# Swedish Operating Room Nurses and Nurse Anesthetists' Perceptions of Competence and Self-Efficacy

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**Purpose:** *To compare perceived competence and self-efficacy (SE) among Swedish operating room (OR) nurses and registered nurse anesthetists (RNAs), and to evaluate the relationship between SE and competence, gender, age, and years of experience.*
**Design:** *Comparative cross-sectional survey.*
**Methods:** *Two validated questionnaires, Perceived Perioperative Competence Scale-Revised and General Self-Efficacy Scale, were sent to members of the Swedish Association of Health Professionals (n = 2,902).*
**Findings:** *The response rate was 39% (n = 1,033). OR nurses showed significantly higher scores on Perceived Perioperative Competence Scale-Revised subscale* foundational knowledge *and* leadership *as well as General Self-Efficacy Scale scores compared with RNAs. The RNA group showed significantly higher* empathy *scores compared with OR nurses. Among the OR nurses* professional development *made the strongest contribution to SE and* proficiency *among the RNAs.*
**Conclusions:** *These results suggest that there are differences in perceived competence and SE between OR nurses and RNAs. Gender may be an independent factor affecting SE.*

**Keywords:** *perceived competence, operating room, perioperative nursing, self-efficacy.*
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**PROVIDING GOOD PERIOPERATIVE NURSING** care and ensuring optimal safety for surgical

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patients in competence in anesthetic nursing and intraoperative nursing care.[1] The concept of competence in nursing has been explored in several studies[2,3] that investigate nurses from different contexts and with different clinical expertise.[4,5] Agreement about the components of competence in the operating room (OR) has been lacking, but Gillespie and Hamlin[2] have described perioperative competence as an eclectic concept that is difficult to define and even more difficult to measure. Competence for OR nurses and registered nurse anesthetists (RNAs) encompasses a combination of perioperative technical skills[6] and nontechnical skills such as the ability to work in teams, communication, situational awareness, and task management.[7-11] Exploring and comparing perceptions of skills in different aspects of competence can increase

understanding between OR nurses and RNAs and identify areas of competence that need to be strengthened to enhance safe clinical practice.[12] One variable that may influence personal competence is self-efficacy (SE).[13] SE is linked to one's ability to cope with a specific task and how the task is performed.[14,15] Huston-Shaikh[16] describes the importance of self-reported SE to meet individual learning needs and to understand the relationship between SE and competence and how it contributes to clinical expert knowledge. In the OR environment, the ways in which individuals experience and solve the complex tasks is an indicator of competence. Earlier research on the relationship between SE and different demographic variables (ie, gender, age, and academic or clinical years) found that student certified nurse anesthetists had lower SE in their clinical years compared with their didactic year.[17] It has also been described that newly graduated certified nurse anesthetists are helped in their professional development when their SE is strengthened.[18]

Patient safety has been linked to competence; however, there has been a paucity of research evidence linking competence and SE. We hypothesize that perioperative nurses who report high levels of perceived competence will also perceive higher levels of SE. *Competence* and *SE* OR nurses focus on performing safe surgical care, whereas RNAs maintain the patient's cardiopulmonary status during anesthesia and ensure safe vital signs and unconsciousness.

