

ORIGINAL RESEARCH

Are nurses at Swedish Departments of Infectious diseases prepared to care for patients with African viral haemorrhagic fever? - A survey study

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ABSTRACT

Background: The African viral haemorrhagic fevers have in recent years been the cause of large outbreaks with high mortality rates and elevated risks of global spread. These outbreaks put the Departments of Infectious diseases, both national and international, on high demand when caring for this patient group, in a patient- and staff-safe manner. The aim of the study was to describe nurses' perceived ability and knowledge about caring for patients with suspected or verified African viral haemorrhagic fever at Departments of Infectious diseases in Sweden.

Methods: A web survey was conducted to collect data. The results are presented through a descriptive design. The participants were registered nurses working in infectious diseases clinics; 216 survey results were registered.

Results: Registered Nurses in Swedish Departments of Infectious diseases witnessed having limited knowledge about the African haemorrhagic fevers. The respondents also perceived having limited or very limited knowledge about various practical procedures, such as drawing blood samples to confirm the infection. The majority of the participants had not been given theoretical education, nor had been given the opportunity to sufficiently practice using personal protective equipment at their place of work. The nurses perceived fear for their personal safety while caring for this group of patients.

Conclusions: The participants perceived fear, both limited theoretical and practical knowledge and training about caring for patients with African haemorrhagic fever, even though they had worked with infectious diseases for several years. There is a need for implementation of measures to ensure the healthcare professionals' safety and to prevent them from being infected with potentially lethal infections. It also poses a risk for the patient in the absence of specific nursing care, which can lead to an increased critical disease state.

Key Words: Haemorrhagic Fever, Personal protective equipment, Nursing care, Nurse, Infectious diseases

1. BACKGROUND

Globalization leads to natural gains in economic and social benefits, but it also demands consciousness and knowledge about its consequences.^[1] In the field of infectious diseases healthcare, globalization is seen in various ways. Tropical

diseases find their way to previously unknown territories like Sweden, through global traveling and immigration.^[2] Climate change also alters the common areas for tropical pathogens spread.^[2]

The African viral haemorrhagic fevers are a group of diseases

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caused by RNA-viruses. These are severe but uncommon in Europe.^[3] The group includes Ebola, Marburg, Lassa fever, Crimean-Congo and, Rift-Valley. The pathogens attack various cells of the body causing major damage, for example on the endothelial cells. The Ebola virus also attacks the hepatocytes causing organ dysfunction and coagulation defect.^[3]

World Health Organization (WHO) has stated in their guidelines regarding personal protective equipment (PPE) that health and wellbeing of healthcare professionals is the responsibility of the employer.^[4] WHO also states that it is in healthcare professionals' interest and responsibility to stay informed about recent science, routines and, knowledge about the diseases. Recommended PPE should be provided by the employer, including responsibility for educating the staff in using PPE.^[4]

Since the large Ebola outbreak in West Africa throughout the years of 2014 to 2016, which has caused the death of more than 10 000 people,^[5] countries have been forced to prepare and create structure in dealing with diseases that are not that common but have high mortality.^[6] A large outbreak of Lassa fever has been ongoing in Nigeria since 2016 and several patients have been cared for, both suspected and verified infection, in Swedish Departments of infectious diseases because of this outbreak.^[7] WHO reports that among the group of Lassa fever infected patients are several caregivers included.^[7]

Currently, Europe is struck hard by the Covid-19 pandemic.^[8] All over the world, healthcare workers struggle to acquire PPE and other necessities to care for patients. In Europe, Sweden was one of the countries which hospitalized and cared for a large number of patients diagnosed with Covid-19.^[8] WHO stated that employers and managers in health care are responsible for making sure to take all the required measures to provide a safe and risk-free working environment.^[9] The employers are also responsible for providing education and training in working with PPE – and providing for this equipment.^[9] The responsibilities for both employers as well as employees are similar, both regarding Covid-19 and African Haemorrhagic fevers.^[4]

