

# Student Nurses' Knowledge Acquisition on Oral Medication Administration: Comparison of Lecture Demonstration Vs. Video Demonstration

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## Research article

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# Abstract

**Background** Safe and accurate medication administration is an important and potentially challenging nursing responsibility. The objectives of this study were to evaluate whether the nursing students could learn and retain the basic guidelines for safe medication administration when taught using a video-assisted teaching method compared with the lecture-demonstration method and to assess the students' attitude towards the two types of teaching methods.

**Methods** This study was conducted as a quasi-experimental study with a pre and post-test design. Forty-five students in the first year of the Bachelor's in nursing degree programme have participated in this study. All the participants completed a self-administered questionnaire, including background characteristics and questions of oral medication administration. Subsequently, participants were randomly assigned to two groups. Oral medication administration procedure was taught using two different teaching methods. Finally, the post-test knowledge scores in both groups were assessed and analysed using the paired-sample t-test.

**Results** The results revealed that there is no significant difference in terms of age, gender and type of residence of students in both groups. When comparing the pre-test mean score and post-test mean score using paired sample t-test, there was a statistically significant difference in both video demonstration group ( $t = -4.533, p < 0.001$ ) and lecture-demonstration group ( $t = -4.208, p < 0.001$ ). Almost all the students obtained good knowledge scores disregard of the method used in teaching oral medication administration. However, when comparing post-test scores of both groups using an independent sample t-test, it was identified that there was no significant difference between the two groups. Therefore, it was difficult to identify which method is effective than the other. According to the student feedback obtained at the end of the study, 67% of them preferred to have more video demonstrations in their skills classes.

**Conclusion** The results of this study suggest that oral medication administration can be effectively taught using both lecture demonstration and video-assisted teaching methods.

# Introduction

High-quality health care demands a nursing workforce with sound clinical skills. Increasing the efficiency and effectiveness of nursing care is essential for the delivery of safe patient care. Clinical skills are an essential aspect of nursing practice, and practice-orientated teaching is needed to enable nursing students to develop confidence and power to engage in fundamental care delivery (1). In order to provide quality and safe nursing care to patients, nurses need to be competent in clinical nursing skills. Learning clinical nursing skills is a prerequisite not only for a successful and confident nursing career but also for the facilitation of critical thinking, cultivation of deep interest in the profession, and most important for the overall improvement of patient care (2).

Pre-registration nursing education was based on a three-year diploma level nursing program in schools of nursing that are attached to the ministry of Health, Sri Lanka. It was proposed that the entire nursing

education should be upgraded to the degree level. As a result, the University Grants Commission (UGC) in Sri Lanka has established four-year degree programs leading to BSc (Honours) in Nursing in five universities. In 2012, General Sir John Kotelawala Defence University, Sri Lanka established the Faculty of Allied Health Sciences (FAHS), and FAHS is catering civil nursing undergraduates by offering BSc (Honours) in Nursing four-year degree programme.

The nursing curriculum encompasses scientific and humanistic foundation for nursing practice and enables the students to develop competencies related to prevention, maintenance, cure, rehabilitation & promotion of health. The degree program is fulltime, and module-based with 126 credits allocated to modules. Out of 126 total credits, 59 credits are allocated for teaching theory and 54 credits are allocated to hospital-based clinical training. Before the students are placed in-hospital training, they are supposed to learn and practice nursing procedures within the skills lab. The skills lab practical demonstrations are to be taught from the beginning of the first year to the final year. These are ranging from basic nursing procedures to advanced nursing procedures.

Administering oral medication to the patient is one of the essential procedures supposed to be taught during the first year second semester. Safe and accurate medication administration is an important and potentially challenging nursing responsibility. It is crucial to have excellent decision-making skills and clinical judgment for a nurse, and the nurse is responsible for making sense of medication administration and its implications for patient safety. Maintaining quality and safety care is essential to meet the needs of the patient (3).

Alterations of the teaching methodologies have become an enormous challenge today due to the rapid transformation of the nursing curriculum. Since students have different learning styles, the teachers should deliver the lessons according to the learning styles of the students. Therefore, teachers should implement different teaching methods and techniques other than the conventional lecture method in order to teach different skills. In terms of skills demonstrations, video-based education is used when demonstrations are impossible to be undertaken. Further, the students have the opportunity to listen to the voice and watch diagrams, figures and delineation in video-based education (4).

