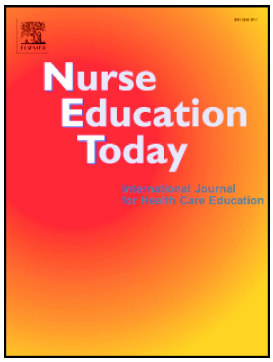
Accepted Manuscript



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PII: S0260-6917(18)30484-2
DOI: https://doi.org/10.1016/j.nedt.2018.11.012
Reference: YNEDT 4021

To appear in: *Nurse Education Today*

Received date: 27 August 2018
Revised date: 13 October 2018
Accepted date: 11 November 2018

Please cite this article as: Piao-Yi Chiou, Chih-Yin Chien, Amanda Lee, Hayter Mark, Nai-Ying Ko , Experiential learning of HIV self-test among student nurses: A qualitative study. Ynedt (2018), https://doi.org/10.1016/j.nedt.2018.11.012

Experiential learning of HIV self-test among student nurses: A qualitative study

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Funding statements

The funding source was ministry of education award grant which administered by the committee and review process of Mackay Medicine, Nursing and Management College.

Interest statement

There is no competing financial interest in the research. The purpose of the research did not reflect the official policy or position of the organization and government.

Ethical Approval

Ethical approval was granted by the Mackay Memorial Hospital institutional review board (15MMHIS202e).

Acknowledgements

The authors are very gratitude to all the student nurses in the study for performing the self-testing and willing to share their experience after the self-testing.

Authors' contributions

PYC was responsible for the research design data analysis, and manuscript preparation. CYC contributed to data collection, analysis, and manuscript preparation. NYK, AL and MH contributed to data analysis and rigor techniques and made critical and intellectual contributions to the manuscript.

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Abstract

Background: There is increasing demand for HIV self-tests, and nurses play an important role in counselling and assisting in the testing process. Traditional lecture-based nursing education has not typically focused on self-testing procedures, and there is little understanding of clients' experiences of self-testing.

Objectives: To understand the experiential learning (EL) of student nurses during the process of self-testing for HIV.

Design: This study used a qualitative design.

Settings: A college in northern Taiwan.

Participants: We recruited a purposive sample of 30 nursing students.

Methods: The OraQuick self-test was used as the self-testing tool in this study. After participants used the OraQuick self-test, they underwent a semi-structured interview during the post-test counselling period. All interview data were subjected to line-by-line content analysis.

Results: We extracted nine themes of nursing students' experiences during experiential learning of HIV self-test. In the pre-test stage, they recalled possible risk behaviors for HIV infection, decided to complete the self-test alone or asked for significant others to accompany them, and endured emotional fluctuations immediately prior to the test. When waiting for the test results, they felt isolated from the outside world. Some participants also began questioning the accuracy and safety of the test, and either viewed the results immediately or later on. In the post-test stage, some participants reported being uncertain about the results. Participants reported a greater understanding of the personal impact of testing and revealed their needs for support. Some identified a sense of loss and linked this to the rapid and direct delivery of test

results.

Conclusions: Our results can be used to guide HIV-related education courses and prevention programs. Experiential learning has the potential to improve HIV pre and post-test counseling, as nurses develop both clinical knowledge and personal insight of the testing process.

Key word: Experiential learning, HIV, self-test, student nurses, nurse education, student experience

1. Introduction

Human immunodeficiency virus (HIV) testing is an effective strategy to achieve the United Nation's (UN) target that 90 % of people with HIV are aware of their status and will receive antiretroviral therapy and achieve viral suppression by 2020 (UN Joint Programme on HIV/AIDS, 2018)(Acquired immunodeficiency syndrome; AIDS). Self-administered at-home oral HIV tests (self-test) are widely used for HIV screening. They provide a highly accurate, convenient and painless self-testing resource for people who need the tests (Castel et al., 2012; Suntharasamai et al., 2015). Two large screening campaigns following self-tests revealed HIV positive rates between 1.0 - 1.7% (Castel et al., 2012; Centers for Disease Control, 2017). As such, HIV self-tests are now seen as one of the key ways that more people can become aware of their HIV status.

