Role development, implementation and evaluation of nurse practitioners in a Belgian university hospital: a mixed methods study protocol

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ABSTRACT

Introduction Due to the increased prevalence of chronic conditions, multimorbidity and an increased complexity of care, the burden on healthcare teams is high resulting in unmet needs of patients and their family and a high workload on healthcare professionals. To respond to these challenges, care models integrating nurse practitioners were introduced. Despite the proven benefits, implementation in Belgium is at an early stage. The aim of this study is to develop, implement and evaluate nurse practitioner roles in a Belgian university hospital. Insights into development and implementation processes can inform healthcare managers and policymakers for future (nationwide) implementation.

Methods and analysis For the development, implementation and (process-)evaluation of nurse practitioner roles in three departments in a Belgian university hospital, a participatory action research approach involving interdisciplinary teams of healthcare professionals, healthcare managers and researchers will be used. To investigate the effectiveness at patient (eg, quality of care), healthcare providers (eg, team effectiveness) and organisational level (eg, utility) a longitudinal (matched controlled) pre–post mixed methods study will be set up. Quantitative data (surveys, data from electronic patient files, administrative files) will be analysed using SPSS V.28.0. Qualitative data will be collected throughout the whole process and will consist of the meetings, (focus group) interviews and field notes. All qualitative data will be analysed thematically both across-case and within-case. This study is designed and will be reported based on the Standard Protocol Items: Recommendations for Interventional Trials 2013 statement. Ethical approval for all parts of this study was obtained from the Ethics Committee of the participating university hospital (February–August 2021). All participants throughout the study parts will receive written and verbal information and will be asked written consent. All data will be stored on a secured server. Only the primary researchers will have access to the data set.

Trial registration number NCT05520203.

INTRODUCTION

Hospitals face new challenges in providing sustainable high quality care as the prevalence of chronic conditions, multimorbidity and the complexity of care increases.1-3 The high burden on healthcare teams, growing costs and increasing scarcity in healthcare providers (HCPs) result in unmet needs of patients and their families and a high workload on HCPs. Worldwide there is growing recognition that new care models integrating nurse practitioners (NPs) in interdisciplinary teams could contribute to respond to these challenges.4 NPs engage in task substitution (nationwide) implementation.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ The mixed methods design creates the opportunity to triangulate and integrate quantitative and qualitative data in a profound way.
⇒ Several strategies are used to enhance the internal validity of the quantitative part: using validated questionnaires, outcome indicators to distinguish confounding from independent variables and if possible matched compared groups.
⇒ Involving researchers who did not participate in the participatory action research-process, systematically organising and coding data and triangulation will reinforce the internal and external validity and transferability of the findings.
⇒ Despite the variety in included departments in the study and the in-depth evaluation of the development and implementation process, the convenience sample and single-centred study design might limit the generalisability of the results.
⇒ The process from development to evaluation is an iterative and complex process so it can be challenging to link the integration of nurse practitioners with the outcomes.
order to assess, diagnose and manage patients in primary healthcare settings and acute care populations as well as ongoing care for populations with chronic illness. The NP assumes various roles and these are described using the CanMEDS framework. Here the role of ‘clinical expert and practitioner’ is central, and from this the other roles of ‘clinical and professional leader’, ‘communicator’, ‘collaborator’, ‘health promoter’, ‘researcher’ and ‘organizer of quality care’ are shaped.

There is a long history of NP practice in different countries around the world, including Australia, Canada, Finland, The Netherlands, The UK and The USA. Identified reasons for the introduction of NPs in these countries include: (1) responding to shortages of doctors, (2) responding to changing demands and promoting high quality care, (3) responding to growing health costs and (4) improving prospects for nurses. Development of the NP role should be primarily driven by the (unmet) healthcare needs of the population but also other drivers can be of influence such as practice patterns, education, workforce issues and legal-policy context.

As NP roles are shaped by country context and evolve through the stages of development, there is an inconsistency in NP roles between and even within countries given that the time of introduction differs across countries or regions. This diversity due to different situational realities in which the role emerges, emphasises the complexity and versatility of development and implementation of new nursing roles in different healthcare systems.

In line with the development, also implementation processes are subject to various influencing factors. Bryant-Lukosius and Dicenso identified six possible issues that could occur in the implementation process of the NP role: confusion about terminology, failure to define clear roles and goals, role emphasis on physician replacement/support, underusage of all role domains, failure to address environmental factors that undermine the roles, and limited use of evidence-based approaches to guide their development, implementation and evaluation. Anticipating these issues in the development and implementation process will increase the chances of successful integration.

