https://doi.org/10.33805/2573.3877.147
Volume 5 Issue 1 | PDF 147 | Pages 5
Nursing and Health Care
Research Article ISSN: 2573-3877

Effectiveness of Workshop on Hand Washing Techniques among Undergraduate Nursing Students: A Quasi Experimental Study

Noor Asikime Binti Mohamad[1], Kasmini Che Muda[1], Siti Nor Asiah Ab Khadir[1], Umiaziente Suchi[2] and Regidor III Dioso[3*]

Affiliation
[1]Department of Nursing, Ramsay Sime Darby Healthcare College, Petaling Jaya, Malaysia
[2]Department of Nursing, Universiti Putra Malaysia, Serdang, Malaysia
[3]Department of Nursing, Lincoln University College, Petaling Jaya, Malaysia
[*]**Corresponding author:** Regidor III Dioso, Department of Nursing, Lincoln University College, Petaling Jaya, Malaysia,
E-mail: duke@lincoln.edu.my

Citation: Mohamad ABN, Muda CK, Ab Khadir NAS, Suchi U and Dioso IIIR. Effectiveness of workshop on hand washing techniques among undergraduate nursing students: a quasi experimental study (2020) Nursing and Health Care 5: 10-14.
Received: Jan 25, 2020
Accepted: Feb 18, 2020
Published: Feb 24, 2020

Abstract
Background: Compliance with the performance of correct and effective hand hygiene has not been adequate among undergraduate nursing students, in clinical settings. **Aim:** That is why this study evaluated if a hand washing workshop can effectively enhance the performance of hand washing among undergraduate nursing students. **Method:** A total of 15 participants were enrolled from a group of undergraduate nursing students; selected using simple random sampling. These participants primarily did a workshop on the 12-step of hand washing procedure based on the guidelines adapted from the World Health Organization. Their hand washing performance was evaluated before (pre-test) and after (post-test) the workshop using an observation checklist. **Results:** There was a significant effectiveness of work shop on hand washing techniques (p0.0046). **Conclusion:** Therefore, a hand washing workshop was an effective strategy in enhancing the skills of nursing students in effectively performing hand hygiene. A periodic re-education workshop or program regarding hand hygiene was recommended for health care personnel across all levels in order to maintain the quality of hand hygiene performance.

Keywords: Hand washing technique, Healthcare, Nursing, Undergraduate nursing students, Educational program, Hand hygiene, Observational study.
Abbreviations: HAIs- Hospital Acquired Infections, WHO-World Health Organization, HCAIs-Healthcare-Associated Infections, UH-University of Hertfordshire, ICU-Intensive Care Unit.

Introduction

Hand washing is an easy and cost-effective method in controlling the spread of Hospital Acquired Infections (HAIs). However, compliance with the performance of correct and effective hand hygiene has not been adequate among nursing students, especially in clinical settings. Several studies have demonstrated that periodic re-education that comprises knowledge and demonstration components is necessary to keep the compliance of hand washing at effective levels.

Background and Rationale of the Study

Hand washing or hand hygiene is known as the most important intervention in order to prevent the risk of HAIs prevalence. According to the World Health Organization (WHO) 2019 [1] hand washing compliance is able to lower the rate of prevalence for Healthcare-Associated Infections (HCAIs) in clinical area; especially hospital setting [2]. In the healthcare setting, it is identified that nurses as the healthcare professionals that provides nursing care accounts for approximately 80% direct contact to patients in clinical area that involves personal and intimate care activities [3]. It is shown that, nurses spent most of their working time with the patients as compared with other healthcare professionals [4]. So, it is compulsory for the nursing students making contact with the patients in the clinical area during the clinical placement where it is part of their educational course as requirements [5]. During the clinical placement or attachment period, the nursing students are frequently exposed to variety of sources of infection such as the Coronavirus [3].

However, previous study found that the nursing students had a low level of knowledge related to the prevention and control of infections in clinical area [6]. Hand washing is known as the most efficient and economical method in order to prevent HAIs and HCAIs, such as the Coronavirus [3,7]. It is essential for the healthcare workers to conduct hand washing procedure before and after any patient care procedure [5]. Previous studies had shown that, the implementation of different approaches such as workshop, hands-out, and posters in order to enhance the theoretical and practical knowledge on hand washing shows the variability in the efficacy between educational and interventional approaches worldwide [2,5-8].

