MRS. ANNICA ROSVALL (Orcid ID : 0000-0003-1213-5618)

TITLE

Registered Nurses' Perception of Self-Efficacy and Competence in Smoking Cessation after

Participating in a Web-Based Learning Activity

Annica Rosvall RN, MNSc[1*]; Elisabeth Carlson RN, MNEd, PhD[1]

[1] Department of Care Science; Faculty of Health and Society; Malmö University, Sweden

Correspondence to:

[*] Annica Rosvall, Lecturer, Department of Care Science; Faculty of Health and Society; Malmö
University, SE- 205 06 Malmö Sweden

E-mail: annica.rosvall@mah.se

Telephone: +46-40-6657035

@annicarosvall

CONFLICT OF INTEREST STATEMENT

No conflict of interests has been declared by the authors.

ABSTRACT

Aims and objectives. This study aims to describe how registered nurses having undergone a web-based learning activity perceive their self-efficacy and competence to support patients with smoking cessation in connection with surgery.

Background. Smoking cessation in connection with surgery reduces postoperative complications, and the support patients get from registered nurses may be important in helping them become smoke-free in connection with their surgery. Therefore, registered nurses are in need of enhanced understanding about which kind of counselling is the most effective for smoking cessation. Educating large groups of registered nurses in a digital environment appears to be a flexible and cost-effective way.

Design and methods. A convergent mixed-method design with data collection was done using questionnaires (n = 47) and semi-structured interviews (n = 11). Inclusion criteria were registered nurses in surgical wards. The samples were non-probability and modified nested. Descriptive statistics and content analysis were used for data analysis.

Results. After completing the web-based learning activity, the registered nurses perception was that of good self-efficacy and increased competence in supporting patients with smoking cessation in connection with surgery. They improved their understanding of how to talk about smoking cessation with patients in dialogue using open-ended questions. Nevertheless, the registered nurses requested opportunities for dialogue and interaction with colleagues or topic experts.

Conclusions. The results indicate that registered nurses can enhance their competence in supporting patients to embrace smoking cessation by learning in a digital environment. Self-efficacy and understanding of the topic seems to motivate registered nurses to counsel patients about smoking cessation.

Relevance to clinical practice. Findings from this study will be of particular interest to educators in healthcare settings who can devise further development of web-based learning activities.

KEYWORDS

Competence; Continuing education; Registered Nurses; Self-efficacy; Smoking cessation; Surgery; Web-based learning.

SUMMARY BOX

What does this paper contribute to the wider global clinical community?

- A digital environment seems to be supportive to learning.
- Self-efficacy seems to motivate RNs to counsel patients about smoking cessation.
- Digital learning environments can be optimized by providing collaborative surfaces.

INTRODUCTION

It is well documented that smoking cessation in connection with surgery results in health benefits due to the correlation between the use of tobacco and postoperative complications. Smoking cessation at least four weeks before surgery reduces many of the risks of postoperative complications such as cardiopulmonary and wound-related complications, extended hospital stays, and prolonged convalescence (Thomsen et al. 2014). A recent Cochrane review by Rice et al. (2013) concluded that smokers are motivated to quit smoking, especially in a hospital setting. Registered nurses (RNs) are represented through the whole chain of care, and they make up the largest group of healthcare providers that patients who smoke encounter in connection with surgery. The support from RNs may be important in helping patients to become smoke-free (Rice et al. 2013), and the most effective intervention is counselling by healthcare staff and nicotine replacement therapy (Thomsen et al. 2014).

BACKGROUND

Pelkonen & Kankkunen (2001) show in their study that RNs are in need of enhanced understanding about which kind of counselling is the most effective for smoking cessation. The core of smoking cessation techniques involves counselling to patients based on conversations whereby RNs are responsible for making the patient participate and become motivated to a change their behavior to become smoke-free. O'Donovan (2009) and Svavarsdóttir & Hallgrímsdóttir (2007) argue that the lack of education and training in smoking cessation techniques leads to RNs choosing not to counsel patients who are smokers. On the other hand, studies reveal that RNs who have undergone education in smoking cessation techniques are positive and willing to counsel patients in smoking cessation (Chan et al. 2007, Kerr et al. 2011, Sheffer et al. 2011).

