DR. ANNALENA WELP (Orcid ID : 0000-0002-5116-9098)

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The importance of reflecting on practice: How personal professional development activities affect perceived teamwork and performance

Running title: Teamwork, performance and professional development

Annalena Welp[1*]

Anya Johnson[1]

Helena Nguyen[1]

Lin Perry[2]

[1]Work and Organisational Studies, University of Sydney Business School, Australia

[2] South Eastern Sydney Local Health District and Faculty of Health, University of Technology Sydney, Australia

[*]corresponding author

Email: annalena.welp@sydney.edu.au

Phone: +61 02 8627 5938

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ABSTRACT

Aims and objectives: To examine the relationships between participation in personal professional development activities (e.g. coaching, mentoring), teamwork and performance; to investigate the mediating and moderating effects of reflective thinking and perceived usefulness of development activities.

Background: Professional development is associated with better performance and attitudes towards one's work. The current study adds to this research by focusing on understanding this effect and the conditions under which this occurs.

Design: Cross-sectional survey study.

Methods: Participants were 244 nurses working in a large, metropolitan acute public hospital. They completed a questionnaire consisting of validated measures and provided information on frequency of participation and perceived usefulness of personal professional development activities. We analysed data using regression-based moderated mediation analyses.

Results: The relationship between frequency of participation in personal professional development activities and both perceived teamwork and performance was mediated by reflective thinking. Perceived usefulness of development activities moderated the relationship between frequency of participation in personal professional development activities and reflective thinking.

Conclusion: Our results highlight the importance of professional development activities that go beyond knowledge- or skill-based training. Activities that cater to nurses' personal professional development needs are also associated with more positively perceived teamwork and performance. Results provide insights into the mediating mechanisms: participation in personal professional development activities encouraged reflective thinking which was associated with better perceived teamwork and performance. This association between personal professional development activities and reflective thinking was even stronger where nurses perceived the activities as useful.

Relevance to clinical practice: Personal professional development activities enhance reflection in and on practice as these activities were linked with higher perceived quality of care and teamworking. To ensure the positive effects of personal professional development activities should target nurses' professional development needs and need to be perceived as useful by those who undertake them.

Keywords: nurse, practice development, professional development, quality of care, reflection, reflective practice, teamwork

INTRODUCTION

Internationally, healthcare providers are experiencing enormous demographic, financial, operational, innovation-related and regulatory challenges. In response, the health workforce is required to accommodate ongoing restructures and mergers, reframing health models for better community management of chronic disease, shifting acute services from volume- to value-based care; all within the simultaneous priorities of effective, efficient, equitable care and cost containment (Buchan, Twigg, Dussault, Duffield, & Stone, 2015; Deloitte, 2016). There is growing appreciation of the crucial role that nurses, the largest employee group in most healthcare organizations, play in dealing effectively with these demands. Given the pace of change, healthcare providers increasingly acknowledge the relevance of providing opportunities for nurses' ongoing training, learning and development as a means of enhancing organizations' performance (Aiken et al., 2011). However, demonstrating improvement of work practices, such as teamwork and care quality as a direct result of nursing professional development activities remains a challenge.

This paper reports the findings of a cross-sectional survey which examined the frequency of nurses' participation in personal professional development activities (PPDA), and the effect of these activities on perceived nursing performance and teamwork. For this study, PPDA were defined as activities such as coaching, mentoring or clinical supervision, which are geared towards nurses' general professional growth and career development rather than on improving specific skills related to their current position. We investigated the role of reflective thinking, a skill which plays a critical role in nursing practice and education (Kuiper & Pesut, 2004), in linking frequency of participation in PPDA to teamwork and performance indicators including quality and proactive patient care. We also explored the moderating effect of perceived usefulness of PPDA on reflective thinking.

BACKGROUND

Continuing professional development (CPD) is essential for nursing practice due to the growth in professional knowledge, speed and continual change of healthcare systems and nurses' roles. Internationally, nurses' continuing professional development is understood as those processes occurring beyond entry-level nursing qualification aimed at 'actively engaging nurses in a lifelong process of learning, with the ultimate goal of improving delivery of healthcare' (Griscti & Jacono, 2006, p. 450). In many countries, including China, the UK, the US and Australia, nurses and midwives require evidence of a minimum number of hours of CPD for renewal of their registration (e.g., Grant & Zilling, 2015; NMB, 2016). The purpose of CPD is to maintain and improve nurses' knowledge and skills (Grant & Zilling, 2015; Ni et al., 2014) and 'develop the personal and professional qualities required throughout their professional lives' (NMB, 2016, p. 1).

