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GenoNurse – Project-

an international partnership to enhance genetic and genomic competence in European nursing students

Arja Halkoaho¹, Nina Smolander¹, Mari Laaksonen¹, Essi Huhtinen¹, Josephine Hegarty², Maria Caples², Marija Milavec Kapun³, Tina Kamensek³, Angelo Dante⁴, Vittorio Masotta⁴, Cristina Petrucci⁴, Loreto Lancia⁴

¹ Tampere University of Applied Sciences, Department of Health, Kuntokatu 3, 33520 Tampere, Finland

² University College Cork, School of Nursing and Midwifery, College Road, Cork T12 K8AF, Ireland

³University of Ljubljana, Nursing Department, Kongresni trg 12, 1000 Ljubljana, Slovenia

⁴Department of Health, Life and Environmental Sciences, University of L'Aquila, Edificio Rita Levi Montalcini - via G. Petrini, 67010 L'Aquila, Italy

Abstract. Genomic nursing is a unique and rapidly developing area in health care. As a part of personalized medicine, research on genomics use in health care is leading to many scientific breakthroughs demanding also changes to nursing education. The whole topic of genomics is novel in Europe. The topic has been included in medical science to some extent, but in nursing less until recent years. In Europe there are no agreed guidelines for genetic and genomic nursing competences to be utilized in nursing education. The main objective of the GenoNurse project is to create a model for European Genetic and Genomic Nursing Education and educate nursing teachers and student to use the GenoNurse Model. Another aim is to establish a GenoNurse community and to collaborate with national associative partners in the field of genomics.

Keywords: Genomic, education, nursing.

1 Introduction

Genetic and genomic nursing are part of personalized medicine (PM). The utilization of genomics in health care and health promotion are rapidly leading to scientific breakthroughs [1]. Therefore, health care and the competencies required by health care professionals are undergoing an immense renewal [2,3]. Internationally it has been acknowledged that there is a need to implement agreed core competencies relating to genomics [4]. Furthermore, Skirton et al. [5] have highlighted the need for homogenous minimum standards for health care professionals across Europe. Based on our knowledge and experience, also nursing teachers in Europe have a skill gap in this area, which needs to be strengthened [2].

In 2005, the requirements for knowledge of genetic and genomic information were set in the USA. Skirton et al [6] undertook a systematic review to ascertain the extent to which nurses were achieving core competencies in genetics relevant to nursing practice. Their findings suggested that nurses were not demonstrating the competencies needed to offer care to people with genetic conditions. In 2017, the Global Genomics Nursing Alliance (G2NA) was founded in response to the recognized shortfall in nurses' knowledge and understanding of genomics [3]. In response to this shortfall and to support transformational change in genomics and healthcare delivery, Tonkin et al. [7] introduced a competency framework in genomics. Furthermore, an iterative consensus published a roadmap for the global acceleration of genomics integration across nursing. Also, from a perspective of midwifery education genetics and genomics competency framework have been revised in the UK. [4]. Recently, as per existing literature, genetic and genomic nursing has been developed especially in the US and UK. From a European perspective, regulatory frameworks from the different member states and the lack of an explicit EU legal framework may determine the application and adoption of practice relating related to genomics [8]. To advance genomic nursing health care policy, it is essential to develop genomic measurement tools for different stakeholders e.g., clinicians, purchasers, regulators and policymakers and to adequately prepare the nursing workforce. [9].

A key regulatory challenge is to ensure the privacy and security of genomic data which is susceptible to data breaches and cyber-attacks [10]. An international commitment to curricula development is needed to utilize a broad range of expertise in the area of genetic and genomic education, curricula and education development and comprehensive digital learning activities.

Currently, genomic literacy and ethical competencies concerning genomics in nursing are not commonly and systematically included in nursing curricula in Europe. Genetic information is rapidly increasing due to the development of PM and public interest in direct-to-consumer genetic tests in Europe. Therefore, there is a great need for education for present and future health care professionals related to genomics in nursing, genomic related ethical competence, and the utilization of genomics in health care. To be able to utilize genomics in nursing education, teachers need basic and topical

knowledge on genomics as well as PM and advanced skills on online teaching utilizing dialogical interaction and active presence in online learning [11].

2 Aims and objectives

The GenoNurse project aims to fill the skill gaps of nursing teachers and nursing students in genetic and genomic nursing through the development of co-created online courses. The project is conducted in co-operative partnership between four European universities: Tampere University of Applied Sciences in Finland (project coordinator), University of L'Aquila in Italy, University of Ljubljana in Slovenia and University College Cork in Ireland. GenoNurse project is funded by Erasmus+ Cooperative partnership, KA2- Cooperation for Innovation and the Exchange of good practices, European Union.