International studies have shown that there are shortcomings in caring for this group of patients.^[10,11] It is also known that healthcare professionals who care for this patient group experience fear of infecting relatives, but also experience stigmatization from family and friends. The self-monitoring of the health workers in connection with having cared for a person with haemorrhagic fever made them concerned for their own life and health.^[12] Previous studies show that nurses feel a need for regular training in PPE to achieve higher self-confidence and skill in self-protection.^[13] Glob-

ally, healthcare will be facing patient cases with unusual tropical diseases to an increased extent as a result of globalization and immigration.^[2] To conclude, the health care professionals are globally witnessing about having an insufficient level of knowledge about the diseases and there is uncertainty about how to build caring structures around these patients. As shown by previously conducted studies, there is a need for clear guidelines and procedures as well as a higher level of knowledge about the diseases amongst healthcare professionals.^[10-13] The amount of research regarding Swedish nurses working at Swedish Departments of infectious diseases and their knowledge and experiences when caring for patients with either suspected or confirmed African viral haemorrhagic fever is considered non-existing by the authors.

2. METHODS

The aim of this study was to describe the Swedish nurses' perceived ability and knowledge about caring for patients with suspected or verified African viral haemorrhagic fever at Departments of Infectious diseases in Sweden.

2.1 Design

The study was conducted as a quantitative study with a deductive approach. This was an opportunity to see if there were trends in data collection and to describe the extent to which the various phenomena occurred, for example, routines and training opportunities. The web survey was chosen as the method of data collection. The method, which has the advantage to reach a larger population, is self-administered and the participants are also given the possibility to remain completely anonymous.^[14]

2.2 Participants

Eligible participants were all nurses employed within Departments of Infectious diseases in Sweden. The inclusion criteria for the participants were that they were registered nurses (RN) and worked at the Departments of Infectious diseases clinics, both in- and outpatient departments. In Sweden there are 28 Departments of Infectious diseases, and 26 of them met the inclusion criteria, which was that there was a possibility that a patient with haemorrhagic fever could be admitted to the ward. Two of them were excluded, one because they specialized in highly contagious diseases and one because they did not care for this patient group. Out of these 26 departments, 18 Departments of Infectious diseases chose to participate. Eight departments chose to refrain from participating. A total of 603 nurses were asked to participate, this was the number of nurses working in those departments. Of these 603 nurses, 216 nurses participated in the study.

2.3 Data collection

The study was conducted as a web survey. The data was collected between September 16 through October 21, 2019. The head of the departments of the included Departments of Infectious diseases was contacted by email and was asked to forward the web survey by email to their employees. The study project plan and the aim of the study were attached to the email. The heads of the departments received reminders twice about participating in the study. They also received reminders, which they forwarded to the employees about answering the study. These reminders contained information that the respondents could ignore the reminders if they had already answered the web survey.

2.4 The web survey

The authors chose a web survey with closed-ended questions as the data collection method.^[14] A survey in the participants' native language, Swedish, was considered necessary to get as high response rate as possible. The authors could not find any pre-designed survey on the topic. Therefore, the web survey was developed by the authors themselves. Assembling a self-report instrument is challenging, and the researchers had to analyze the research requirements and take into account all applicable details.^[14] The questions were designed based on literature, the authors' experiences and, in collaboration with experienced colleagues.

The first questions concerned demographic information and were described in a nominal scale and ratio scale. Thereafter the questions were closed survey questions in a Likert scale with a 5-point scale; "Strongly disagree, Disagree, Undecided, Agree, Strongly Agree".^[14] The survey was distributed by esMaker.^[15]

2.5 Content validity and reliability

Content validity means to make sure that the questionnaire is adequately constructed and captures the intended contained domain.^[14]