Professional development is an ongoing process that includes practice evaluation, definition of learning needs, participation in learning activities and reflection on their outcomes (NMB, 2010). It is anticipated that this learning is incorporated into practice, enhancing care delivery, care quality, staff and patient experience and outcomes. However, the transfer of learning from professional development opportunities to the clinical setting is difficult to ascertain. In 1995, seeking evidence of the impact of continuing education, Perry noted no real indication of its effectiveness in terms of participants' behaviour; this was reiterated a decade later by Griscti and Jacono (2006) who found similarly little direct evidence of patient outcomes improved by nurses' CPD.

Efforts to establish links between delivery of education (in various forms), clinician learning (knowledge change) and changes in behaviours (care delivered/care quality) have been sought for decades and continue to show small and often inconsistent effects (Coomarasamy & Khan,

2004; Forsetlund et al., 2009). Studies often lack quantitative evidence, and either restrict the focus to interventions for specific disciplines or include mixed groups of healthcare professions (Bell, Pestka, & Forsyth, 2007; Eddy, Jordan, & Stephenson, 2016). Nevertheless, it has been shown that a supportive organisational culture that values learning, provides sufficient staffing, and organisational access to CPD can promote learning and development (Coventry, Maslin-Prothero, & Smith, 2015; Davis, White, & Stephenson, 2016). Overall, however, the effects of CPD interventions within healthcare settings are not well documented. Evidence of linkage to patient outcomes is even harder to establish and similarly scant (Johnson & May, 2015). However, relationships have been repeatedly demonstrated between the qualifications of the nursing workforce, the perceived quality of care delivered and patient outcomes, especially those designated as potentially sensitive to nursing (infections, pressure injury, 'failure to rescue' etc.; Aiken et al., 2014). The educationally 'developed' nature of the registered nursing workforce clearly does have an impact on those for whom they deliver care, despite problems in showing a clear chain of causation.

Further, the way nurses perform also impacts other healthcare professional groups. In recent years, team-working has been identified as crucial for effective healthcare, and the central role of nursing within teams has become increasingly recognized. As long ago as 1983, Thomas identified nursing as the 'glue' (p. 67) that held healthcare services together, a finding supported by Kilbride, Perry, Flatley, Turner, & Meyer (2011), when seeking to identify the characteristics that defined the UK's top-performing stroke team. Given this central role of nursing and the mandated annual effort that nursing expends on CPD, lack of clarity in relation to its impact on care quality and outcomes is an important omission.

CPD comprises a wide spectrum of activities to support and enable nurses to meet the various roles encompassed by nursing. One cluster of activities entails 'craft' knowledge (such as planning nursing care for patients with specified diseases) and skills (for example, techniques such as cannulation etc.) which are directly relevant to the individual's current role; another cluster encompasses more 'soft' profession and career-focused, transferable skills, such as communication, leadership, team-building, reflection on and in practice (Schön, 1983).

Using 2006 data from the research site of this study, Johnson, Hong, Groth, & Parker (2010) categorized CPD offerings at that time as either organizational development activities (focusing on organisationally relevant skills) or professional development activities (focusing on professionally relevant skills). Findings revealed that attendance at organizational development activities significantly predicted perceived core performance whilst engagement with professional development activities significantly predicted both job satisfaction and commitment. In addition, role breadth self-efficacy, the confidence to be proactive in a role, helped explain the association between organizational development activities and core performance. In other words, organizational development activities increased self-efficacy and this increase helped explain the improved performance. In a similar way, professional development activities increased flexible role orientation or a greater sense of responsibility for issues beyond a prescribed role, and this increase, along with the increased role breadth self-efficacy, improved both quality and proactivity of care.

The role of reflective thinking in personal professional development

Reflective thinking is considered an essential part of continuing nurse education and practice (Kuiper & Pesut, 2004). It is a multi-faceted concept, originally described as a meta-cognitive process aiming to turn a dissonant or conflicting situation into a harmonious, coherent one via controlled, deliberate thought (Dewey, 1910). In nursing practice, such dissonant situations

may result from lack of situational information (missing information to judge a situation), overload of situational information (non-routine events), or lack of situation-specific knowledge (lack of knowledge about a certain medical condition or case) (Teekman, 2000). Reflective thinking draws on personal and professional experiences, feelings and emotions, sensory stimuli and analysis of skills (Kuiper & Pesut, 2004; Teekman, 2000); these are combined and applied to the dissonant situation to make sense of it. Strategies are applied such as drawing from collegial support, similar past experiences, framing (building a mental model to further understand the situation), and mental discussions with oneself (Teekman, 2000).

