

Exploration of the Gap between Theory and Practice in Tunisia Nurse Education System: A Cross-Sectional Descriptive Study with a Focus on Hand Hygiene

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Abstract

The theory/practice gap has long been highlighted as one of the biggest problems hindering the advancement of nurse sciences and nursing students. This problem however has never been explored nor proved to be present within the Tunisian nurse bachelor degree. Thus we aim to explore the existence of this gap in the Tunisian nurse education program through the technique of simple hand washing. This study is a cross-sectional descriptive study, recruiting cohort of randomly chosen nurses (n=70), over the span of 6 months. Both a survey questionnaire and an observation grid were used, one was to test the nurse's knowledge of the simple hand washing technique the other to evaluate the execution of the technique. Only 10% of our population were able to correctly name the different recommended steps needed to execute the technique in question. Only 8.6% were able to successfully answer the entire survey questionnaire. 67.1 % of the observed nurses failed to execute the technique in accordance with the recommendations for it. Our study proved the existence of the theory/practice gap within in the curriculum of the high institute of nursing of Tunis, at least when it comes to hand hygiene, which calls for further examination of the problem and immediate intervention.

Keywords : Hand Disinfection, Nursing Theory, School Nursing, Students, Nursing, Theory-practice Gap

1. Introduction:

It is a well-known Historic fact in the health industry that nursing first emerged as a science and research field in 1854 during the Crimean War at the hands of the pioneer Florence Nightingale. (Jeanguiot, 2014) she later on founded the first non-religious nursing school at St. Thomas's Hospital in London in 1860. The education offered at this school was based on clinical practice and three sets of theoretical courses given by doctors, who shifted most of their focus on observation, experience, and hygiene ... (Jeanguiot, 2014). This transition however was limited to England at that time and took several years to catch up in other countries. Take Tunisia for instance, where another 64 years were needed to make this transition of separating religion and nursing. As such it wasn't until 1924 that the first non-religious nursing education training program was born at the Sadiki hospital in Tunis (Formerly known as Aziza Othmanain our days).

4 years later the first nursing training school called Avicenne Public Health Professional School was founded (Higher institute of nursing science of Tunis, 2008). And so as a result of the constant changes, innovation and evolution brought on by the blooming scientific research and nursing knowledge around the world, Nursing education in Tunisian has gone through three major reforms over the span of the last 80 years, the last of which resulted in the founding of 5 faculties of nursing in the year 2006.

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(Higher institute of nursing science of Tunis, 2008) Ultimately, the goal of nursing education is to granite professional and clinical competencies which would in turn enhance the quality of nursing care (Forsberg, Georg, Ziegert, & Fors, 2011; H.-C. Tseng et al., 2011). Keeping that in mind the curriculum taught within the 5 Tunisiannursing faculties, was made to include theoretical lessons, tutorials, clinical practice and hospital internships. One of the unique aspects of this nursing education program is the existence of clinical practice through a hospital internship as part of the curriculum. This kind of practice should make it possible to diffuse knowledge through the body and translate it into physical action. (Estrada, GuanHing, & Maravilla, 2015; C.-N. Tseng, Hsieh, Chen, & Lou, 2013)

Furthermore, the clinical learning aspect of nursing education has long been considered as a key component which allows the nursing student to apply all of his theoretical knowledge in a clinical setting, to practice their skills, to increase their knowledge and to develop their professional identity (Kirkpatrick, Byrne, Martin, & Roth, 1991; Peyrovi, Yadavar-Nikraves, Oskouie, & Berterö, 2005; Wills, 1997)

Over the last few years, the nursing community has turned to a more research-grounded clinical practice (Baxter, 2007; Dadgaran, Parvizy, & Peyrovi, 2013; Estrada et al., 2015; Thomson, 1998), this however could not hide the ever so growing rift between nursing theory and nursing practice which has been highlighted by several studies over the years (Estrada et al., 2015; Gallagher, 2004; Khairulnissa & Salima, 2011; Landers, 2000) The goal of most nursing teaching programs especially that of the Tunisian nursing facilities is to supposedly use the complementarity between theory and practice in 3 years teaching program to form a well-balanced nurse (Higher institute of nursing science of Tunis, 2008)

But it has also been made clear through several studies that new nurse graduates find it at times extremely difficult to apply the theoretical concepts acquired during their initial nursing bachelor degree education (Estrada et al., 2015; Khairulnissa & Salima, 2011; Wolff, Pesut, & Regan, 2010) Nursing students are often faced with the dilemma of the contradiction they find between the theoretical courses and lessons they receive in class and the application of that knowledge in the hospital setting (Le Helloco-Moy, 2011). This fact is reflected in the difficulties of assimilation of the knowledge taught and the skills transmitted to the students (Westin, Sundler, & Berglund, 2015)

This phenomenon is aggravated by the fact that in some countries like the Philippines, nursing graduates can immediately apply for and pass the nursing licensure examination and enter the clinical practice as licensed nurses within weeks after graduation (Estrada et al., 2015). Such is the case in Tunisia where nursing graduates only need their nursing degree to get employed as full-fledged nurses in both public and private sector without any form of examination post-graduation. As a result, the transition from a student to a registered nurse has been described as one of the most stressful periods and this is due to the discrepancies between the theory taught in class and its clinical demonstration and application in the hospital. (C.-N. Tseng et al., 2013)

Some studies went as far as to incriminate the environment of the classroom, the place where most of the theoretical knowledge is acquired because it can never truly resemble a real life situation, even a full understanding of nursing underlying principles is simply not enough to ensure their proper application in practice and real life situations (Steele, 1991). Over 56% of the respondents included in a study conducted by (Hickey, 1996) reported that they felt there was a lack of emphasis given to practical skills in the classroom.

In nowadays, new graduates nurses are increasingly deployed into clinical areas requiring competency, professional responsibilities and accountabilities that is potentially beyond their capacity (Burns & Poster, 2008; Estrada et al., 2015; Li & Kenward, 2006). It has been recorded that in some countries up to 10% of their current nursing workforce in different care settings are new nurse graduates (Berkow, Virkstis, Stewart, & Conway, 2009)

Evidence suggests that despite having cleared the legal and professional requirements to enter nursing practice, the newly licensed nurses display an alarming lack of clinical and problem-solving skills (Shin, Jung, Kim, Lee, & Eom, 2010) and judgement (Li & Kenward, 2006) along with lacking the ability to handle multiple patients (Casey et al., 2011), thus they are unable to provide safe and competent nursing care. On the other hand, even newly graduate nurses themselves have stated having felt conflicted and at times not up to the various expectations and demands of their senior colleagues and employers. (Estrada et al., 2015; Halfer & Graf, 2006; Parker, Giles, Lantry, & McMillan, 2014).