Regardless of topic, it is a challenge to educate large groups of healthcare providers concerning the latest research results, guidelines, and techniques (Ruggeri et al. 2013). Even though it is a challenge, it is necessary and important to reach the target groups in an effective way to ensure their competence so that they can provide care that is safe for patients (Grol & Grimshaw 2011). Nisar (2004) concludes that one alternative to reach large groups of healthcare providers in a flexible and cost-/time-efficient way is through learning in a digital environment. Learning in digital environments allows the individual to study at his/her own pace since the educational material is available 24 hours a day. The educational material is also easily accessible for those whose participation is limited due to their location, which reduce both cost and time (Nisar 2004). Sarna et al. (2016) confirm that it is feasible to use web-based educational smoking cessation programmes in order to reach large groups of nurses. Moreover, several studies emphasize that learning in a digital environment is a flexible way to acquire skills (Cook et al. 2004, Korhonen & Lammintakanen 2005, Sit et al. 2005). However, the flexibility has been described as a two-edged sword due to the lack of fixed classes and the need for self-discipline to achieve learning (Atack 2003). One perceived disadvantage with learning in digital environment is the absence of face-to-face interaction compared to traditional learning in classrooms

(Atack 2003, Nisar 2004, Sit et al. 2005). No differences were found when traditional learning and learning in digital environment were compared with regard to RNs' competence in, for example, pressure ulcer classification, hand hygiene, and prevention of malnutrition (Lahti et al. 2014). Knowles et al. (2015) claim that the learning outcome is affected by how the digital environment is customized to the knowledge and skills that the educational intervention intends to support. There should be a variety of learning activities, and when the proper adjustment to achieve expected learning outcomes has been done by the educators, the digital environment is considered effective and appropriate to learn both knowledge and skills (Bloomfield et al. 2010, Hart et al. 2008, Nyamathi et al. 2010).

According to Bandura's social learning theory (1977, 1995), individuals learn from each other through observation and imitation, thus acquiring experiences from the model's behavior. Those observed response patterns have an inhibitory or disinhibitory effect on the learner who decides whether the observed response patterns are worth imitating. Thus, the individual decides whether or not the learning leads to a change in behavior. One motivational variable in Bandura's social learning theory is self-efficacy, which deals with the experience of individuals' belief in their own abilities. The individual's belief can execute a given behavior in a given setting. Belief in self-efficacy determines how individuals tend to perceive the completion of the tasks and challenges that have to be accomplished in life. Bandura argues that individuals with strong self-efficacy seek to master challenges, are persistent in completing tasks, and are confident in their own ability to successfully engage in a specific task or challenge (Bandura, 1977, 1995). In a study by Barta and Stacy (2005), nurses (n=15) participated in a two-hour session based on clinical practice guidelines by the Agency for Healthcare Research and Quality, designed around Bandura's theoretical model of self-efficacy and which incorporate several sources to enhance the nurses' self-efficacy. The study's results reveal that smoking cessation training can be effective in increasing nurses' self-efficacy and changing their behavior in smoking cessation counselling. Lauder et al. (2008) argue that self-efficacy is thought to be related to competence. This could explain why individuals with low self-efficacy appear to perform

less successfully than those with strong self-efficacy. That is, less successful performance is not dependent on lack of skills and competence, but because individuals lack the necessary belief in their own self-efficacy to use their skills and competence effectively. Thus, self-efficacy is an individual's perceived ability, not a reflection of their actual ability.

Therefore, RNs' competence and self-efficacy in smoking cessation counselling techniques are enhanced as a matter of patient safety: to reduce postoperative complications. Accordingly, educating large groups of RNs in a digital environment seems to be a flexible and cost-effective way to achieve this. However, to our knowledge, no studies have been conducted that describe how RNs self-report their self-efficacy and competence as regards supporting patients in smoking cessation in connection with surgery after they have been educated in a digital environment.

This study aims to describe how RNs having undergone a web-based learning activity perceive their self-efficacy and competence to support patients with smoking cessation in connection with surgery.

METHODS

A convergent mixed-method design was used to explore whether there was a consistency between quantitative and qualitative data in how RNs who have undergone a web-based learning activity perceived their self-efficacy and competence to support patients to smoking cessation in connection with surgery. Questionnaires were used for the quantitative part, thus making it possible to measure the RNs self-reported competence. For the qualitative part, the RNs were asked to describe their perceptions regarding self-efficacy, competence, and learning in a digital environment through semi-structured interviews. Data collection and analysis have been done convergent, and the comparison and interpretation occurred in the results. The findings from both methods are equally weighted (Creswell 2014, Polit & Beck 2010). (insert figure 1)

The web-based learning activity

A university hospital in the southern part of Sweden implemented an educational intervention called *Smoke-free surgery*, which aimed to educate nurses who were tasked with counselling patients to achieve smoking cessation in connection with surgery. The education was web-based, and the learning outcomes for the initiative were that after participating in the web-based learning activity, the RNs were expected to be able to do the following:

1. Talk with patients about smoking cessation in dialogue using open-ended questions
2. Encourage patients' efforts to become smoke-free
3. Provide patients with contact details to counselling for behavioral support
4. Offer nicotine replacement therapy of the right dose to patients in need

The RNs' participation in the self-directed e-learning, *Smoke-free surgery*, was optional; however, the web-based learning activity was available on the Internet 24 hours a day. It consisted of one general introduction to the topic *smoke-free surgery,* followed by six lessons: (1) patient safety and evidence, (2) how smoking affects the body, (3) counselling techniques, (4) motivation and nicotine replacement therapy, (5) counselling preoperatively and (6) counselling postoperatively. The final part of the education ended with a general summary of the topic *smoke-free surgery* and a concluding quiz that consisted of 12 multiple-choice questions. It took approximately 30 minutes to complete the web-based learning activity (County Council of Scania 2015).

Sample

The inclusion criteria were RNs with a Bachelor degree in Nursing who had successfully completed the web-based learning-activity quiz. They all held positions as registered clinical nurses in surgical wards at a university hospital in southern Sweden. The sample was non-probability, and a total of 113 RNs corresponded to the inclusion criteria, of which 47 chose to participate in the quantitative part. In the final question on the questionnaire, the RNs were asked if they were willing to continue their

participation in the following qualitative part of the study. For the qualitative part of the study, 11 RNs chose to participate. This was made possible through a modified nested sample (Onwuegbuzie & Collins 2007), which means that a subgroup has been selected, based on voluntarily participation, from a larger population.

Data collection

Data was collected between October 2013 and September 2014. A previously validated instrument (Rosvall et al. 2013) was used and modified based on Bandura's social learning theory (1977). Four questions were added to the instrument about self-efficacy as the perception of the individual's own competence can influence how challenges are mastered and tasks are completed. Furthermore, questions with connection to the learning outcome were added. The instruments internal consistency was tested for Cronbach's alpha (Polit & Beck 2010), and the results were adequate (self-efficacy 0,80 and competence 0,84), thereby, Cronbach´s alpha for competence is comparable to the original instrument by Rosvall et al. (2013) were alpha was reported at 0,83.

The study instrument contained 12 statements where the respondents were asked to indicate their strength of agreement on a Likert-type scale that ranged from

1 (strongly disagree) to 5 (strongly agree). The participants were requested to answer statements about their self-reported self-efficacy (4 questions) and competence (8 questions). The instrument also contained background variables such as gender, age group (<30, 31-40, 41-50, and >50), and perceived computer skills (3 questions). The language used in the questionnaire was Swedish and the participants had the opportunity to write comments freely after finishing the questionnaire.

One month after completing the web-based learning activity, the questionnaire was sent to the participants who also received two reminders (after 1 and 2 weeks). The RNs who agreed to participate in the following qualitative part of the study were contacted within a week by the first author (AR).

Semi-structured interviews (n=11) were conducted using an interview guide with one opening question: *Could you please tell me about your experiences of talking with patients about smoking cessation in dialogue using open-ended questions*? The interviews took place at the RNs' workplaces, were conducted using a digital voice-recorder, and lasted between 14 to 30 min (mean 24 min).

Data analysis

Statistical analysis procedures were performed using the SPSS statistical software package (version 22). The findings are presented in descriptive statistics (frequencies, percentages, mean, and standard deviation). The differences between the pre and post statements were analyzed using a non-parametric Wilcoxon Signed Ranks Test (Polit & Beck 2010). Statistical significance was set at a p-value of <0.05.

The qualitative data was analyzed by content analysis. The interview data and free comments from the questionnaires were transcribed verbatim and read multiple times by the authors. Meaning units were identified and then condensed with the core of the content intact. The condensed meaning units were sorted into subcategories, and, finally, the subcategories were abstracted into three categories describing the RNs' perceptions regarding self-efficacy, competence, and learning in the digital environment (insert table 1). According to Graneheim and Lundman (2004), the perspective of the data moved back and forth between parts of the text and the whole throughout the process of analysis. Furthermore, to enhance the study's dependability, the two authors first conducted the content

analysis independently, and the emerging findings were subsequently discussed and agreed upon by the two authors during the analysis process until consensus was reached. The findings are presented in three categories: *the value of counselling, the art of counselling, and equipped for counselling*, and they are illustrated by quotes.

Ethical considerations

Ethical approval was obtained from the ethics committee (HS60-2013/571:1) at the (name withhold during review). Participation was voluntary, and all the RNs were assigned a code (e.g., nurse 1, nurse 2) to protect their identity. All participants gave their written consent, and they were assured that all information would remain confidential.

