

Facilitating a learning culture to strengthen professional autonomy among hospital nurses: a mixed methods study

Ria den Hertog · Marjon Wolters-Zwolle · Tjard Schermer · Anja Bussink-Legers

Received: 5 November 2025 / Accepted: 4 September 2026

© The Author(s) 2026

Abstract

Background Professional autonomy is essential to nursing leadership development in Evidence-Based Quality Improvement (EBQI), yet hospital nurses may struggle to enact this autonomy. This study examined how a participatory learning trajectory influences professional autonomy and nursing leadership development within EBQI practice.

Methods A convergent mixed-methods design combined qualitative Participatory Action Research (PAR) with an appreciative approach and a prospective pre-post comparative study. Two nursing teams participated in the PAR trajectory and two served as non-PAR comparison teams. Qualitative and quantitative data were collected and analysed separately and then brought together at the interpretation stage through triangulation, allowing the findings from both approaches to be compared and integrated to provide a comprehensive understanding of the effects of the PAR trajectory.

Results PAR enabled each team to develop a tailored learning trajectory combining reflection, knowledge development, and enactment of nursing leadership behaviours. Four key outcomes emerged: (1) increased professional autonomy, (2) more proactive work practices, (3) enhanced psychological safety, and (4) development of a shared team vision. Compared with non-PAR wards, nurses in participating wards showed significant improvements in aspects of professional leadership (Challenge the Process, $p=0.014$), attitudes and skills related to EBQI ($p=0.037$), and self-efficacy ($p=0.038$).

Conclusions PAR can strengthen professional autonomy and nursing leadership development within EBQI. Ward-based learning, guided reflection, and collective practice appear to be key mechanisms. Sustaining improvements requires ongoing support for practice consolidation and innovation. Transferability may be limited by the Dutch nursing context, where vocationally and bachelor-educated nurses work together in teams with a different skill mix than in other countries.

Implications Nursing leadership development should be embedded in everyday clinical practice through structured action-reflection cycles. PAR can foster trust, engagement, and team development, while organizational support is essential for meaningful participation and sustainable impact.

This Article in Press is shared early to give you faster access to new research. It is citable and carries a permanent DOI. The final edited version will replace it automatically.



Keywords Professional autonomy · Nursing leadership development · Evidence-based quality improvement · Self-efficacy · Self-determination theory · Hospital nurses · Learning culture · Participative action research · Prospective comparative study

Background

Professional autonomy is essential to nursing leadership development in Evidence-Based Quality Improvement (EBQI), yet hospital nurses often struggle to enact this autonomy, thereby impeding nursing leadership. Moreover, professional autonomy is an essential building block of advanced practice and in nursing leadership development within EBQI [1]. The concept of professional autonomy has been defined in various ways, as clinical and professional autonomy are often used interchangeably in the literature [2, 3]. However, professional autonomy is a well-established concept within the literature on Magnet hospital characteristics [4], as articulated by the American Nurses Credentialing Center (ANCC). Professional autonomy in nursing is the freedom and independence to organize their work, make independent decisions within professional frameworks, and go beyond the standard nursing practice in the best interest of nursing and patient outcomes [5–8]. The concept aligns with the core task of exemplary professional practice, what results in less stringent guidance or supervision and more motivation, quality, and client satisfaction [9]. Autonomy is linked to the Self-Determination Theory (SDT), and a core factor affecting intrinsic work motivation, enhanced performance and well-being [10, 11]. Hospital nurses often struggle to enact this autonomy, thereby impeding nursing leadership within EBQI. EBQI aims to integrate scientific evidence and methods into the EBQI process while maintaining focus on team-based innovation and problem-solving within real-world settings [12]. In hospitals, nursing leadership contributes significantly to error prevention, improved patient outcomes, and enhanced quality of care [13]. Moreover, effective nursing leadership plays a key role in promoting patient safety and staff retention [14].

Professionals are challenged to demonstrate personal leadership to continuously improve and embrace new methods based on scientific evidence, professional expertise, and patient experiences [15]. Thus, professional autonomy in practice is also about actively claiming space as a professional and being accountable for it [16]. In hospital practice, nurses' professional autonomy is often reduced by lack of resources, reliance on other services, segregation between nurses and doctors, and lack of institutional support [2, 17]. Since hospital nurses work in interprofessional collaboration with diverse healthcare professionals, and patients and their families, it is important to involve the context of team efforts and relational collaboration [18, 19]. Current literature emphasizes the strengthening of professional autonomy [20, 21]. However, it remains unclear how promoting professional autonomy contributes to nursing leadership development within EBQI practice.

Transformational leadership

One of the most prevalent leadership styles within EBQI practice is transformational leadership. Transformational leadership has been defined as a leadership style that motivates and inspires followers to pursue higher goals through the transformation of their attitudes, beliefs, values, and behaviours [22, 23]. Positive changes are initiated by a shared vision of what constitutes good work execution [24]. Transformational nurse leaders set goals and demonstrate proactive work behaviour [24]. They also have a higher degree of self-efficacy, a psychological concept of Bandura (1977) of a person's belief in their ability to succeed in a particular situation [25]. The level of self-efficacy determines a person's trust in their capacity to complete activities toward reaching their goals. People with high self-efficacy are more resilient and persevere longer in the face of challenges and setbacks. A person with low self-efficacy, on the other hand, is more likely to avoid challenging tasks and to withdraw more quickly [26]. Despite extensive scientific literature on leadership development within EBQI, hospital nurses often struggle to exercise their professional autonomy in ways that support nursing leadership.

Conceptual framework

In the literature, autonomy is the psychological concept as the regulation of the self, and linked to SDT, a psychological framework that underlies development and growth. SDT proposes that people are inherently driven to develop when three universal psychological needs are met (Fig. 1).

Competence, autonomy, and relatedness are basic human needs. Feeling skilled, in control, and connected to others increases intrinsic motivation, engagement, performance, and well-being [27]. In the workplace, organizations can support employees' development by promoting growth, autonomy, and a supportive environment [28]. The model of Self-Determination Theory was used as an example to illustrate how the concept of autonomy is positioned alongside competence and relatedness. Therefore, it contributed to answering the main research question: 'How can hospital nurses be supported in strengthening their professional autonomy in nursing leadership development within EBQI practice?'

Aims

The aim of the study was to evaluate and examine how a participatory learning trajectory influences hospital nurses' professional autonomy and nursing leadership development within EBQI practice. An additional aim was to triangulate the method and examine changes in attitudes toward evidence-based practice, nursing leadership, and self-efficacy compared with nurses on the non-PAR comparison wards.

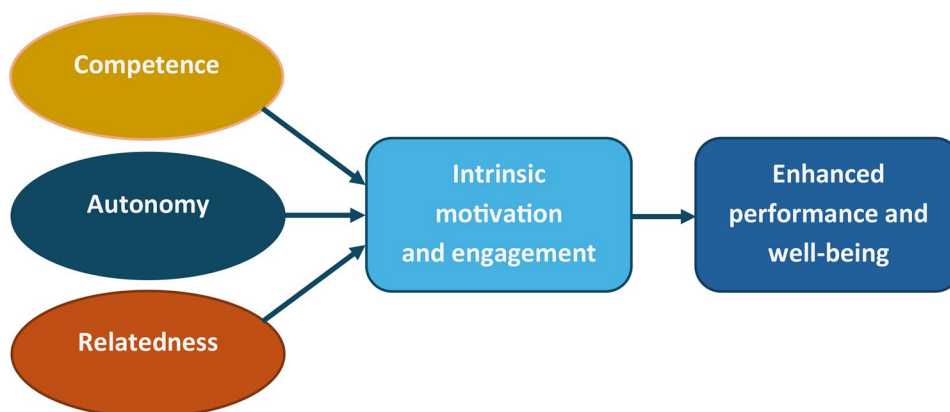
Methods

Design

The study employed a convergent mixed-methods approach, combining qualitative Participatory Action Research (PAR) [29, 30] with a prospective pre-post comparative study; data were collected sequentially and converged at the interpretation stage. An appreciative approach was incorporated within the PAR component [31]. This approach was selected in response to recent organizational changes within the hospital, with the aim of reducing unrest among nurses and promoting a constructive, future-oriented perspective.

PAR is an emergent, collaborative, and context-specific process in which participants co-create the content, direction, and actions of the research. As the process unfolds, the research trajectory may evolve in response to new insights, the identification of additional variables, or the development of alternative theoretical explanations.

Fig. 1 Self-Determination Theory, humans' three basic needs to achieve intrinsic motivation and being engaged, resulting in enhanced performance and well-being (Deci & Ryan, 2000)



To support comprehensive and transparent reporting and to enhance the rigor of theory development, the Quality Action Research Checklist (QuARC) was used to guide the study [32].

To explore potential outcomes associated with the PAR trajectory, a prospective pre-post comparative component was added for the two participating nursing teams and the two nursing teams as a non-PAR comparison group (Fig. 2). After separate analyses of the qualitative and quantitative datasets, findings were integrated through triangulation [33]. Qualitative findings from the PAR process helped explain the mechanisms, contextual factors, and participants' experiences, while quantitative outcomes provided information on the magnitude and direction of changes over time. Integrated interpretation enabled a more comprehensive understanding of the effects of the PAR trajectory.