A surgical procedure is a complex situation, and anesthesia, medical technology, and teamwork can all increase patient risk during the perioperative experience.[19] To ensure that the patient receives evidence-based and high-quality care during surgery, it is imperative that OR nurses and RNAs combine technical skills with nontechnical skills to manage adverse events and ensure safe clinical practice.[20] There are several instruments to measure perianesthesia nursing competence.[21] The lack of correlation between technical and nontechnical skills among trainee anesthesiologists can lead to decreased patient safety.[22] However, there are several tools for measuring perioperative performance,[23] including Nurse Anesthetists' Non-Technical Skills (N-ANTS), a behavioral marker system for nontechnical skills among nurse anesthetists,[24] and Scrub Practitioners' List of Intraoperative Non-Technical Skills (SPLINTS), a behavioral rating tool for nontechnical skills among scrub practitioners.[25] On the basis of the SPLINTS system, Mitchell et al[26] have described how to teach different nontechnical skills in a structured way. However, these tools are based on narrow descriptors that may not necessarily capture the components of perioperative competence. One instrument developed specifically for the perioperative context is the Perceived Perioperative Competence Scale-Revised (PPCS-R),[27] which has previously been validated for use in a Swedish context.[28] Another concept that may impact on clinical performance is SE.[29] The sociocognitive model developed by Bandura describes how an optimistic self-belief in one's competence depends on one's personal possibility to perform, self believe in how to solve a task, or to cope unexpected events.[15,30,31] The chances of successfully mastering an activity are based on relations between four factors of efficacy for producing a favorable outcome. The areas include mastery experiences followed by vicarious experiences, verbal persuasion, SE, and finally emotional and physiological states.[30] SE beliefs change depending on the circumstances and the tasks. Individuals with a strong SE and individual beliefs can view situations and tasks as challenges instead of obstacles, whereas those who doubt their own ability and have a low SE in a given area cannot.[32] The tasks the individuals choose to learn and the goals they set for themselves are influenced by their SE.[33] The General Self-Efficacy (GSE) scale was developed on the basis of Bandura's SE theory,[14] and has been translated and tested in several countries.[34] There is limited evidence about SE among clinical nurses. Nielsen et al,[35] described the effects of team and SE at two elderly care units, indicating a mediating effect on the relationship between transformational leadership and well-being. Welsh[36] found that more experienced medical-surgical clinical nurses had higher levels of perceived SE. SE in nursing education among academics is described in the literature.[37] Jnah and Robinson[38] have described the effect of mentoring and SE among neonatal nurse practitioners. To our knowledge, no previous study has examined SE in OR nurses and RNAs, or examined any relations between SE and perceived competence. To our knowledge, this is one of the first studies to examine the relationship

between perceived competence and SE in perioperative nurses.

### RNA and OR Nurse

There are two types of specialist nurse in Swedish ORs: RNAs and OR nurses. Although their competencies are different, they share the responsibility of enhancing safe and person-centered care in the OR.[39] OR nurses and RNAs require evidence-based knowledge of clinical physiology, pharmacology medicine, technology, and nursing,[40,41] and must be alert and prepared as they are interacting with patients within the short time frame of the "here and now."[41] The situations can also dynamically change context if an acute adverse event arises.[12,24,41,42] These skilled nurses cannot be replaced by nurses without the requisite specialty education and experience in perioperative practice.[2,43] In Sweden, both professions must undergo 4 years of education; 3 years to become a registered nurse, and 1 year of specialist postgraduate education, the last of which is at an advanced level and includes a 1-year masters in science.

## Aim

The aim of this study was to compare perceived competence and SE among Swedish OR nurses and nurse anesthetists, and to evaluate the relationship between SE and competence, gender, age, and years of experience.

### Design

A comparative cross-sectional survey design was used.

### Sample/Participants

The sampling frame included nurses who were members of the Swedish Association of Health Professionals, a trade union for nurses in Sweden (n = 2,902). An online questionnaire was distributed through the Association during April and May 2015 to all RNAs and OR nurses who had an active membership e-mail account. Of these, 129 had a nonfunctioning e-mail address, leaving 2,773 potential participants. Two e-mail reminders were sent out 2 weeks apart during the study period. All nurses who worked as OR nurses or RNAs in

the perioperative context were eligible to participate. Nurses who worked in other areas such as education or management were excluded.