RESULTS

Of the RNs (n=113) who had completed the web-based learning-activity quiz successfully, a total of 47 participated in the quantitative part of the study (42% response rate). The RNs were divided into four age groups: <30 (n=13), 31-40 (n=13), 41-50 (n=10), and >50 (n=11). All of them reported that their computer skills were good enough to accomplish the web-based learning activity successfully, and the majority were women (n=45, 96%).

The RNs agreed that they were able to talk about smoking cessation in dialogue with patients using open-ended questions and to encourage patients' efforts to become smoke-free; thus, the mean value (SD) was 4.11 (0.699) respective 4.30 (0.623). They also agreed they had the ability to provide patients with contact details to counselling for behavioral support and to offer nicotine replacement therapy of the right dose to patients in need (insert table 2).

The results significantly support this—more RNs stated that they talked about smoking cessation in dialogue with patients using open-ended questions after the web-based learning activity than before (p 0.000). The statements about encouraging patients' efforts to become smoke-free and providing patients with contact details to counselling for behavioral support also revealed a significant difference between pre and post web-based learning activity (p<0.023 respective p<0.0001). When comparing the differences between the pre and post statement regarding whether the RNs increased their ability to offer nicotine replacement therapy of the right dose to patients in need, the results revealed no significant distinction (insert table 3).

For the qualitative part of the study, the RNs were divided into age groups: <30 (n=2), 31-40 (n=4), 41-50 (n=3), and >50 (n=2). A majority of those interviewed were women (n=10). During the data analysis of the transcripts, three categories were revealed. The first category (*the value of counselling*) contains the RNs' perceptions of their motivation to support patients in smoking cessation in connection with surgery. The second category (*the art of counselling*) highlights the RNs' self-efficacy about counselling and their experiences of how to talk in dialogue with patients using open-ended questions. The last category (*equipped for counselling*) relates to the RNs' perceptions of their competence in supporting patients in smoking cessation in connection with surgery after they have participated in the web-based learning activity.

The value of counselling

The majority of the RNs deemed that smoking cessation in connection with surgery was important because of socio-economic perspectives and, in part, specifically out of concern for the patients' wellbeing with regards to the postoperative progress. They felt motivated to counsel about smoking cessation, and they said that they needed few arguments about the importance since the advantage of smoking cessation in connection with surgery was immediate.

As I see it, it is a matter of importance to talk with patients about smoking cessation since it is extremely essential for them. (Nurse 3)

The dialogues the nurses described were often brief and informative. The RNs strived to motivate the patients to embrace smoking cessation by presenting evidence such as the connection between smoking and postoperative complications, usually wound related. Obstacles for the counselling were stress and lack of time.

Nowadays, most of the smokers know it is bad. I feel I can contribute since many of them do not know why it is bad in connection with surgery. I can explain how smoking affects them and why healing is impaired (Nurse 4).

The nurses said it was important that the provided information was correct and distinct. If patients lacked motivation to embrace smoking cessation, the RNs perceived it as difficult to continue the counselling, and they expressed that it was hard to motivate some patients.

The only thing we can do is to bring them evidence, to show them scientific proof about impaired healing. We cannot do more than to try to motivate them. If you cannot motivate a patient, then there is a problem. (Nurse 7).

The art of counselling

The RNs expressed that they experienced good self-efficacy and perceived they were able to counsel on smoking cessation in connection with surgery. They felt that it was a personal and delicate topic to counsel on since many smokers were ashamed of their smoking. They were anxious to talk with

patients in a good manner and without giving them a guilty conscience. They wanted neither to reveal their own point of view in the dialogue nor to preach or lecture.

I try to think of not being too much of a police. I mean, I do not want to reveal what I feel about smoking. I do not want it to permeate too much. I have to think of how I present it; do not want to come off as controlling. If you want to motivate the patients, the approach is actually extremely important (Nurse 6).

After being educated in a digital environment, the RNs had improved their understanding of how to talk with patients in a dialogue using open-ended questions. They thought that conversation with open-ended questions was good, but difficult.

The education made me think over this with open-ended and closed questions. It is an eye opener which urges me to reflect. I bite my tongue every time I ask a question as I am used to. It really is an art form to ask questions without getting the answer yes or no. It requires careful consideration and training (Nurse 5).

After the web-based learning activity, the RNs felt that they had begun to reflect on how they talked with patients and that they tried to improve their skills in dialogue using open-ended questions.