When implementing NP roles, a thorough process-evaluation and investigation of the impact is needed. Multiple systematic reviews show the advantages of integrating NPs in interdisciplinary teams. It has the potential to lower the cost of ambulatory, primary and acute care and to improve access to primary care without decreasing care quality, safety or clinical outcomes. A Cochrane review on nurses as substitutes for doctors in primary care even reports the possibility for better clinical outcomes (eg, blood pressure, cholesterol, glycated haemoglobin) and self-reported measurements of health status. Investigating the process and impact will enhance effective NP role integration in hospital departments in an early stage, and enable them to make decisions about the optimal design and use of NP roles to further improve outcomes.

The aforementioned shows the importance of careful planning, development and evaluation of the NP role, taking into account all influencing factors. To guide this process, Bryant-Lukosius and Dicenso developed the participatory, evidence-based, patient-focused process for advanced practice nursing role development, implementation and evaluation (PEPPA) framework. This nine-stepped strategy has been used in at least 16 countries and is recognised as a best practice for introducing a new APN role such as the NP role.

Despite these proven benefits of integrating NPs in interdisciplinary teams, introduction in Belgium is at an early stage. We can speak of an early phase given APNs, including NPs, are formally recognised in Belgium only since 2019, but there is still no legal framework in which additional rights or agreements compared with other nursing groups are defined. In addition, the academic master in nursing science only recently changed to a specific programme for APNs. The focus of this master is on acquiring the competencies necessary according to the CanMEDS roles: clinical expert and therapist, organiser of quality care and leader in innovation, professional and clinical leader, collaborator, researcher, communicator and health promoter.

Given the early stage of introduction, little is known about the development, implementation and impact of NPs in the Belgian healthcare context. Additionally, there is only limited research that comprehensively analyses the process from development to evaluation of the integration of NPs, especially over different hospital departments simultaneously. Gaining insights into the implementation processes and the effectiveness of NP roles at different levels can inform healthcare managers and policymakers for future (nationwide) implementation in a hospital setting.

**METHODS AND ANALYSIS**

**Study aims**
The overall objective of this longitudinal (matched controlled) pre–post mixed methods study is to develop, implement and evaluate the integration of NPs in four different departments in a Belgian university hospital.
The study can be divided into three major phases each with their specific aims. These phases and aims are outlined in figure 1. The study will be carried out over 3–4 years (December 2020 to December 2024).

**Study design overview**
A mixed methods approach will be used to develop, implement and evaluate the acceptability, appropriateness, feasibility, penetration and sustainability of the integration of NPs in four different departments (digestive surgery, gastroenterology and hepatology, anaesthesiology and paediatrics) in a Belgian university hospital. This study is designed and will be reported based on the Standard Protocol Items: Recommendations for Interventional Trials 2013 statement.
The overarching framework used to guide the process from development to evaluation is the PEPPA-framework. This framework outlines a nine-stepped implementation strategy that takes the complexities of implementing a new role in an existing healthcare environment into account. To tailor the integration of NPs to the Belgian context, the local context of a specific healthcare setting (ie, university hospital), the interdisciplinary teams and their specific needs, a participatory action research (PAR) approach will be used throughout the full process of development, implementation and evaluation.

PAR is a combination of participatory research and action research. This approach is characterised by (1) the cyclic process of planning, acting, observing and evaluating the result of a specific action and (2) the participation of both the subjects of the study and professional researchers throughout the research process. On the one hand, the iterative cycles in the PAR-process have the advantage that the researchers, who do not have the knowledge of the specific implementation context, do not wrongly collect data and misinterpret the gathered information. On the other hand, it ensures that all necessary stakeholders are involved and are supportive for the change. The goal of PAR is to promote a more democratic process and to enhance the contribution of all stakeholders in the development and integration of new nursing roles. These principles of PAR are also integrated in the overarching PEPPA-framework.

In each phase, PAR-meetings with key stakeholders will be held, although in each phase the goals of these meetings will be different. Also the participants involved in the PAR-meetings can differ throughout the process. Additional stakeholders might be identified, for example, when the scope of NP integration becomes clearer or when topics are discussed for which stakeholders with specific expertise are needed. Figure 2 is a general overview of the study with integration of the PEPPA-framework.