Project team

The project team comprised two researchers and a nurse scientist from the science department of a Dutch general hospital, and a senior researcher affiliated with a university of applied sciences. Two of them, professional action researchers, were responsible for conducting and analysing the action research (AB, RdH). The quantitative data collection and analysis were carried out by the other team members (MW, TS). All researchers had experience conducting nursing research in hospitals.

Participants and study organisation

Nursing teams from this hospital's nursing wards were invited to participate in a learning trajectory in which they were challenged to strengthen their professional autonomy and enhance nursing leadership skills within EBQI. Participants were nurses from two participating clinical wards of a Dutch general hospital and comprised vocationally educated nurses (EQF level 4) and bachelor-prepared nurses (EQF level 6). In the Dutch healthcare system, both are registered nurses; however, they differ in educational preparation and qualification level as defined by the European Qualifications Framework (EQF). Nurses at both qualification levels are educated in the principles of evidence-based practice, work together within the same nursing teams, and share responsibility for patient care. In daily practice, the nurses jointly identify clinical questions, uncertainties, and opportunities for improvement. Thus, EBP is a shared component of nursing practice, with BSN nurses having an additional responsibility for the systematic retrieval and appraisal of evidence to support practice development.

Nursing team A, from a ward that primarily treats surgical patients, responded immediately and positively. Team B, from the coronary care unit, agreed to participate after some hesitation and the provision of additional information. Two nursing teams from wards primarily caring for surgical patients agreed to serve as a non-PAR comparison group for the questionnaire component of the study. No formal sample size calculation was

Fig. 2 Convergent mixed-methods design integrating a Participatory Action Research (PAR) process with a prospective pre-post comparative study in the participating nursing teams and the non-PAR comparison teams. Convergence occurred at the interpretation stage, not before or during data collection



performed. Instead, we aimed to collect questionnaires from as many of the nurses as possible across all four wards, making every effort to achieve the highest possible response rate.

The action researchers introduced PAR to the teams and took on the roles of coach and facilitator. Between January 2024 and March 2025, they conducted 14 monthly inspirational reflective sessions on each participating ward. The 14-month timeframe was agreed upon with the grant provider to ensure completion of the project within the two-year funding period. To maximize the learning impact, the team leaders approved the sessions to take place during the nurses' shift. In team A, 14 monthly sessions were held during a fixed weekly training period in the morning coffee break. Team B took part in 12 monthly sessions, preferring the inspirational reflective sessions during their afternoon tea break. One planned session was cancelled due to illness of nurses and one session evolved into a discussion about the extent to which professional autonomy is valued by the ward's leadership. Detailed notes were taken during this session and subsequently incorporated into the analysis.

Two bachelor-educated nurses from each ward completed a short PAR course of three half-day sessions to facilitate and support daily change processes within their teams. Ultimately, seven ward action researchers were trained due to natural staff turnover on the wards. To support them and facilitate experience exchange, four separate meetings with the professional researchers were organized.

Data collection

Data were collected using a script developed by the professional action researchers, which specified the content and structure of the inspirational and reflective sessions and, where applicable, the objectives of the participatory action research process. Recurring steps included identifying shared challenges related to increasing professional autonomy and developing nursing leadership. Nurses of both wards explored solutions, practiced new behaviours with peer support, and evaluated these actions to enhance their professional autonomy and support nursing leadership development within their teams. The researchers took notes during the sessions and discussed their own reflections afterward, which were summarized in a short report. Finally, they documented the four meetings with action researchers from both wards. The data was stored in a secure research environment to which only the researchers had access.

A prospective comparative pre- and post-study was conducted as method triangulation. At the time of the pre- and post-PAR measurements, all nurses from the two participating teams and the two non-PAR comparison teams were invited to complete a questionnaire. The self-administered questionnaire was designed to assess whether, and to what extent, the nurses themselves perceived their knowledge gains and changes in their leadership behaviour within EBQI.

Composite questionnaire

The composite questionnaire consisted of the Leadership Practice Inventory (LPI), the Evidence Based Practice Questionnaire (EBPQ), and the Dutch General Self-Efficacy Scale (DGSES).

The LPI is a questionnaire based on the research of Kouzes and Posner (2007), who identified five central themes in effective leadership: Model the way, Inspire a shared vision, Challenge the process, Enable others to act, and Encourage the heart [34, 35]. The 30 questions of this self-assessment focus on specific, observable behaviour, rather than personality traits. The scores on a ten-point Likert response scale range from 'almost never' to 'almost always'. The LPI is a reliable and valid instrument that accurately measures the five main practices of effective leadership [36]. The LPI demonstrated acceptable to excellent internal consistency in previous research, with Cronbach's alpha values ranging from 0.75 to 0.90 across subscales and approximately 0.90 for the total scale.

The EBPQ (Upton and Upton, 2006) consists of 24 items spread across the subscales Practice, Attitude and Knowledge/Skills. The scores on a seven-point Likert response scale range from 'almost never' to 'almost always'. This questionnaire is developed and validated to measure the application of Evidence-Based Practice

(EBP) for nurses [37]. The EBPQ showed acceptable to good internal consistency in previous studies ($\alpha=0.79$ – 0.91 across subscales).

The DGSES (Teeuw, Schwarzer and Jerusalem, 1994) is a unidimensional questionnaire with 10 items to assess how individuals generally cope with stressors or difficult life situations ('self-efficacy') as well as adaptation after experiencing all kinds of stressful life events with the aim in mind to predict coping. The criterion validity of the scale is high [38]. The respondent is asked to answer on a four-point response scale from 'completely incorrect' to 'completely correct'. A high score indicates high self-efficacy. The General Self-Efficacy Scale has demonstrated good internal consistency in previous research (Cronbach's $\alpha=0.75$ – 0.91).

Respondents completed the three self-administered questionnaires themselves. Given the exploratory nature of the survey and the limited number of nurses in the four participating wards, no formal sample size calculation was performed. Instead, we aimed to collect questionnaires from as many nurses as possible across all wards, making every effort to maximize the response rate.

Data analysis

The qualitative and quantitative strands were analysed separately, with findings from both strands subsequently integrated during interpretation to identify areas of convergence, complementarity, and divergence. Qualitative data were analysed using Braun and Clarke's thematic analysis [39]. Notes from the inspirational reflective sessions, reflection reports of the professional action researchers, and records of meetings with ward action researchers were systematically reviewed quarterly to identify patterns, themes, and meanings to share with the nursing teams and guide following steps. Subsequently, the professional action researchers conducted a separate thematic analysis of all collected notes from 26 inspirational reflective sessions – 14 sessions in Team A, 12 in Team B and the discussion session - their own reflection reports on each session, and the four meetings with the ward action researchers. The identified themes were largely consistent, and minor differences in interpretation were discussed with the ward action researchers to achieve consensus.

The quantitative data-analysis started with the nurse-respondents' demographic data which were descriptively analysed using frequencies and percentages. EBPQ, LPI and DGSES scores were analysed using mixed model analysis (MMA) in SPSS version 28 [40] in order to compare changes between pre-PAR and post-PAR measurements between the nurses from the participating and the non-PAR comparison wards. The models were corrected for nurses' level of educational training (i.e., vocationally educated nurse or bachelor's degree nurse) and years of nursing experience. A p -value < 0.05 was considered statistically significant. As the purpose of these analyses was to explore patterns and effect sizes rather than to test prespecified hypotheses, no correction for multiple testing was applied.

Hedges' g was calculated to quantify differences in questionnaire scores between pre- and post-PAR measurements for nurses from the participating and non-PAR comparison wards. Hedges' g values of 0.2, 0.5, and 0.8 were interpreted as representing small, medium, and large effects, respectively.

Missing questionnaire items were handled according to the tool use instructions, where available. Total or subscale scores were calculated only if missing items did not exceed the recommended threshold. For subscales with a small number of missing items, the mean of the remaining items was imputed; subscales with excessive missing items were not scored. Because MMA was used, all available questionnaires - including those from respondents who completed only the pre- or post-PAR survey - were included, and missing questionnaires from a respondent at either time point were not imputed. Internal consistency reliability was evaluated at baseline by calculating Cronbach's alpha coefficients for the LPI and EBPQ subscale scores and the DGSES total score. Cronbach's alpha values of $\alpha \geq 0.70$, ≥ 0.80 , and ≥ 0.90 were interpreted as indicating acceptable and good reliability, respectively [41].

Ethical considerations

Ethics approval was obtained from the institutional review board of Gelre Hospitals (approval number 2024.06). All participants provided informed consent prior to their participation in the study.

Results

Characteristics of the participants

Over 60% of nurses on both wards participated in one or more inspirational reflective sessions over the 14-month study period, depending on shift allocation. The number of nurses actively participating ranged from 6 to 12 per session, with an average ward staffing level of approximately 12–14 nurses during the day shift. Each session lasted 35–45 min. Sessions were conducted during working shifts; therefore, participants were occasionally called away to attend to clinical duties before rejoining the session. This did not disrupt the research process, as the professional action researchers - being registered nurses themselves - understood the context and the necessity of these priorities. The ward action researchers proposed the points for dialogue themselves, ensuring that discussions and action plans remained closely aligned with the team and that processes of development and behavioural change continued between the inspirational reflective sessions.

The prospective comparative study included two participating ward teams (with a total of 65 employed nurses at baseline and 58 employed nurses at follow-up) and two non-PAR comparison teams (with a total of 72 employed nurses at baseline and 66 employed nurses at follow-up). A paper version of the questionnaire was deliberately chosen to allow personal handover and maximize the response rate. An administrative employee assigned a unique code to each questionnaire, which only she could link to the individual, enabling pre- and post-PAR responses to be matched. Questionnaires were distributed on all four wards and collected after three weeks. Ward action researchers and team leaders were asked to encourage questionnaire submission.