The survey was evaluated by a panel of experts who provided valuable feedback regarding the questions' clarity and the risk of bias from the authors. Avoiding bias is an important consideration when assembling a self-created instrument.^[14] This was done through consultation of the experts before the questionnaire was sent out to the study participants to test that the questions were interpreted as intended. The panel of experts consisted of five registered nurses (RN) with different backgrounds in intensive care, anesthesia, surgery, and infectious disease. They varied in age and had different lengths of working experience and gender. With this sample, the panel of experts was considered to be representative respondents for the population to which the survey was directed.^[16] The

experts were asked to assess the individual questions and to make an overall assessment of the entire questionnaire.^[14] The expert panel was requested to comment on the relevance of the items and the structure of the questionnaire by email. The feedback was consistent that the questionnaire turned out well and that it was both understandable and relevant, therefore it proceeded without any changes. This procedure aimed to ensure reliability.^[16] In addition, since the demography of the participants were similar to the panel of experts, the reliability was estimated to be a reasonable index of the web survey accuracy.^[14]

2.6 Data analysis

The result was analyzed through descriptive statistics, which was appropriate when the authors wanted to describe the participants' views on a particular situation. To describe the results of the survey, the same software was used in which the survey was designed. The software used for this study was esMaker.^[15] By using esMaker, every single question has been processed and statistically analysed. Demographic data are reported in a nominal scale and descriptive data regarding age and work experience are described according to the quota sampling. The issues that described a perceived level of knowledge and security were analyzed and reported according to an ordinal scale. Collected data has been typed in as quantitative data in numerical form.^[14]

2.7 Ethical considerations

The study was conducted within Specialist Nursing Programme in Infectious Diseases Care as a master degree project and approved by the Red Cross University. According to the Swedish Ethics Review Act, no further approval was needed.^[17] Ethical considerations have also been taken with regard to the Helsinki Declaration.^[18] The participants in this study answered the questions anonymously, which was of great value when questions regarding perceived levels of knowledge and fears were asked. This could be assured by forwarding the web survey from the head of operations of the unit. For research questionnaires that may expose participants' weaknesses, this should be addressed in a way that does not put the participants in a position of being exposed through their participation.^[14]

The study participants have been informed about the purpose of the study, their anonymity and, their ability to abandon the study or cancel it if they wish. The participants of the study answered voluntarily, and the answers could not be linked to any specific individual. This is required to assure the participants' anonymity when participating in the study and also to ensure that their data is held confidential.^[14] This has been done by using the esMaker survey program which does not

register IP addresses or e-mail addresses. EsMaker encodes the participants' respective survey responses and indicates only the date and time the survey is completed. With this approach, it has been impossible for the authors to be able to identify the participants. This has also meant that written consent was not possible to obtain.

The research has followed the ethical considerations given for presenting clinical research.^[19] This is through informing about consent, choosing a relevant subject regarding the group of participants, and leading up to content that is useful for further studies and education.

3. RESULTS

A total of 18 Swedish Departments of Infectious diseases located throughout Sweden participated in the study. Departments from both regional- and university hospitals were included. From these departments, 216 (36% of all nurses working at these 18 Departments of Infectious diseases) participated in the study by answering the web survey. The majority of the participants were female, 90.3% (n = 195) (see Figure 1). The largest group was between the ages of 20-30 (40.3%, n = 87), but all age groups are represented in the study (see Figure 2). The participants had several years of working experience in the field of infectious diseases and 32.9% (n = 71) had worked in the field for more than 10 years (see Figure 3).

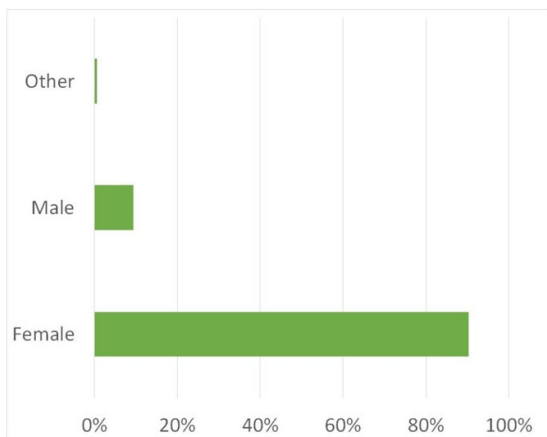


Figure 1. Demographic data: Gender of participants (n = 216)

The result of this study shows that the participants had low levels of knowledge regarding the African viral haemorrhagic fevers. They had not been given theoretical- or practical education from their employers on an adequate level and felt unsafe when caring for this group of patients. They were also concerned for their safety while caring for patients who may be infected by an African Haemorrhagic fever.