**Study settings**
Prior to this study explorative interviews were conducted with both the head of the medical chiefs and head nurses of 11 departments in this hospital. These departments were selected based on a broad literature search of the relevance of NPs in different hospital settings and on the interest of the departments in the project. During these interviews, individual needs of each department and relevance of the introduction of NPs were explored as well as their interest to participate in a pilot setting. Based on these findings, the research group decided, in consultation with the hospital management to select...
four departments: digestive surgery, gastroenterology and hepatology, anaesthesiology and paediatrics. Criteria for selection included a pressing need for a new care model as experienced by the medical chiefs and head nurses, their interest to participate and the inclusion of a variety in disciplines (surgical, internal, critical care and paediatrics).

In the early stage of the development process, the settings are very broadly defined given that the starting point of the study is only the participating department. The development phase therefore starts with step one of the PEPPA-framework, in which the patient population and scope will be identified and a clearer vision on the integration of the NPs in each department is defined.

In the following paragraphs, the research approach (design, sample, data collection and data analysis) of the three study phases are explained.

**Phase 1: development**

The development phase (PEPPA steps 1–6) concentrates on narrowing down the scope, setting up role structures and planning the implementation strategies. This phase will take 4–8 months.

**Design**

A PAR approach will be used to develop the new model of care in which the NP will be integrated in the interdisciplinary team. In this phase, a total of four to six PAR-meetings will be planned with each interdisciplinary team. The PEPPA-framework is used as a tool to guide and to determine the subjects of discussion without being restrictive by content or order. The steps and aims, according to PEPPA are outlined in table 1.

**Sample/participants**

Representatives of all relevant stakeholders (from each department) will be invited to participate in this phase and will form an interdisciplinary team. This phase will be completed with each interdisciplinary team from the different participating departments separately. The teams of each setting will consist of the head(s) of the medical department(s), physicians, physicians in training, (head) nurses, care managers, the chief medical officer, specialised nurses (eg, nursing consultant, clinical nurse specialist (CNS)) and other care providers (eg, social worker, pharmacist). The aim is to strike a balance...
between medical and other stakeholder viewpoints to achieve optimal outcomes.11

Data collection

Qualitative data will be collected continuously throughout the development phase. The full data set will consist of the reports of the exploratory interviews, the recorded PAR-meetings, the field notes and the logbook of telephones and informal contacts between researchers and participants.

All PAR-meetings will be chaired by the same researcher. During the meetings, the researcher will bring the input together, process and refine it into output based on the feedback from the participants. In addition, the principal investigator and co-investigator of the study will participate actively and facilitate the discussion resulting in an iterative cycle of research, action and reflection. The aim of this process is to create greater awareness of the participants into their situation in order to take action.28 Other members of the research team are observing and taking field notes of their first impressions. All PAR-meetings will be audio recorded and if there are informal contacts in addition to the meetings, this will be noted by the researcher in a logbook.

Data analysis

The PAR-meetings will be recorded and transcribed verbatim. Subsequently, all data from the prior described data set will be coded in categorised themes by using QSR International’s (2012) NVivo V.10.0 software. Both across-case and within-case analysis will be conducted to retrieve themes that have explanatory or conceptual power in both and therefore have the best potential for analytical generalisation.29

To enhance the quality of this inquiry, different strategies will be used in data generation and data analysis, such as (1) the use of comprehensive field notes, (2) audiotaping and verbatim transcription, (3) data triangulation (data from different groups and methods), (4) researcher triangulation (multiple researchers), (5) peer-review sessions and (6) an audit trail (in-depth documentation of all keys stages).

Phase 2: implementation

The implementation phase (PEPPA step 7) is the actual action stage of implementation and introduction of the NP. This phase will take at least 6–8 months to carry out key actions to implementation and introduction. During this phase, the PAR-team (interdisciplinary team and researchers) will meet monthly to reflect on and make adjustments to the detailed implementation plan whenever necessary. It will be a sequential process of try and adjust in which all stakeholders as well as the NPs themselves are involved. Even after this phase, after the start of the evaluation phase, further implementation actions can be realised if deemed necessary. The systematic approach that will be used for choosing appropriate implementation strategies is described and applied to issues related to NP role integration of which previous research demonstrates its importance.