A variety of research attests that some employers strongly believe that new graduate nurses are not clinically-prepared to be integrated in the work force (Moriarty et al., 2010), moreover it has been noted that only 10% of nurse executives believe the new nurse graduates to be ready and capable of delivering safe and efficient patient care (Berkow et al., 2009).

However, this disbelief in new graduates nurses is not unanimous, as a large number of nurse educators, assure the public to the professional readiness of their nurse graduates and to their having the needed clinical competency to deliver safe and efficient patient care (Wolff et al., 2010; Woods et al., 2015). Such divergence in beliefs between employers and educators is what pushed nursing scholars and their institutions around the world to investigate and eventually suggest solutions to the apparent gap between theory and practice (Kyrkjebø & Hage, 2005).

1.2 Background:(Conceptual framework)

The definitions for the term "Theory" varies dramatically throughout the scientific literature (Upton, 1999). When trying to explain "theories" from a nursing point of view they may be described as either "grand theories" which because of their highly abstract nature essentially serve as something of a broad perspective to the goals and structure of nursing practice (Landers, 2000) or "middle range theories" which are more concrete in their nature as such they are less complex and are better suited to specific day to day nursing issues and care giving (Meleis, 2011). However, for the purpose of this paper the term 'theory' will be defined as the subject matter of nursing, taught in the classroom, which equips students for practice.

As for the term "practice" it refers to the use of one's knowledge in a particular profession (Dorland's Medical Dictionary for Health Consumers, 2007), as such the scope of nursing is defined as the range of roles, functions, responsibilities and activities which a registered nurse is educated, competent and has the authority to perform. (NMBI, 2017). And so for the purpose of this paper the term "practice" as the physical application and use of "theory" taught in class, within a hospital setting by a nursing student.

Over the later part of the 20th century, a multitude of research papers have been published on the subject the theory-practice gap in the discipline of nursing. Some described this gap as a void and believed it was an ongoing issue for nursing education to address (Scully, 2011). Evidence also showed that the theory-practice gap in nursing interfered with evidence uptake in clinical practice (Upton, 1999). An exploration of this particular phenomenon from the perspectives of three user groups, students, nurse educators, and clinical preceptors, showed that all the identified groups highlighted the existence of a deep discrepancy between what is taught in classrooms as nursing theory and what is encouraged by the clinical preceptors as good practice habits at the bedside (Corlett, 2000; Hussein & Osuji, 2016).

Some researchers argue that this phenomenon is due to a certain misconception about the exact nature of the relationship linking nursing theory and the practice of the nursing profession some these researchers went as far as to identify certain specific contributing factors such as students' feelings of powerlessness and abandonment by clinical faculty (Dadgaran, Parvizi, & Peyrovi, 2012; Hussein & Osuji, 2016; Rolte, 2001).

One of the main reasons explaining the gap between practice and theory is the attempt of nurse theorists to define grounded rules which are in direct abstractions of the situations dealt with in the clinical domain (Hislop, Inglis, Cope, Stoddart, & McIntosh, 1996). It has been noted in several cases that a large number of nurse theorists give different meanings to the same term, which in turn hinders nurses and clinical preceptors from reaching the assumption that one author's use of a term is going to be the same for another (Draper, 1990; Upton, 1999), this fact would explain why in some cases nurse educators and clinical preceptors assign different meanings to the same concept. As such the existence of this phenomenon speaks to the difficulty in grounding highly abstract intellectual concepts in practice. It is the general assumption of some researchers that a more explicit explanation of the concept of nursing theory is needed in order to achieve harmony and complete synchronization between theory and practice in the curriculum. (Ferguson & Jinks, 1994).

Despite the abundant body of knowledge regarding the gap between practice and theory, some researchers believe that the complex nature of this gap is not yet fully understood (JO Corlett, 2006), there has been a few cases where research participants viewed this gap as a potential positive stimulus to the student process of learning but generally and in most cases it is acknowledged that this phenomenon has a negative effect on the student learning process and as such it needs to be minimized (Hussein & Osuji, 2016; JO Corlett, 2006).

Even though the body of literature regarding this gap between practice and theory in nursing is considerably large, it is however lacking when it comes to exploring or exposing this phenomena in the particular and specific setting of the nursing profession and education in Tunisia. Having chosen to tackle this multidimensional issue our greatest challenge as researchers was to focus the study center of interest because due to the immense quantity and the extensiveness of the theories taught in the curriculum of Tunisian faculty of nursing it was simply impossible for us to include them all.

And so, after being greatly influenced by the World Health Organization initiative “the Global Patient Safety Challenge: Clean Care is Safer Care” (WHO, 2009) which considered hand hygiene as an elementary right because “clean hands help prevent patient suffering and save lives” (WHO, 2009). Thus we have chosen the hand hygiene technique as a representative element of the theoretical knowledge taught in nursing faculties given its primordial place in the promotion of health. Which means that we will focus on only one unit of the teaching program which is hygiene specifically hand hygiene.

1.3 Aim

Thus this study aims to explore the existence of this gap within the curriculum of the high institute of nursing of Tunisia, through hand hygiene namely the simple hand washing technique.

2. Material and Methods

2.1 Study design, duration, and setting.

It is a cross-sectional descriptive study which was conducted over the span of six months. In the following units: Operating room at the Neurology Institute of Tunisia, Bardo basic health center, 3rd-floor children's hospital of Tunisia, La Rabta Hospital: (surgery wing (A), nephrology and ER), Razi Hospital: Pavilion E,

2.2 Study population

Participants: Our study included $n=70$ nurses in total collected from seven different hospital units that were randomly picked. The technique of simple random sampling was used (From the complete list of nurses of each of the seven hospital units included in the study), our inclusion criteria used to collect our sample were:

- The nurse must work in one of the seven units chosen for this study.
- Having filled the role of an internship preceptor in their unit
- They must express their written and oral consent to participate.