The result is presented in three categories. These categories were included; Experienced level of knowledge, Conditions given by employers and Perceived personal security.

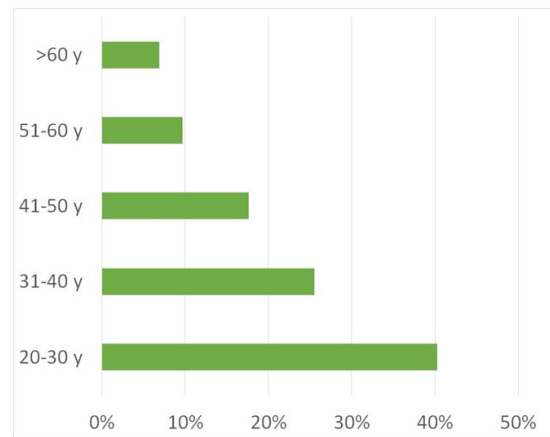


Figure 2. Demographic data: Ages of participants (n = 216)

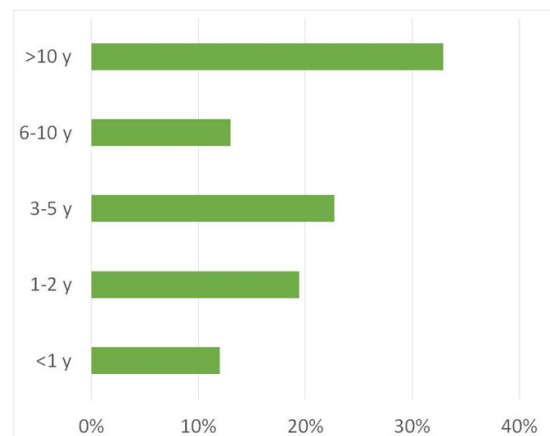


Figure 3. Demographic data: Years of working experience in the infectious diseases field (n = 216)

3.1 Experienced level of knowledge

The dimension contained questions about the participants' perceived level of knowledge regarding the African viral haemorrhagic fevers, like "I have good knowledge about the different African viral haemorrhagic fevers, such as Ebola, Lassa fever, Rift-Valley fever, Crimean-Congo and Marburg" and also more detailed questions – for example, "I have good knowledge of how the different African viral hemorrhagic fever, e.g. Ebola and Lassa fever, transmits". The questionnaire also included questions about the knowledge concerning PPE and how to screen patients suspected of carrying the viruses.

Generally, the participants graded themselves low in the Likert scale, witnessing about low degree of knowledge. The largest number of answers to the question about "... having

good knowledge about the different haemorrhagic fevers”, was mostly negative (61.6%, n = 133) (see Figure 4).

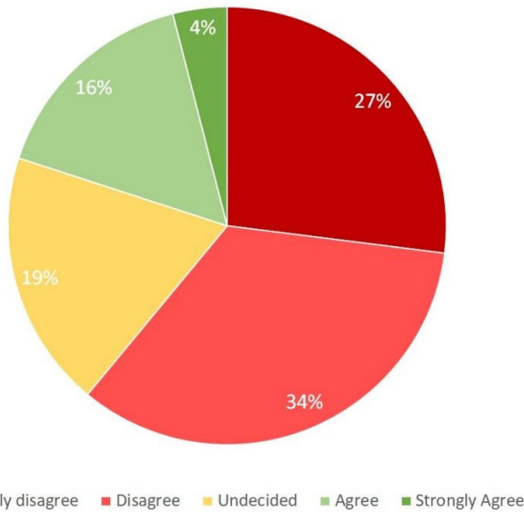


Figure 4. Percentage distribution regarding the statement “I have good knowledge of the different African viral hemorrhagic fever Ebola, Lassa fever, Rift-Valley fever, Crimean-Congo and Marburg” . (n = 216)