To meet these policy and public demands for HIV self-tests, nurses increasingly play an important role in delivering counselling and assisting patients with the self-testing process (McNaghten et al., 2015). Therefore, nurses must develop their knowledge and awareness of the psychological and clinical implications of HIV self-tests for their clients (Camlin et al., 2016, Leidel et al, 2015). However, this important and growing area of HIV care has not been fully addressed in nurse education. There have been no studies of teaching interventions to explore how nursing students can be helped to understand the experiences that their patients may have during HIV self-testing (Cappi et al., 2001; William et al., 2004).

Experiential learning (EL) refers to the process of learning through experience, or more specifically as "learning through reflection on doing" (Hill, 2017; Kolb, 2015). EL allows nursing students to develop a greater awareness of their patient's experiences by immersing them in situational experiences (Kerr, 2015). In the past,

EL has been applied to HIV-related nursing education in the form of story sharing and face-to-face learning events with a person living with HIV. This type of learning has been shown to be effective in creating understanding and empathy among nursing students of how people living with HIV experience their lives (Gallop et al., 1992; Stiernborg et al., 1996).Therefore, EL that involves students taking HIV self-tests could be a new strategy to enhance their awareness of how their patients experience this situation – enabling them to empathize and subsequently improve how they may care for patients undergoing these tests.

Aim

The aim of this study was to examine student nurses' experiences of an experiential learning exercise on HIV self-tests.

2. Methods

2.1. Study design

This study used a qualitative design. Semi-structured interviews were conducted with nursing students in a college in northern Taiwan between September 2016 and February 2017.

2.2. Participants

Participants were recruited through purposive sampling. The sample size was determined through data saturation. We recruited senior student nurses who had completed a one-hour basic HIV/AIDS introduction course and had at least three months experience in clinical practice. Participants were excluded if they had previously used an HIV self-test. Advertisements of the study were posted on campus billboards in the nursing department. The researcher also announced the study and need for participants in an HIV/AIDS-related nursing course.

2.3. Procedure

The OraQuick ADVANCE® Rapid HIV-1/2 Antibody Test (OraQuick) was used as the self-testing tool in this study. OraQuick is a non-invasive HIV oral fluid test to detect HIV-1 and HIV-2 antibodies in oral fluid. Results are obtained within 20 minutes. It is licensed by the Taiwanese FDA (regulatory authority) and has 97% accuracy in comparison with serum testing (Marley et al., 2014).

Before the study began, a researcher with more than ten years of experience in HIV pre- and post-test counselling gave written and verbal explanations of the OraQuick to all participants, as well as a demonstration of the testing procedure (the same researcher later provided the post-test counselling to the study participants). Participants were then given thirty minutes of pre-test counselling, which included explanations of HIV transmission routes, test confidentiality, and the implications of the results. After all their questions about OraQuick operation had been answered, participants took the OraQuick kit home and conducted the self-test in line with the official testing procedure (OralSure Technologies, 2013). Upon completing the self-test, participants made an appointment with the researcher for the post-test counselling and interview.

All the interviews were conducted in a private room at the college using an interview guide. The guide comprised the following questions: How did you feel about taking the HIV self-test and what did you do to prepare for the test? When and where did you conduct the HIV self-test? What were your feelings and thoughts regarding to the HIV self-test process? How did you cope with waiting for the result? What were your feelings, thoughts, and behaviors after obtaining the result? Are you willing to share your result? Could you please share your feelings and thoughts regarding HIV after the self-test? The entire interview was recording and transcribed for further analysis.