Teachers must change the idea of teaching, change teaching methods to maximise students' learning, thinking and practice of students themselves, so they have to study hard, earnest thinking, serious practice in order to enhance their ability to learn and develop their ability to think, to enhance their practical ability and their ability of innovation. Identifying a better teaching method in oral medication administration can be necessary for the teacher to enhance student's performance and can contribute more in the field of treatment skills. It will bring about positive outcomes in future health indicators and quality of care.

Although there are plenty of studies carried out in this area around the world, very few studies were found in Sri Lanka. The present study aims to determine the effectiveness of video demonstration in clinical skills education of medication administration for undergraduate nursing students compared to the lecture demonstration method.

# Methods

## Study design

A quasi-experimental study with a pre and post-test design was utilised to determine whether the nursing students could learn and retain the theoretical knowledge of oral medication administration when taught using a video demonstration compared with the conventional demonstration method. Students' attitudes regarding the two teaching methods were also assessed at the end of the study. A questionnaire and a video clip were developed specifically for these purposes.

## Participants and setting

Considering the effects of the dependant variable of this study, only the first year BSc Nursing undergraduates of General Sir John Kotelawala Defence University were recruited as participants for the study. These students have never been exposed to oral medication administration procedure before. The study was conducted in 2019 at the Faculty of Allied Health Sciences, General Sir John Kotelawala Defence University.

## Hypothesis

The hypothesis generated for this study was that the nursing students who participated in the video demonstration would have increased knowledge score related to oral medication administration than the nursing students who have experienced the lecture demonstration in the skills lab.

## Sample size

The sample included all the nursing students enrolled in the first-year of BSc in Nursing program. Among the 45 first-year BSc nursing students, 22 students were randomly selected and assigned into video demonstration group and the lecture demonstration group consisted of 23 students.

## Data collection tools and Methods

In the first phase, the video demonstration of oral medication procedure and the self-administered questionnaire were developed by the investigators. The video demonstration included similar guidelines throughout the procedure, as in the lecture demonstration, and it was 10 minutes long video clip. The video clip was recorded in the skills lab setting using the same equipment which is used in the lecture-demonstration. Video dubbing was done by the same lecturer who conducted the lecture-demonstration. The self-administered questionnaire consisted of three parts. Part I covered demographic information and Part II composed of fifteen questions on basic principles on oral medication administration which was utilised to calculate knowledge score before and after undergoing teaching sessions, and Part III consisted of twelve questions using the Likert scale on attitudes regarding the two types of teaching methods which was administered only in the post-test. The questionnaire was pre-tested and amended accordingly.

After completing the sociodemographic data form, the pre-test knowledge scores of both groups were assessed using Part II of the questionnaire. After that, the lecture-demonstration group (n=23) received the oral medication administration through a lecture-demonstration, which is a routine teaching method adopted by nursing faculties for teaching. Here, the teaching of correct steps of oral medication administration by the lecturer was adopted in the skills laboratory setting. Whereas, the video demonstration group (n=22) was taught the oral medication administration procedure by the same lecturer using the video clip on a projected screen with speakers in the skills lab setting on the same day. Finally, the post-test and the attitude questions were administered to both groups on the 8<sup>th</sup> day after delivering lecture demonstration and video demonstration.

## **Ethical considerations**

This study was approved by the ethical review committee of the Faculty of Medicine, General Sir John Kotelawala Defence University with registration no. RP/2018/10, dated January 30, 2019. Furthermore, the permission to enrol undergraduates of KDU for this study was obtained from the Vice-Chancellor of General sir John Kotelawala Defence University. All enrolled students signed an informed consent containing clear information about the study, its purpose, and methods.

## **Statistical Analysis**

Pre-test baseline characteristics for the experimental and control groups were examined using t-tests and  $\chi^2$  tests. The paired t-test was used to compare the mean differences in knowledge based on the questionnaire within groups. The independent sample t-test was used to compare the pre-test and post-test self-confidence scores within groups. A difference was considered significant when the p-value was less than 0.05.

# **Results**

## **Participants characteristics**

Forty-five students have participated in the study at a rate of response of 100%. There were 13 (28.9%) male and 32 (71.1%) female students with a mean age of  $21.24 \pm 0.86$  years. The sociodemographic characteristics for the lecture demonstration group and the video-demonstration group are shown in Table 1. According to the results of Fisher's Exact Test, there is no statistically significant difference between the two groups in terms of gender, nationality, religion and type of residence.