Problem Statement

Other than that, based on observation in clinical areas, most of the nursing students undergoing clinical attachment or placement are unable to implement the right technique of hand washing either before or after deliver nursing care procedures. Hence, it is essential to conduct a study to evaluate the hand washing techniques of the undergraduate nursing students before graduated and working as the registered staff nurse in clinical area.

The hand washing practice significantly associated with the HAIs where the correct hand washing practice is significantly able to reduce risks and rates of HAIs and HCAIs in clinical area, especially in hospital settings [9]. It is because increasing in the prevalence of HAIs and HCAIs may become the burden of morbidity, mortality and increase in the length of hospitalization among patients in hospital setting [10]. During the clinical attachment or placement period, nursing students are compulsory to serve nursing care services to the patients [9]. Thus, nursing students also have an inevitable role in the spreading of HAIs and HCAIs [3,5].

Objective, Purpose, Hypothesis and Research Questions

The objective of this study is to evaluate the effectiveness of the workshop on hand washing techniques among post-qualified undergraduate nursing students. The purpose however is to pave new avenues in preventing HAIs and HCAIs from nursing students through workshops on hand washing. Hence, it is hypothesized that there is a significant effectiveness of workshop on promoting hand washing techniques among nursing students. On account of the objectives, purposes, and hypothesis, this study deems to ask:

- What are the steps of hand washing techniques do student nurses perform before a workshop is implemented?
- What are the steps of hand washing techniques do student nurses perform after a workshop is implemented?

Methods

In this study, a pre and post quasi experimental study design was used. This study observed the effectiveness of a workshop on the techniques of hand washing among nursing students. The intervention was the workshop on hand washing technique, and then after a pre-observation test the participants are to attend a workshop. After the workshop, all of the participants needed to undergo a post-test and again using exactly the same observational checklist found on the appendix. This method in order to observe the effectiveness of an intervention-workshops on hand washing techniques-using a checklist on hand washing techniques as recommended by the WHO (2009) guideline [1]. Hand washing workshop was introduced as an intervention because it is a factual knowledge that can be observed for many healthcare professionals especially among nursing students [7,9,11-13].

Study Population, Sampling Technique and Sample Size

In this study, simple random sampling was used in order to choose and recruit all the student nurses from the 4th year. The study populations were undergraduate nurses at SIME Darby Medical Center located in Selangor, Malaysia. The inclusion criteria limited nursing students who were currently being in year 4 and have experienced or undergone clinical placements. All the participants of this study were randomly chosen from a specific number through an automated process. A total of 15 students were selected to enroll in the experimental study.

Research Instruments and Data Collection Procedure

The research instrument of this study is known as a checklist where it had been adapted from the study conducted by Felix and Miyadahira (2009) [9] with the title 'Evaluation of the Hand Washing Technique Held by Students from the Nursing Graduation Course' integrated with the WHO (2009) [1] guideline on the right hand washing techniques. The checklist (appendix) had listed the several steps of hand washing techniques and it is reliable to be followed by all healthcare workers worldwide when demonstrating the proper techniques of hand washing.

Figure 1 had shown the flow of the data collection procedure. The duration of this workshop is 2 hours. Then, in the third session, after the workshop session, all of the participants again need to show how they wash their hand in clinical area from the beginning till the end of the process of hand washing procedure known as post-test. During the pre and post-test session, the hand washing technique was observed from the participants, and then filled the checklist based on the reference from the WHO guideline of 2009.

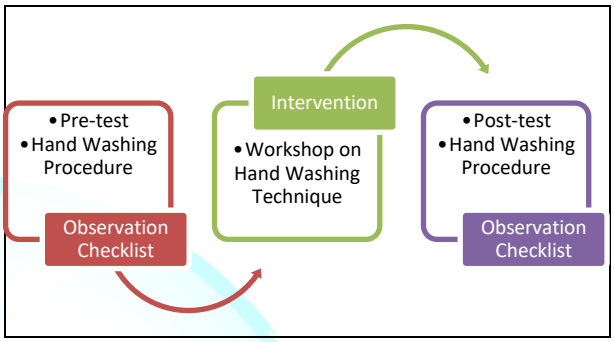

Figure 1: Flow of the Data Collection Procedure.