In their model of self-regulated learning, Kuiper and Pesut (2004) suggest that knowledge acquisition processes are enhanced by reflective thinking and other meta-cognitive abilities because they allow simple stimuli-response and memory storage processes to be set in context. Besides knowledge acquisition, Teekman's (2000) model of reflective thinking in nursing assumes that the purpose of reflective thinking is to enable action. Thus, reflective thinking is also thought to aid problem solving and clinical reasoning to support decision-making in nursing practice (Kuiper & Pesut, 2004). Providing nurses with cognitive tools to consciously reflect on their practice may enable them to switch from a reactionary, or problem-solving approach, to an anticipatory, or problem-posing approach (Teekman, 2000). Personal professional development activities – which we describe as a subset of professional development activities – entail activities such as coaching, mentoring or clinical supervision, and may offer the structures and tools to guide an individual (or a group) through reflective processes, yet allow enough freedom for healthcare professionals to contribute their own thoughts and experiences. They may improve soft skills such as patient-centeredness, building of interpersonal relationships or communication, that are particularly important in delivering care with compassion (Chen & Lou, 2014; Plourde-Cole, Davis, & Davis, 2015). PPDA offer

a "reflection *on* action" approach encouraging nurses to reflect on a situation after it has taken place, with the goal to improve "reflection *in* action" – reflecting on a situation while it is taking place (Schön, 1983), hence contributing to, and improving, decision-making and care in the moment.

To develop the habit of reflective thinking within nursing practice it seems essential to provide training for the underlying cognitive processes (Tan, Cashell, & Bolderston, 2012). Thus, we assume that a certain regularity or frequency of participation in PPDA facilitates the development of reflective thinking. Moreover, we hypothesise that the perception of participation in PPDA as personally meaningful or useful for nursing practice also plays an important role in nurses' engagement in reflective thinking, and that perceived usefulness can amplify the positive effect of frequent participation in PPDA on reflective thinking. Based on the above rationale, we propose the following hypotheses:

Hypothesis I: Frequency of nurses' engagement in PPDA is positively related to reflective thinking (path *a1* in figure 1).

Hypothesis II: The positive relationship between participation in PPDA and reflective thinking is moderated by the perceived usefulness of the PPDA. Specifically, this relationship is stronger when nurses also perceive that the PPDA is useful (path *a3* in figure 1).

Outcomes of reflective thinking: performance and teamwork

Griffin, Neal, and Parker (2007) describe performance as a multidimensional concept and differentiate between proficiency and proactivity. Proficiency refers to performance of the tasks that are often identified in formalized job descriptions, or within the core of a role. However, according to Griffin et al. (2007), relying solely on core performance in uncertain

and interdependent environments is not sufficient; employees working in these environments also need to be proactive. Proactive performance involves the individual taking action to respond to anticipated change and developing better ways to accomplish one's task. In the healthcare context, proactive patient care refers to activities such as including the patient and the patients' family in the care process, longer-term planning of patient recovery, or anticipation of patients' needs (Johnson et al., 2011).

Both proficiency (i.e., planning and carrying out routine tasks) as well as proactive performance (i.e., taking action to respond to future events) require reflective thinking, or the ability to strategize to overcome an unfavourable situation and turn it into a favourable one, and to solve dilemmas in clinical practice (Lutz, Scheffer, Edelhaeuser, Tauschel, & Neumann, 2013). However, as mentioned above, evidence on the relationship between CPD and clinical performance is scanty and ambiguous, and the steps required to translate learning into better patient care remain unclear. Participation in PPDA designed to encourage reflective thinking may be an effective approach to enhance individuals' performance.

Hypothesis III: Reflective thinking mediates the relationship between frequency of participation in PPDA and perceived:
1) quality patient care, and
2) proactive patient care
(paths *b1* and *b2* in figure 1).

In addition to healthcare skills and knowledge, effective teamwork is a major contributor to clinical performance (Catchpole, Mishra, Handa, & McCulloch, 2008). Healthcare delivery is inherently a team-based activity, and effective teamwork is connected to many aspects of clinical performance, such as fewer medication errors or hospital-acquired infections

(Manojlovich & DeCicco, 2007; Vogus & Sutcliffe, 2007). Moreover, teamwork seems to reduce or buffer the negative effects of highly demanding environments, as it is associated with clinician occupational well-being (Li et al., 2013; Van Bogaert et al., 2014).

Marks, Mathieu, and Zaccaro (2001) divide teamwork into action, transition, and interpersonal processes. Interpersonal teamwork is considered to be the foundation that facilitates action and transition processes and consists of activities such as conflict management or confidence building. Conflict within a team may negatively impact intra-team relationships and effectiveness (Lemieux-Charles & McGuire, 2006), whereas active and constructive conflict management facilitates the action and transition processes directly related to the task at hand (Marks et al., 2001). Transition processes entail reorientation activities such as goal setting or strategy formulation. Action processes directly relate to goal accomplishment, such as coordination, monitoring, or backup and helping behaviours.

While considerable effort has been put into identifying the outcomes and organizational antecedents of teamwork in healthcare, relatively little is known about cognitive processes of individual team members that might facilitate better teamwork (Antoni & Hertel, 2009). In this study, we focused on an interpersonal process (*conflict management*) and an action process (*backup and helping*).