About the question regarding “I have good knowledge of how the different African viral haemorrhagic fever, e.g. Ebola and Lassa fever, transmit”, the participants’ answers were spread. The largest group of answers was the ones of “agree” (35.6%, n = 77) followed by participants who answered, “disagree” (25.5%, n = 55) (see Figure 5).

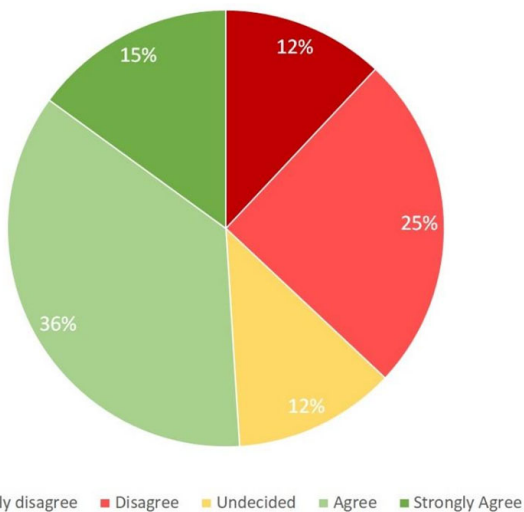


Figure 5. Percentage distribution regarding the statement “I have good knowledge of how the different African viral haemorrhagic fever, e.g. Ebola and Lassa fever, transmit. ”. (n = 216)

Regarding diagnosing the patients in a correct and safe way, questions with the statement for example “I have good knowl-

edge about how to test patients regarding African viral haemorrhagic fevers” were asked. The majority stated that they “strongly disagree” (40.7%, n = 88) or “disagree” (21.3%, n = 46) to the statement (see Figure 6).

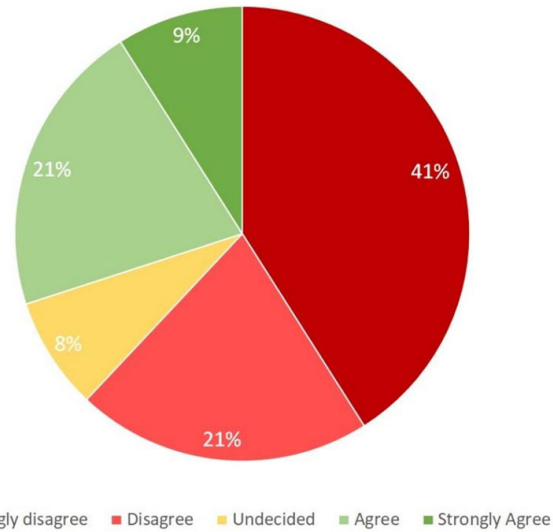


Figure 6. Percentage distribution regarding the statement “I have good knowledge of how to test patients regarding African viral haemorrhagic fever”. (n = 216)

3.2 Conditions given by employers

The web survey contained questions about how cooperative the employers were to enhance the level of knowledge about the haemorrhagic fevers among healthcare professionals. One of the questions was regarding if the participant had been given chances to practice PPE enough to feel safe caring for patients with haemorrhagic fevers. 43.1% (n = 93), which is also the largest group of participants, answered “disagree” (see Figure 7). The majority of the participants also answered negatively about being given theoretical education from their employers. 7.4% answered “strongly agree” (see Figure 8).