Participants were provided with the number of a 24-hour professional counselling hotline situated at an AIDS designated hospital to address any negative physical or psychological reactions that they might have suffered during the self-test. Participants were not required to disclose their diagnosis to anyone after the test. We intended to offer participants with positive test results and who agreed to disclose those results further counselling and referral to a hospital for treatment. However, no participants reported a positive result.

2.4. Data analysis

The interviews were transcribed and analyzed using a thematic analysis technique guided by the work of Van Manen (2016). This is a line by line approach to generate the major themes of qualitative data which involved reading the transcribed interviews and summarizing all sentences into clusters of meaning units. Statements were then derived from the content and features of these clusters, from which themes were extracted.

To ensure the credibility and dependability of the results, data were collected and analyzed by a single researcher with significant clinical experience in HIV screening and care. Graneheim and Lundman (2004) suggest having one person collate the results reduces the possibility of intra-observer bias. All researchers were involved in analyzing a selection of transcripts. Any differences in interpretation were discussed and agreed upon. We also conducted a member check of providing the results to five participants for reviewing. Participants indicated that the results have covered all of their self-test experiences.

2.5. Ethical considerations

Ethical approval was granted by the Mackay Memorial Hospital institutional review board (15MMHIS202e). After interested students contacted the researcher,

information on the study was provided and students gave their written consent. Participants were told they could withdraw from the study at any time without returning the OraQuick. All participants' data were analyzed anonymously. The study design also enable informed consent to be made and also provided safeguards for any anxiety and further information needs it may create among participants.

3. Result

Thirty female student nurses agreed to participate in this study. Their age ranged from 19 to 22 years old, with a mean age of 20.3 years (SD=0.95). Of the thirty participants, 40% (n=12) reported that they had engaged in unprotected sexual behaviors. The average time to complete the HIV self-test after receiving the OraQuick kit was 2.8 days (SD=1.6). All participants reported their test results as negative.

The analysis revealed three phases and nine themes (Table 1) relating to their cognitions, emotions, and behaviors surrounding the HIV self-test.

3.1. Phase 1 - Pre-test period

The pre-test period consisted of the time from preparation of the HIV self-testing kit until the oral swab was placed within the buffer solution tube. Three themes were identified: recalling possible risk behaviors, do alone or ask others to accompany them, and emotional fluctuations.

With regard to the theme of "recalling possible risk behaviors," participants described how, before taking the self-test, they had begun to review past behaviors that put them at risk of HIV infection. Unsafe sexual behaviors, accidental punctured, or contacted with patients' bodily fluid were the most common incidents. Despite having learned about the transmission route of HIV, some participants were concerned about HIV infection due to non-risky behavior, such as sharing cups with roommates,

going to crowded places, and donating blood. One student nurse reported possible vertical transmission of HIV from her mother.

"*The first thought that came into my mind was: I could have been infected by him. We don't use condoms. I am not sure how many sex partners he has had. Was that fever he had a sign of HIV infection?*" (PT 5)

"*I wonder about my parents' health condition. Is it possible that I was infected with HIV by my mother during pregnancy?*" (PT 9)

As for the theme, "do alone or ask others to accompany them," some participants did not want to be seen while performing the HIV self-tests. Individuals who preferred privacy or who felt incapable of predicting the test results often chose to do the test alone.

"*I didn't tell anyone because I was afraid of being judged by others. They might regard me strangely. I wouldn't know how to explain it to them if I got a positive result*." (PT 8)

Participants who let their friends and relatives know or asked someone to accompany them while they took the self-test mainly did so in an effort to obtain social support. Some participants also noted that their sexual partner should share some of the responsibility of the test results.

"*I have asked for my parents to accompany me. I would need someone to stand by me or cry with me when the test result shows up*" (PT 24)

"*He [my partner] should be there with me and take responsibility for the result; at least, he should do something for me if the result is positive*." (PT 11)

With regard to the theme of "emotional fluctuations," most participants experienced considerable turmoil in their emotions before the self-test. Common positive feelings were excitement and expectation, whereas common negative feelings

were anxiety and fear. They also experienced an increased heart rate, shortness of breath, sweating, and body tremors.