Backup and helping requires team members to have accurate shared mental models and transactive memory systems, i.e., they are required to recognize unexpected events during healthcare processes, maintain situational awareness, anticipate where help might be needed and redistribute the workload accordingly (Salas et al. 2005). These cognitions – the comparison between the unfavourable status quo and a favourable future status, and devising a strategy to get there – are the foundation of reflective thinking (Kuiper & Pesut, 2004).

Similar assumptions about reflective processes may be made about (cooperative) team conflict management, which comprises behaviours and attitudes such as open discussion of conflicts, orientation towards problem-solving, or concern for the self and others (Somech, Desivilya, & Lidogoster, 2009). Thus, to resolve a conflict situation, the individual or the team is required to monitor and analyse the current situation, determine the role of self and others within it and develop a solution. Consequently, participation in PPDA that encourage reflective thinking may be considered an individualistic approach to improving teamwork.

Hypothesis III: Reflective thinking mediates the relationship between frequency of participation in PPDA and perceived:
3) backup and helping within the team, and
4) interpersonal conflict management within the team
(path *b3* and *b4* in figure 1).

METHODS

Design

The design of this study was a cross-sectional correlational survey. The research was carried out in a tertiary referral public adult hospital in Australia. The hospital had around 440 beds, over 48,000 admitted patient episodes and 56,000 emergency department presentations in the year 2015-16.

Data collection

The study was approved by the health organisation Human Research Ethics Committee and ratified by the university Ethics Committee. Survey participants signed a consent form and were assured of confidential handling of their data.

We drew our sample from a hospital-wide survey conducted in 2012 in which 448 nurses participated, this constituted a 45% response rate. Nurses of all grades and specializations were included; the final sample of 244 nurses consisted of all nurses who completed the survey and stated that they participated in internally delivered personal professional development programs. Table 1 provides a comparison of demographic characteristics of nurses who participated in PPDA and those who did not.

Measures

Demographic and Occupational Information. Nurses recorded their age, gender, position (which was rank ordered according to seniority), and tenure at the hospital.

Personal Professional Development Activities. Items assessing nurses' participation in PPDA were formulated by a reference group consisting of nurse educators and hospital-based researchers who provided or facilitated the training and development activities across the hospital. PPDA included coaching and facilitation training, mentoring and clinical supervision provided by hospital staff. We asked participants to indicate how much time they had spent on PPDA during the previous 12 months (frequency, ranging from 1 (up to 1 day) to 3 (more than 35 hours)), and how useful this activity had been for helping them develop in nursing (usefulness ranging from 1 (not at all) to 5 (a large extent)).

Mediator: Reflective Thinking. Reflective thinking was assessed using a measure developed for this context based on Kuiper & Pesut (2004) and Teekman (2000). Nurses were asked via two items to indicate the extent to which they reflect on the way they could have done things effectively or avoided errors, and take time as part of their work to consider how they might have dealt with things differently, rated on a scale from 1 (very infrequently) to 5 (very frequently).

Outcome: Teamwork. Teamwork was assessed using two different dimensions of team processes from the taxonomy of team processes proposed by Marks et al. (2001). The first aspect (back-up and helping) is an action process and taps the extent to which team members work to balance the workload, help each other out and "watch out" for one another. The three-item measure was adapted from Dickinson & McIntyre (1997) to suit the context of this study. A sample item is "In this team, to what extent do you collectively offer each other help when it might be needed?" The second aspect (conflict management) is an aspect of interpersonal team processes and measures the extent to which nursing teams actively manage their interpersonal conflict. The measure was adapted for the context from Somech et al. (2009). A sample item is "In this team, to what extent do you collectively solve conflict in fair and equitable ways?" The anchors for both scales were 1 (not at all) to 5 (very large extent).

Outcome: Performance. Core performance was conceptualized as quality patient care or the extent nurses feel able to provide superior patient care, think ahead to avoid complications and plan for changes in a patient's status and needs. This was measured with a 4-item measure previously validated by Johnson et al. (2010). A sample item is: "When dealing with patients, to what extent do you provide quality patient care?"

Proactive patient care measures the extent to which nurses anticipate what a patient might need, make suggestions to improve patient care, and actively encourage longer-term recovery and health. Proactive performance was measured using a validated 5-item measure (Johnson et al., 2010). A sample item is "When dealing with patients, to what extent do you spend time thinking ahead to prevent possible complications?" Both measures used anchors of 1 (not at all) to 5 (a great extent).