Across the pre- and post-PAR surveys, the overall questionnaire response rate was 79% among nurses participating in the PAR trajectory and 56% among nurses in the non-PAR comparison teams.

Completion of both pre- and post-PAR questionnaires varied across wards, ranging from 58% to 79%. In the participating wards, 71% of nurses in Ward A and 60% in Ward B completed both questionnaires, while completion in the non-PAR comparison wards was comparable or slightly higher (Ward A: 79%, Ward B: 58%). Nurses who did not complete both questionnaires either left the hospital (4–10 per ward), transferred to another ward (6–10), newly joined the ward (6–15), or were temporarily absent (up to 4).

Table 1 shows the characteristics of the nurses who completed the questionnaires. At baseline, respondents in both groups were predominantly younger than 30 years. At follow-up, there appeared to be an increase in the proportion of respondents under 25 years in the non-PAR comparison wards (36.1% to 46.1%), while this proportion seemed lower in the participating wards (45.0% to 29.8%).

Educational levels were similarly distributed across both groups, with a slight predominance of vocationally educated nurses, reflecting the typical staffing composition of Dutch regional hospitals.

Results PAR process

The approach with PAR led to the development of a customized learning trajectory for each team, incorporating reflection, knowledge development, and enacting nursing leadership behaviours. Team A initially focused on gaining a clearer overview of daily tasks, while Team B sought greater independence from other professionals.

Table 1 Characteristics of respondents in the participating and the non-PAR comparison wards at the baseline (pre-PAR) and the follow-up (post-PAR) measurement

	Baseline				Follow-up			
	Participating wards (n=51)		Non-PAR comparison wards (n=36)		Participating wards (n=47)		Non-PAR comparison wards (n=39)	
	n	%	n	%	n	%	n	%
<i>Age</i>								
< 25 years	23	45.0	13	36.1	14	29.8	18	46.1
25 to 30 years	13	25.5	9	25.0	18	38.3	6	15.4
30 to 40 years	6	11.8	3	8.3	5	10.6	6	15.4
40 to 50 years	6	11.8	6	16.7	4	8.5	4	10.3
> 50 years	3	5.9	5	13.9	6	12.8	5	12.8
<i>Level of education</i>								
vocationally educated nurses	27	52.9	21	58.4	26	55.3	24	61.5
BSN nurses	24	47.1	15	41.6	21	44.7	15	38.5
<i>Years of work experience</i>								
< 5 years	30	58.7	15	41.7	23	48.8	19	48.7
5 to 10 years	7	13.7	10	27.8	10	21.3	9	23.1
10 to 20 years	8	15.7	3	8.3	6	12.8	5	12.8
20 to 30 years	3	5.9	4	11.1	2	4.3	5	12.8
≥ 30 years	3	5.9	4	11.1	6	12.8	1	2.6
<i>Working hours per week</i>								
6 to 20 h	2	3.9	0	0	3	6.4	1	2.6
20 to 32 h	18	35.3	10	27.8	12	25.5	10	25.6
32 to 36 h	31	60.8	26	72.2	32	68.1	28	71.8

Despite early frustration and perceptions that change was impossible, researchers encouraged participants to reflect on how they wished to shape their professional autonomy and to describe a good working life for themselves and others. Over the course of the meetings, it became apparent that the needs of both teams became increasingly aligned. Thematic analysis of the qualitative data yielded four key outcomes: (1) increased professional autonomy; (2) more proactive work practices; (3) enhanced psychological safety; and (4) developing a shared team vision.

Increased professional autonomy

The PAR process on both wards commenced with an introduction to the study and its objectives, followed by a presentation of the Magnet definition of professional autonomy [4]. Nurses were asked to describe their perceptions of professional autonomy, with responses ranging from uncertainty “I wasn’t familiar with the concept” to a clear sense of purpose “I know exactly what I want to achieve in my work”. Several sessions explored how nurses could personally benefit from enhanced professional autonomy, emphasizing that it could empower them to make more confident, collaborative decisions in nursing care. However, participants saw increased professional autonomy, intended to support leadership development within EBQI, as an added burden that could exacerbate workload and limit time for implementation. They also reflected on the recent hospital reorganization, which had already demanded considerable effort. The perceived additional burden and the efforts required for the reorganization led to initial resistance toward participation in the PAR process.

During the first inspirational reflective sessions, nurses’ resistance was addressed, and they were encouraged to articulate their professional values and norms in nursing practice. In a next session, an overview of all stakeholders involved in delivering optimal hospital care was made, with their respective contributions. They discovered that the organization’s management shared similar objectives, which caused their resistance to decrease and offered an opportunity to critically examine their own values and norms in nursing care. The definition

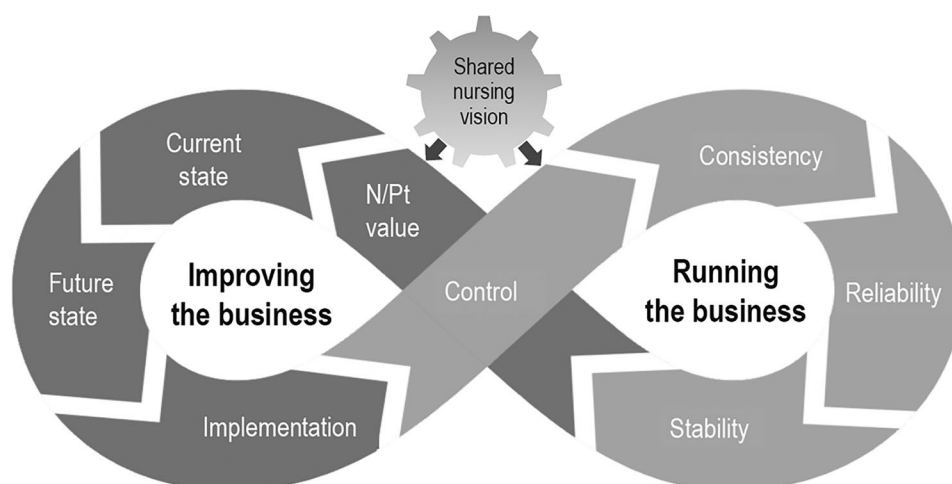
of professional autonomy was frequently displayed during the sessions and connected to the question of what changes nurses would like to implement to optimize their professional autonomy. Reflection on the perceived professional autonomy became a regular practice in the PAR process, both in the inspirational reflection sessions and in daily interactions with colleagues. Nurses increasingly reported that discussing these issues with peers enhanced their ability to exercise professional autonomy in leadership behaviour, not only among themselves but also in decision-making with other healthcare professionals. They felt stronger in standing up for nursing insights, for example during doctor's rounds, and told each other how they did this. Several nurses remarked: "Engaging in these discussions collectively has strengthened my sense of empowerment, enabling me to reflect this in my professional behaviour."

More proactive work practices

The professional action researchers recognized that, at the beginning of a session, nurses needed a brief respite from the daily hustle and bustle and typically began with the engaging question, "How are things here today?" They listened to the answers and created an atmosphere of openness. In response to the reminder of what professional autonomy consists, nurses often complained about being so busy on a day with less control over the execution of their work. Every time they believed their work was nearly complete, unexpected issues arose. Although they attempted to finish their tasks, they often felt dejected, knowing that the following day would present the same challenges. Overall, they worked predominantly reactively, focused on 'running the business'. Participants reported beginning their shifts by reviewing patient files approximately half an hour in advance, followed by the preparation of a to-do list for the day. They described experiencing relief upon completing the items on the list and deliberately avoided taking on extra tasks. However, tasks were frequently adjusted, and new assignments were introduced throughout the day, "which led me to lose control of my schedule and I had to seek assistance from colleagues." Both action researchers from Ward A concluded that the existing working method was primarily reactive and, as a result, unwieldy. A professional action researcher (RdH) developed a lemniscate model based on management philosophy [42, 43], which was presented in several sessions and widely adopted for reflecting on personal professional behaviour (Fig. 3).

The figure illustrates a continuous process between two interconnected, sometimes contrasting poles. The right pole represents "running the business," focusing on consistency, reliability, and stability, whereas the left pole reflects "improving the business," rooted in the values of nurses and patients. Nurses recognized that they mainly operated within the 'running the business' loop, leaving limited time for innovation. Discussions in the sessions focused on working more proactively, identifying moments for innovation, and applying behavioural changes in practice. A nurse reported that, supported by the learning process, she shared knowledge she would not normally

Fig. 3 The closely linked processes of running and improving the business, guided by a shared nursing vision. (N/Pt value: Nurse/Patient value)



have raised: “The bandage material used for one patient was inadequate, but having read about a new product, I was able to suggest it to the doctor, and we successfully applied it.” The lemniscate model was also recognized on Ward B. With a clearer understanding of the model’s left and right loops, the team reflected on the sense of recognition and the flow it facilitated. During the inspirational reflective sessions, the nurses discussed how transformational leadership might align with the lemniscate. They concluded that transformational leadership primarily influences the left side of the figure and that, consequently, they lacked sufficient time to engage in it.