> "*I cannot wait to read the result, but I am also afraid that the result is not what I want. Such a strange feeling*." (PT 28)

> "*In the beginning, I was very interested and looked forward to the result. A minute later, when the procedure had actually started, I felt anxiety and both of my hands were shaking*." (PT 2)

3.2. Phase 2 - Waiting for the test results

This phase was defined as the period from when the oral swab was placed into the buffer solution tube until the results were revealed. The average waiting time for the results was 20 minutes. Three themes emerged during this phase: isolation from the outside world, questioning the accuracy and safety of the test, and viewing the results immediately or later on.

Participants often felt isolated from the external world and entered their own space because of the heavy concentration involved in the process of waiting for their results (i.e., "isolation from the outside world"). They reported that the time passed slowly.

> "*When I saw the buffer solution rising up, I heard my heart pounding. I could not hear any sound from outside. Time seemed to slow down and even stop. I was the only one left in the world*." (PT 25)

In relation to "questioning the accuracy and safety of the test," some participants, despite receiving explanations and demonstrations of the self-test, still questioned the accuracy of the results and pointed out the possible environmental factors that might affect them. Other participants were not sure that the buffer solution was safe or could be touched.

"*I had followed each step on the instruction. But I still asked myself: am I correct to do this? Can the buffer solution be exposed to air? Can light affect anything? Should I wait for longer?*" (PT 14)

"*I don't know if there is HIV in the buffer solution, so I wear gloves for safety during the test in case I dropped the buffer solution by accident.*" (PT 20)

The theme "viewing the results immediately or later on" pertained to how some participants constantly watched the buffer solution get absorbed on the oral swab before the results appeared. Other participants, however, could not focus on the swab and tried to distract themselves, leading them to delay when they actually read the results.

"*I just couldn't help but look; and I sang and yelled, even prayed for a negative test result, all while watching the solution go up into the swab.*" (PT 19)

"*I played mobile games while waiting; I could not watch the buffer solution going up or the result when they appeared. I needed more time to finish my game and calm myself enough to look at the outcome.*" (PT 18)

3.3. Phase 3 - Post-test period

This phase referred to the period following the revelation of the results. Three themes emerged during this phase: uncertainty of the result, understanding the impact of and needs related to HIV tests, and sense of loss.

The first of these themes ("uncertainty of the result") described how some participants did not fully trust the results. They noted the possibilities of a "window period," false-positive results, and problems with the screening tool, even though the test results had been clearly presented. Often, participants rechecked the swab from different angles and at different times to make sure that the results did not change.

"*The negative result made me happy. However, the buffer solution could be inaccurate. I waited for several minutes to see whether the result would change.*" (PT 22)

"*Was that really my result? I brought the result into the lamplight to check it. Should I do a re-test to make sure in a few weeks?*" (PT 17)

Through participating in the tests, participants developed an understanding of HIV tests, which they felt was unlike any other experience. Some participants regarded the results of HIV tests as particularly shocking and life-altering, and came to understand the impact and concerns of people who avoid the test. They also developed a more accepting view of HIV infection ("understanding the impact of and needs related to HIV tests").

"*I had never been so close to HIV in my life. You know, your life is decided within a few minutes. A positive result would mean hell and death. I would consider killing myself if I got a positive result…people must be really brave to take the test. I now understand why people refuse to do the test; they just want to take control of their lives.*" (PT 21)

"*It is easy and convenient to take a self-test. There is nothing terrible about HIV. If I get a positive result, I am still me, nothing has changed. HIV can be seen as a special characteristic of the body. I will find a way to live with HIV.*" (PT 6)

The experience of conducting a self-test also stimulated participant's motivation to take the test regularly and engage in safer sexual behavior to prevent HIV infection.