The GenoNurse project has following objectives:

1. To develop a GenoNurse Model for Nursing Education
2. To educate students, teachers, health care professionals and representatives of associative partners in the utilization of the content of the GenoNurse Model
3. To collaborate with national associative partners in the field of genomics
4. To enhance participants' cooperation and networking
5. To strengthen the integration of genomic nursing into nursing education, health care and society

Project work is based on iterative work packages (WP) which are led by one of the partner universities. All project work will be planned and conducted in close cooperation with all partners and thus, guaranteeing high quality and full utilization of expertise provided by each partner. The overall workflow of the GenoNurse project is described in the

Figure 1.

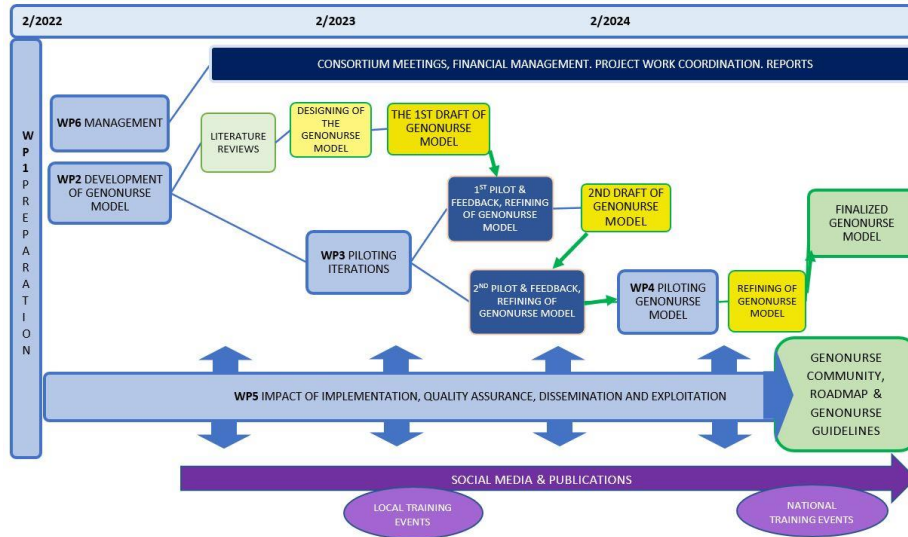


Fig.1. GenoNurse workflow

3 Expected GenoNurse project results

3.1. GenoNurse Model

GenoNurse Model is a generic model for facilitating nursing teachers and nursing students learning about genomics and its utilization in health care. In nursing, the demand for mastering genomic information is very topical and, for example, increasingly included as a desired skill criteria in nurses' recruitment announcements. The GenoNurse Model, as a generic model, will be applicable to any teaching context, independent of local teaching or working cultures in nursing. The GenoNurse Model will be integrated into existing teaching curricula or added into curricula as independent study material. The GenoNurse Model offers a structured and piloted concept for training students in developing skills so that they are better equipped to deal with genomic related issues in nursing. In addition, the GenoNurse Model focuses on patient education in digital and online environments thereby improving accessibility and enhancing nursing students' digital competencies.

The model will support students and teachers to adopt a change in attitude and behavior as well as increase their confidence in addressing genomics related issues with patients. Teachers and professors will receive a conceptual framework and practical tools to integrate teaching of genetic and genomic nursing in their courses. Graduate healthcare students will positively influence the quality of patient support, counseling, and nursing

care, as a result of increased knowledge and competence in genetic and genomic nursing. Up-to-date professional knowledge and skills will ultimately impact the quality of patient care, which is critical to move the nursing profession forward in the area of genetics and genomics. Nurses are on the forefront of patient care and therefore it is essential that nurse educators have the knowledge and skills they need to participate in and conduct this educational transition.

The GenoNurse project prepares students to take up an active role in integrated and patient-centered care systems. The focus will be on genetic counselling of patients and their significant others using evidence-based information to empower their informed decision-making process. In addition, online activities and courses will challenge teachers and students to improve their digital learning and competence through online activities and courses. These skills will further encourage the mind-set shift to inevitable online health care services and online patient counselling.

The GenoNurse Model will be designed in collaboration with all consortium partners and draft versions will be piloted through several agile pilot cycles. The GenoNurse pilots testing the GenoNurse Model in real life learning environment, will utilize the feedback and experiences collected from the previous curriculum development project, the DigiNurse project [12]. In the DigiNurse project, the project output was piloted in both national pilots [13-17], and a joint international co-pilot coordinated by Tampere University of Applied Sciences [18]. Especially, the structure and results of the international pilot will benefit the pilot process between different GenoNurse partner universities.