Implementation strategies will be chosen in relation to the barriers and facilitators identified in step 6 of the development phase. Choosing tailored implementation strategies is crucial and can make the difference between implementation failure and success.30 A systematic approach (figure 3) described by van Achterberg30 will be used. The first step in determining the appropriate strategy will be to group the barriers and facilitators

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**Table 1** Steps and aims according to PEPPA framework of phase 1 of the study (development)

<table>
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<th>Steps:</th>
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| **Step 1:** Define patient population and describe current model of care | ▶ Narrowing down patient population.  
▶ Defining period or continuum of care. |
| **Step 2:** Identify stakeholders and recruit participants | ▶ Identifying key stakeholders for participating the PAR-process.  
▶ Ensuring commitment to and providing support for planned change. |
| **Step 3:** Determine need for a new model of care | ▶ Analysing strengths and weaknesses of the current care model. |
| **Step 4:** Identify priority problems and goals | ▶ Establishing priorities and setting goals. |
| **Step 5:** Define new model of care and APN role | ▶ Determining modifications to the current model of care.  
▶ Clarifying perceptions about purpose and multidomains of NPs related to clinical practice, education, research, professional development and leadership.  
▶ Defining relationship between care providers.  
▶ Establishing qualifications (level of experience, education and credentials). |
| **Step 6:** Plan implementation strategies | ▶ Developing a plan to ensure system readiness.  
▶ Outlining the evaluation plan and outcomes.  
▶ Identifying strategies to facilitate APN role development.  
▶ Identifying strategies to prevent and anticipate on barriers. |

APC, advanced practice nurse; NP, nurse practitioner; PAR, participatory action research.
identified in the PAR-meetings into relevant concepts. Subsequently, these concepts shall be fit with a suitable theory enhanced strategy and the associated operational actions. To make this fit, a taxonomy of behaviour change methods will be used. The use of a taxonomy has been proven beneficial to improve clarity of definitions and assists end users to undertake targeted actions. The last step before execution will be to set out an operational plan.

Role clarity
Role clarity has been proven beneficial for a successful introduction of APN roles. All stakeholders should be fully informed about the NP roles to align expectations. Subsequently, in the operational plan, there should be a clear role description (brochure for patients and job description) written out in consensus with the PAR-team of each care setting addressing the activities and tasks an NP will fulfil. However, this will not be exhaustive as the role can still be adjusted and refined during and after implementation. Next to the role description, team sessions will be organised by the NPs during this phase to stimulate stakeholders (eg, nursing teams) to actively participate in the role development.

Development of all NP role domains
For a successful implementation, it will be important that the knowledge and skills of the NPs are sufficient to provide qualitative care and to facilitate role introduction. Besides the role as a clinical expert, the NP also has other roles including being an educator, researcher and clinical leader. According to Hamric et al who described the core roles and competencies of APN the central competency needed is direct clinical practice, but also other core competencies (viz. collaboration, leadership, guidance and coaching, consultation, evidence-based practice, collaboration, ethical decision-making) are required to successfully fulfil all role domains. Therefore, it will be important that NPs receive both clinical guidance to build their clinical knowledge and expertise and also guidance and support to develop the other role domains and the associated competencies as defined by Hamric et al. The relevant theory-based strategies for the concept of education and knowledge is active learning and feedback. In the operational plan, a mentorship programme as well as a theory and practical educational programme will be included.

The mentorship programme for the NPs will be developed and will focus on two domains: clinical mentorship and mentorship in other NP role domains. The clinical mentorship will be preliminary taken up by a physician, the mentorship of the other role domains will be taken up by an experienced APN/CNS who has extensive experience with introducing and enacting the different APN/NP roles and who is also a trained mentor.

In Belgium the educational programme for the master of science in nursing has been renewed in 2021 including a specific programme for APNs such as the NP. However, since this programme has just started and takes several years to fulfil, an educational programme will be outlined together with each PAR-team with attention to the development of all competencies that are expected from an NP. The programme will consist of in-hospital education programmes, medical specialty specific training programmes, courses from the renewed master’s degree programme and on the job learning. In addition, feedback to NPs will be provided about their learning process and performance in practice. The follow-up meetings with all stakeholders in the implementation phase, as well as the (mid-term) evaluation and mentorship programme will facilitate this.