Then, the researchers introduced the concept of ambidextrous leadership. They asked if this description of leadership would be a more fitting concept to align with the processes of “running the business” and “innovation” described as the poles of the lemniscate model. Ambidextrous leadership, literally meaning “two right hands,” refers to a leader’s capacity to simultaneously engage in two seemingly contradictory activities: exploration (innovating, experimenting, and exploring new possibilities) and exploitation (optimizing existing processes, improving efficiency, and leveraging current successes). Both concepts are related in the context of nursing leadership development, as transformational leadership provides the vision and motivation for innovation, while ambidextrous leadership captures the practical balance between innovation and efficiency [44]. The proposal was positively received, as the concept of ambidextrous leadership resonated with nurses’ experiences of balancing professional and managerial roles.

The process of collectively discovering and implementing more proactive approaches resulted in a new workflow within the nursing teams. Participants explored ways to work more proactively: “Shortly after admission, I updated the electronic patient record until discharge, allowing us to order the infrequently used cannulas for this gentleman in a timely manner. Otherwise, that would have cost me many phone calls and time.” One concern about more proactive approaches to work was that nurses feared freed-up time could lead to staff reductions. Consequently, the professional action researchers asked both teams to explore how this time could be used to foster innovations in nursing care. This discussion generated numerous ideas and led to the implementation of small, concrete initiatives, such as proactively seeking evidence and deliberately pursuing learning opportunities with more experienced colleagues. These initiatives also enhanced nurses’ conceptual understanding of the ways in which professional autonomy contributes to nursing leadership development.

Enhanced psychological safety

The third outcome was nurses’ psychological safety, a key prerequisite for professional autonomy and related to performance and well-being [11]. An action researcher from Ward A noted that it had long been a priority due to the ward’s hectic pace, and could partly explain nurses’ reactive working style. This reflection arose from a case discussed during an inspirational reflective session, in which a patient did not receive parenteral nutrition as physicians deferred intervention and nurses avoided confrontation. Drawing on theory [45], PAR participants explored how reduced mutual trust undermines psychological safety - feeling safe to speak up, seek help, and admit errors - and ways to better support one another.

During the PAR learning trajectory, it became evident that nurses across both wards predominantly held a fixed professional orientation, seeing nursing primarily as “bedside” or hands-on care. While some nurses did engage in reviewing evidence and updating protocols, these activities were generally performed only when time permitted or outside of regular working hours. Even after multiple PAR sessions, including one that linked a serious clinical case to professional autonomy, nurses commented that it was good the session had ended so they could “get back to work.” This response underscores a focus on task completion and suggests limited awareness of the shared, rigid underlying work philosophy. They often experienced reduced psychological safety when working on innovation issues and withheld their ideas. Moreover, nurses wishing to contribute more actively to innovation usually said they were “temporarily off work” to update protocols or gather evidence. Notably, participants were actively encouraged to check for new evidence: “I can give my opinion now and it makes me so happy”.

Unfortunately, new team members were expected to first conform to established team practices before being permitted to propose new ideas. Both team leaders confirmed this expectation, noting that “this process takes

around half a year to a year.” It was assumed that when a team member fails to identify with the team’s defence mechanisms psychological safety is at stake. An individual remains marginalized within the group and is more likely to exit the team [46]. During the sessions, the nurses explored how this expectation relates to ‘running the business’ and how it affects a nursing team’s capacity for innovation. While nurses acknowledged this as a novel insight, they were not yet prepared to abandon this underlying assumption.

Developing a shared team vision

To strengthen professional autonomy and to support individual nursing leadership development, a shared team vision is essential, as it provides guidance regarding priorities and future direction [47], as reflected in Fig. 3. One nursing team possessed a written vision statement, although its location was unclear, while the other team was uncertain whether such a statement had been formally developed. In the absence of unit-specific visions, both teams referred to the hospital’s overarching vision statement, which is publicly available on the organization’s website. Despite the theoretical input and multiple examples of some ward vision statements presented, nurses found it difficult to contribute ideas for developing such a vision. Nevertheless, a shared team vision is widely recognized as important for guiding the delivery of high-quality nursing care. Although efforts were made to develop a vision document between inspirational reflective sessions, these attempts were frequently discontinued due to perceived workload pressures and limited time.

One successful outcome of working toward a shared nursing vision was the teams’ mutual commitment to ensuring systematic nursing input during physicians’ rounds. This approach aimed to highlight not only physical care but also psychosocial aspects and family involvement. Nurses reported that critical information about a patient’s overall well-being or psychosocial concerns was not always adequately considered in medical decision-making. In response, nurses from both teams collaboratively developed a standardized electronic patient record format to ensure consistent nursing input during ward rounds, reflecting and supporting the shared nursing vision. Gradually, the ward action researchers took over the role of the professional researchers, and the format has been integrated into the electronic system.

Results prospective comparative study

Cronbach’s alpha coefficients demonstrated acceptable to good internal consistency across all questionnaire domains in this study, with values ranging from 0.72 to 0.89, see Table 2.

Compared with both non-PAR comparison groups, nurses in the participating wards showed significant pre–post improvements in professional leadership, EBQI-related attitudes and skills, and self-efficacy. Figures 4, 5 and 6 present the changes in questionnaire domain scores between the pre- and post-PAR surveys.

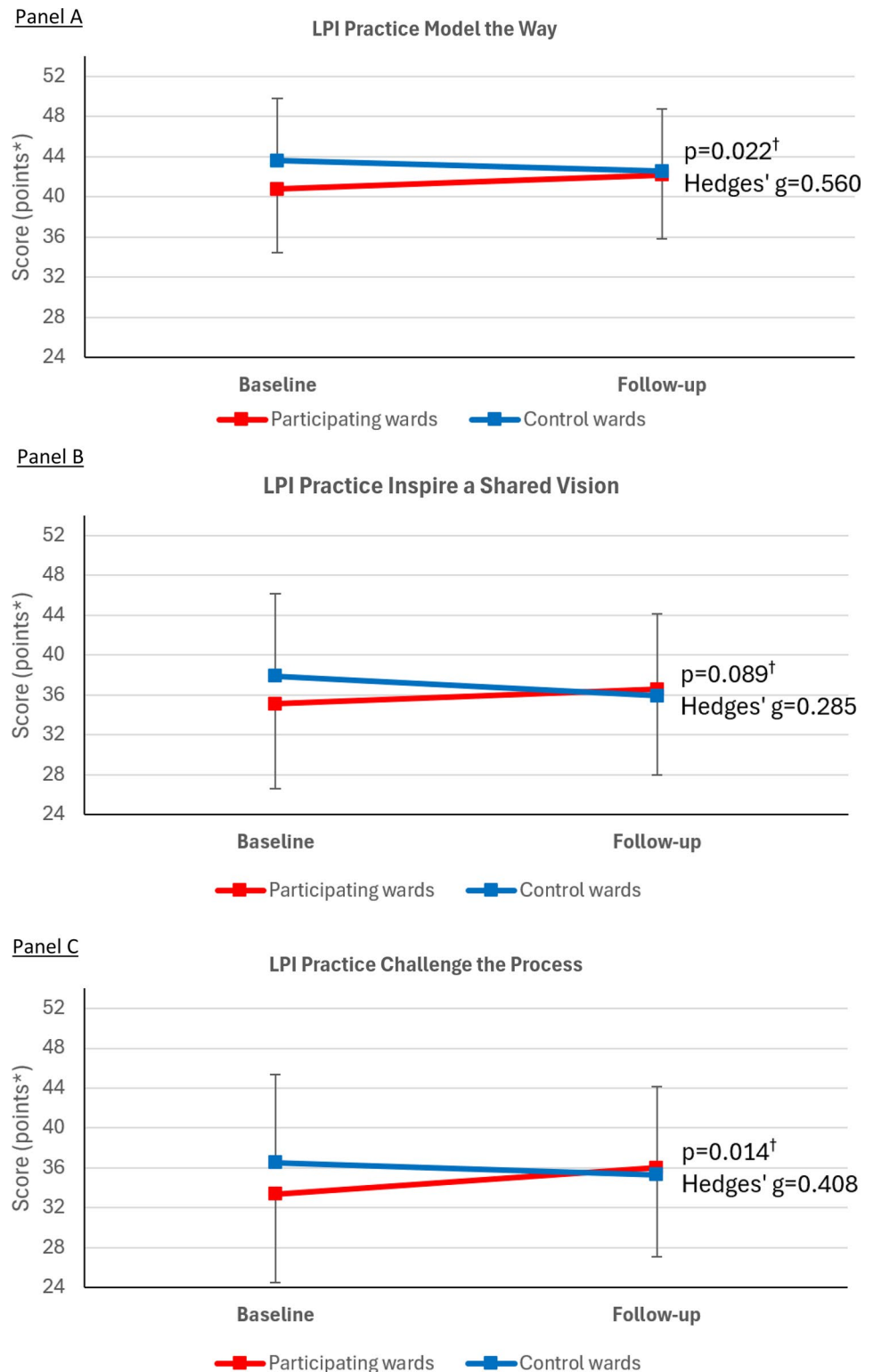
Regarding the LPI (Fig. 4), both groups scored lowest on the ‘Challenge the Process’ and ‘Inspire a Shared Vision’ domains, while the other three domains scored at least four points higher. After one year, nurses on

Table 2 Calculation of internal consistency for the questionnaire subscales ($n = 87$ nurses)