Data analysis

Data were analysed using SPSS version 22. First, we generated descriptive statistics, correlation coefficients, and Cronbach's alpha reliability coefficients. We then conducted confirmatory factor analyses of all multi-item measures to determine the convergent and discriminant validity of the underlying constructs. To test the proposed model, we used a conditional process analysis approach as described by Hayes (2013), which estimates the simultaneous conditional and indirect effects hypothesized by moderated mediation models by using an ordinary least squares (OLS) regression-based path analysis approach. Effects were estimated based on 95% confidence intervals and 5,000 bootstrap samples. To fully utilise the data related to our main hypotheses, we did not include demographic covariates as this would have decreased the final sample size due to unsystematic missing data.

RESULTS

The sample

Eighty-three percent of participants were female, with a mean (standard deviation) age of 36 (10.78) years (ranging from 21 to 67 years) and mean professional experience of 12 (9.51) years (ranging from 8 months to 40 years). The majority of participants (56%) were Registered Nurses (see table 1 for detailed demographic characteristics). Comparison of demographic characteristics with nurses who did not participate in PPDA showed that participants were somewhat younger and consequently had less professional experience, lower tenure, and tended to hold more junior roles (see table 1). Means, standard deviations, and correlations between variables included in the regression analyses are reported in table 2.

Validity and reliability

Factor loadings ranged from 0.58 to 0.89 on the respective survey constructs, and the Cronbach alpha values ranged from 0.81 to 0.87, indicating convergent validity. The model fit indices for a five-factor model suggested a good fit to the data ($\chi^2(109, N=244) = 202.21$, $p < .0001$, comparative fit index =0.95; Tucker-Lewis-Index =0.94; root mean square error of approximation =0.06) and significantly better than for a one-factor solution ($\chi_D^2 = 629.11$, $p < .0001$), thus showing the discriminant validity of the measures. In addition, we calculated the Average Variance Extracted, which should be greater for each construct than the squared correlation between constructs to demonstrate discriminant validity (Fornell & Larcker, 1981). Discriminant validity was confirmed, with the Average Variance Extracted ranging from 0.71 to 0.82, and squared correlations ranging from 0.05 to 0.42.

Testing the moderated mediation model

Regression analyses using the SPSS Process Macro by Hayes (2012) were conducted to test our hypotheses (table 3).

Moderation analyses. Hypothesis one proposes that frequency of participation in PPDA is positively related to reflective thinking, as represented by index *a1* in figure 1 and table 3. Analyses revealed that this was not the case ($B = -0.31$, $p = 0.07$).

Hypothesis two proposes that perceived usefulness of PPDA moderates the relationship between frequency of participation in PPDA and reflective thinking, such that the strength of the relationship between frequency of PPDA and reflective thinking depends on the extent that nurses find the PPDA useful for their nursing professional development.

To test moderation, predictor, moderator, and their interaction term (*a1*, *a2*, and *a3*, respectively, in figure 1 and table 3) were entered into the regression equation. Analyses showed that the interaction term between frequency of participation in PPDA and perceived usefulness of PPDA predicted reflective thinking (B =0.09, p =0.04), thus demonstrating that the association between PPDA participation frequency and reflective thinking as suggested by hypothesis one was dependent on perceived usefulness of the PPDA. Figure 2 suggests that the frequency of participation in PPDA is only associated with reflective thinking when nurses also perceived the PPDA as useful. This provides support for hypothesis two.

Mediation analyses. In addition, we argued that reflective thinking mediates the relationship between the frequency of engaging in PPDA and perceived 1) quality patient care, 2) proactive patient care, 3) interpersonal conflict management in the team, and 4) backup and helping in the team (hypothesis three). Two conditions need to be fulfilled to confirm that reflective thinking mediates this relationship.

The first is that reflective thinking would have to be associated with the outcome (represented by index *b* in figure 1 and table 3). This condition was fulfilled for all outcome variables: perceived backup and helping (B =0.24, p < 0.001), perceived interpersonal conflict management (B =0.21, p < .001), perceived quality patient care (B =0.28, p <0.001), and perceived proactive patient care (B =0.26, p <0.001).

Secondly, the overall moderated mediation indirect effect would have to be significant. This condition was also confirmed for all outcomes (perceived backup and helping: B =0.02, 95% lower confidence interval (LCI) =0.0009, 95% upper confidence interval (UCI) =0.0416; perceived interpersonal conflict management: B =0.02, 95% LCI =0.0013, 95% UCI =0.0529; perceived quality patient care: B =0.03, 95% LCI =0.0022, 95% UCI =0.0603; and perceived

proactive patient care: *B* =0.02, 95% LCI =0.0004, 95% UCI =0.0605). This provides support for hypothesis three (1 to 4).