## **Knowledge scores on oral medication administration**

The students have answered 15 knowledge questions on oral medication administration and obtained the pre-test score. According to the results, the lecture demonstration group had a mean knowledge score of  $47.20 \pm 14.08$  out of 100, whereas, the video-assisted teaching group scored  $48.38 \pm 16.92$  mean knowledge score. The pre-test scores of both groups have compared with the post-test scores, and the

results are shown in Table 2. Based on the paired t-test result, there was a statistically significant difference between the pre-test and post-test scores of both video demonstration and lecture-demonstration method [(t = -4.533, p < 0.001) and (t = -4.208, p<0.001)]. This indicates that both the methods were found equally effective in enhancing the knowledge of oral medication administration of nursing students (Table 2).

**Table 1:** Sociodemographic characteristics of the study participants

Group	Video - assisted Teaching group (N = 22)	Lecture demonstration group (N = 23)
Age of students in years; mean (SD)	21.36 (0.85)	21.13 (0.87)
Gender, n (%)		
Male	06 (13.3)	07 (15.6)
Female	16 (35.6)	16 (35.6)
Nationality, n (%)		
Sinhala	21 (95.5)	21 (91.3)
Tamil	0 (0)	2 (8.7)
Muslim	01 (4.5)	0 (0)
Religion, n (%)		
Buddhist	21 (95.5)	19 (82.6)
Hindu	0 (0)	2 (8.7)
Christian	0 (0)	2 (8.7)
Islam	1 (4.5)	0 (0)
Residence, n (%)		
Home	5 (22.7)	2 (8.7)
University Hostel	0 (0)	2 (8.7)
Boarding House	17 (77.3)	19 (82.6)

**Table 2** Knowledge scores on oral medication administration

Knowledge scores	Video-assisted teaching group	Lecture demonstration group
Pre-test score	48.38 (SD =16.92)	47.20 (SD = 14.08)
Post-test score	65.90 (SD =17.06)	60.25 (SD =15.80)
"t"	-4.533	-4.208
Paired t test p	0.001	0.001

Furthermore, an independent sample t-test performed for comparing post-test results of the lecture demonstration group and the video-assisted teaching group to identify whether there is a significant mean difference between the two groups. Post-test marks were normally distributed in both groups, and equal variances assumed according to the Levene's Test for Equality of Variances and gave a Sig. (2-tailed) = 0.254. Hence, it shows that there is no significant difference between the post-test marks of the two groups.

### Students responses to attitude questionnaire

Students were asked the question "Do you feel the videos were an enjoyable way to study?". As per their response, 82% was agreed with that statement. 66% of them have agreed to incorporate videos into the skills demonstrations in the future. However, 82% agreed to learn skills classes as a demonstration in the skills lab. It was found that most of them satisfied with a combination of lecture and video demonstration methods while learning skills practice in nursing (Table 3).

**Table 3 Frequency of students responding to different attitude questions**

Statements	Level of Agreement			
	Strongly Agree	Agree	Neutral	Disagree
I enjoy learning skills through video	05 (11.11)	32(71.11)	04 (8.89)	04 (8.89)
I enjoy learning skills through demonstration by a lecturer in the skills lab	19 (42.22)	18 (40.00)	08 (17.78)	0 (0.00)
I felt prepared for the skills class after I watched the videos	12 (26.67)	16 (35.56)	15 (33.33)	02 (4.44)
I feel the videos and skills classes have prepared me for the skills in clinical practice	06 (13.33)	33 (73.33)	06 (13.33)	0 (0.00)
I would like videos to be used more in skills teaching	04 (8.89)	26 (57.78)	09 (20.00)	06 (13.33)
I feel I will use the videos to revise clinical skills in the future	09 (20.00)	30 (66.67)	06 (13.33)	0 (0.00)
I feel motivated to learn the skills through video	07 (15.56)	26 (57.78)	10 (22.22)	02 (4.44)

## Discussion

Teaching methods are based on principles and a variety of educational methods. They serve as suggestions, instructions, guidance and encouragement to learn. New methods and training materials are developing every day with the research. A lecture-demonstration, a clinical demonstration, a video demonstration or combinations of these methods are used mostly. For the better and quality patient care, the nurses should learn the nursing theories and clinical practice as it is updating with the time. Training programs are, therefore, essential in order to close the gap between theory and practice.