"*Now I know that this test is important for reminding me to engage in safer sex. Particularly, I don't know if sex partners are safe.*" (PT 1)

The test also allowed participants to understand the needs of people who take HIV self-tests.

> "*It is important to explain the details of the process and possible mood changes. I will provide useful resources to people for both good and bad results.*" (PT 15)

Due to the rapid results, some participants found it difficult to come down from the emotional turmoil that they had experienced before the test. A few participants reported that they had had greater expectations for the results. The quickly and directly presented results left participants with a "sense of loss."

"*That's it? I got the result so fast that I felt like I lost something.*" (PT 30)

4. Discussion

4.1. Major findings

It is important to prepare nursing service providers for HIV self-test in order to reach the first goal of the 90-90-90, as well as fight the stigma and discrimination related to HIV. However, self-testing and attitude changes related to HIV test are not often discussed in HIV-centric courses in nursing education (Snowden, 1997; Williams et al., 2004; Wu et al., 2014). EL of HIV self-testing is an innovative teaching strategy for student nurses to facilitate greater reflection and a deeper understanding of self-tests and HIV (which might not be produced via traditional lecture-based education). Our results revealed that, through EL, student nurses learned how to operate the self-testing kit and came to understand the changes in emotions, cognition, and behaviors associated with HIV self-tests. EL is therefore a strategy that can not only increase HIV-related knowledge (like lecture-based education) but also enhance students' empathy and attitudes toward HIVself-testing.

Since clients conduct HIV self-tests alone, it can be difficult to fully

comprehend the psychological effects this process may have (Kerr et al., 2011). Our study revealed that student nurses found that the waiting period for test results was 'unbearable'. Furthermore, 70% of our participants (n=21) decided to take the self-test alone to prevent judgment by others. This suggests that EL of HIV self-testing provided student nurses with the opportunity to experience, to a degree, the social stigma of HIV and how important privacy is for conducting an HIV test. These results are consistent with previous studies indicating how privacy is a critical concern for avoiding social stigma of HIV test (Frye et al., 2015; Wirtz et al., 2017). In our study, student nurses were able to have a similar experience to their clients, feeling fear and anxiety while waiting for the self-testing results (Kelvin et al., 2016). Similar to clients, some nurses even reported that they would commit suicide if they were HIV positive, and would rather live in doubt of their HIV status (Kelvin et al., 2016; Nyanzi-Wakholia et al., 2009).

Negative emotions related to anticipating a HIV-positive result might discourage some individuals from obtaining an HIV test (Martínez Pérez, et al., 2016); through the EL of HIV self-testing in this study, student nurses came to understand why people sometimes refuse to take HIV tests. Nursing educators might therefore discuss with students strategies for encouraging and increasing acceptance of self-testing, as well as how to cope with the stigma of HIV, based on students' personal experiences. Students' reflection on the needs of clients during HIV self-tests encouraged them to think about the appropriate services they might provide surrounding the self-test. Some of the student nurses showed an accepted attitude change regarding HIV after the self-test. They described that HIV would not change their personal characteristics, and that they would find a way to live with HIV. This attitude might help reduce nurses' resistance to providing care to a person with HIV/AIDS in the future.

Before the self-test, participants reflected on their own HIV-related risk behaviors. This finding mirrors previous research on men who have sex with men (MSM) and injection drug users performing HIV self-tests (Middelthon and Aggleton, 2001; Hughes, 2002). Although student nurses had received education on basic HIV knowledge, some perceived a number of non-risky behaviors as possible sources of HIV infection, such as sharing a drink with others or going to crowded places. Such speculations about HIV infection likely increased participants' negative emotions (e.g., fear and anxiety) during the self-testing procedure. Mere discussion of the actual transmission routes of HIV is obviously not enough; therefore, the routes should be covered in detail in nursing education to clarify them. Nursing educators might, for example, discuss empirical data on high-, low-, and no-risk HIV transmission routes with students to dispel myths before EL of self-testing.