The last step in establishing mediation is to determine whether the direct effect of the predictor on the outcome variables (represented by index *c'* in figure 1 and table 3) remains statistically significant once the mediator variable is included in the equation. If the direct effect is no longer significant, this indicates a partial or full mediation effect. Analyses suggest partial mediation for all outcomes except perceived backup and helping (*B* =0.20, *p* <0.01), as perceived interpersonal conflict management: (*B* =0.07, *p* =0.25); perceived quality patient care (*B* = -0.002, *p* =0.96) and perceived proactive patient care (*B* =0.04, *p* =0.49) are not significant when reflective thinking is included in the equation, but they do not reduce to zero (full mediation).

DISCUSSION

The current study contributes to research on nurses' professional development by illuminating the mechanisms by which frequency of participation in PPDA is associated with perceived high-quality nursing practice. In summary, we found that reflective thinking mediated the relationship between frequent participation in PPDA, and perceived teamwork and performance. Furthermore, the relationship between frequency of participation in PPDA and reflective thinking was moderated by perceived usefulness of PPDA: PPDA were only able to encourage reflective thinking where they were perceived as useful.

This study expands knowledge on the effects of the *personal professional* development spectrum (i.e., with a 'soft-skills' focus) of CPD. Compared to *organisational* development activities (Johnson et al., 2010), PPDA are not designed to improve a specific skill or knowledge in a particular clinical field. While the coaching, mentoring, or clinical supervision

sessions that constitute PPDA in this study may be used to address a specific problem in clinical practice, PPDA follow a holistic approach in aiming to improve generic and widely relevant core skills and attitudes. These include communicative and conflict solving skills, assertiveness, confidence, or increased awareness of self and professional issues, which are thought to be beneficial to many scenarios in clinical practice (e.g., Wood, 1998) and are therefore considered equally important compared to specific clinical skills in the development of a professional identity (Webster-Wright, 2009).

This study showed that at the individual level, frequent participation in PPDA may encourage and structure reflective thinking and thus help nurses define their professional role and the way they approach their work. Eddy et al. (2016) found that besides skills-based team training, healthcare professionals highly value opportunities for reflection to gain a deeper understanding of effective team functioning. Thus, PPDA may help nurses gain a clearer understanding of team processes, and of their role within the team, and may engage them in behaviours that promote effective teamwork. Lastly, PPDA may help improve patient care practices such as anticipation of patient needs or planning for long-term recovery, thus improving overall performance.

The results highlight the central role of reflective thinking in linking participation in PPDA with perceived team- and patient care-related outcomes. Reflective thinking can be used to observe and influence cognitive processes (Kuiper & Pesut, 2004; Pesut & Herman, 1992) and thus influence tasks, goals, and behaviours. It may be difficult to integrate such advanced cognitive processes into daily clinical practice independently. PPDA can provide a platform that helps to structure these cognitions, consolidate the subsequent behaviours (Asselin & Fain, 2013) and thus help nurses to increase awareness of cognitive processes that might otherwise have occurred subconsciously (Gustafsson & Fagerberg, 2004; Kuiper, 2002).

However, mere participation in PPDA is not sufficient to improve reflective thinking – the activities need to be perceived as personally meaningful by the staff to be effective. According to the job characteristics model (Hackman & Oldham, 1975), perception of an activity as meaningful is likely to result in higher motivation, performance, and positive personal outcomes. Meaningfulness – i.e., perception of the activity as valuable for oneself or people in the environment – derives from several task characteristics: developing a variety of skills, visible outcomes, autonomy, receiving feedback, and knowledge that the activity is relevant to the organization (Hackman & Oldham, 1975). Therefore, if PPDA possess the above characteristics and are perceived as useful, they are more likely to motivate nurses to engage in reflective thinking.

The reflective processes outlined above are hypothesized to be a precursor to developing a mature professional identity (Öhlén & Segesten, 1998), and they may also affect the specific perceived team- and patient care-related outcomes investigated in this study. In order to gain an understanding of how to improve these processes, a certain level of self- and other awareness is essential (Wood, 1998), i.e., nurses need to be able to anticipate a co-worker's action or future (patient-care related) events, and be aware of their own and others' roles within these processes. A qualitative study conducted by Gustafsson & Fagerberg (2004) found that reflective thinking helped nurses be empathic with their patients and facilitated learning and knowledge transfer. These consequences of reflective thinking would certainly aid the specific perceived team- and patient care-related outcomes addressed in this study.

Limitations

Some study limitations should be acknowledged. First, due to the cross-sectional nature of this study, no conclusions regarding causal relationships between study variables can be drawn. However, nurses reported activities conducted over the preceding 12 months and were

asked about their subsequent perceptions of performance and teamwork. Second, responses reported in this study derived from the subset of survey respondents who participated in CPD activities. The simple comparison of demographic data from these nurses to those who did not participate in CPD suggests caution in extrapolating findings to unselected nurse samples and raises questions about CPD choices. Why were participants in PPDA overall younger than non-participants? Does this indicate that this form of CPD was less available, suitable or preferred for older and more experienced nurses? Or was support for attendance less available, and, if so, why? Third, self-report measures, such as those used in this study, might be biased and ideally should be complemented with objective indicators. However, a more positive perception of teamwork and patient care associated with participation in PPPD as an additional outcome besides improved skills is likely to make the experience more meaningful for the learner and might increase motivation to participate in future PPDA. Ideally, these perceptions would translate into behavioural change. Fourth, we did not include any covariates to avoid a reduction in sample size. However, repeating the analyses including covariates age, gender, tenure, and seniority did not change overall results. Lastly, we used measures assessing the frequency of participation and perceived usefulness of all PPDA available in the hospital. Future research could investigate whether there is a difference between different personal professional development activity types.