Data Analysis

Statistical analysis of the data is done using descriptive statistics utilizing frequency distribution and percentage. This was done to determine the extent to which the participants were able to correctly perform each of the procedural steps. In order to determine the effect of the hand hygiene workshop, data between pre-test and post-test were compared. Data analysis was done using the Data Analysis tool pack of Microsoft Excel 2016 and the Statistical Packages for Social Sciences version 21. A t-test was used since the samples are small and there are two samples such as the pre and post-test [14]. However, the t-test on comparing means of the two groups will only be assumed reliable if the observed subjects are normally distributed which this study has failed to analyzed [14].

Ethical Approval

Ethical approval for this research and its designs were approved by University of Hertfordshire (UH) with research protocol number acHSK0081 SDU 03002. Participants were asked to sign the consent and they were given the autonomy to withdraw from the study at any time without further questions. Confidentiality and anonymity were also considered by not revealing the participants name on the observation checklist but by using serial numbers and their results were only shown to them filed in a safe locked and undisclosed.

Results

Table 1 identified the pre-test result regarding the hand washing technique performed by the nursing students addressing the first research question. Before attending the workshop, a majority of the participants were not able to perform the steps perfectly. Felix and Miyadahira (2009) [9] also said that wetting hands with water, using enough soap to cover the hands, scrubbing, palm-with-palm, rinsing hands, and drying with paper are the steps where nursing students usually forget or were just complacent in doing it properly. **Table 2** answered the second research question and identified that after the workshop, 10 out of the 12 steps in the procedure checklist were performed by the nursing students.

These were: (2) Wet hands with water; (3) Use enough soap to cover all hand surface; (4) Scrub palm-with-palm; (5) Scrub palm-with-back

of hand; (6) Scrub between palm to palm with finger interlaced; (8) Scrub their thumb; (9) Scrub their nails; (10) Rinse their hands; (11) Dry hand use paper towel; (12) Close the faucet using a paper towel. Although there was improvement in the performance, two of the steps still did not garner full performance of the participants such as removal of the jewelry, bracelet, and watches. Similarly, Felix and Miyadahira (2009) [9] also said that nursing students do not realize the importance of those steps. **Table 3** identified that there was a significant effectiveness of work shop on hand washing techniques (p0.0046).

No	Pre test	Yes		No	
		F	%	F	%
1	Remove jewelry, bracelets, and watches to wash hands	8	53.3	7	46.7
2	Wet hands with water	15	100.0	0	0.0
3	Use enough soap to cover all hand surface	15	100.0	0	0.0
4	Scrub palm-with-palm	15	100.0	0	0.0
5	Scrub palm-with-back of hand	13	86.7	2	13.3
6	Scrub between palm to palm with finger interlaced	7	46.7	8	53.3
7	Scrub back of fingers opposing palm with fingers interlocked	8	53.3	7	46.7
8	Scrub their thumb	12	80.0	3	20.0
9	Scrub their nails	8	53.3	7	46.7
10	Rinse their hands	15	100.0	0	0.0
11	Dry hand use paper towel	15	100.0	0	0.0
12	Close the faucet using a paper towel	12	80.0	3	20.0

Table 1: Pre-test.

No	Post test	Yes		No	
		F	%	F	%
1	Remove jewelry, bracelets, and watches to wash hands	11	73.3	4	26.7
2	Wet hands with water	15	100.0	0	0.0
3	Use enough soap to cover all hand surface	15	100.0	0	0.0
4	Scrub palm-with-palm	15	100.0	0	0.0
5	Scrub palm-with-back of hand	15	100.0	0	0.0
6	Scrub between palm to palm with finger interlaced	15	100.0	0	0.0
7	Scrub back of fingers opposing palm with fingers interlocked	13	86.7	2	13.3
8	Scrub their thumb	15	100.0	0	0.0
9	Scrub their nails	15	100.0	0	0.0
10	Rinse their hands	15	100.0	0	0.0
11	Dry hand use paper towel	15	100.0	0	0.0
12	Close the faucet using a paper towel	15	100.0	0	0.0

Table 2: Post-test.

Comparison between pre and post tests	Pre-test	Post-test
Mean	11.92	14.5
Variance	10.81	1.55
Observations	12	12
Df	11	-
t Stat	-3.1476	-
P(T<=t) one-tail	0.0046	-
t Critical one-tail	1.7959	-

Table 3: Comparison between pre and post-tests.