3.3 Perceived personal security

The web survey contained questions for the participants concerning perceived security due to caring for this group of patients. The majority of the participants’ answered “strongly disagree” (31.2%, n = 67) or “disagree” (21.9%, n = 47) about the question “I am/would feel safe about my own security if I care for patients with African viral haemorrhagic fever”. Only 9.3% (n = 20) responded “strongly agree” (see Figure 9).

4. DISCUSSION

The results show that the participants perceived fear, limited theoretical and practical knowledge and training about caring

for patients with African haemorrhagic fever, even though they had worked with infectious diseases for several years.

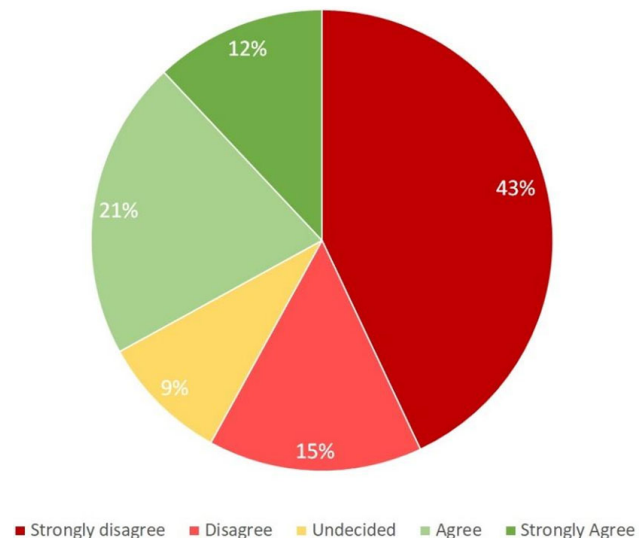


Figure 7. Percentage distribution regarding the statement “I have practiced PPE (personal protective equipment = protective equipment/protective clothing) enough to feel safe in caring for patients with suspected African viral hemorrhagic fever”. (n = 216)

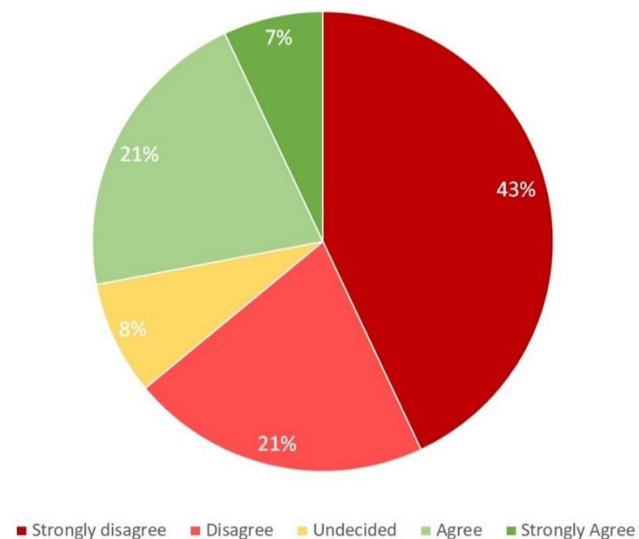


Figure 8. Percentage distribution regarding the statement “Through my employer or other instance funded by the employer, I have received theoretical training in African viral hemorrhagic fever and the care of patients affected by this.” (n = 215)

The demographic data that were collected from the participants did in some ways reflect the demographics of Swedish nurses. The dividing of genders was accurate for the general nursing staff in Sweden.^[20] Concerning age, 40% of the participants were younger than 30 years, which in the general

group of nurses in Sweden is 11%.^[21] This could mean that the participants had limited years of working experience, but 32% of the participants reply practicing in the specialized field of infectious diseases for at least 10 years. 67% of the participants had been working in the field for more than 3 years. The authors are concerned by the fact that the nurses experienced limited knowledge concerning several topics in the web survey, even though the nurses had worked with infectious diseases for several years.