Data collection: We collected data from a cohort of nurses working in a variety of hospital units that ensure student nurse internships during their university studies. These units were randomly chosen from a complete list of the eligible units for student nurse training, this list was provided by the Higher Institute of Nursing of Tunisia. Seven units were chosen randomly, each representing a medical specialty through which a nursing student must pass during their university education (according to the curriculum of the Higher Institute of Nursing in Tunisia each student must pass 4 weeks internship in each of the 7 medical specialties before graduating). The chosen units were: Operating room at the Neurology Institute of Tunisia, Bardo basic health center, 3rd-floor children's hospital of Tunisia, La Rabta Hospital: (surgery wing (A), nephrology and ER), Razi Hospital: Pavilion E,

2.3 The search Instruments: For our study we used a survey questionnaire and an observation Grid:

- The survey questionnaire contained 3 sections and was conducted to test the nurse's knowledge of the technique of hand hygiene; it was adjusted according to the results of a pre-test which included 10 nurses
- The observation Grid was divided into two sections. The first was for the purpose of observing and evaluating the preparation of the necessary supplies needed for the execution of the technique of hand hygiene and the second section was for the purpose of observing and evaluating the execution of the technique of hand hygiene.
- The content for both the survey and the observation Grid was inspired from the teaching curriculum of the high institute of nursing of Tunisia and the book: “fiches des soins infirmiers” (Hallouët, Eggers, & Malaquin-Pavan, 2015)

2.4 Data Analysis

We collected 70 surveys and 70 observation grids. The data was entered and encoded on Excel software (Microsoft Excel 2016). Statistical analysis was performed by SPSS v22 for Windows. A descriptive study of the different variables including the sociodemographic characteristics for the entire study sample ($n = 70$) was first carried out. Secondly, we studied the relationship between the different variables such as the Type of nurse diploma and gender. For percentage comparisons, the χ^2 test was used with a significance threshold of 5%.

2.5 Validity and reliability

The survey questionnaire and an observation Grid were developed by the investigators specifically for this study.

The content for both instruments was inspired from the book: "fiches de soins infirmiers" (Hallouët, Eggers, & Malaquin-Pavan, 2015). Both instruments were adjusted according to the results of a pre-test which included 10 nurses which were not included in the final sample.

2.6 The ethical considerations:

All ethical approvals including that of the review board of the Higher Institute of Nursing of Tunis was sought before undertaking this study. Before commencing the data collecting, we explained to each of the nurses participating in the survey the purpose and objectives of the study through an information sheet that was delivered, read and explained to them. Confidentiality of the answers provided has been guaranteed through a coding system. Access to the premises of the hospital units was undertaken after agreement of the head nurse of each of the units. The written and oral consent was obtained before beginning the survey and observation of each nurse.

3. Results

3.1 Sociodemographic Aspects of our population :

Age: The age distribution of our population is summarized in the following diagram. The average age was 33 years [23, 59].

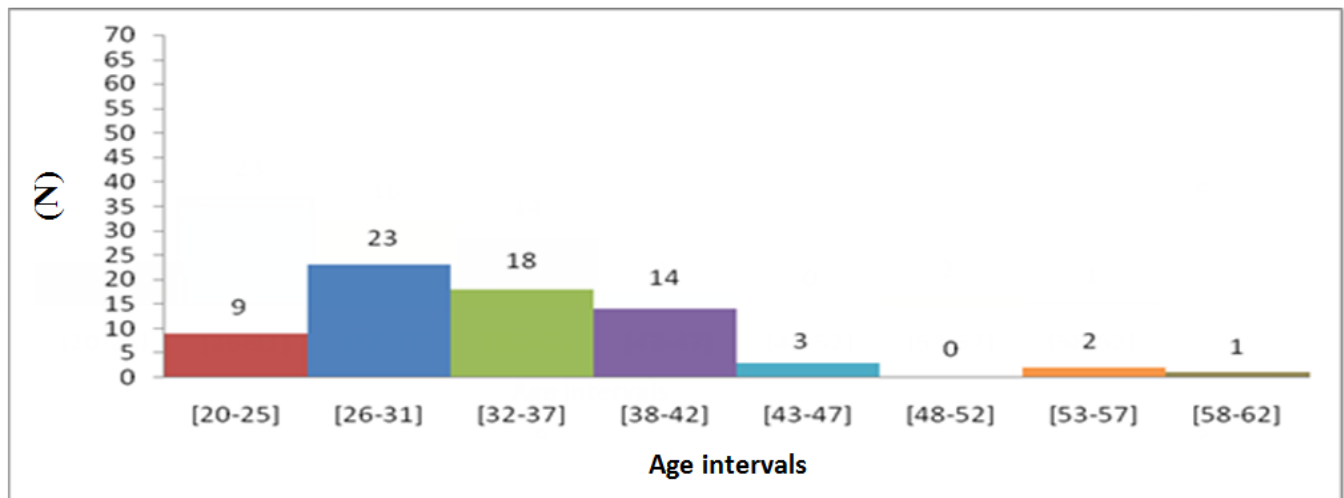


Figure 1. Distribution of the study population by age.

Gender

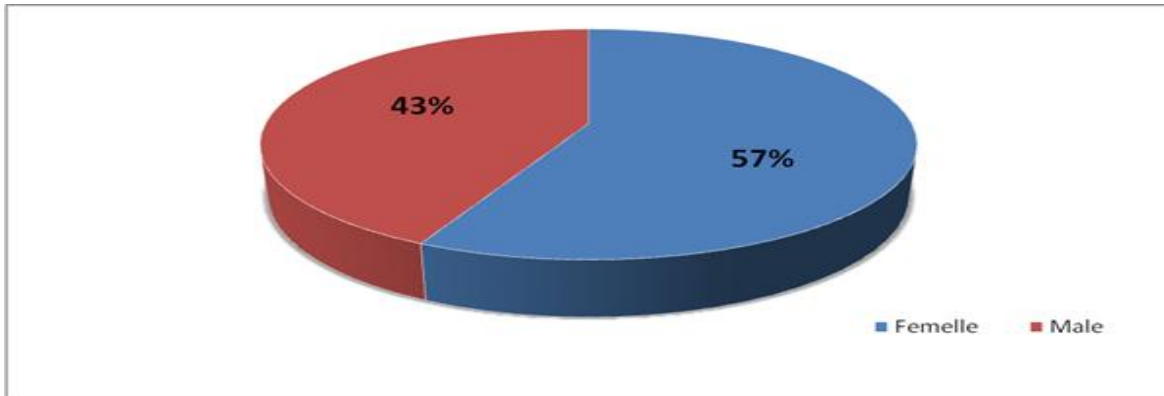


Figure 2. Distribution of the study population by gender

Seniority in the unit:

The following table summarizes the distribution of the nurses according to their Seniority in their units

Table 1: Distribution of the study population by number of years of experience

Number of years of experience	(N)	Percentage %
1	8	11,4
[2,5]	27	38,6
[6,10]	21	30
[11,15]	11	15,7
> 15	3	4,3
Total	70	100

Number of post university training courses:

The attached table shows the distribution of nurses according to the number of post university training courses followed since recruitment; 24 nurses / 70 (48.6%) did not undergo any kind of post university training courses until the date of this study.