Some of the participants questioned the accuracy and safety of HIV self-tests after receiving operational guidance on it - and were uncertain about the test results. Similar experiences were reported by MSM, transgender women, and high-risk young adults during their first time taking an HIV self-test (Schnall et al., 2016; Wirtz et al., 2017). Because individuals who take self-tests often understand the error rate (which is around 3%), effects of incorrect operation, and the window period of self-tests, uncertainty about the self-test results is common (Frye et al., 2015; Kelvin et al., 2016; Schnall et al., 2016). Therefore it is important to provide easy-to-understand, step-by-step instructions before self-tests (Brown et al., 2016; Schnall et al., 2016). In addition, participants noted that the lighting condition, temperature, waiting time, and the safety of the buffer solution should be clearly described during pre-test counselling in order to answer clients' questions and reduce their uncertainty about self-testing, especially the first time they take the test. Nursing educators should

emphasize that student nurses actively discuss any uncertain feelings about the results, arrange post-test follow-up meetings, and provide second self-tests or resources to confirm the results.

4.2. Implications for nurse educators

Nurse educators should perform self-tests themselves before applying these tests to HIV education courses or training. Experiencing self-tests can help guide educators in designing EL of self-tests and anticipating the responses and demands of student nurses on this topic. The results of this study can also be used to construct pre- and post-test counselling training on self-testing in the nursing curriculum. When designing HIV related education nurse educators should provide the opportunity and resources for student nurses to experience taking an HIV self-test. However, this must be done in a manner to protect confidentiality and also include sign-posting students to sources of help and information on HIV. The internship of HIV pre and post-test counseling could be arranged to these students to evaluate the influences of EL of self-test. Though, it is possible that not all students would agree to participate in self-testing; therefore, alternative teaching methods that cover the same content and meet the requirements of the curriculum should be designed to respect these wishes.

4.3. Limitations

This study used purposive sampling, which may have recruited participants with a specific interest in self-testing and HIV, thus influencing the credibility of results. However, the research question aimed to evaluate experiential learning as a mechanism to educate student nurses on physiological and psychological aspects of the testing processes. Thus, purposive sampling of a group of student nurses was the most appropriate approach to the study. As with any qualitative phenomenological study, this research relied upon truthfulness and veracity of responses from

participants. Because the number of male students in nursing department who meet the incursive criteria is extremely small, we could not recruit the male research participants. Therefore, the results could have gender bias. Some participants may have not actually taken the test and provided false results. This is of note given that the researchers were academics and professional nurses, and that an HIV positive diagnosis may have implications in practice.

5. Conclusions

Nine themes related to student nurses' EL during HIV self-testing were extracted. In the pre-test stage, participants wondered about the possible sources of HIV infection in their lives and decided to complete the tests in privacy or accompanied by significant others in order to psychologically prepare for the test result. When waiting for the test result, they felt isolated in space and time. Some participants also doubted whether they had operated the tests correctly and the safety of the buffer solution, and chose when to view the results. In the post-test stage, some participants found that they doubted the results. All participants revealed they had gained a greater understanding of the impacts of HIV self-testing and the needs of those who take such self-tests. This study has shown that when nursing students take HIV self-tests they experience at first hand the emotions that their patients could go through in clinical practice. Therefore, this type of EL can play a significant role in developing HIV related empathy amongst nursing students - thereby enabling them to provide quality care when they meet patients' going through this process in their clinical practice. The study also adds to the evidence base on the effectiveness of EL in nursing and health care education.

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Table 1 Three phases and nine themes of experience in self-test of nursing students

Phase	Themes
Pre-test period	1. Recalling possible risk behaviors
	2. Do alone or ask others to accompany them
	3. Emotional fluctuations
Waiting for test results	1. Isolation from the outside world
	2. Questioning the accuracy and safety of the test
	3. Viewing the results immediately or later on
Post-test period	1. Uncertainty of the result
	2. Understanding the impact of and needs related to self-testing
	3. Sense of loss