Organisational conditions undermining the role
The introduction of the NPs should be facilitated by the healthcare organisation in which NPs will work (eg, organisational procedures and policies, administrative support, resources) to safeguard NP role autonomy. Given that NPs have advanced roles and responsibilities, specific organisational and environmental conditions might need to change. Strategies to change such organisational and environmental conditions include structural redesign of specific processes and workflows, increasing stakeholder influence, providing technical assistance and participatory problem solving. Hence, in the operational plan, structures to support the new role autonomy should be set up in such a way that the NPs can fully develop and enact their role. Policies and protocols outlining autonomy, authority and accountability of the new role will be developed as this can bridge the gap caused by the fact that there is no legislation in Belgium yet that supports this NP role. In addition, technical assistance will be needed to give the NPs extended access rights to the patient records. Finally, monthly PAR-meetings will be

Figure 3 A systematic approach for choosing implementation strategies. PAR, participatory action research.
held to discuss problems and solutions on an organisational level.

**Phase 3: evaluation**

The comprehensiveness of this study protocol already shows the complexity of introducing an NP in the interdisciplinary teams. This intervention meets the definition of a complex intervention as it is tailored to the needs of each care setting, there are multiple and a wide range of targeted outcomes and different groups (eg, patients, providers, organisation levels) are targeted.1 3

The aim of the third phase is to comprehensively evaluate the development and implementation of NPs in four different departments. To evaluate complex interventions, a process evaluation is essential as it can identify causal mechanisms and contextual factors that are associated with the fidelity and quality of implementation but also can be explanatory for the variability in outcomes.12

Subsequently, measuring the effectiveness of the implementation actions is of meaning to replicate the introduction of NPs in different healthcare settings. Principles of the realist evaluation will be used and in addition to the impact of introduction and insight in the implementation process, the context of the intervention and the underlying mechanisms at play will be identified and will be part of the analysis to explain the outcomes. A set of patient-related, HCP-related and organisation-related outcomes as well as the PAR-process will be thoroughly mapped and evaluated.

**Outcome evaluation**

A longitudinal (matched controlled) pre–post mixed methods study will be undertaken to evaluate the effects of implementation on patient, HCP and organisational level. Settings for which a comparable group of patients, hospitalisation units and/or providers are available in the same hospital and in consultation with the interdisciplinary teams, a matched controlled group will be used to compare outcomes. Next to a set of generic outcome indicators, a set of discipline specific outcome indicators will be used. These discipline specific outcomes will be identified with input from the PAR-team during the development phase. Hence, only the generic outcome indicators are described below.

**Sample/participants**

Two groups of participants are targeted for inclusion in this part of the study: (parents of) patients and HCPs. Patients (or their parents in the paediatric department) will be recruited consecutively for the quantitative part of the study. To determine the sample size of patients needed for the desired effect size, a sample size calculation will be conducted. The needed sample size will be calculated for each setting separately and will depend on each interdisciplinary team’s primary objective of integrating the NP role. This primary objective as well as the inclusion and exclusion criteria will be identified in phase 1 of the study. If questionnaires will not be returned within 2 weeks after discharge or consultation, reminder phone calls will be made.

For the qualitative part, a subsample of patients (and their parents) will be purposefully sampled, striving for a diversity in, for example, gender, age, vision on care provision, positive and negative experiences. Patients or their parents will be recruited for the qualitative part until data saturation occurs.

For HCPs, a convenience sampling method will be used to recruit HCPs who are currently involved in the care process of the targeted patient population in the different participating departments. A subsample of HCPs will be recruited through purposive sampling to participate in the semi-structured focus groups or individual interviews. The choice for an individual interview or focus group per discipline depends on the power structure between groups of participants. For example, the head nurse nor the medical chief will attend the focus group for nurses. HCPs will be recruited for the qualitative part until data saturation occurs.

**Data collection**

Individual data of patients (or their parents in the paediatric department) and HCPs will be collected at three points (T0, T1 and T2). Table 2 gives an overview of the generic quantitative and qualitative outcomes that will be collected over the four settings.

Quantitative data of patients will be collected at T0, T1 and T2 from electronic patient files and self-reported validated questionnaires. Qualitative data of patients (or their parents in the paediatric department) will be collected at T1 and T2 through semi-structured individual interviews.

Administrative files and validated self-reported questionnaires will be used to collect quantitative data of HCPs at T0, T1 and T3. Qualitative data of HCPs will be collected at T1 and T2 by semi-structured individual interviews or focus groups.

For the evaluation at organisational level, administrative data will be continuously collected regarding the financial implications (eg, justified length of stay), utility (number of prescriptions and orders) and activity changes (eg, number of consultations/admissions, bed occupancy rates).