Then I realized that we forgot to talk about the importance of smoking cessation, even after an operation. After the education, I usually think a lot about how I counsel. Why did I say this and that? All of them were closed questions… I would like to be so much better at it (Nurse 8).

Equipped for counselling

All the RNs perceived that they had good competence, or at least good enough competence, to counsel patients about smoking cessation in connection with surgery. Some of them experienced enhanced competence after the web-based learning activity, while others did not experience the enhancement. Most of the RNs felt more secure in counselling patients about smoking cessation after the web-based learning activity because the content included guidelines and examples of how to counsel according to best practice.

I feel better prepared, and I am more confident in talking about it, and how I am supposed to do it. That is a feeling I got and I think I dare more, so to speak (Nurse 1).

The education contributed most to a general understanding of smoking cessation, and the RNs thought that the web-based learning activity was easily accessible and flexible. However, a few RNs pointed out some flaws in the educational content. They requested more information in physiological explanations of the impact of smoking on the human body in connection with surgery and different counselling techniques to support behavioral changes in patients, and they even suggested classroom lectures by experts on the topic.

It has been great to do this digital education, but I really would like to complement it with a proper lecture. I want the latest guidelines. What am I supposed to inform the patients about? I guess I need to acquire new skills. Perhaps the digital education did not give me so much that I feel I can say that I know what happens in the wound when you smoke (Nurse 9).

The lack of possibilities for the RNs to interact, communicate, or conduct a dialogue with colleagues or topic experts revealed that learning in a digital environment was suitable for repetition of subjects they have learned before and not when they were supposed to learn about entirely new topics.

I liked the digital education, and I absolutely think continuing professional education can be like this. I think I have learned new things, but there is difficulty with it. It tends to be flat as a pancake since you have no one to ask unless you have a colleague close by. It is one-way communication (Nurse 10).

After successfully completing the web-based learning activity, the RNs perceived that they had good self-efficacy and that they had enhanced their competence in how to support patients in smoking cessation in connection with surgery.

To compare and converge the results from both the quantitative and qualitative data, a majority of the RNs stated that they talked about smoking cessation with patients in dialogue using open-ended questions less before than after the web-based learning activity. The RNs were motivated to inform the patients about the benefits of smoking cessation in connection with surgery since it was important for the patient's expected postoperative progress. The RNs enhanced their understanding of how to counsel patients but called for practical skills training on how to use open-ended questions since they believed it was an important technique, but a difficult one. The RNs stressed that counselling in a good manner, without revealing or permeating their own personal thoughts about smoking, was important. The majority of the RNs did enhance their competence after the web-based learning activity to encourage patients' efforts in becoming smoke-free and providing patients with contact details to counselling for behavioral support. The ability to offer nicotine replacement therapy of the right dose to patients was a skill the RNs had already mastered before the web-based learning activity. The education was easily accessible and flexible, and the web-based learning activity contributed

most of all to examining the topic of smoking cessation in general. The education also contributed to the feeling of being better equipped, feeling more confident, and feeling more secure. Despite this, the RNs requested classroom lectures as they expressed a desire to interact, communicate, or conduct a dialogue with colleagues or topic experts. Finally, after the web-based learning activity, the RNs said that they counselled patients about smoking cessation to a greater extent.

DISCUSSION

The study revealed that the RNs self-reported perception, after completion of the web-based learning activity, was that of good self-efficacy and an increased competence in supporting patients with smoking cessation in connection with surgery. One criticism is that the RNs in this study expressed that they were missing interaction, communication, and dialogue with colleagues as well as classroom lectures with topic experts. This could be a sign of the need for positive feedback and encouragement. Howard-Jones (2011) argues that there is a positive correlation between rewards and learning and that this could be explained by the motivating factor of getting a reward. The participants in the study were motivated to get high scores; thus, it gave them a reward and even the very thought of getting a reward seemed to be a trigger for learning. Howard-Jones suggests that education may benefit from this result and that learning activities should contain gaming events like rewards to increase participants' motivation. Gamification, which means inspiration from games in the shape of virtual rewards such as positive feedback and encouragement, could have been offered in the web-based learning activity in this study in order to strengthen the RNs' motivation even more. To accomplish enhancement of the RNs self-efficacy, one could argue for Bandura's social learning theory (1977); the experience of mastering a challenge is an effective way of creating a strong sense of efficacy. Bandura claims that even vicarious experiences, verbal persuasion, and reduction of stress reactions develop and enhance an individual's self-efficacy. When designing the web-based learning activity in this study, one suggestion could have been to ask the RNs to consider a dilemma. After solving the dilemma, the participants could have been given positive feedback and encouragement. Gamification leads to feedback and encouragement, which can occur in various ways in a digital environment. To

level up and increase the degree of difficulty on solving a dilemma is one option. Another alternative is to provide the participants with virtual badges as proof of their enhanced ability to solve dilemmas (Shute & Zapata-Rivera 2012).