CONCLUSION

This research investigated the mechanisms that help explain why participation in PPDA affects perceived nursing practice outcomes and under what conditions. Overall, the results revealed that activities targeting individual development needs, such as mentoring or clinical supervision, can be linked to better perceived teamwork and performance. Specifically, these activities encourage reflective thinking, a meta-cognitive skill enabling the individual to analyse problematic situations and develop solutions. Results suggest that practice

development activities need to be carefully selected, as only activities perceived as useful set these processes in motion.

RELEVANCE TO CLINICAL PRACTICE

Whilst demonstrating the effectiveness of participation in PPDA, a key implication from this research is that there is no 'one size fits all' participation in PPDA – no one activity will positively affect all participants' perception of their nursing practice. To find the right set of activities, it is essential to take into consideration the requirements and opinions of staff. While it may be challenging to provide a variety of PPDA that takes the diversity of the nursing workforce into account, Spence Laschinger, Nosko, Wilk, & Finegan (2014) showed that both team and individual outcomes – unit effectiveness and job satisfaction – improved with an organizational culture that provided broad opportunities for learning and development including access to resources such as information and support. On the other hand, PPDA programs that disadvantage certain groups of the workforce (e.g. part-time or older nurses) may lead to frustration (Nolan, Owen, Curran, & Venables, 2000). Thus, investment in enabling participation in tailored PPDA opportunities is likely to be worthwhile, because nurses will choose the activities to address the topics they feel will be useful and beneficial. Further research should examine what sorts of participation in PPDA might be suited for older and more experienced nurses, who were less likely to report uptake of PPDA in this study.

From a managerial perspective, it is important to ensure that nurses possess and develop the required skills. The nursing workforce includes diverse individuals with different professional development needs and learning styles; development and implementation of PPDA should take this diversity into account and provide activities for all types of learning (Eddy et al., 2016). Our findings indicate that perceived improvements of teamwork and patient care do not necessarily have to consist of formalised (team-based) activity - an individual approach

via participation in PPDA that encourages reflective thinking can subsequently improve perceived teamwork and patient care. Developing transferable 'soft skills' through PPDA may have the advantage that they are applicable in numerous settings, particularly those requiring high levels of compassionate, patient-centred care (Plourde-Cole et al., 2015).

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What does this paper contribute to the wider global clinical community?

- Patients and nursing colleagues are likely to benefit when nurses invest in personal professional development.
- Investment by nurses, educators or managers in personal professional development activities that support nurses to define and reflect on their professional role is likely to be equally (and potentially more) valuable than skill-based training.

Administrators, educators and managers might evaluate their professional development schemes and teaching activities and ensure that these schemes and activities are tailored to nurses' needs and perceived as useful.

Table 1: Demographic characteristics of nurses who did and did not participate in personal professional development activities

	Participation in PPDA			No participation in PPDA		
	N	*Mean*	*Standard deviation*	*N*	*Mean*	*Standard deviation*
Age	210	36.36	10.78	158	40.12	11.08
Professional experience	204	11.37	9.59	152	15.79	11.36
Tenure in hospital	209	5.84	5.34	165	8.82	7.78
Tenure on ward	229	4.92	5.25	177	6.87	6.56
Weekly work hours	231	37.68	8.40	181	37.49	10.00
	N	*Frequency*	*Percent*	*N*	*Frequency*	*Percent*
Gender	237			184		
- Male		40	17		27	15
- Female		197	83		157	85
Employment status	238			189		
- Full time		196	84		146	77
- Part time		35	15		39	21
- Casual		3	1		4	2
Work hours	234			184		
- Monday to Friday		134	57		103	56
- Rotating roster		86	37		69	38

- Other		15	6		12	7
Professional role	232			180		
- Registered Nurses		133	56		96	51
- Enrolled Nurses		14	6		17	9
- New graduate nurses		16	7		1	1
- Clinical Nurse Specialists		35	15		29	15
- Nurse Educators		7	7		8	4
- Clinical Nurse Consultants		12	5		9	5
- Nurse Unit Managers		14	6		14	7
- Senior Nurse Managers		4	2		9	5

Note. Not all nurses provided information on their demographic data. PPDA = Personal professional development activities.