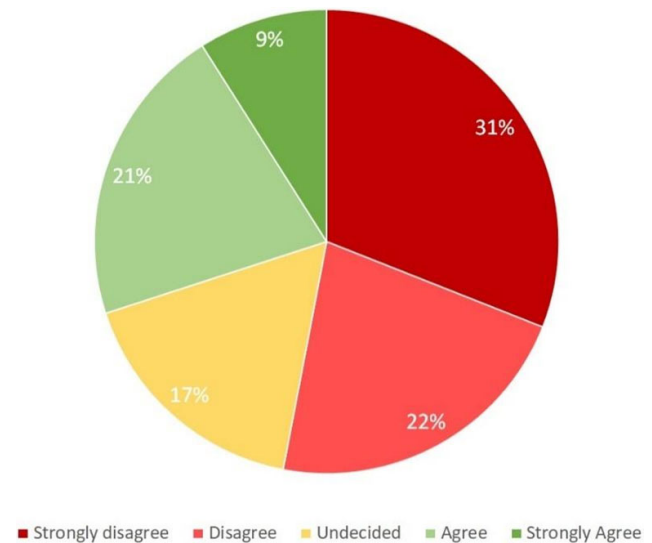


Figure 9. Percentage distribution regarding the statement “I am/would feel safe about my own security if I care for patients with African viral haemorrhagic fever” (n = 215)

The results of this study state that nurses that perceived having inadequate theoretical- and practical practice felt insecure and had less knowledge about the haemorrhagic fevers. Almost half (45%) of the participants responded that they did not agree, nor disagree, with the claim that they had good knowledge of the haemorrhagic fever. Similar results have previously been described, among others.^[10,11] The result is in direct contrast to the requirements that the Swedish Public Health Authority requires in preparation to maintain high infection protection, including the requirements that the Swedish Infectious Diseases Association puts on the national departments.^[22,23] The same applies to the negative responses participants have provided regarding knowledge of sampling and packaging and transport of samples. WHO describes that the responsibility lies with each employee to seek their knowledge of the subject and make sure that they are updated in the event of any situations in their working field.^[4] The individual responsibility for knowledge in professional practice is also described in the International Council of Nurses Code of Ethics.^[24] This also applies to the responsibility for proper professional practice. The nurses should

work grounded in evidence-based knowledge.^[25] This is likely to fail according to this study.

The result showed that in some ways the participants were not able to, even though they had extensive working experience, live up to the standards put up by WHO and the International Council of Nurses (ICN).^[4,24] The majority of the nurses who participated in the survey did not receive theoretical training on the haemorrhagic fever, nor did they practice PPE sufficiently to feel confident in their work caring for patients. Several studies have shown that it is precisely the practical training combined with increased theoretical knowledge that is the foundation for being able to safely care for patients with high risk infection.^[10,26,27] This has also been shown in other studies regarding several other nursing fields.^[28–31] As practitioner having a specific knowledge regarding a specific patient group leads to a higher clinical expectation and understanding of changes in the patient's health.^[32] It also means that the observation capacity is enhanced.^[32] Since almost half of the participants responded negatively to the claim that they have "... good knowledge about the haemorrhagic fevers ..." it could mean that they have difficulty reaching a higher level of nursing practice. That some experienced nurses could feel like being on a novice level can be related to Benner who described different levels from novice to expert.^[30] This could occur in a clinical environment where the nursing of the patient is unfamiliar. For example, more than half of the participants of this study answered negatively to the statement that they were sure of how to screen patients for African viral haemorrhagic fevers. These nurses could then be perceived as novices, even though they had several years of experience working in the nursing field.^[33]