In this study, the RNs called for practical skills training in counselling since they believed that it was an important technique but that it was difficult to talk with patients in dialogue using open-ended questions. Therefore, a challenge, and one possibility for development of the web-based learning activity, is to supplement it with skills training that can be done with case scenarios in the digital environment. This has been done in a study by Shishani et al. (2013) with a similar combination of learning activities describing how nursing students completed an online educational program coupled with simulation in the form of roll play based on cases. The result revealed that integrating simulation as a learning activity was effective since the students improved both their knowledge and self-confidence in smoking cessation skills.

The RNs in this study expressed enhancement in their competence in supporting patients in smoking cessation, which indicates that learning in a digital environment can be achieved; nevertheless, they requested classroom lectures to get an opportunity to interact, communicate, or conduct a dialogue with colleagues or topic experts. The RNs' desire to interact with their peers is consistent with Bandura's (1977) view on how learning occurs in social settings in which individuals learn from each other by observing and imitating. A barrier for the self-directed web-based learning activity in this study was the lack of social and collaborative surfaces. This confirms the findings by Sarna et al. (2015) who suggested that their brief web-based educational programme could be developed by including case-based scenarios and/or classroom lectures. Digital environments can easily provide both social and collaborative surfaces, for example, through discussion forums and social media (Knowles et al. 2015). Lehtinen et al. (2013) concluded that computer-supported collaborative learning enhances the quality of social interactions and supports cognitive processes that strengthen the participants' information society skills—skills that are considered essential, both now and in the

future. Based on the results of this study, we argue that this should be taken into consideration for future educational interventions in order to optimize the digital environment.

Limitations

This study has several limitations that need to be addressed. The RNs were requested to recollect and self-report their perceptions of their competence both before and after the web-based learning activity; thus, memory bias might have affected the results, and this should be considered a limitation. Furthermore, this study builds upon self-reported data, and due to the data validity and accuracy, this has to be questioned. Another limitation of this study is the low number of participants; therefore, generalization of the data to larger populations should be applied with caution (Polit & Beck 2010).

RELEVANCE FOR CLINICAL PRACTICE

Findings from this study will be of particular interest to educators in healthcare settings who can devise further development of web-based learning activities. One example might be the development of social and collaborative surfaces in order to optimize the learning environment. Moreover, it is most likely that RNs, in the near future, will interact with patients through digital media, and therefore continuous professional development need to address and support digital literacies in RNs.

CONCLUSION

The results indicate that RNs can enhance their competence in supporting patients to embrace smoking cessation by learning in a digital environment. Self-efficacy and understanding of the topic seem to motivate RNs to counsel patients about smoking cessation. RNs need to use their pedagogical skills in the encounter with patients to initiate a learning process, which can motivate the patients to change their behavior to become smoke-free in connection with surgery. However, more research is needed to explore the effects of education and counselling on patient related outcomes such as postoperative complications.

REFERENCES

Atack L (2003) Becoming a web-based learner: registered nurses´ experiences.

Journal of Advanced Nursing **44**, 289-297.

Bandura A (1977) Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review* **84**, 191-215.

Bandura A (Red.) (1995) *Self-efficacy in changing societies*. Cambridge University Press, Cambridge.

Barta S, Stacy R (2005) The effects of a theory-based training program on nurses' self-efficacy and behavior for smoking cessation counseling. *The Journal of Continuing Education in Nursing* **36**, 117-123.

Bloomfield J, Roberts J, While A (2010) The effect of computer-assisted learning versus conventional teaching methods on the acquisition and retention of handwashing theory and skills in pre-qualification nursing students: A randomized controlled trial. *International Journal of Nursing Studies* **47**, 287-294.

Chan SS, Sarna L, Wong DC, Lam T-H (2007) Nurses´ tobacco-related knowledge, attitudes and practice in four major cities in China. *Journal of Nursing Scholarship* **39**, 46-53.

Cook G, Thynne E, Weatherhead E, Glenn S, Mitchell A, Bailey P (2004) Distance learning in post-qualifying nurse education. *Nurse Education Today* **24**, 269-276.

County Council of Scania (2015) (In Swedish: Region Skåne Vårdgivare i Skåne. Webbutbildning: Rökfri operation. >http://vardgivare.skane.se/kompetens-utveckling/utbildningskalender/e-learning/rokfri-operation/< 2016-11-08)

Creswell JW (2014) *Research design. Qualitative, quantitative, and mixed methods approaches*. 4th edn. Thousand Oaks, Sage.