Table 2: Descriptive statistics, Pearson correlation and reliability coefficients of study measures

	Mean	*Standard deviation*	Cronbach's Alpha	1	2	3	4	5	6
1 Frequency PPDA	2.18	1.02	-						
2 Usefulness PPDA	3.49	1.18	-	.56**					
3 Reflective thinking	3.86	.79	.84	.13*	.22**				
4 Backup and helping	4.01	.83	.85	.16*	.27**	.23**			
5 Interpersonal conflict management	3.61	.80	.87	.09	.19**	.22**	.54**		
6 Quality patient care	4.13	.60	.81	.05	.20**	.35**	.32**	.32**	
7 Proactive patient care	3.72	.80	.85	.08	.10	.27**	.29**	.21**	.54**

Note. *$p < .05$. **$p < .01$. ***$p < .001$. PPDA = personal professional development activities. $N = 244$ nurses.

Table 3: Path coefficients for the effects of frequency of participation in personal professional development activities, and interactions with perceived usefulness of personal professional development on reflective thinking, teamwork, and performance

	Mediator		**Outcome variables**							
	Reflective thinking		**Backup and helping**		**Interpersonal conflict management**		**Quality patient care**		**Proactive patient care**	
	B	Standard Error	B	Standard Error	B	Standard Error	B	Standard Error	B	Standard Error
Intercept	4.13	.40	2.79	.29	2.61	.27	3.04	.22	4.13	.40
Independent variables										
Frequency PPDA *(a1)*	-.31*	.17								
Usefulness PPDA *(a2)*	-.09	.12								
Reflective thinking *(b)*			.24***	.07	.21***	.06	.28***	.05	.26***	.06
Interaction										
Frequency x Usefulness *(a3)*	.09*	.04								
Direct effect										
(c')			.14*	.06	.07	.06	-.002	.05	.04	.06

Moderated mediation indirect effect			.02*	.01	.02*	.01	.03*	.02	.02*	.02
Overall Model summary	R^2 = .07***	F = 5.92 (df = 240)	R^2 = .08***	F = 10.10 (df = 240)	R^2 = .06***	F = 7.52 (df = 240)	R^2 = .12***	F = 16.75 (df = 240)	R^2 = .08***	F = 9.90 (df = 240)

Note. *N* = 244 nurses. Significance levels based on bootstrapping (5 000) bias corrected and accelerated confidence intervals. *$p < .05$. **$p < .01$.

***$p < .001$. PPDA = personal professional development activities. Letters in brackets refer to hypotheses tested (see figure 1).

Figure legends

Figure 1: Conceptual framework and hypotheses

Figure 2: Moderation of the effect of frequency of participation in personal professional development activities (PPDA) on reflective thinking by perceived usefulness of personal professional development activities

Figure 1: Conceptual framework and hypotheses

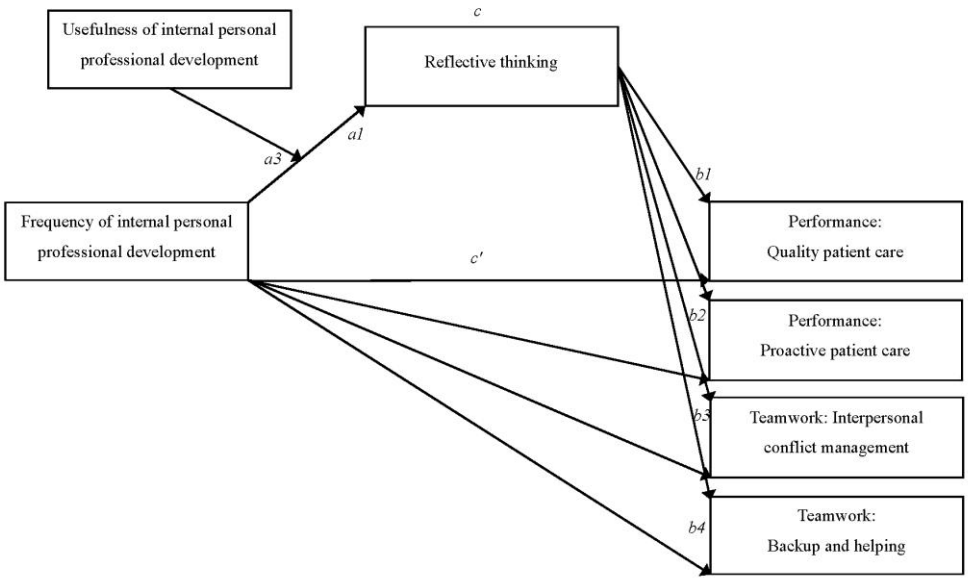

Figure 2: Moderation of the Effect of PPDA Frequency on Reflective Thinking by perceived PPDA Usefulness