Table 2. Distribution of the study population by the number of post university training courses

Number of post university training courses	(N)	Percentage %
0	34	48,6
1	7	10
2	9	12,9
3	7	10
4	4	5,7
5	4	5,7
6	1	1,4
8	1	1,4
9	1	1,4
19	1	1,4
30	1	1,4
Total	70	100

Time of the shift:

The table below summarizes the distribution of our population according to their shifts time.

Table 3: Population Distribution by shift Schedule

Observation periods	(N)	Percentage %
Morning shift	43	61,4
Afternoon shift	16	22,9
Night Shift	11	15,7
Total	70	100

Units: The distribution of the population by their work unit is summarized in the table below.

Table 4. Distribution of the population by their units of work

Nom Service	(N)	Percentage %
Operating room at the neurology institute of Tunis	6	8,6
La Rabta hospital surgery wing (A)	17	24,3
Bardo basic health center	5	7,1
3rd floor children's hospital of Tunis	12	17,1
La Rabtahospital : nephrology	15	21,4
Razi hospital: Pavilion E	6	8,6
La Rabtahospital : ER	9	12,9
Total	70	100

3.2 Results of the survey questionnaire

Indications :

When asked to name 4 indications for the simple hand washing technique, 17.1% failed the question. Summarized in the table below is the distribution of the different answers of the interviewed nurses regarding the indications of simple hand washing.

Table 5. Distribution of answers for the indications of simple hand washing

	(N)	Percentage %
All answers are wrong (failed indications section)	12	17,1
1 correct answer	12	17,1
2 correct answers	22	31,4
3 correct answers	12	17,1
4 correct answers (all answers are correct)	12	17,1
Total	70	100

Execution

When asked to name the different steps recommended for the execution of simple handwashing only 10% of the nurses retained correct answers. The table below summarizes the results.

Table 6: Distribution of the nurses answers regarding the recommended execution steps of the Simple Hand Washing technique

	(N)	Percentage %
No answer (left blank)	31	44,3
Answered correctly	7	10,0
Answered incorrectly	32	45,7
Total	70	100,0

The different answers for the material section:

The following chart summarizes the percentages of the answers collected for the questions regarding the supplies section, 71.4% (N = 50) failed the question.

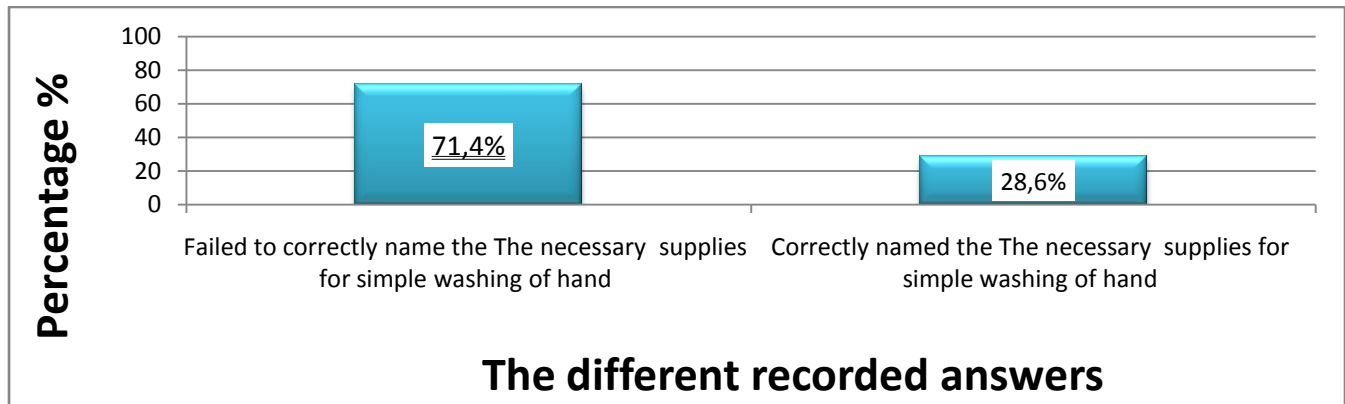


Figure 4. Distribution of answers regarding the supplies section of the survey questionnaire

The results of the entire survey questionnaire

Over the entire survey, only 8.6% were able to give all the right answered correctly. While 64.3% answered wrongly to all the questions

Table 7. Distribution of the total of answers the entire survey questionnaire

	(N)	Percentage %
Failed tree sections	45	64,3
1/3 sections are correct	13	18,6
2/3 sections are correct	6	8,6
All answers provided are correct	6	8,6
Total	70	100,

3.3 Results of the observation grid:

The preparation of the required supplies for the execution of the simple washing:

65.7% of the observed nurses prepared the necessary supplies needed for the execution of simple hand washing

Table 8: The distribution of the Observations of the preparation of the required supplies for the execution of the simple washing

	(N)	Percentage %
Unprepared or missing supplies	24	34,3
All the needed supplies were prepared	46	65,7
Total	70	100,0

A. Execution:

During the observation phase of the technique we noted that 67.1% did not follow the recommended steps of the execution and thus failing the technique

Table 9: Distribution of the results of the observation of the execution phase

	(N)	Percentage %
Failed The execution (Did not follow the recommended steps)	47	67,1
Succeeded in the execution (followed the recommended steps)	23	32,9
Total	70	100

Results of the observation of the entirety of all the phases of the observation grid for the technique of simple hands washing

The graph below summarizes the entirety of all the phases of the observation grid