Strengths and Limitations

The key advantage on a quasi experimental study design is that all the confounding variables are easily controlled in the process of investigation. However, this quasi experimental study design is limited to an interventional way that is very often unpractical to control as all the essential factors actually can significantly influence the intervention. Consequently, the results might be biased as it is limited to a single cohort. That is why the appropriate way to use this quasi-experimental design (though unpractical) is to control and limit confounding variables such as the student year level, and their evidences of being exposed to clinical placements.

Finally, this study cannot be generalized as a worldwide acceptable finding. However, should it be used in general, it must be taken with caution considering the demography of the experimental subjects such as their year level and the setting of the cohort.

Nevertheless, in general, this study showed that student nurses must be well-prepared to exhibit professionalism, accountability, and the provision of safe and quality nursing care [15]. In any aspects and areas of nursing practice, hand hygiene is a core and basic skill that should be possessed, which impacts not only on own health and safety but more importantly, on the patient's well-being [16]. On a more specific aspect, hand hygiene has a great impact on the mortality and morbidity of patients in all health care setting [17]. Therefore, the correct technique of hand hygiene is one way to exhibit safe and quality patient care [15].

It has been noted that over time, there is a decrease in performance of hand hygiene among post-qualified undergraduate student nurses [7,9]. Mahmood, Verma and Khan (2015) [11] agreed with Felix and Miyadahira (2009) [9] and Hong and Jang (2016) [7] that is neglected to be studied and demonstrated properly by nursing students in their clinical practices. The frequency of performing hand washing as well as the correct procedure in doing such tend to decline over time [15,17]. That is why most of the literatures reviewed had also addressed the findings of this study that education and training should be continuously done [7,9,11,12].

Implications to Practice

Hand hygiene is considered as the single most important and effective method in preventing HAIs [18]. The techniques of hand hygiene, which includes hand rubbing and hand washing are included in the basic curriculum of nursing education [16,18]. One of the trainings that need to be emphasized was the removal of jewelry and watches as it is a very important step in hand-washing procedure and according to this study is often missed by nursing students (n4, 26.7%) even after the workshops are already been given. Watches, jewelries, and chains harbour trap microorganisms that may be transferred through skin-to-skin contacts, like Coronavirus, Staphylococcus and Pseudomonas [3,19].

Khodavaisy, et al., (2011) [20] also noted these findings in their study on the contamination of Intensive Care Unit (ICU) health care workers' hands and rings and recommended that medical and hospital personnel should remove watches, jewelries, and bracelets before washing their hands [16,19]. It is therefore very important to emphasize the performance of this step given that this is one of the most forgotten steps by the student nurses prior to the workshop, and that the presence of watches and jewelries can affect the quality of hand hygiene [18]. There are instances, as shown in the results, that students are generally able to perform hand washing procedure but missed critical steps especially on certain parts of the hands.

The WHO (2009) [1] emphasizes six (6) critical areas that should be included when doing hand hygiene: palm, dorsum, between fingers, back of fingers, thumb, and fingertips. A study by Skodová, et al., (2015) [18] evaluated the hand hygiene quality of hand hygiene techniques among health care workers and found out thumbs and fingertips are the ones that are least covered. Similarly, in this study, some participants were still able to miss in the steps that include fingers (n2, 13.3%) even after the workshop has already been given.

The importance of education and re-education on hand hygiene strategies were highlighted on the results of the study [11]. It was

found out that there is an improvement in the performance of hand washing among the participants after they underwent and participated in the hand washing workshop, with the increase in pre-test mean of 11.92 to 14.50 in post-test. In congruence with this study's results, several other studies have demonstrated similar effectiveness on the use of re-education and workshop in enhancing the performance of hand hygiene skills [7,9,12,13].

Arise, et al., (2017) [21] noted in their study that continued direct observation and feedback on hand hygiene significantly decreased the incidence of infection. A similar study involving workshop intended for medical students also demonstrated an increase in performance among the participants after the workshop, and further concluded that educational programs can improve knowledge and performance in short and long time periods [13,22]. Furthermore, Randle, et al., (2014) [23] noted that adherence to hand hygiene could be improved and sustained through educational intervention.

