**Study Protocol**

**Title:** Critical Care Nurse Work Environments in five European Countries

**Background**

Healthy work Environment (HWE) is the cornerstone for a quality and safety patient care, nurses’ wellbeing and ultimately nurse recruitment and retention. A healthy workplace is one where workers and managers collaborate to continually improve the health, safety and wellbeing of all workers and by doing this, sustain the productivity of the business (Burton, J., 2010).Research indicates a positive correlation between healthy nurse work environments, nurse job satisfaction and retention, and patient outcomes (Ulrich, B. et. al., 2014).

Studies in the United States indicate that improved organisational features of nursing care, including better patient-to-nurse staffing ratios and sound work environments are associated with improved nurse wellbeing and better patient outcomes (Nurse Forecasting: Human Resources Planning in Nursing, 2011). Measures implemented in the United States and Australia based on these findings have succeeded in increasing the attractivity of nursing as a career path and reverting the nursing shortage (close to 1 million nurses in 2000) that the two countries were confronted with (Nurse Forecasting: Human Resources Planning in Nursing, 2011). Such initiatives included developing standards for healthy work environments or mandated safe nurse staffing ratio. The American Association of Critical-Care Nurses (AACN) published a document entitled “AACN Standards for Establishing and Sustaining Healthy Work Environments” outlining the 6 essential standards necessary for creating a HWE: skilled communication, true collaboration, effective decision making, meaningful recognition, appropriate staffing and authentic leadership. This landmark document is being widely used by nurses and organizations to promote nurse work environments that foster excellence in patient care.

The uptake of such initiatives in Europe which is nowadays confronted with a critical shortage of health care professionals remains however limited. (Nurse Forecasting: Human Resources Planning in Nursing, 2011). A continuing nursing shortage is envisaged to constrain health system reform and innovation, while also contributing to escalating healthcare costs (Nurse Forecasting: Human Resources Planning in Nursing, 2011). Different analyses (Estryn-Behar, M. et. al., 2007; Bariball, L. et. al., 2015, Cortese, C., 2012) suggest that the main drivers for nurses leaving their current organisation and/or the nursing profession are generally related to the working conditions (e.g. relationship problems, emotional diffculties, time pressure and quality of care, dissatisfaction with use of one’s competence and lack of autonomy, work schedule difficulties, poor management, lack of career development opportunities, lack of acknowledgement). Critical Care nurses are particularly at risk given the high-pressure nature of their specific specialty. In this context, reducing nursing staff turnover and increasing the appeal of the nursing profession becomes of paramount importance for the EU Member States.

* **Aim:** To evaluate the current state of critical care nurse work environment in five European countries: Cyprus, Spain, Poland, Croatia, and Romania and develop an educational platform for trainers of ICU nurses on the six elements of HWE (Skilled communication, true collaboration, Effective decision making, meaningful recognition, appropriate staffing and authentic leadership)

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**Objectives**

* Validation of the translated scale in each one of the five languages
* Overall Assessment of the critical care nurse environments of the five participating countries
* Assessment of the critical care nurse environments in each one of the five participating countries
* Correlations between the five countries regarding the 6 elements of the scale (Skilled communication, true collaboration, Effective decision making, meaningful recognition, appropriate staffing and authentic leadership)
* Correlations with demographics (within each country and all countries)
* Reassessment of the critical care nurse environments of the five participating countries in a set period of time (1year) after.
* Piloting a training course curriculum for the development of HWE knowledge, skills and competencies among CCU nurses in 4 EU countries.
* Describe lessons learnt and best practices with the goal of supporting other institutions in the healthcare sector to implement such a training in their curricula.

**Methods**

**This study protocol is composed of two phases as described in detail below and is a part of a larger Erasmus + KA2 project funded by the European Commission**

**1st Phase of the study**

**Design:** The first phase of the study will include a Multinational Descriptive correlational study aiming to evaluate the current state of critical care nurse environments in five European countries: Cyprus, Spain, Poland, Croatia, and Romania.