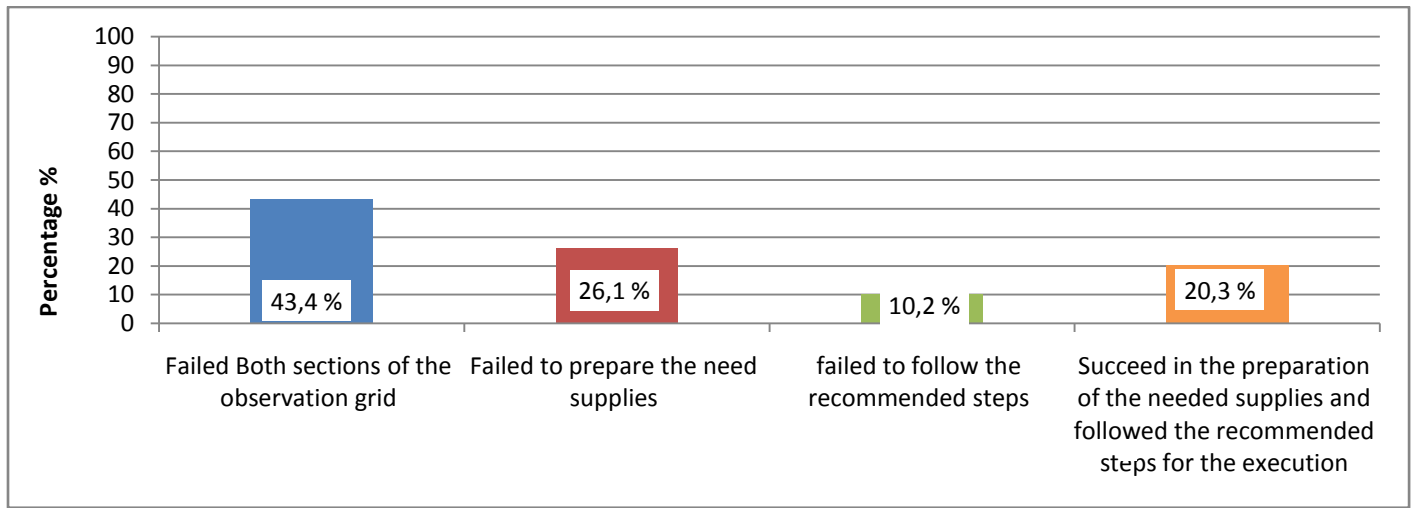


Figure 5. Distribution of the results of the observation the entirety of all the phases of the observation grid

3.5 The results of the cross tabulation

Table 10. Cross tabulation of the results of the observation grid with the unit's specialty

Units	Results of the observation grid			Total
	Failed	1/2 section was successful	Favorable observation	
Operating room at the neurology institute of Tunis	0	6	0	6
The Rabta hospital surgery wing (A)	14	3	0	17
Bardo basic health center	5	0	0	5
3rd floor children's hospital of Tunis	3	3	6	12
The Rabta hospital : nephrology	10	4	1	15
Razi hospital: Pavilion E	4	2	0	6
The Rabta hospital : ER	9	0	0	9
Total	45	18	7	70

A significant correlation was noted; P = 0.000, with a 95% confidence interval

Table 11. Cross tabulation of the results of the survey questionnaire with the unit's specialty

Units	Results of the survey questionnaire				Total
	Failed	1/3 section correct	2/3 sections correct	3/3 sections correct	
Operating room at the neurology institute of Tunis	0	1	0	5	6
The Rabta hospital surgery wing (A)	13	2	1	1	17
Bardo basic health center	3	2	0	0	5
3rd floor children's hospital of Tunis	8	1	3	0	12
The Rabta hospital : nephrology	10	5	0	0	15
Razi hospital: Pavilion E	4	1	1	0	6
The Rabta hospital : ER	7	1	1	0	9
Total	45	13	6	6	70

A significant correlation was noted; P = 0.000. with a 95% confidence interval

Table 12. Cross tabulation of the results of the supplies section of the survey questionnaire with the gender

Gender	Total of answers for the section “ materials ”		Total
	Failed	Correct answers	
F	29	11	40
M	21	9	30
Total	50	20	70

No statistically significant relationship was recorded between the preparation of the needed supplies for the execution of the technique and the variable gender with $p = 0.053$, with a 95% confidence interval

4. Discussion

Our study aims to explore the gap between theoretical teachings and applied training in nursing education through the technique of hand hygiene, the influence of this gap on nursing students and to eventually propose recommendations that would help reduce this gap. Nursing education on a university level is unique due to the existence of clinical placements programs which are supposed to help clarify the knowledge acquired in class as theory, this is done specifically through the phenomena of knowledge diffusion, these clinical placements programs in particular help the students to learn through their bodies, which would allow the flourishing of underlying habits. (Le Helloco-Moy, 2011) Nevertheless, nursing students are still faced with the challenge of mediating the gap between the theoretical knowledge they receive in class and the clinical instructions and application they perceive in the hospital (Le Helloco-Moy, 2011); this phenomena is particularly visible through the multiple and recurring statements of nursing students who noted having various difficulties of assimilation of the knowledge taught in class and then integrating it with the skills transmitted in the hospital (Estrada et al., 2015). Thus, the transition from student to registered nurse has been described as the most stressful period and this is especially due to the gap between the theory taught and the place of clinical practice. (Burns & Poster, 2008; Estrada et al., 2015)

Having chosen to tackle this multidimensional issue our greatest challenge as researchers was to focus the study center of interest because due to the immense quantity of theory instructed in the nursing faculty curriculum it was simply impossible for us to include them all. And so, after being greatly influenced by the WHO initiative “the Global Patient Safety Challenge: Clean Care is Safer Care” (WHO, 2009), which considered hand hygiene an elementary right because “*clean hands help prevent patient suffering and save lives*”. Thus we have chosen the hand hygiene technique as a representative element of the theoretical knowledge taught in nursing faculties given its primordial place in the promotion of health.

And so in order to emphasize the link between knowledge, attitude and practice, we opted for a data collection using survey questionnaire associated with an anonymous observation grid, grouping mixed open and closed questions based on the instructions cited in Issy-les-Moulineux’s book which has been validated by the WHO. The survey was divided into three sections, indications, supplies need for executions and the different steps of execution of hand hygiene.

For the indication section, only 17.1% correctly cited four of the indications for hand hygiene, 42.9% failed to name any of the correct indications for hygienic washing of hands, while 28 nurses / 70 were not able to answer the question at all and left the corresponding space blank.

According to WHO hand hygiene is indicated essentially in the 5 following situations (WHO, 2009)

1. Before patient contact
2. Before an aseptic task (such as oral/dental care, secretion aspiration, wound dressing, catheter insertion, preparation of food, medications)
3. After body fluid exposure risk (such as oral/dental care, secretion aspiration, drawing and manipulating blood, clearing up urine, feces, handling waste)
4. After patient contact.
5. After contact with patient surroundings.

Our survey questionnaire revealed that over 71, 4% of the nurses included in our study failed to name the necessary supplies for the execution of the hand hygiene technique. When asked to name the different steps needed to execute the technique in question, only 7 nurses (10%) retained correct answers. Shockingly only 8.6% were able to successfully answer the entire survey questionnaire and nearly 80% of the nurses who failed the entire survey have tried to justify their answers through the comment section of the survey and these are the most recurring justifications: Insufficient supplies (hygienic liquid soap ...), insufficient time and exhausting workload.