Conclusion

It can be concluded that a hand washing workshop is an effective strategy in enhancing the skills of nursing students in effectively performing hand washing. A periodic re-education workshop or program regarding hand hygiene is recommended for health care personnel across all levels in order to maintain the quality of hand hygiene performance.

Recommendation

The result of this study further highlights the importance of workshops and re-education in enhancing the skills of a healthcare provider. This does not only apply to handwashing but could be true with any clinical skills. Hence, the following recommendations are made:

- Creation of a handwashing workshop module and other tools that would refresh the knowledge and skills of nurses and other healthcare providers in performing handwashing, highlighting the need to perform the first step.
- Regular re-education schedule in order to constantly update students and healthcare providers on the techniques of hand washing.
- Further research to determine practice as a factor in the performance of hand hygiene during the 5 moments as emphasized by the WHO (2009) [1].

Furthermore, the first step in the procedure, which is the removal of jewelry, watches, and bracelets, is the step that has the least improvement post-workshop. It can also be recommended that although hand hygiene practice is already included in the curriculum, a periodic re-education through workshop is necessary in maintaining the quality of hand hygiene performance. It is essential for the nursing students able to implementing the right and proper technique of hand washing in clinical area before graduated. The right and proper hand washing techniques are able to reduce risk and rate of prevalence healthcare-associated infections in clinical area. Next, the continuous and consistent education or training should be providing to the nursing students so that may ensure they having the latest and adequate theoretical and practical knowledge regarding hand washing technique.

The nursing school and healthcare organization that involve in the clinical placement period should emphasized on the formal and informal education regarding hand washing technique so that nursing student compliance with the right and proper hand washing technique. The results of this study are promising enough to warrant recommendations on the enhancement of hand washing practices among health care providers. However, it is to be noted that certain factors may make this study's generalizability be limited.

- This study involved student nurses as participants. Therefore, certain caution must be done in applying these results to all members of health care team members.
- The sample size of the participants is limited. Although they are homogenous, the power of the sample size may not be enough to warrant a complete generalization to the entire population of student nurses.
- The lack of a control group may limit the rigour of the study given the fact that the participants have taken the same evaluation methods in pre-test and post-test. Hence, there may be a certain degree of a gap as to which the effect of the pre-test on the participant's performance on the post-test.

Nevertheless, this study follows carefully the research protocol and principles ascribed to an observational, quasi-experimental research. Hence, the study itself possesses a reliable academic merit.

Acknowledgment

The authors would like to acknowledge the University of Hertfordshire for the ethical approval; and specifically, to Carolyn Hill for the academic supervision. Lastly, we would like to thank Edu Punay for the final editing of this written research.

References

1. World Health Organization Guidelines on hand hygiene in healthcare, First Global Patient Safety Challenge, Clean Care is Safer Care (2009) A world health alliance for safer healthcare, Geneva.
2. Aizen E and Zlotver E. Prediction of falls in rehabilitation and acute care geriatric setting (2013) J Clin Gerontology Geriatrics 4: 57-61. https://doi.org/10.1016/j.jcgg.2013.01.001
3. World Health Organization, Coronavirus disease (COVID-19) outbreak (2019) Geneva.
4. Al Kadi A and Salati S. Hand Hygiene Practices among Medical Students (2012) Interdiscip Perspect Infect Dis 1-6. https://doi.org/10.1155/2012/679129
5. Al-Khawaldeh O, Al-Hussami M and Darawad M. Influence of Nursing Students Handwashing Knowledge, Beliefs, and Attitudes on Their Handwashing Compliance (2015) Health 7: 572-579. https://doi.org/10.4236/health.2015.75068
6. Foote A and El-Masri M. Self-perceived hand hygiene practices among undergraduate nursing students (2015) J Res Nurs 21: 8-19. https://doi.org/10.1177/1744987115606959
7. Hong S and Jang H. The Effect of a Hand Washing Education Program for Pre-practicum Nursing Students (2016) Int J Software Engineering Applications 10: 161-170.
8. Abdalrahman I, Shamat S, Mamoun S, Abdelraheem R, Salah, E, et al. Educational sessions may not be enough to improve knowledge about hand hygiene: Assessing the knowledge about hand hygiene of health workers before and after an educational workshop in Sudan (2018) F1000 research 7: 449. https://doi.org/10.12688/f1000research.13029.1
9. Felix CC and Miyadahira AM. Evaluation of the handwashing technique held by students from the nursing graduation course (2009) Rev Esc Nurs 43: 139-145. https://doi.org/10.1590/s0080-62342009000100018
10. Nasirudeen AMA, Koh JWN, Lau ALC, Li W, Lim LS, et al. Hand hygiene knowledge and practices of nursing students in Singapore (2012) Am J Infect Control 40: e241-e243. https://doi.org/10.1016/j.ajic.2012.02.026
11. Mahmood S, Verma R and Khan M. Hand hygiene practices among nursing students: importance of improving current training programs (2015) Int J Community Med Public Health 2: 466-471. https://doi.org/10.18203/2394-6040.ijcmph20151031
12. Brosio F, Kuhdari P, Stefanati A, Sulcaj N, Lupi S, et al. Knowledge and Behaviour of Nursing Students on the Prevention of Healthcare Associated Infections (2017) J Prev Med Hyg 58: 99-104.