### Instruments

Perceived competence was measured with PPCS-R. This instrument was originally developed in Australia and psychometrically tested among 1,122 OR nurses.[27] It includes 40 items, with responses on a five-point Likert scale: never (1), sometimes (2), often (3), very often (4), and always (5). Scale scores range from 40 to 200, with higher scores indicating greater levels of perioperative competence. The PPCS-R uses six subscales that indicate different dimensions of perioperative competence: foundational knowledge, proficiency, professional development, leadership, collaboration, and empathy. The revised scale has been used in the Australian, Canadian, and UK contexts, showing internal consistency (Cronbach's $\alpha$) of 0.96, 0.97, and 0.95, respectively.[4,27,44] It has been translated into Swedish and tested for its psychometric properties, providing evidence of construct validity and strong internal consistency reliability for both the overall scale ($\alpha$ = 0.85) and all subscales ($\alpha$ range 0.78 to 0.89).[28]

General SE was measured with the GSE scale,[45] which refers explicitly to personal factors, that is, the belief that our own actions are responsible for successful outcomes. The GSE scale has become a widely used instrument for measuring general SE, and consists of 10 items rated on a four-point Likert scale: not at all true (1), hardly true (2), moderately true (3), and exactly true (4). The scale is unidimensional. Scores are calculated by summing the item scores, and scores range from 10 to 40, with a lower score indicating less SE.[14] The scale has been translated into Swedish[46] and tested for internal consistency in a Swedish general-population sample ($\alpha$ = 0.91, n = 4,027).[47] Survey respondents also completed a demographic questionnaire covering age, gender, profession, years of experience, and professional qualifications.

### Ethical Considerations

According to the Swedish Act based on the Ethical Review of Research, formal ethical approval was not required for this study because the survey

did not include any sensitive questions or the implementation of any new medical product. Access to the relevant population of RNAs and OR nurses was provided by the Swedish Association of Health Professionals. E-mails were sent to all listed members through the Secretariat of the Association, ensuring that the study investigators were blinded to the names of the members listed in the database. The attachment in the e-mail contained an information sheet that explained the nature of the project, and respondents were assured of their voluntary participation, anonymity, and right to withdraw from the study at any time.

### Statistical Analysis

Descriptive statistics were calculated using absolute and relative frequencies (%), means, standard deviations (SD), and range as appropriate. Cronbach's $\alpha$ was used to determine the internal consistency of PPCS-R and SE in OR nurses and RNAs, respectively. To analyze differences between OR nurses and RNAs, an independent-samples $t$ test was used for continuous normally distributed data, $\chi^2$ test for categorical data, and a Mann-Whitney $U$ test for ordinal data. Mann-Whitney $U$ test was used to analyze differences between genders. A multiple linear regression model was used for correlations between SE (dependent variable) and the independent variables foundational knowledge, proficiency, professional development, leadership, collaboration, and empathy (ie, the six subscales in PPCS-R) and gender, age, and years of experience in OR nurses and RNAs, respectively. Goodness-of-fit values, $R^2$, for each group were also calculated. Statistical significance was set to $P < .05$. Version 23.0 of the, SPSS for Windows software package (SPSS Inc, Chicago, IL) was used to perform all tests.

## Results

The web-based questionnaire was send via e-mail to 2,902 perioperative nurses, 129 of whom had a nonfunctioning e-mail address. A further 94 respondents reported that they had a different work position and so were excluded from the analysis, leaving 2,679 potential respondents. The response rate was 39% (n = 1,033). There were no significant differences between OR nurses and RNAs in terms of either age or years of specialist experience. The group of RNAs had a significantly higher proportion of nurses with academic degrees on the advanced and research levels, compared with the sample of OR nurse (Table 1). When nurses without an academic degree were compared with nurses with an academic degree on the advanced and research levels, respondents without a degree were significantly older (53.8 years [SD 7.5] vs 44.2 years [SD 9.4], $P < .0001$) and had a significantly higher number of years of specialist experience (23.4 years [SD 9.4] vs 12.8 years [SD 10.0], $P < .0001$).

### PPCS-R

There were significant differences in three of the six PPCS-R subscales between OR nurses and RNAs. Higher scores on *foundational knowledge* and *leadership* were observed among the OR nurses, whereas higher *empathy* scores were observed among the RNAs. No differences were seen in total PPCS-R scores across groups (Table 2). After controlling for age, there were no significant correlations between academic degree and PPCS-R on any of the six subscales.