This study aimed to evaluate whether nursing students could learn and retain the theoretical aspects of oral medication administration when taught using a video demonstration compared with the conventional face-to-face teaching method. The findings of the study indicated that there was a statistically significant difference between the pre-test and post-test scores of both video demonstration and lecture-demonstration method [(t = -4.533, p < 0.001) and (t=-4.208, p < 0.001)]. This indicates that both the methods were found equally useful in enhancing the knowledge of oral medication administration of nursing students.

Similar to the findings of the present study, another study which was done to examine the effectiveness of video teaching over lecture-demonstration in increasing knowledge and skill of nursing students on antenatal examination. It has discovered that there was a significant difference in the pre-test and post-test knowledge scores within experimental and control groups and there was gaining knowledge in every area in both groups. However, some findings were inconsistent with our study that there was no significant difference in pre and post-test knowledge scores between groups. Hence this study has concluded that video teaching is an effective method of teaching the students (5).

The current study findings were similar to a prospective study done in the University of London to assess the relative effectiveness of the two approaches of video demonstration and lecture-demonstration teaching methods for orthodontic auxiliary training. They found that video teaching and lecturing were equally effective with video achieving slightly better results (6). Similarly, another study was done to compare two forms of teaching methods such as video and live lecture for education in clinical periodontology resulted that the live lecture group performed better than the video group during the in-depth post-test assessment and more students favoured for video method. At the same time, most of the students favoured an ultimate combination of video and lecture also (7).

A systematic review was conducted to identify teaching methods of medication administration safety of nursing undergraduates using four electronic databases. The three methods identified were: simulation experience, use of technology and online learning. However, they insisted that those three methods cannot be implemented in all the nursing programmes, and the teachers should pay attention to preparing and confirming classroom-based teaching methods. Furthermore, it was suggested to conduct future studies on developing tools considering psychological aspects to assess nursing students' compliance on medication administration safety (8).

A quasi-experimental study on obstetrical palpation was conducted using 60 third-year nursing students in India. The students were divided into an experimental group (video-assisted teaching program) and a

control group (traditional demonstration). There was a statistically significant difference between the pre-test and post-test marks in both groups. However, the traditional demonstration group achieved more marks for the post-test than the people in the video-assisted teaching programme. Therefore, it was concluded that the traditional demonstration method is more efficient in the competency development and adding of blended teaching technique is also essential (9).

A two-group quasi-experimental study was conducted on 165 baccalaureate nursing students to assess the effect of a video-based case study over a written case study. The outcome measures were student satisfaction, self-confidence, and knowledge. According to the findings, the video-based learners gained higher scores for knowledge testing, compared to the written case study group of learners. There was a significant improvement in student satisfaction and self – confidence in both groups. This study suggested that video-based education method can be used as an additional method to improve classroom teaching (10).

Despite the positive perceptions, our students reported regarding the use of videos during the skills practice class, and they preferred the conventional teaching of skills practice. This project has several limitations. The current study used a small convenience sample from a limited target population of nursing students. If it has done on a larger sample, we could obtain a different result. Another drawback was that there could be contamination as the post-test was done eight days later. It should have been done on the same day after teaching and repeated on the 8th day.

## **Conclusion**

This study found that both conventional demonstration method and video-assisted teaching method were equally effective on knowledge acquisition of oral medication administration. Hence, it is recommended that a combination of teaching methods can be adopted to enhance the skill development of the students. A live demonstration is a traditional and preferred method, but a video can also be used. Future studies can be extended to other nursing procedures with the participation of other nursing faculties for uplift the arena of nursing education.

## **Abbreviations**

**FAHS** : Faculty of Allied Health Sciences

**UGC** : University Grants Commission

## **Declarations**

### ***Ethics approval and consent to participate***

Ethical approval for this study was received from the ethical review committee of the Faculty of Medicine, General Sir John Kotelawala Defence University with registration no. RP/2018/10. Written informed

consent was obtained from all participants of the study.

### ***Consent for publication***

Not applicable.

### ***Availability of data and materials***

The datasets generated and/or analysed during the current study are not publicly available to protect the participants but are available from the corresponding author on reasonable request.

### ***Competing interests***

The authors declare that they have no competing interests.

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### ***Authors' contributions***

MGRC participated in writing the proposal and data collection, preparation of video demonstration, writing. RDUPS participated in data collection, analysing of data, interpretation of data and writing and submission of the article for publication. All authors read and approved the final manuscript.

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