The same justifications were noted by (Conly, Hill, Ross, Lertzman, & Louie, 1989) who conducted a similar study in a neonatal intensive care unit in Canada, in this study it was noted that risk factors associated with non-observance of hand hygiene in epidemiological studies and the justifications given by health care providers to explain their failure to comply with hand hygiene recommendations is one of the main factors behind insufficient hand hygiene. (WHO, 2009). The goal behind our second measurement instrument which is an observation grid is to unveil the knowledge that is inscribed in concrete situations through the analysis of the nurses' actions in real life work situations. Our observations were made during two separate intervals the first was during the preparation of the necessary supplies for the execution of the hand hygiene technique the second was during the execution phase.

An analysis of the recorded data revealed that 65, 7% of the nurses correctly prepared the necessary supplies for the execution of the simple hygiene technique. But shockingly 67,1 % failed to execute the technique in accordance with the WHO recommendations for the technique (WHO, 2009), it has been noted that 42,9% of the observed nurses took less than 20 sec to finish the entire procedure which is almost half the recommended time (30 to 40 sec) (WHO, 2009), 58,6% of our population skipped the following recommended steps: Rub hands palm to palm, Rub right palm over left dorsum with interlaced fingers and vice versa, Rub palm to palm with fingers interlaced, most of the nurses in question simply skipped ahead to rinsing their hands of the soap right after applying it. When it came to one of the final steps of the procedure which is "dry hands thoroughly with a single use towel" 64, 3% of the observed nurses choose to dry their hands over their clothing specifically their white coats, rendering the entire procedure invalid.

Our results are in concordance with previous studies, which have noted that low compliance with hand hygiene procedure recommendations is universal in health care (Pittet & Boyce, 2003), it was also noted by several observational studies of hand hygiene that both the frequency and the quality of practices are considerably suboptimal (Larson & Kretzer, 1995), in addition (Taylor, 1978) have concluded that in addition to washing their hands for very short time periods, health care providers often failed to cover all surfaces of their hands and fingers.

According to the WHO guidelines on hand hygiene in health care (2009) even if the hand hygiene compliance is high the applied technique may be inadequate (WHO, 2009). The analytical study using chi square test showed statistically significant results for the cross-tabulation of the survey questionnaire results and the hospital unit specialty ($p = 0.000$), it was noted that from all the nurses observed it was only those working in the operating room of the neurology institute of Tunis, correctly answered the entirety of the survey questionnaire. A positive correlation was also noted for the cross-tabulation of the observation grid and the hospital unit specialty ($p = 0.000$). No statistically significant relationship was found for the cross-tabulation of the survey questionnaire results (preparation of supplies need for the execution of the technique section only) with the gender of the nurses observed ($p = 0.053$).

In summary, we find these results extremely alarming and furthermore proving the existence of the gap between knowledge taught in class rooms and the training students receive in the hospital that is at least regarding simple hand hygiene. We believe that these results could be explained in part by the fact that 48.7% of the observed nurses have not had any kind of post university training or continuing education. Other factors which have been long discussed by previous studies is the lack of the nurses' personal initiative to maintain their knowledge up to date with the innovation in health care science. It is most likely that the knowledge transmitted in the class room was not consolidated and properly integrated in the clinical training.

It has been made clear through this study that the gap between practical training and theoretical knowledge is widening and the results of which is the confusions experienced by the students through their hospital internships, which will ultimately result in future nurses with reduced level of competency. The existence of this gap might also be the result of various other factors such as the lack of the needed supplies for the demonstration in the hospital units (Westin et al., 2015), insufficient internship time (C.-N. Tseng et al., 2013), the personality and attitude of the interne, a lack of coordination between the hospital administration and the school of nursing's administration in the conceptions of the academic curriculum (Le Helloco-Moy, 2011).

The faculties of nursing generally recruit professors with high-level degrees (masters, PhD) but they generally lack experience and competence in practical demonstrations, this fact has been closely linked to the creation of the observed gap (Le Helloco-Moy, 2011), simply because the success of a student in their study is as much a question of their personal commitment as it is a question of the teaching and guidance they receive (Le Helloco-Moy, 2011; Westin et al., 2015). As such and so in order to mend this gap we recommend the establishment and validation of a detailed list of qualifications that all nurse must meet in order to become a clinical preceptor, this list should include :

1. A minimum of 3 years experience in their unit.
2. A positive performance appraisal approved by their employment institution.
3. Accomplishment of professional competencies and annual training requirements on the clinical advancement system
4. The desire to provide a learning experience for students.

It is also important to take into consideration the factors that may influence the quality of the internship before the assignment of the students such as the duration of the internships, the schedules, the workload, the definition of the role of interne in the unit and the pedagogical goals of the internship, the clarity and accuracy of requirements, the evaluation of inter and the maximum number of inters hosted in the same unit (Le Helloco-Moy, 2011).

The professors of the Faculty of Nursing must visit on a regular bases the units where students can be placed and maintain joint meetings in both the hospital units and at the faculty which will enable the professors, the nursing staff and the clinical preceptors to coordinate and cooperate in the design of the courses and instructions that will be given to students resulting in the diminishment of the disparity between what the professors teach in class and what the students observe and practice in there internships.

The current need is for a more active health professional. As such PBL (problem based learning) is an approach that must be encouraged in order to cope with the continuing changes in nursing education that has shifted from 'doing' to 'understanding' (Romeder, 2009; Westin et al., 2015), Another interesting approach is that of lifelong learning which encourages professionals to stay proactive in regard to renewing their knowledge and staying up-to-date with all the changes and innovations worldwide (Romeder, 2009), it has also been made clear that a redefinition of the nursing education programs regarding the teaching skills, strategies and evaluation of both theoretical and clinical teaching, should include the appreciation of individual and generational differences in the learning.

In return, and to ensure the effectiveness of the nurse internship, the supervisors themselves must be evaluated at least once every semester, such step allows the educational institutions to monitor the quality of the clinical professors while helping them to constantly improve their educational capacities by being up to date with all the new developments in the scientific field and so we propose the establishment of a multidimensional evaluation tool that allows : (Le Helloco-Moy, 2011; Romeder, 2009, 2009)

1. Self-evaluation by the supervisors of the internships.
2. Evaluation of the supervisors by the student.
3. Evaluation of supervisors by the head nurse manager of the designated unit.
4. Assessment of supervisors by the theoretical professors of the educational institution.