**Sample:** a convenience sample of all RN working in adult ICUs. Power analysis using G.Power 3.1.9.2 for detecting a small to medium effect size (f=0.07) in a regression modelling with 10 covariates (demographic characteristics and job satisfaction) for achieving a 90% power with a 5% error, estimates a minimum sample size of ***300 participants*** in each participating country. For the validation of translated scale in each of the five languages, 10-15 participants per country will be included (see survey development section).

**Data collection and Ethical issues:** Research ethics approval will be obtained according to the requirements of each country. In each country a lead investigator will coordinate survey distribution and reminders. The survey will be distributed in 2020 between September-April either by hand, or via mail (country) email (country) or as a link hosted on professional societies’ website (countries). Information about the aim and objective of the study through an attached letter will be provided including that the completion of the survey will be considered as an informed consent.

Survey data will be checked and entered into a specifically designed database by the lead investigator of each country. The database will be maintained by the lead statistician of the survey of the coordinating centre, Cyprus. The lead statistician will be responsible for the data cleaning, analysis and reporting. This will ensure the standardised and harmonised data coding, cleaning and comparative analysis.

Reassessment of the critical care nurse environments of the five participating countries in a set period of time (1year) after, will be performed using the same tool and the target group will be Registered Nurses working in adult ICUs that participated in educational activities and got familiarised with the proposed educational content for the development of their HWE knowledge, skills and competencies (by the end of phase 2 of the study).

**Survey development:** The AACN Critical Care Nurse Work Environment Survey will be used and translated with permission. The AACN Critical Care Nurse Work Environment Survey has 3 parts: The Critical Elements of a Healthy Work Environment Scale, a series of additional questions to explore certain work environment elements in more detail, and questions about the demographics of participants and their employing organization. The survey also includes open-ended questions to elicit additional information on work environment issues and best practices. The Critical Elements of a Healthy Work Environment Scale is a 32-item survey based on the AACN HWE standards. The scale measures the health of the work environment in the participants’ work units and organizations, using Likert-type statements with 4-point response options: strongly disagree (1 point), disagree (2 points), agree (3 points), and strongly agree (4 points). The initial AACN Critical Care Nurse Work Environment Survey instrument was developed in 2006 and was based on the AACN Standards for Establishing and Sustaining Healthy Work Environments: A Journey to Excellence 2 and on previous independent national research about nurses’ work environments. Before its use in 2006, the survey was pilot tested using a national sample of registered nurses (RNs) and no major changes were indicated. In subsequent studies, the additional questions were modiﬁed to probe results from the preceding surveys.

In discussion with country lead investigators we will review the AACN Critical Care Nurse Work Environment Survey and iteratively modify some of the additional questions to include contextually relevant items applicable to participating countries. The Critical Elements of a Healthy Work Environment Scale will remain consistent and will not be modified. Co – investigators will iteratively refine survey items via email and teleconference discussion for face and content (validity of survey). The final survey will be translated and back translated, from English to Greek, Spanish, Polish, Croatian, Romanian, by two experienced native translators, in consultation with the lead investigator from each country. A panel of experts in each country will discuss the final content till consensus. Then, the survey will be given to 10-15 critical care nurses, in each country, in two phases with 2 weeks interval, for Test retest.

**Statistical Analysis**

*Scale Reliability:*

We will evaluate the scale reliability by assessing the a) Stability of the scale using the test – retest correlation of items, and b) the Internal Consistency of the scale using the Composite Reliability index (CR). Missing value analysis: Missing values will be analysed and assess the missingness mechanism (MCAR, MAR, MNAR). Multiple Imputation technique will be applied for imputing the missing entries.

*Primary Analysis:*

Descriptive statistics to assess the level of the state of the critical care nurse environments in the six subscales, the job satisfaction level, across the five participating countries.

Explore the relationship between implementation of the AACN Healthy Work Environment standards, the health of critical care nurse work environments, and job satisfaction positions via multilevel regression models to accommodate random (i.e. Hospital) and fixed effects factors .

*Secondary Analysis:*

Explore the relationships between HWE measures, demographic information, and outcomes via regression modelling (within each country and all countries)

Data analysis will be conducted in the R programming language.