**Data analysis**

Quantitative data will be analysed using SPSS V.28.0.35 Input of data will be done by one researcher with a sample check for correct input of 20% by another researcher. Responses will be excluded for analysis if the same response is provided for every question (no-variance) or if less than 80% of the patient experience questionnaire (patients) or psychosocial conditions in workplaces questionnaire (HCP) is filled in. Repeated measures analysis will be used to calculate differences over time. In order to compare the intervention group with the control group an analysis of variance will be used (in case of matched controlled design).
All interviews and focus groups will be recorded and transcribed verbatim. The transcriptions will be coded and categorised to identify main themes using thematic framework analysis. This thematic analysis will be performed using QSR International’s (2012) NVivo V.10.0 software. Both data and researcher triangulation will be used to enhance the quality of this inquiry. The qualitative research can be used to explain the quantitative findings.

Based on the findings at T1, the role of the NP and the integration in the interdisciplinary team can be discontinued or modified if patient safety outcomes (eg, complications, admission rates) are compromised. Adverse events or unintended effects will be assessed and reported in the PAR-meetings.

**PAR-process evaluation**

Next to clinical and service system outcomes, this study also aims to investigate implementation outcomes for the overall PAR-process and to identify contexts and mechanisms that enabled and hindered implementation and had an effect on sustainability. Implementation outcomes serve as indicators of the implementation success, are proximal indicators of implementation processes and are key intermediate outcomes. The implementation outcomes of interest in this study are the acceptability, the appropriateness, feasibility, penetration and sustainability of the integration of the NP in the interdisciplinary teams.

**Sample/participants**

Three groups of participants are targeted for inclusion for the PAR-process evaluation: key stakeholders from the interdisciplinary teams, HCP’s working with the NP and the researchers who actively participated in all phases of the process from development to evaluation of all four departments. A consecutive sampling method will be used to recruit participants for the PAR-process evaluation.

**Data collection**

Data will be collected through semi-structured individual interviews and focus group interviews. First, the key stakeholders from the interdisciplinary teams who participated in the PAR-process of development, implementation and evaluation will be interviewed individually to avoid interference and influence from each other. Second, other HCPs from clinical practice who collaborate with or are affected by the integration of the NP in their team will be divided in groups based on their profession (eg, nurses, physicians, physicians in training) and focus groups will be held without the presence of their direct supervisor/clinical leader. Last, a focus group discussion will be conducted with the researchers who actively participated in all four
PAR-processes. All data collection will be conducted by a researcher who was not involved in the PAR-process itself.

Data analysis
All focus groups will be audio recorded and transcribed verbatim. The transcriptions will be coded in categorised themes by using QSR International’s (2012) NVivo V.10.0 software. Both across-case and within-case analysis will be conducted. To enhance the quality of analysis data and researcher triangulation will be used as well as member checking after data have been fully analysed.

Patient and public involvement
There was no patient or public contribution to the development of this protocol. During execution, HCPs will be actively involved in determining the design, outcome measures and implementation strategies. In addition, both patients and HCPs will be involved in the evaluation.

Ethics and dissemination
Ethical approval for all parts of this study was obtained from the Ethics Committee of the participating university hospital. All participants will be informed and will receive written information regarding the aim of the respective phase of the study, the implications of participation, the confidentially and voluntary participation in the study. There will be an opportunity to ask questions and written consent will be asked of all participants. All data will be anonymised for further analysis and reports.

According to the approved data management plan (in DMPOnline.be), all data will be stored on a secured server. Only the primary researchers will have access to the data set. Results will be communicated in the PAR-meetings and to the participating HCPs. In addition, the results will be published in peer-reviewed journals.

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Contributors
LD, FV and AVH designed the study. LD wrote the paper in consultation with L-MK, FV and AVH. The manuscript was critically revised by L-MK, FV and AVH and approved for publication by all authors.

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Competing interests
None declared.

Patient and public involvement
Patients and/or the public were involved in the design, or conduct, or reporting, or dissemination plans of this research. Refer to the Methods section for further details.

Patient consent for publication
Not applicable.

Provenance and peer review
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REFERENCES

7 Delamare ML, Lafontune G. Nurses in advanced roles: a description and evaluation of experiences in 12 developed countries. 2010.
8 Schober M. Factors influencing the development of advanced nursing in Singapore. In: Sheffield Hallam University (United Kingdom, 2013.