4.2 Limitations

Much like any other study, ours is not without its limitations one of which is that only one unit of the curriculum was tested furthermore the results are only valid for 1 out of the 5 nursing faculties in Tunisia ... these limitations however, could not be avoided due to the current circumstance under which this study was undertaken.

5. Conclusion

The gap between theory and practice in nursing education is a well established fact. The theoretical knowledge received in class often diminishes during the internships and even more during the actual practice of the nurse profession.

Our study yielded various alarming results, which proved the existence of this gap in Tunisia's high institute of nursing education curriculum, at least when it comes to hand hygiene, the leap from this particular technique to the generalization of this problem is not an easy one to make but it is the possibility with highest probability of being true. In order to avoid or mend this we have suggested various recommendations some which are the establishment and the validation of a detailed list of qualifications that all nurse must meet in order to become an internship supervisors, taking into consideration the factors that may influence the quality of the internship before the assignment of the students such as the duration of the internships, the schedules, the workload...With these recommendations we hope to reduce the existence of this phenomena and thus garnering a higher level of competency from new graduating nurses.

References

- Baxter, P. (2007). The CCARE model of clinical supervision: bridging the theory-practice gap. *Nurse Education in Practice*, 7(2), 103–111. <https://doi.org/10.1016/j.nepr.2006.06.007>
- Berkow, S., Virkstis, K., Stewart, J., & Conway, L. (2009). Assessing new graduate nurse performance. *Nurse Educator*, 34(1), 17–22. <https://doi.org/10.1097/01.NNE.0000343405.90362.15>
- Burns, P., & Poster, E. C. (2008). Competency development in new registered nurse graduates: closing the gap between education and practice. *Journal of Continuing Education in Nursing*, 39(2), 67–73.
- Casey, K., Fink, R., Jaynes, C., Campbell, L., Cook, P., & Wilson, V. (2011). Readiness for practice: the senior practicum experience. *The Journal of Nursing Education*, 50(11), 646–652. <https://doi.org/10.3928/01484834-20110817-03>
- Conly, J. M., Hill, S., Ross, J., Lertzman, J., & Louie, T. J. (1989). Handwashing practices in an intensive care unit: the effects of an educational program and its relationship to infection rates. *American Journal of Infection Control*, 17(6), 330–339.
- Corlett, J. (2000). The perceptions of nurse teachers, student nurses and preceptors of the theory-practice gap in nurse education - *Nurse Education Today*. Retrieved November 9, 2017, from [http://www.nurseeducationtoday.com/article/S0260-6917\(99\)90414-8/pdf](http://www.nurseeducationtoday.com/article/S0260-6917(99)90414-8/pdf)
- Dadgaran, I., Parvizy, S., & Peyrovi, H. (2012). A Global Issue in Nursing Students' Clinical Learning: The Theory–Practice Gap - *ScienceDirect*. Retrieved November 9, 2017, from <http://www.sciencedirect.com/science/article/pii/S1877042812026249?via%3Dihub>
- Dadgaran, I., Parvizy, S., & Peyrovi, H. (2013). Nursing students' views of sociocultural factors in clinical learning: a qualitative content analysis. *Japan Journal of Nursing Science: JJNS*, 10(1), 1–9. <https://doi.org/10.1111/j.1742-7924.2012.00205.x>
- Dorland's Medical Dictionary for Health Consumers. (2007). practice. *Dorland's Medical Dictionary for Health Consumers*. Retrieved from <https://medical-dictionary.thefreedictionary.com/practice>
- Draper, P. (1990). The development of theory in British nursing: current position and future prospects. *Journal of Advanced Nursing*, 15(1), 12–15.
- Estrada, M. G., GuanHing, M. S. S., & Maravilla, S. N. (2015, June 2). Thomasian Nursing Education and Clinical Practice: A Gap Analysis. Retrieved November 8, 2017, from <https://www.arjonline.org/full-text/american-research-journal-of-nursing/thomasian-nursing-education-and-clinical-practice-a-gap-analysis>
- Ferguson, K. E., & Jinks, A. M. (1994). Integrating what is taught with what is practised in the nursing curriculum: a multi-dimensional model. *Journal of Advanced Nursing*, 20(4), 687–695.
- Forsberg, E., Georg, C., Ziegert, K., & Fors, U. (2011). Virtual patients for assessment of clinical reasoning in nursing — A pilot study. *Nurse Education Today*, 31(8), 757–762. <https://doi.org/10.1016/j.nedt.2010.11.015>
- Gallagher, P. (2004). How the metaphor of a gap between theory and practice has influenced nursing education. *Nurse Education Today*, 24(4), 263–268. <https://doi.org/10.1016/j.nedt.2004.01.006>
- Halfer, D., & Graf, E. (2006). Graduate nurse perceptions of the work experience. *Nursing Economic\$,* 24(3), 150–155, 123.
- Hallouët, P., Eggers, J., & Malaquin-Pavan, É. (2015). Fiches de soins infirmiers - 9782294743344 | Elsevier Masson - Livres, ebooks, revues et traités EMC pour toutes spécialités médicales et paramédicales. Retrieved November 9, 2017, from <https://www.elsevier-masson.fr/fiches-de-soins-infirmiers-9782294743344.html>
- Hickey, G. (1996). The challenge of change in nurse education: traditionally trained nurses' perceptions of Project 2000. *Nurse Education Today*, 16(6), 389–396.