Questionnaire (domain)	Cronbach’s alpha	Interpretation
LPI Model the way	0.74	Acceptable internal consistency
LPI Inspire a Shared Vision	0.85	Good internal consistency
LPI Challenge the Process	0.84	Good internal consistency
LPI Enable Others to Act	0.78	Acceptable internal consistency
LPI Encourage the Heart	0.78	Acceptable internal consistency
EBPQ Practice/Use	0.86	Good internal consistency
EBPQ Attitudes	0.72	Acceptable internal consistency
EBPQ Knowledge/Skills	0.89	Good internal consistency
EBPQ Total Score	0.82	Good internal consistency
DGSES	0.75	Acceptable internal consistency

LPI: Leadership Practice Inventory; EBPQ: Evidence Based Practice Questionnaire; DGSES: Dutch General Self-Efficacy Scale

Fig. 4 Pre- and post-PAR scores on LPI for the Model the Way (panel A), Inspire a Shared Vision (panel B), Challenge the Process (panel C), Enable Others to Act (panel D), and Encourage the Heart (panel E) practice scores for nurses from the participating wards and the non-PAR comparison wards. LPI: Leadership Practice Inventory. † from mixed model analysis, taking clustering of nurses within wards and wards within study group (i.e., PAR and non-PAR comparison groups) into account, and adjusted for level of vocationally educated training and years of work experience. * the score on the LPI instrument subscales ranges from 6 to 60 points. Error bars are standard deviations



the participating wards showed statistically significant improvements in the 'Model the Way' (Fig. 4, Panel A, p -value=0.022; Hedges' g =0.560) and 'Challenge the Process' (Fig. 4, Panel C, p -value=0.014; Hedges' g =0.408) domains, a positive but non-significant trend (Fig. 4, Panel B, p -value=0.089; Hedges' g =0.285) in the

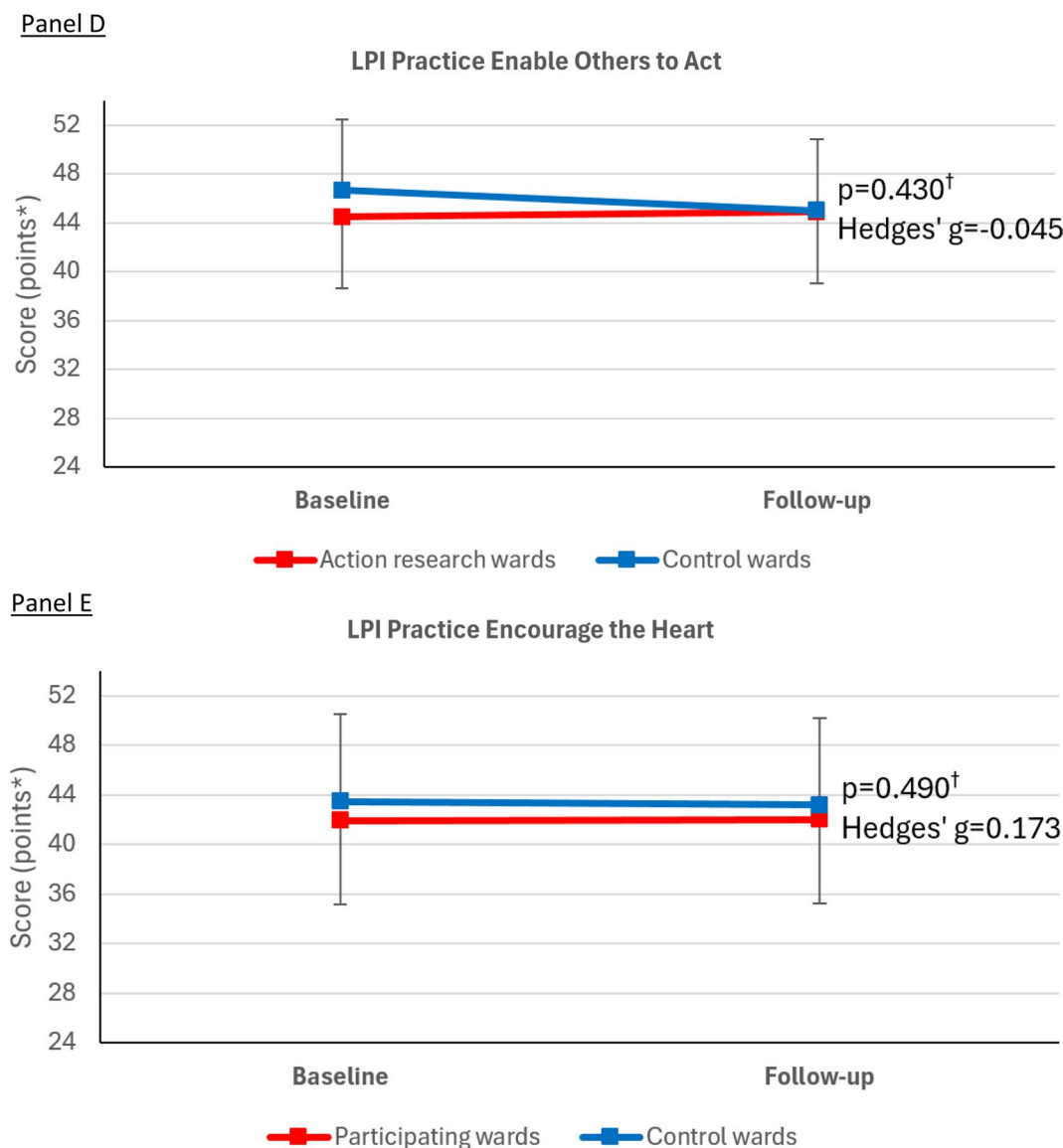
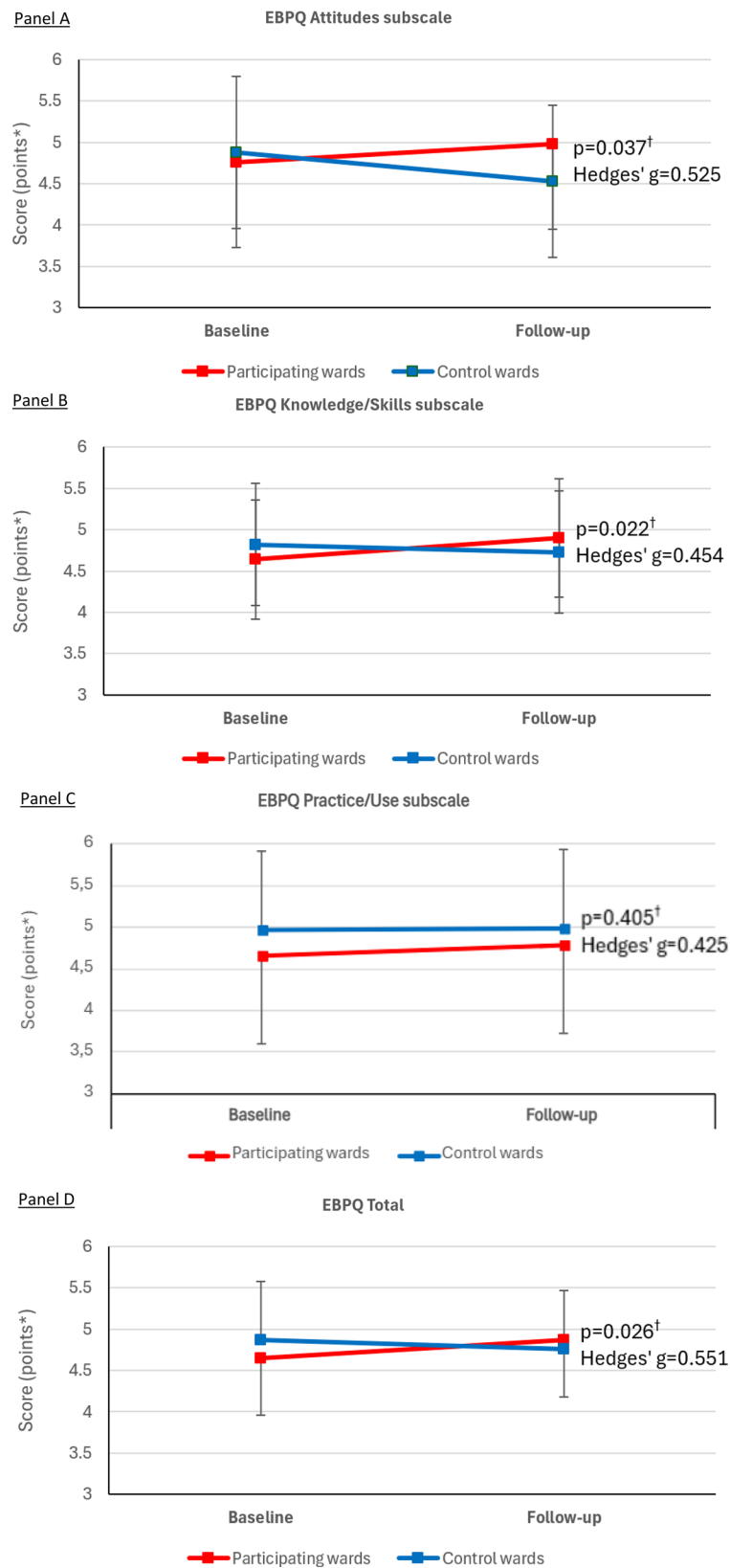


Fig. 4 (continued)

‘Inspire a Shared Vision’ domain, and no changes in the ‘Enable Others to Act’ (Fig. 4, Panel D, p -value=0.430; Hedges’ g = -0.045) and ‘Encourage the Heart’ (Fig. 4, Panel E, p -value=0.490; Hedges’ g = 0.173) domains.