**2nd Phase: Educational Platform Development and pilot testing of its content**

The second phase will include the content development and the pilot testing of a proposed training program for the development of HWE knowledge, skills and competencies among CCU nurses in 4 EU countries. Lessons learned and best practices, along with a detailed literature review on Healthy Work Environments and Active Learning Methodology for developing knowledge, skills and competences related to HWE among healthcare professionals, will be presented, with the goal of supporting other institutions in the healthcare sector to implement such a training in their curricula. The educational content will be available as an open educational resource, on an educational platform.

**Study design:** A qualitative approach will be followed via focus groups.

**Sample:** 8 trainers and 32 CCU nurses in 4 European countries (Cyprus, Croatia, Spain, Poland), will be selected according to pre-determined selection criteria

**Data collection Methods and ethical considerations**

The validation of the educational content will be carried out in 4 pilots (Cyprus, Croatia, Poland and Spain). 2 trainers and 8 CCU nurses will participate in each pilot so 8 trainers and 32 CCU nurses in total. This will enable the educational content to be reviewed, assessed, and refined prior to expanding it across a wider range of respondents.

The method of data collection for this study will be the focus groups (4 focus groups in total= one in each participating country) and semi-structured interviews to explore the trainers and critical care nurses experience in the use of the proposed educational content. Focus groups will take place at a time and place convenient to the respondents and ideally will be limited to a maximum of 1 hour duration. Discussions will be moderated by an independent coordinator. Each focus group session will be audio-recorded. A semi structured interview form, that will facilitate the moderator during the interview, will be used. Transcripts (verbatim) will be presented back for verification by each respondent. Main content aspects to be covered: their opinion on the content, the methods and tools, any difficulties experienced, and suggestions for improvement.

Results will be discussed in connection to the background of the pilot participants and particular national contexts related to the HWE dimensions (e.g. healthcare system openness to soft skills and leadership training, previous knowledge of the participants on HWE related topics, organizational culture specifics in the healthcare sector across the four countries involved in the testing phase etc.). Best practices, lessons learnt and suggestions will be presented in the conclusion, to support other organizations which might be interested in implementing such a training course in their curricula.

This study will be conducted according to general ethical standards and national study protocols. Approval will be obtained by the Cyprus Bioethics Committee and the Cyprus State Health Services Organization (SHSO), and access to the hospitals will be obtained by the Board of managers and the director of each hospital. Anonymity and confidentiality and the right to refuse or withdraw from the study will be ensured for all participants. All participants will sign a consent form and the purpose and methodological details of the study will be explained, verbally and written, to them. All data will be made anonymous and all confidences respected.

**Data analysis**

Interviews will be transcribed verbatim. Content analysis will be used to analyse data. The participants statements will be coded based on their content into categories.

**Expected results for the two-facet study**

The results of this two- facet study will serve as the baseline of the state of health of critical care nurse work environments at a European level and will identify areas of concern and opportunities for improvement. In addition, Critical care Nurses perceptions will provide evidence of the relationship between the AACN HWE standards (i.e., communication, collaboration, effective decision-making, appropriate staffing, meaningful recognition, and authentic leadership) and the health of critical care nurse work environments, between the health of critical care nurse work environments and job satisfaction, and between job satisfaction and the intent of critical care nurses to leave their current positions or to stay. In addition, this study will provide additional information about the reliability and validity of the Critical Elements of a Healthy Work Environment Scale tested at a European level in order to support its use as an organizational measure.

Finally, an open and multilingual blended training course on HWE for trainers working with critical care nurses will be developed and provide innovative training opportunities for the target group, ie. for critical care nurses. The content and the ready lessons on each standard of HWE will be pilot tested and published as an Open Educational Resource (OER). Through the development of the blended training content proposed and its integration in the training programmes offered by nurse training providers to CCU nurses, the project will contribute to supporting trainers and nursing staff develop key competencies required for the 21st century, ensuring staff retention and better patient care. All the skills proposed (i.e. communication, collaboration, leadership, decision-making, recognition and staffing) are closely related to fostering employability and socio-educational and professional development in the nursing field, which is strategic for smart economic and social development.

References

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3. Ulrich BT, Lavandero R, Woods D, Early S. Critical care nurse work environments 2013: a status report. Critical care nurse. 2014 Aug 1;34(4):64-79.