13. Škodová M, Gimeno-Benítez A, Martínez-Redondo E, Morán-Cortés J, Jiménez-Romano R, et al. Hand hygiene technique quality evaluation in nursing and medicine students of two academic courses (2015) Rev Latino-Am Enfermagem 23: 708-717. https://doi.org/10.1590/0104-1169.0459.2607
14. Kim H. Statistical notes for clinical researchers: assessing normal distribution (2) using skewness and kurtosis (2013) Restor Dent Endod 1: 52-54. https://doi.org/10.5395/rde.2013.38.1.52
15. Rhodes MK, Morris AH and Lazenby RB. Nursing at its best: competent and caring (2011) Online J Issues Nurs 16: 10.
16. Sopjani I, Jahn P and Behrens J. Hand Hygiene Training and Its Impact on the Knowledge of Undergraduate Nursing Students in Kosovo (2017) Glob J Health Sci 9: 142. https://doi.org/10.5539/gjhs.v9n4p142
17. Mathur P. Hand hygiene: back to the basics of infection control (2011) Indian J Med Res 134: 611-620. https://doi.org/10.4103/0971-5916.90985
18. Skodová M, Urra FG, Benítez AG, Romano MR and Ortiz AG. Hand hygiene assessment in the workplace using a UV lamp (2015) Am J Infect Control 43: 1360-1362. https://doi.org/10.1016/j.ajic.2015.07.003
19. Isitua C, Igbinidu O and Imariabe O. Microorganisms associated with gold jewelries worn by students in the University of Benin, ugbowo campus, Nigeria (2012) Res J Recent Sci 1: 46-50.
20. Khodavaisy S, Nabili M, Davari B and Vahedi M. Evaluation of bacterial and fungal contamination in the health care workers' hands and rings in the intensive care unit (2011) J Prev Med Hyg 52: 215-218. https://www.ncbi.nlm.nih.gov/pubmed/22442928
21. Arise K, Nishizaki S, Morita T, Yagi Y and Takeuchi S. Continued direct observation and feedback of hand hygiene adherence can decrease incidence of meticillin-resistant *Staphylococcus aureus* infection/colonization (2017) Int J Infect Control 13. https://doi.org/10.3396/IJIC.v13i2.010.17
22. Rezaee R, Danaei M and Askarian M. The efficacy of teaching hand hygiene to medical students: an interventional study (2014) International J Academic Res Business Social Sci 4. https://doi.org/10.6007/IJARBSS/v4-i9/1138
23. Randle J, Arthur A, Vaughan N, Wharrad H and Windle R. An observational study of hand hygiene adherence following the introduction of an education intervention (2014) J Infect Prev 15: 142-147. https://doi.org/10.1177/1757177414531057

Appendix

Checklist	Pre		Post	
	Yes	No	Yes	No
1 - Remove jewelry, bracelets, and watches to wash hands.				
2 - Wet hands with water.				
3 - Use enough soap to cover all hand surface.				
4 - Scrub palm-with-palm.				
5 - Scrub palm-with-back of hand.				
6 - Scrub between palm to palm with finger interlaced.				
7 - Scrub back of fingers opposing palm with fingers interlocked				
8 - Scrub their thumb.				
9 - Scrub their nails.				
10 - Rinse their hands				
11 - Dry hand use paper towel.				
12 - Close the faucet using a paper towel.				