At follow-up, nurses on the participating wards showed a more positive attitude toward EBP and reported greater knowledge and skills than those on the non-PAR comparison wards. This was reflected in statistically significant increases in the EBPQ Attitudes (Fig. 5, Panel A; p -value=0.037; Hedges’ g = 0.525) and Knowledge/Skills (Fig. 5, Panel B; p -value=0.022; Hedges’ g = 0.454) subscale scores, also resulting in a higher total EBPQ score (Fig. 5, Panel D; p -value=0.026; Hedges’ g = 0.551). However, these gains in attitude and perceived competence were not accompanied by greater actual EBP use. The EBPQ Practice/Use subscale (Fig. 5, Panel C) showed a medium-sized effect (Hedges’ g = 0.425); however, this effect did not reach statistical significance (p = 0.405).

Fig. 5 Pre- and post-PAR scores on the EBPQ for the Attitude subscale (panel **A**), Knowledge/Skills subscale (panel **B**), Practice/Use subscale (panel **C**), and total score (panel **D**) for nurses from the participating wards and the non-PAR comparison wards. EBPQ: Evidence Based Practice Questionnaire; PAR: Participatory Action Research. † from mixed model analysis, taking clustering of nurses within wards and wards within study group (i.e., participating or non-PAR comparison) into account, and adjusted for level of education and years of work experience. * the score on the EBPQ instrument and its subscales ranges from 1 to 7 points. Error bars are standard deviations



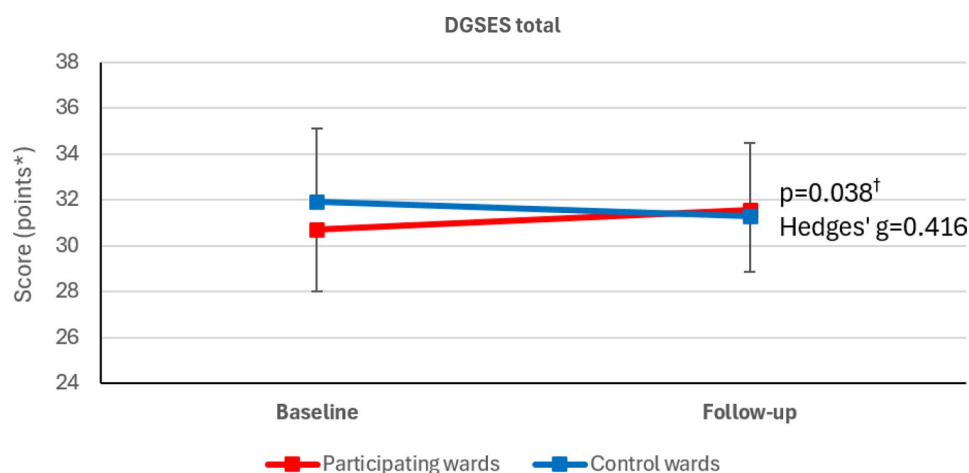


Fig. 6 Pre- and post-PAR scores on the DGSES for nurses from the participating wards and the non-PAR comparison wards. DGSES: Dutch General Self-Efficacy Scale; PAR: Participatory Action Research. † from mixed model analysis, taking clustering of nurses within wards and wards within study group (i.e., action research or non-PAR comparison) into account, and adjusted for level of education and years of work experience. * the score on the DGSES instrument ranges from 10 to 40 points. Error bars are standard deviations. Although nurses on the participating wards started with lower baseline DGSES scores, their self-efficacy had increased after one year, while it slightly decreased in the nurses from the non-PAR comparison wards (Fig. 6, p-value=0.038; Hedges' $g=0.416$)

Discussion

This study aimed to evaluate and examine how a participatory learning trajectory influences hospital nurses' professional autonomy and nursing leadership development within EBQI practice in a participatory learning trajectory. An additional aim was to triangulate the method and examine changes in attitudes toward EBP, nursing leadership, and self-efficacy, compared with nurses on the non-PAR comparison wards. Data from both the PAR process and the prospective comparative study were complementary, enabling methodological triangulation that enhanced the validity and reliability of the study findings. The unique contribution of this study is that the concept of nurses' professional autonomy is a developmental capacity and has been linked to ward level nursing leadership development within EBQI. Professional autonomy, one of the concepts of Magnet hospitals [4, 5], has again been shown to be an essential cornerstone for leadership development in nursing. Hospital nurses demonstrated that they are able to strengthen their professional autonomy in a learning process using the PAR method and an appreciative approach. These results showed that nurses, inspired by facilitation and coaching by professional action researchers in a collaborative learning process, are able to strengthen their own professional autonomy. This sheds new light on theories that posit that the development of nurses' professional autonomy should primarily be supported by management measures [3, 47]. Triangulation of the method in the prospective comparative study confirmed that participating nurses' attitudes towards EBP, leadership and self-efficacy changed significantly positively on several aspects.

The mechanisms underlying the strengthening of hospital nurses' professional autonomy, supporting their nursing leadership development within EBQI, are grounded in the principles of PAR and the appreciative approach. The PAR method provides the freedom to align with the contextual needs and, in close collaboration, to sustainably change them. The PAR process used in this study involved three iterative steps: reflection, generating actionable knowledge, and practicing new behaviour [29].

Reflection

The PAR process started with awareness of what could be changed in growing and using these nurses' professional autonomy and how to manage those change goals. Starting point in the method is a shared responsibility to work together with stakeholders to sustainably transform a situation that needs to be improved. Study participants were eager to improve their professional autonomy for optimal care results and job satisfaction. The appreciative approach supported the formulation of achievable goals for a stronger commitment to professional autonomy in the often complex contexts of diverse interests and interprofessional collaboration. The prevailing theme in the critical dialogues in the inspirational reflective sessions was that nurses felt responsible for 'running the business', the nursing care for patients on their ward, which hardly allowed their leadership in innovation processes to take shape.

Actionable knowledge

Together with the professional researchers, the ward action researchers, and the team members is sought knowledge that the participants themselves could use to take action and change the situation. The Self-Determination Theory (Fig. 1) provided insight into how experiencing autonomy contributes to individuals' intrinsic motivation and supports optimal behaviour [11]. The presented lemniscate of interrelated processes that have to be managed (Fig. 3) provided a conceptual framework for reflection on what was going on in practice. Nurses recognized their efforts 'to running the business' in the right loop, forgetting the left loop of important improvement and innovation in their nursing care. Theory about exploitation and exploration inspired them to increase their professional autonomy, perceive a higher level of psychological safety [45] and work more proactive [49]. In reaction of emphasis placed on 'running the business' an alternative was found for transformational leadership in EBQI. The lemniscate prompted the introduction of ambidextrous leadership [43]. Nurses felt more recognized in this approach and felt empowered to explore potential innovations for improving the quality of care, both nursing and patient outcomes. In addition to theoretical knowledge, recent practical cases were also presented, usually by the ward action researchers, and learned from.

Practicing new behaviours

The overall result in this study is that nurses were motivated to practice new behaviours, as mentioned as a result of the PAR learning processes. Participants indicated that discussing their own professional values, team values, and practicing new behaviours contributed to their perceived psychological safety. This paved the way for developing a shared nursing vision for their ward. A shared team vision allows nurses to practice professional autonomy in their nursing leadership in EBQI and provides them with a framework for reflection on team collaboration in addition to the applicable professional standards [24].

The findings in the prospective pre-post comparative study indicate that the PAR approach contributed to significant positive changes across several dimensions of nurses' professional leadership development. Compared with the non-PAR comparison wards, nurses from the participating wards demonstrated modest improvements in EBP-related knowledge and skills, as well as increased self-efficacy. Notably, specific leadership competencies, particularly role modelling, and actively seeking opportunities for improvement also showed marked advancement, suggesting that the PAR approach effectively supported the development of practical leadership behaviours. As both vocationally educated nurses and bachelor's degree nurses functioned as a single team, the observed minor differences in outcomes are likely attributable to the prevailing work culture rather than educational level. Despite the observed willingness and confidence to apply EBP, actual changes in behaviour were not measured, indicating the need for additional education and strategies.

The four key outcomes in the PAR research are context-specific and, therefore, not generalizable. Nevertheless, the findings may be transferable, as similar themes have been recognized in other wards within our hospital and

in other hospitals in the region. In addition, all four outcomes are reflected in recent literature, although the combination of the four concepts has not been specifically addressed. Although attitudes toward EBP and perceived competence improved, perceived EBP utilization did not show a statistically significant change. However, the EBPQ Practice/Use subscale demonstrated a medium-sized effect ($g=0.425$), suggesting a potentially meaningful change that may not have reached statistical significance due to the limited sample size and statistical power. The finding suggests that, although PAR may enhance nurses' willingness and confidence to apply EBP, these gains did not appear to translate into measurable behavioural change in everyday practice. Therefore, additional strategies beyond PAR may be necessary to facilitate the successful implementation of EBP in clinical settings.

Strengths and limitations

This study provides innovative findings that encourage the use of PAR to promote professional autonomy as a foundation for nursing leadership within EBQI. The findings in the PAR process are context-specific and not statistically generalizable; however, they may be transferable to similar settings, as comparable themes have been identified in other wards and regional hospitals. Both the qualitative and quantitative research data were small-scale and context-bound, but the results offer insights into processes and mechanisms that may be relevant across comparable contexts.