- Higher institute of nursing science of Tunis. (2008). Règlement Intérieur de l'Institut Supérieur des Sciences Infirmières de Tunis. Retrieved November 8, 2017, from http://webcache.googleusercontent.com/search?q=cache:fAxNxeKR0cJ:issit.tn/userfiles/downloads/Reglement%2520Interieur%2520ISSIT%2520V2013_2014.pdf+&cd=1&hl=en&ct=clnk&gl=tn
- Hislop, S., Inglis, B., Cope, P., Stoddart, B., & McIntosh, C. (1996). Situating theory in practice: student views of theory-practice in Project 2000 nursing programmes. *Journal of Advanced Nursing*, 23(1), 171–177.
- Hussein, M. T. E., & Osuji, J. (2016). Bridging the theory-practice dichotomy in nursing: The role of nurse educators. *Journal of Nursing Education and Practice*, 7(3), 20.
- Jeanguiot, N. (2014). Des pratiques soignantes aux sciences infirmières, From caring practices to nursing sciences. *Recherche en soins infirmiers*, (87), 75–135.
- JO Corlett, A. T. (2006). Negotiation of care by children's nurses: lessons from research [Text]. <https://doi.org/https://journals.rcni.com/doi/abs/10.7748/paed.18.8.34.s26>
- Khairulnissa, A., & Salima, M. (2011). Gap between knowledge and practice in nursing - ScienceDirect. Retrieved November 9, 2017, from <http://www.sciencedirect.com/science/article/pii/S1877042811009426?via%3Dihub>
- Kirkpatrick, H., Byrne, C., Martin, M.-L., & Roth, M. L. (1991). A collaborative model for the clinical education of baccalaureate nursing students. *Journal of Advanced Nursing*, 16(1), 101–107. <https://doi.org/10.1111/j.1365-2648.1991.tb01503.x>
- Kyrkjebø, J. M., & Hage, I. (2005). What we know and what they do: nursing students' experiences of improvement knowledge in clinical practice. *Nurse Education Today*, 25(3), 167–175. <https://doi.org/10.1016/j.nedt.2004.11.008>
- Landers, M. G. (2000). The theory–practice gap in nursing: the role of the nurse teacher. *Journal of Advanced Nursing*, 32(6), 1550–1556. <https://doi.org/10.1046/j.1365-2648.2000.01605.x>
- Larson, E., & Kretzer, E. K. (1995). Compliance with handwashing and barrier precautions. *The Journal of Hospital Infection*, 30 Suppl, 88–106.
- Le Helloco-Moy, G. (2011). Formation professionnelle et professionnels formateurs. *Recherche en soins infirmiers*, 106(3), 73–73. <https://doi.org/10.3917/rsi.106.0073>
- Li, S., & Kenward, K. (2006). A national survey of nursing education and practice of newly licensed nurses. *JONA'S Healthcare Law, Ethics and Regulation*, 8(4), 110–115.
- Meleis, A. I. (2011). *Theoretical Nursing: Development and Progress* (Fifth edition). Philadelphia: LWW.
- Moriarty, J., Manthorpe, J., Stevens, M., Hussein, S., MacIntyre, G., Orme, J., ... Crisp, B. (2010). A degree of success? Messages from the new social work degree in England for nurse education. *Nurse Education Today*, 30(5), 443–447. <https://doi.org/10.1016/j.nedt.2009.10.003>
- NMBI. (2017). NMBI - NMBI Scope of Practice: Nursing Practice. Retrieved November 9, 2017, from <https://www.nmbi.ie/Standards-Guidance/Scope-of-Practice/Nursing-Practice-Scope-Definition>
- Parker, V., Giles, M., Lantry, G., & McMillan, M. (2014). New graduate nurses' experiences in their first year of practice. *Nurse Education Today*, 34(1), 150–156. <https://doi.org/10.1016/j.nedt.2012.07.003>
- Peyrovi, H., Yadavar-Nikraves, M., Oskouie, S. F., & Berterö, C. (2005). Iranian student nurses' experiences of clinical placement. *International Nursing Review*, 52(2), 134–141. <https://doi.org/10.1111/j.1466-7657.2005.00417.x>
- Pittet, D., & Boyce, J. M. (2003). Revolutionising hand hygiene in health-care settings: guidelines revisited. *The Lancet. Infectious Diseases*, 3(5), 269–270.
- Rolte. (2001). hospital nursing. *Nursing 2017*, 31(4), 32hn8.
- Romed, F. (2009). Autour de la formation aux diagnostics infirmiers, quelle dynamique d'accompagnement? *Recherche en soins infirmiers*, (99), 97–116.
- Scully, N. J. (2011). The theory-practice gap and skill acquisition: An issue for nursing education. *Collegian*, 18(2), 93–98. <https://doi.org/10.1016/j.colegn.2010.04.002>
- Shin, K.-R., Jung, D., Kim, M. W., Lee, Y. J., & Eom, J. Y. (2010). Clinical supervisors' satisfaction with the clinical competence of newly employed nurses in Korea. *Nursing Outlook*, 58(3), 129–134. <https://doi.org/10.1016/j.outlook.2010.01.002>

- Steele, R. L. (1991). Attitudes about faculty practice, perceptions of role, and role strain. *The Journal of Nursing Education*, 30(1), 15–22.
- Taylor, L. J. (1978). An evaluation of handwashing techniques-2. *Nursing Times*, 74(3), 108–110.
- Thomson, M. A. (1998). Closing the gap between nursing research and practice. *Evidence-Based Nursing*, 1(1), 7–8. <https://doi.org/10.1136/ebn.1.1.7>
- Tseng, C.-N., Hsieh, C.-J., Chen, K.-H., & Lou, M.-F. (2013). Comparative study of an externship program versus a corporate-academic cooperation program for enhancing nursing competence of graduating students. *BMC Medical Education*, 13(1), 108. <https://doi.org/10.1186/1472-6920-13-108>
- Tseng, H.-C., Chou, F.-H., Wang, H.-H., Ko, H.-K., Jian, S.-Y., & Weng, W.-C. (2011). The effectiveness of problem-based learning and concept mapping among Taiwanese registered nursing students. *Nurse Education Today*, 31(8), e41-46. <https://doi.org/10.1016/j.nedt.2010.11.020>
- Upton, D. J. (1999). How can we achieve evidence-based practice if we have a theory-practice gap in nursing today? *Journal of Advanced Nursing*, 29(3), 549–555.
- Westin, L., Sundler, A. J., & Berglund, M. (2015). Students' experiences of learning in relation to didactic strategies during the first year of a nursing programme: a qualitative study. *BMC Medical Education*, 15(1), 49. <https://doi.org/10.1186/s12909-015-0338-x>
- WHO. (2009). WHO guidelines on hand hygiene in health care | RHL. Retrieved November 9, 2017, from <https://extranet.who.int/rhl/guidelines/who-guidelines-hand-hygiene-health-care>
- Wills, M. E. (1997). Link teacher behaviours: student nurses' perceptions. *Nurse Education Today*, 17(3), 232–246.
- Wolff, A. C., Pesut, B., & Regan, S. (2010). New graduate nurse practice readiness: perspectives on the context shaping our understanding and expectations. *Nurse Education Today*, 30(2), 187–191. <https://doi.org/10.1016/j.nedt.2009.07.011>
- Woods, C., West, C., Mills, J., Park, T., Southern, J., & Usher, K. (2015). Undergraduate student nurses' self-reported preparedness for practice. *Collegian (Royal College of Nursing, Australia)*, 22(4), 359–368.