This study showed that more preparation is needed to take care of patients with infectious diseases in order to feel safe in the situation as caregivers. The fact that participants experienced such insecurity about caring for this patient group was not unexpected, it has been shown numerous times in other studies.^[10,11,26] It was shown that the nurses felt more secure through learning how to handle the risks they were exposed to through practical experiences.^[26] The WHO guidelines for PPE regarding African viral haemorrhagic fever clearly describe that the employer must provide both information and education as well as materials.^[4] WHO also describes that healthcare workers have the right to receive repetitive training on infection prevention and control (IPC) and PPE related to the Coronavirus disease (COVID-19) outbreak.^[9] Regarding the clinical implementation of this matter, one possible way could be through simulation training. The use of simulation training for qualified nurses has shown that it makes it possible to give them experiences that are close to real life.^[31] Simulation training for nurses gives benefits

such as increased knowledge and skills and contributes to perceived readiness.^[31] When comparing simulation training and standard training with cardiopulmonary resuscitation (CPR) with medical students, it has been shown that simulation training is superior.^[34] Nursing students in a Norwegian study experienced simulation as both realistic and effective in handling anaphylaxis during vaccination.^[35] Simulation develops the competence to act in a concrete situation.^[35]

Even though the participants had worked with infectious diseases for several years, they felt unsafe when responding to the questionnaire regarding caring for this special group of patients. This phenomenon has also been described by Hunter and Cook (36) who showed that the senior colleagues were important for the more inexperienced colleagues. The fact that nurses, despite long experience in a specific area, can experience themselves as novices means that they need established routines that guide them in their clinical nursing practice. The responsibility of making these routines and guidelines rests in the hands of the managerial field. These could be performed and established by specialized nurses and other experienced healthcare professionals in the Infectious diseases field.

Continuing professional education as a nurse involves learning about concrete and practical conditions in clinical situations.^[32] Practical exercise with PPE to treat patients with haemorrhagic fever is a prerequisite for being able to act correctly and feel safe if such a situation occurs.^[32] This can also be linked to the covid-19 pandemic which has affected the whole world.^[9] This pandemic showed that many governments and healthcare institutions were not prepared for the consequences of a global spread of an infectious disease like this, neither guaranteeing the patients' safety whilst caring for these large numbers of patients infected.^[9] The large demand for PPE, necessary treatments for intensive care, and biological tests created a shortage of these supplies and also illuminated challenges in a pandemic situation.^[8]

The results of this study could be used to implement routines for exercising and educating nurses in caring for patients with contagious diseases. There is a need for continuous training of using PPE and how to apply existing guidelines. The results also show that organisations should prioritize the security of the staff working close to this group of patients. This is necessary for the staff to be able to fulfill targets set by authorities.

Limitation and strengths

The authors would have preferred to use a pre-designed validated survey, but since the study's research area is to a level unexplored, there are no accepted measuring instruments.^[14]

For this reason, the authors constructed questions that answered the purpose. The comprehensibility of the web survey was evaluated by having an expert group read and answer the actual questionnaire. The response options were designed, in addition to the demographic questions, with the response options "Strongly disagree", "Disagree", "Undecided", "Agree" and "Strongly agree". This is according to the Likert scale, which is a validated response scale where the participant indicates the degree to which they agree with a statement. However, there is a risk when the same answer alternative repeats throughout the survey that the participant's response becomes routine.^[14]

Strengths throughout the study have been the use of a panel of experts, who could confirm that the survey contained questions relevant and fit for the purpose.^[14] The expert groups' variation of experience and specific knowledge contributed to broad expertise when interpreting the questions. Also, this study is presumed to contribute to a highly current issue.

5. CONCLUSION

Both the safety of the patient as well as the health care professionals' own safety are threatened if the staff is not

sufficiently trained in caring for the specific patient group. If the healthcare staff is repeatedly trained to use PPE, it gives a feeling of increased safety and less threat of spreading of the contagious disease. There is a need for implementation of measures, management and educational interventions to ensure the healthcare professionals' safety and to prevent them from being infected with possible lethal infections. It also poses a risk for the patient in the absence of specific nursing care, which can lead to an increased critical disease state. Future studies are needed to increase knowledge about nursing care regarding these patients. There is also a need to study the future level of implementation of practical and theoretical education in this nursing field.

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CONFLICTS OF INTEREST DISCLOSURE

The authors declare that there is no conflict of interest.

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