To enhance credibility through triangulation, three questionnaires (LPI, EBPQ, and DGSES) were used to capture changes in participants' perceptions of nursing leadership. Although the Dempster Practice Behavior Scale (DPBS), which measures perceived professional autonomy, could have been included [50], it was excluded due to the study's focus on nursing leadership development within EBQI rather than autonomy itself. Additionally, its 30 items were considered less sensitive to changes in leadership behaviour. Future research may examine the relationship between DPBS scores and the development of professional autonomy in strengthening nursing leadership within EBQI.

A limitation in the prospective pre-post comparative study was the lower response rate in the non-PAR comparison wards, which may have led to an underestimation of group differences, as less engaged nurses may have been less likely to respond. However, this assumption could not be verified, as no non-responder analysis was conducted. Staff turnover meant that not all nurses completed both pre- and post-PAR questionnaires. To address this, Mixed Model Analysis was applied, including all available data and adjusting for differences in education and work experience due to staff changes. The reasons for non-response are unknown.

All procedures followed relevant guidelines and regulations, and informed consent was obtained. Findings were largely consistent; minor differences in interpretation were resolved through discussion, though inter-rater reliability was not calculated. Credibility was supported by presenting results to researchers and participants, who confirmed their relevance. Reflexivity was maintained through critical reflection and analytic dialogue, and transparency was ensured through researcher triangulation and an audit trail. Taken together, these strategies strengthened methodological rigor and supported a systematic analytic process to minimize bias.

Rigour and transparency were strengthened using the 17-item QuARC checklist [32], which guided the design, process, and reporting across four domains: context, relationships, action research processes, and research and action outcomes. Early in the project, high workload and ward reorganization created unrest. The findings highlight that engagement, trust, and team development were essential for participatory learning. Active involvement fostered shared ownership, while trust enabled open dialogue and reflection, underscoring the importance of relational quality as a key mechanism in participatory learning. A strength of this study is that the mixed-model analysis accounted for educational level before drawing conclusions. However, transferability may be limited by the Dutch nursing context, where vocationally and bachelor-educated nurses work together in teams with a different skill mix than in other countries.

Conclusions

Professional autonomy continues to be recognized as a fundamental pillar of effective leadership in hospital wards. This study demonstrates that PAR is an effective and supportive approach for strengthening professional autonomy and nursing leadership development within EBQI practice. Key mechanisms underlying these changes included ward-based learning, reflection, the collection of actionable theory, and the collective practice of behaviour change. This learning process fostered intrinsic motivation and engagement, contributing to enhanced performance and well-being within participating nursing teams. The prospective comparative study demonstrated statistically significant improvements in nurses' attitudes toward EBP, nursing leadership, and self-efficacy. Nevertheless, both participating and non-PAR comparison teams reported only modest behavioural changes. Sustaining these gains in professional autonomy and leadership development will require additional interventions, including the provision of dedicated time and space to support both the exploitation of existing practices and the exploration of innovative approaches in nursing quality improvement.

Implications for practice and further research

Leadership development should be incorporated and embedded in daily clinical practice through structured action-reflection cycles, rather than relying solely on external training initiatives. This can be achieved by embedding it into existing human resource and work processes, such as linking leadership competencies to performance evaluations, using mentoring or coaching relationships, and providing stretch assignments within regular job roles. In this way, leadership development becomes an integrated part of daily work rather than a separate activity.

PAR plays a crucial role in creating relational conditions characterized by trust, commitment, and team development. These are essential for fostering participatory learning and achieving sustainable change. Organizational support, including dedicated time, expert guidance, and continued management involvement, is crucial to enable meaningful participation in ward based learning and ensure long-lasting impact.

This study contributes to theory development by reaffirming that professional autonomy is a fundamental pillar of effective leadership in hospital wards. The PAR method was identified as an effective approach for facilitating ward-based learning. Additionally, the lemniscate model (Fig. 3) provides novel insights into daily ward processes and warrants further elaboration and refinement to support the strengthening of professional autonomy in nursing leadership development, guiding both exploitation and exploration processes to improve nursing practice and patient outcomes.

We recommend extending this current study to strengthen nurses' professional autonomy in nursing leadership development to confirm the promising results and continue positive practice development. In future research, measuring professional autonomy as a distinct construct may be interesting, as this may provide valuable insight into the processes underlying nursing leadership development. Accordingly, future studies should aim to examine whether PAR-based learning programs designed to support hospital nurses' leadership development are associated with measurable improvements in care quality and patient outcomes.

Abbreviations

EBQI	Evidence-Based Quality Improvement
PAR	Participatory Action Research
ANCC	American Nurses Credentialing Center
SDT	Self-Determination Theory
QuARC	Quality Action Research Checklist
LPI	Leadership Practice Inventory
EBPQ	Evidence Based Practice Questionnaire
EBP	Evidence-Based Practice

DGSES Dutch General Self-Efficacy Scale
MMA Mixed Model Analysis
SPSS Statistical Package for the Social Sciences
DPBS Dempster Practice Behavior Scale

Acknowledgements We would like to thank the nursing teams of the participating hospital wards, and specifically the four PAR-trained nurses who contributed to the daily support of participants in the learning trajectory.

Author contributions RdH: Conceptualization and design, methodology, data collection, data analysis, writing. MW: Data collection, data analysis, writing. TS: Data analysis, writing, supervision. AB: Conceptualization and design, data collection, data analysis, writing. All authors: Final approval and agreement to be accountable for all aspects of the work.

Funding This paper is part of the ARMICA project, which focuses on strengthening professional autonomy of hospital nurses in Evidence Based Quality Improvement. The ARMICA project is funded by the Dutch Organisation for Health Research and Development (ZonMw), (dossier no. 10040022230007).

Data availability The data is not publicly available due to privacy or ethical restrictions. The datasets used and analysed are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate The study was conducted in accordance with the Declaration of Helsinki and ethics approval was obtained from the institutional review board of Gelre Hospitals (approval number 2024.06). All methods were carried out in accordance with relevant guidelines and regulations and informed consent was obtained from all the participants.

Consent for publication Not applicable.

Competing interests The authors declare no competing interests.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

References

1. Zhang Y, Greenway K, Sutherland S, Aveyard H, Strickland L, Stayt L. Autonomy in Contemporary Nursing Practice: A Principle-Based Concept Analysis. *Nurs Forum*. 2025;1:9966610. <https://doi.org/10.1155/nuf/9966610>.
2. Pursio K, Kankkunen P, Sanner-Stiehr E, Kvist T. Professional autonomy in nursing: an integrative review. *J Nurs Manag*. 2021;29(6):1566–77. <https://doi.org/10.1111/jonm.13282>.
3. Pursio K, Kankkunen P, Mikkonen S, Kvist T. Organizational characteristics of nursing practice environments related to registered nurses' professional autonomy and job satisfaction in two Finnish Magnet-aspiring hospitals: structural equation modeling study. *BMC Nurs*. 2024;23:100. <https://doi.org/10.1186/s12912-024-01772-9>.
4. Magnet model, creating a magnet culture. <https://www.nursingworld.org/organizational-programs/magnet/magnet-model/>. Assessed 10 December 2025.
5. Anderson VL, Johnston ANB, Massey D, Bamford-Wade A. Impact of MAGNET hospital designation on nursing culture: An integrative review. *Contemp Nurse*. 2018;54(4–5):483–510. <https://doi.org/10.1080/10376178.2018.1507677>.
6. Yu SY, Yuk S. The effect of professional autonomy and nursing work environment on nurses' patient safety activities: a perspective on Magnet Hospitals. *J Nurs Manag*. 2023;1–9. <https://doi.org/10.1155/2023/5587501>.