Graneheim B, Lundman B (2004) Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today* **24**, 105-112.

Grol R, Grimshaw J (2003) From best evidence to best practice: effective implementation of change in patients´ care. *The Lancet* **362**, 1225-1230.

Hart P, Eaton LA, Buckner M, Morrow BN, Barrett DT, Fracer DD, Hooks D, Sharrer RL (2008) Effectivness of a computer-based educational program on nurses´ knowledge, attitude and skill level related to evidence-based practice. *Worldviews on Evidence-Based Nursing* **5**, 75-84.

Howard-Jones P (2011) Toward a science of learning games. *Mind, Brain, and Education* **5**, 33-41.

Kerr S, Whyte R, Watson H, Tolson D, McFadyen A (2011) A mixed-methods evalutation of the effeictiveness of tailored smoking cessation training for healthcare practioners who work with older people. *Worldviews on Evidence-Based Nursing* **8**, 177-186.

Knowles MS, Elwood FH, Swanson RA (2015) *The adult learner. The definitive classic in adult education and human resource development*. 8th edn. Butterworth-Heinemann Ltd, Oxford.

Korhonen T, Lammintakanen J (2005) Web-based learning in professional development: experiences of Finnish nurse managers. *Journal of Nursing Management* **13**,

500-507.

Lahti M, Hätönen H, Välimäki M (2014) Impact of e-learning on nurses´ and student nurses knowledge, skills, and satisfaction: A systematic review and meta-analysis. *International Journal of Nursing Studies* **51**, 136-149.

Lauder W, Holland K, Roxburgh M, Topping K, Watson R, Johnson M, Porter M, Behr A (2008) Measuring competence, self-reported competence and self-efficacy in pre-registration students. *Nursing Standard* **23-29**, 35-43.

Lehtinen E, Hakkarainen K, Lipponen L, Rahikainen M, Muukkonen H (2013) Computer supported collaborative learning: a review. CL-Net Project.
>http://www.researchgate.net/publication/250788384_Computer_Supported_Collaborative_Learning_A_Review< (2016-11-08)

Nisar T (2004) E-learning in public organizations. *Public Personnel Management* **33**, 79-88.

Nyamathi AM, Casillas MD, King L, Gresham L, Pierce E, Farb D, Weichmann C (2010) Computerized bioterrorism education and training for nurses on bioterrorism attack agents. *The Journal of Continuing Education in Nursing* **41**, 375-384.

O´Donovan G (2009) Smoking prevalence among qualified nurses in the republic of Ireland and their role in smoking cessation. *International Nursing Review* **56**, 230-236.

Onwuegbuzie A, Collins K (2007) A typology of mixed methods sampling designs in social science research. *The qualitative report* **12**, 281-316.

Pelkonen M, Kankkunen P (2001) Nurses´ competence in advising and supporting clients to cease smoking: a survey among Finnish nurses. *Journal of Clinical Nursing* **10**, 437-441.

Polit DF, Beck CT (2010) *Essentials of nursing research. Appraising evidence for nursing practice*. 7th edn. Lippincott, Philadelphia.

Rice VH, Hartmann-Boyce J, Stead LF (2013) Nursing interventions for smoking cessation. The Cochrane Library, issue 8.

Rosvall A, Nilsson R, Idvall E (2013). Evaluation of web-based learning programs usability, content and enhancement of skills. *Nordic Journal of Nursing Research* **33**, 31-33.

Ruggeri K, Farrington C, Brayne C (2013) A global model for effective use and evaluation of e-learning in health. *Telemedicine Journal and e-health* **19**, 312-321.

Sarna L, Bialous SA, Zou XN, Wang W, Hong J, Wells M, Brook J (2016) Evaluation of a web-based educational programme on changes in frequency of nurses' interventions to help smokers quit and reduce second-hand smoke exposure in China. *Journal of Advanced Nursing* **72**, 118-126.

Sheffer CE, Barone C, Anders ME (2011) Training nurses in the treatment of tobacco use and dependence: pre- and post-training results. *Journal of Advanced Nursing* **67**, 176-183.

Shishani K, Stevens K, Dotson J, Riebe C (2013) Improvning nursing students´ knowledge using online education and simulation to help smokers quit. *Nurse Education Today* **33**, 210-213.

Shute V, Zapata-Rivera D (2012) Adaptive educational systems. In *Adaptive technologies for training and education* (I Durlach P ed.), Cambridge University Press, New York, pp. 7-27.

