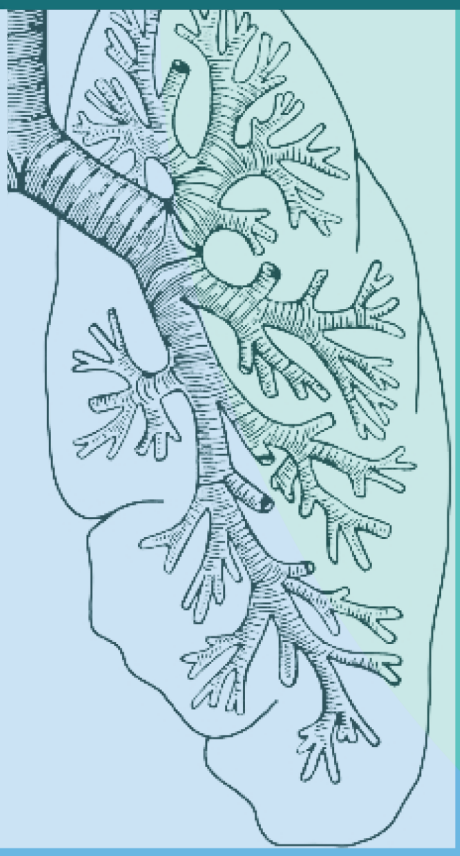

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