The GenoNurse Model will contain:

- Concrete learning objectives of genetic and genomic nursing
- Skills and knowledge needed in genetic and genomic nursing and counselling of patients
- Best teaching and training practices for teaching genetic and genomic nursing and counselling of patients and the utilization of digital tools
- Suggestions by the GenoNurse Model on how to implement training in real-life environment with associated training partners
- A concept of communication between a nurse and a patient regarding active decision-making process
- Evaluation criteria for genetic and genomic nursing and counselling of patients

3.2. GenoNurse Community

The GenoNurse Community will be a platform for sharing expertise and experiences by teaching and training professionals and health care students in the field of genomic nursing. We will collaborate with global associations e.g., the Nursing Genomic Alliance, G2NA, [19] to strengthen the knowledge transfer and competence of health care professionals.

In the ignition phase of the GenoNurse community, the main task of the community is to recognize knowledge needs of genomic nursing education. The community will gather health care teachers and students, faculty members, health care professionals, and other experts who are interested in genomics, genomic nursing and developing genomic nursing education and PM. The community serves as a unique platform for spreading and exchanging new information, ideas, and expertise in a fast-revolving area of genomic nursing education, nursing and health care. The participation in the GenoNurse Community during the nursing studies will encourage involvement and commitment to international networking generating highly empowered future health care professionals.

The GenoNurse community will attract new members to the community by annual online and local events. The new members joining the community will improve global genomic nursing competence among nursing teachers and students and health care professionals. Nursing students' and teachers' initial interest to participate in the international GenoNurse community will be ignited during the genomic nursing education by co-studying and co-educating in an international online environment. The GenoNurse Community also encourages representatives of associate partners e.g., biobanks, research institutes and patient organizations to get involved with the community activities. The GenoNurse community will ensure the sustainability of the project results and use of the GenoNurse Model by signing the project partners as foundational members of the community.

3.3. GenoNurse Roadmap

The GenoNurse Roadmap is a toolkit and guide to get the most benefit out of the GenoNurse Model. The Roadmap contains a collection of the most essential topics to educate in genomic nursing and the best practices in using the GenoNurse model. Also, the GenoNurse Roadmap comprises practical tutorials on how to use the model including videos and success stories, on how to practice relevant skills related to genomic nursing and suggestions / examples on how to embed the model into the nursing curricula.

The GenoNurse Roadmap will be presented in national training seminars organized by each consortium partner. The GenoNurse Roadmap will be available on the GenoNurse Community website. The practical content of the Roadmap lowers barriers to use the GenoNurse Model and encourages the use of the model in European institutions of nursing education. The GenoNurse Roadmap will be a continuously updated document in regard to present technology and content. The GenoNurse Community updates the content of the GenoNurse Roadmap.

3.4. GenoNurse guidelines

An e-publication - Impact of Implementation is a collective and comprehensive publication of the GenoNurse project work and results. During the project, the partners will take on increasing responsibility for converting the implementation of project work into project results. The e-publication will provide teaching and learning materials for

genomic nursing education which are very limited at present but the demand and need for future-proof professional skills is high.

The value of e-publication is emphasized by the participation of both nursing teachers and students as well as associative partners in producing the content through online international co-teaching, co-learning and networking events in collaboration with the project consortium. The way of co-working in an international project will enhance and encourage the dissemination and exploitation of the project results. The e-publication will be published in an open access platform, optimizing the potential of learning about genomic nursing by all interested parties.

3 Discussion

The main benefit of the GenoNurse project is to enhance teachers' and students' competencies in the field of genomics in nursing. The project will focus on improving basic knowledge of genomics in nursing education for nursing students, excluding genetic counselling education. Nurses are the largest professional group in health care and thus genomics competence will spread into every healthcare field. This will generate future-proof nursing professionals into the genomic ecosystem. [20].

The topics covered in the education organized throughout the project are not currently implemented in the nursing curricula of higher educational institutions in Europe despite the evident need. As a result of GenoNurse project, participants have the possibility to integrate new educational elements into their curriculum and also, update and develop their online learning activities utilizing international co-teaching and co-learning methods as well as open access materials. Ideally, the integration will be processed in the curriculum update revision by every partner. Study program leaders will be informed throughout the GenoNurse project to facilitate the integration of genomic modules and learning materials into the curricula. Because the learning materials and genomic enhanced course content will be embedded into the curricula, the key content of learning materials will be maintained up-to-date by nursing teachers through networking in GenoNurse Community and engaging with other genomic related international networks.

GenoNurse project aims to support the solving of known barriers to implementing genomics in nursing education, such as, lack of resources, instructions, educational tools and the non-existence of genomic communities. [3,21]. Potentially, this will reflect in clinical field through nurses advocating genomics competencies [2] and committing to improving their expertise in genomics nursing with the support of visible nursing leadership [3].

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