Sit J, Chung J, Chow M, Wong T (2005) Experiences of online learning: students´ perspective. *Nurse Education Today* **25**, 140-147.

Svavarsdóttir MH, Hallgrímsdóttir G (2007) Participation of Icelandic nurses in smoking cessation counselling. *Journal of Clinical Nursing* **17**, 1335-41.

Thomsen T, Villebro N, Møller AM (2014) Interventions for preoperative smoking cessation. The Cochrane Library, issue 3.

Table 1

Example from the analysis process.

Meaning unit	Condensed meaning unit	Code	Sub-category	Category
I try to think of not being too much of a police. I mean, I don´t want to reveal what I feel about smoking, I don´t want it to permeate too much. I have to think of how I present it, don´t want to come off as controlling. If you want to motivate the patients, the approach is actually extremely important.	Trying to think of not to show my own view about smoking in conversations with patients because it is important that the issue is received by the patient in a good way.	Professional in conversa-tions to reach the patients.	Motivate patients through profess-sional beha-vioral support.	The value of coun-selling

Table 2

Participants self-reported self-efficacy after web-based learning activity on a scale, ranged from 1 to 5 (n=47).

Items	N (%)	Item mean	S.D[a]
I believe I am able to talk about smoking cessation in dialogue with patients using open-ended questions	47 (100)	4.11	0.699
Missing	0		
I believe I am able to encourage patients' efforts to become smoke-free	47 (100)	4.30	0.623
Missing	0		
I believe I am able to provide patients with contact details to counselling for behavioral support	47 (100)	3.55	1.157
Missing	0		
I believe I am able to offer nicotine replacement therapy of the right dose to patients in need	46 (98)	3.87	1.024
Missing	1 (2)		

[a] S.D Standard Deviation.

Table 3

Participants self-reported competence pre and post web-based learning activity on a scale, ranged from 1 to 5 and the results of Wilcoxon Signed Ranks Test (n=47).

Items	N (%)	Item mean	S.D[a]	*p*-value[b]
Before the education I talked about smoking cessation in dialogue with patients using open-ended questions	47 (100)	3.15	1.122	
Missing	0			**0.000**
After the education I have talked about smoking cessation in dialogue with patients using open-ended questions	47 (100)	3.66	0.891	
Missing	0			
Before the education I encouraged patients' efforts to become smoke-free	44 (94)	4.11	0.895	**0.023**

	n (%)	Mean	S.D[a]	p[b]
Missing	3 (6)			
After the education I have encouraged patients' efforts to become smoke-free	44 (94)	4.30	0.701	
Missing	3 (6)			
Before the education I provided patients with contact details to counselling for behavioral support	44 (94)	2.59	1.245	
Missing	3 (6)			**0.001**
After the education I have provided patients with contact details to counselling for behavioral support	43 (91)	2.89	1.351	
Missing	4 (9)			
Before the education I offered nicotine replacement therapy of the right dose to patients in need	43 (91)	3.79	0.940	
Missing	4 (9)			0.180
After the education I have offered nicotine replacement therapy of the right dose to patients in need	43 (91)	3.86	0.941	
Missing	4 (9)			

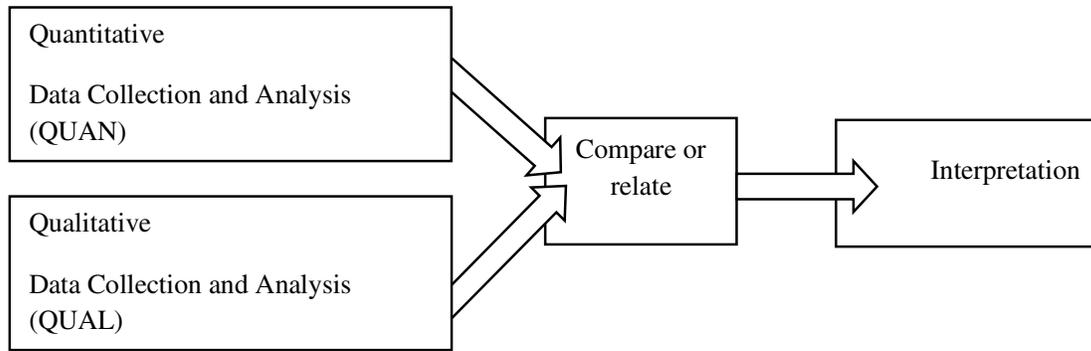[a] S.D Standard Deviation, [b] $p<0.05$.

Figure 1: Flow diagram of convergent parallel mixed method design (Creswell, 2014, s. 270)