7. Both-Nwabuwe JM, Lips-Wiersma M, Dijkstra MT, Beersma B. Understanding the autonomy-meaningful work relationship in nursing: A theoretical framework. *Nurs Outlook*. 2020;68(1):104–13. <https://doi.org/10.1016/j.outlook.2019.05.008>.
8. Rouhi-Balasi L, Elahi N, Ebadi A, Jahani S, Hazrati M. Professional autonomy of nurses: a qualitative meta-synthesis study. *Iran J Nurs Midwifery Res*. 2020;25(4):273–81. https://doi.org/10.4103/ijnmr.IJNMR_213_19.
9. Oshodi TO, Bruneau B, Crockett R, Kinchington F, Nayar S, West E. Registered nurses' perceptions and experiences of autonomy: a descriptive phenomenological study. *BMC Nurs*. 2019;1:18–51. <https://doi.org/10.1186/s12912-019-0378-3>.
10. Pursio K, Kankkunen P, Kvist T. Professional autonomy among registered nurses—Validation of the translation of the Dempster Practice Behaviour Scale and survey results. *Nurs Open*. 2024;11(5):e2185. <https://doi.org/10.1002/nop2.2185>.
11. Ryan RM, Deci EL. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *Am Psychol*. 2000;5(1):68.
12. Giesen J, Berings M, Bakker-Jacobs A, Vermeulen H, Huisman-De Waal G, Van Vught A. Facilitating an Evidence-Based Quality Improvement learning culture in nursing teams through coaching and identification of key influencing factors: An action research approach. *J Adv Nurs*. 2024;81(11):7802–19. <https://doi.org/10.1111/jan.16679>.
13. Cummings GG, Tate K, Lee S, Wong CA, Paananen T, Micaroni SP, Chatterjee GE. Leadership styles and outcome patterns for the nursing workforce and work environment: a systematic review. *Int J Nurs Stud*. 2018;85:19–60. <https://doi.org/10.1016/j.ijnurstu.2018.04.016>.
14. Cummings GG, Lee S, Tate K, Penconek T, Micaroni SP, Paananen T, et al. The essentials of nursing leadership: a systematic review of factors and educational interventions influencing nursing leadership. *Int J Nurs Stud*. 2021;115:103842. <https://doi.org/10.1016/j.ijnurstu.2020.103842>.
15. Kowalski MO, Basile C, Bersick E, Cole DA, McClure DE, Weaver SH. What do nurses need to practice effectively in the hospital environment? An integrative review with implications for nurse leaders. *Worldviews Evid Based Nurs*. 2019;17(1):60–70. <https://doi.org/10.1111/wvn.12401>.
16. Gottlieb LN, Gottlieb B, Bitzas V. Creating empowering conditions for nurses with workplace autonomy and agency: How healthcare leaders could be guided by strengths-based nursing and healthcare leadership (SBNH-L). *J Health Leadersh*. 2021;169–81. <https://doi.org/10.2147/JHL.S221141>.
17. Soares SGA, Camponogara S, Vargas MAO. What is said and unspoken about the autonomy of a nurse: (Dis)continuity in discourses. *Revista Brasileira Enfermagem*. 2020;73(6):1–8. <https://doi.org/10.1590/0034-7167-2019-0401>.
18. Wu Y, Awang SR, Ahmad T, You C. A systematic review of leadership styles in healthcare sector: insights and future directions. *Geriatr Nurs*. 2024;59:48–59. <https://doi.org/10.1016/j.gerinurse.2024.06.033>.
19. De Kok E, Weggelaar-Jansen AM, Schoonhoven L, Lalleman P. A scoping review of rebel nurse leadership: descriptions, competences and stimulating/hindering factors. *J Clin Nurs*. 2021;30(17–18):2563–83. <https://doi.org/10.1111/jocn.15765>.
20. Bailey KD, Cardin S. Engagement in nursing: one organization's success. *Nurs Adm Q*. 2018;42(3):223–30. <https://doi.org/10.1097/NAQ.0000000000000296>.
21. Labrague LJ, McEnroe-Petitte DM, Tsaras K. Predictors and outcomes of nurse professional autonomy: A cross-sectional study. *Int J Nurs Pract*. 2019;25(1):e12711. <https://doi.org/10.1111/ijn.12711>.
22. Collins E, Owen P, Digan J, Dunn F. Applying transformational leadership in nursing practice. *Nurs Stand*. 2020;35(5):59–66. <https://doi.org/10.7748/ns.2019.e11408>.
23. Giddens J. Transformational leadership: What every nursing dean should know. *J Prof Nurs*. 2018;34(2):117–21. <https://doi.org/10.1016/j.profnurs.2017.10.004>.
24. Chai DS, Hwang SJ, Joo BK. Transformational leadership and organizational commitment in teams: the mediating roles of shared vision and team-goal commitment. *PIQ*. 2017;30(2):137–58. <https://doi.org/10.1002/piq.21244>.
25. Shirey MR. Self-efficacy and the nurse leader. *Nurse Lead*. 2020;18(4):339–. <https://doi.org/10.1016/j.mnl.2020.05.001>. 43.
26. Lartey SA, Montgomery CL, Olson JK, Cummings GG. Leadership self-efficacy and nurses' aspiration to leadership: an evolutionary concept analysis. *Int J Nurs Stud*. 2023;143. <https://doi.org/10.1016/j.ijnurstu.2023.104496>.
27. Deci EL, Ryan RM. The importance of universal psychological needs for understanding motivation in the workplace. *The Oxford handbook of work engagement, motivation, and self-determination theory*. 2014;13:13–32.
28. To ML, Tse HHM, Ashkanasy NM. A multilevel model of transformational leadership, affect, and creative process behavior in work teams. *Leadersh Q*. 2015;26:543–56. <https://doi.org/10.1016/j.leaqua.2015.05.005>.
29. Van Lieshout F, Jacobs G, Cardiff S. Actieonderzoek: Principes en methoden voor participatief veranderen. [Action Research: Principles and methods for participatory transformation]. Second ed. Koninklijke van Gorcum BV; 2021.
30. Bradbury H, Divecha S. Action methods for faster transformation: Relationality in action. *Action Res*. 2020;18(3):273–81. <https://doi.org/10.1177/1476750320936493>.
31. Masselink R, De Haan J, Hugenholtz N, Van Rossum M, Schwippert RP. Veranderen met appreciative inquiry: Waarderend actieonderzoek in de praktijk. [Changing with Appreciative Inquiry: Appreciative Action Research in Practice]. Boom; 2020.

32. Casey M, Coghlan D, Carroll Á, Stokes D. Introducing a tool for theory development in action research: a challenge and a resource for nursing research. *Int J Nurs Stud Adv*. 2025;100357. <https://doi.org/10.1016/j.ijnnsa.2025.100357>.
33. Denzin NK. Triangulation 2.0. *J Mix Methods Res*. 2012;6(2):80–. <https://doi.org/10.1177/1558689812437186>. 6.
34. Kouzes JM, Posner BZ. The five practices of exemplary leadership. Jossey-Bass Read educational Leadersh. 2007;63–74.
35. Plas M, Crijns M. Vakinhoudelijk leiderschap en de LPI. [Vocational leadership and the LPI.] *NTvEBP*. 2010;3:20–2.
36. Posner BZ. Investigating the reliability and validity of the Leadership Practices Inventory®. *Admin Sci*. 2016;6(4):17. <https://doi.org/10.3390/admsci6040017>.
37. Upton D, Upton P. Development of an evidence-based practice questionnaire for nurses. *J Adv Nurs*. 2006;53:454–8.
38. Teeuw B, Schwarzer R, Jerusalem M. Dutch adaptation of the general self-efficacy scale. 1994. <https://userpage.fu-berlin.de/~health/dutch.htm>. Accessed 6 October 2025.
39. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol*. 2006;3(2):77–101. <https://doi.org/10.1191/1478088706qp063oa>.
40. IBM SPSS. Statistics. Version 28. IBM Corp.; Armonk, NY, USA.
41. Hair JF, Black WC, Babin BJ, Anderson RE. Multivariate data analysis. 8th ed. Cengage Learning; 2019.
42. Niewöhner N, Asmar L, Wortmann F, Röltgen D, Kühn A, Dumitrescu R. Design fields of agile innovation management in small and medium sized enterprises. *Procedia CIRP*. 2019;84:826–31. <https://doi.org/10.1016/j.procir.2019.04.295>.
43. Keller T, Weibler J. What it takes and costs to be an ambidextrous manager: linking leadership and cognitive strain to balancing exploration and exploitation. *J Leadersh Organ Stud*. 2015;22(1):54–71. <https://doi.org/10.1177/1548051814524598>.
44. Chang YY, Chapman G, Hughes P, Chang CY. Individual ambidexterity, relational context and academic entrepreneurship performance: too much of a good thing? *Br J Manag*. 2024;10.1111/1467-8551.12733 35(2).
45. Hardie P, O'Donovan R, Jarvis S, Redmond C. Key tips to providing a psychologically safe learning environment in the clinical setting. *BMC Med Educ*. 2022;22(1):816. <https://doi.org/10.1186/s12909-022-03892-9>.
46. Ferguson AJ, Downes PE, Brymer RA, Hayman MG, Stoverink AC. Relieving the pressure: team familiarity attenuates external conformity pressure on team member decisions. *JOM*. 2024;50(5):1836–64. <https://doi.org/10.1177/01492063231160724>.
47. Heinen M, van Oostveen C, Peters J, Vermeulen H, Huis A. An integrative review of leadership competencies and attributes in advanced nursing practice. *J Adv Nurs*. 2019;75(11):2378–92. <https://doi.org/10.1111/jan.14092>.
48. Pursio K, Kankkunen P, Kvist T. Nurse managers' perceptions of nurses' professional autonomy: a qualitative interview study. *J Adv Nurs*. 2023;79(12):4580–92. <https://doi.org/10.1111/jan.15744>.
49. Htet HY, Abhichartitubtra K, Wichaikum OA. Factors predicting proactive work behaviors among nurses: A descriptive predictive study. *Int Nurs Rev*. 2024;71(1):101–07. <https://doi.org/10.1111/inr.12856>.
50. Goolsby MJ, Pierson CA, Sheer B. Twenty-eight years of experience measuring autonomy using the Dempster Practice Behavior Scale. *JAANP*. 2020;32(10):696–702. <https://doi.org/10.1097/JXX.0000000000000408>.

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Authors and Affiliations

Ria den Hertog¹ · Marjon Wolters-Zwolle² · Tjard Schermer^{2,3} · Anja Bussink-Legters²

✉ Ria den Hertog
fdhertog@che.nl

¹ Department of Nursing Education, Christian University of Applied Sciences Ede, Ede, The Netherlands

² Science Office Gelre Hospitals, Apeldoorn & Zutphen, The Netherlands

³ Department of Primary and Community Care, Research Institute for Medical Innovation, Radboud University Medical Centre, Nijmegen, The Netherlands