### Table 1. Comparative Demographic Characteristics of Registered Nurse Anesthetists (RNAs) and Operating Room (OR) Nurses

| | OR Nurses, n = 505 Mean (SD) | RNA, n = 528 Mean (SD) | P Value |
|---|---|---|---|
| Age (y) | 48.8 (9.5) | 48.6 (10.1) | .741* |
| Specialist experience (y) | 18.5 (10.9) | 17.1 (10.8) | .040* |
| | Frequency (%) | Frequency (%) | |
| Gender | | | < .0001† |
| Female | 483 (95.6) | 412 (78.6) | |
| Male | 22 (4.4) | 21 (21.4) | |
| No academic degree | 270 (53.9) | 209 (39.6) | < .0001† |
| Academic degree | | | |
| BSc | 136 (27.1) | 187 (35.8) | |
| MSc | 94 (18.8) | 121 (23.1) | |
| Licentiate | 0 | 1 (0.1) | |
| PhD | 1 (0.1) | 5 (1) | |

*Student $t$ test.
†Pearson $\chi^2$ test.

**Table 2. Comparative Data: Six Competence Domains of the Perceived Perioperative Competence Scale-Revised (PPCS-R) for the Operating Room (OR) Nurses and Registered Nurse Anesthetists (RNAs)**

| PPCS-R Subscales | Possible Range | OR Nurses, n = 505 Mean (SD) | RNA, n = 528 Mean (SD) | P Value |
|---|---|---|---|---|
| Foundational knowledge | 9-45 | 38.4 (4.0) | 37.5 (4.7) | .003 |
| Leadership | 8-40 | 27.8 (5.8) | 26.7 (5.8) | .010 |
| Collaboration | 6-30 | 24.6 (3.6) | 24.5 (3.6) | .675 |
| Proficiency | 6-30 | 25.9 (3.0) | 25.9 (2.8) | .494 |
| Empathy | 5-25 | 19.3 (4.0) | 21.7 (2.9) | < .001 |
| Professional development | 6-30 | 22.3 (4.0) | 21.9 (4.1) | .142 |
| Total PPCS-R | 40-200 | 158.2 (20.0) | 158.3 (19.0) | .796 |

Analyzed with Mann-Whitney $U$ tests.

### Self-Efficacy

Cronbach's $\alpha$ was 0.88 for the total sample and 0.89 for OR nurses and 0.87 for RNAs. The OR nurses had significantly higher mean scores in the GSE scale compared with the RNAs (32.1 [SD: 4.0] vs 30.9 [SD: 4.0], $P < .0001$).

### Inferential Analyses

Standardized $\beta$ coefficients for each independent variable on the six subscales of PPCS-R, gender, age, and years of experience were examined to determine their relative impact on SE (GSE scale). Among the OR nurses *professional development*

made the strongest contribution to SE, as evidenced by the $\beta$ coefficient of 0.238, ($P < .001$). *Gender* had the lowest impact to SE, $\beta$ coefficient of 0.008 ($P < .001$). The strongest contribution to SE among RNAs was *proficiency* 0.301 ($P < .001$) and *age* the lowest impact to SE, $\beta$ coefficient of $-0.006$ ($P < .941$) (Table 3).

## Discussion

To the best of our knowledge, this is the first study to investigate the relationship between perioperative competence and SE in a cohort of OR nurses and RNAs. In comparison to RNAs, OR nurses showed significantly higher SE scores

**Table 3. Association Between General Self-efficacy and the Six Competence Domains of the Perceived Perioperative Competence Scale-Revised (PPCS-R), Gender, Age, and Years of Experience for the Operating Room (OR) Nurses and Registered Nurse Anesthetists (RNAs)**

| Independent Variables | OR Nurses, n = 505 | | | | RNA, n = 528 | | | |
|---|---|---|---|---|---|---|---|---|
| | Standard Error | Standardized $\beta$ Coefficient | t Statistic | P Value | Standard Error | Standardized $\beta$ Coefficient | t Statistic | P Value |
| Gender | 0.743 | 0.008 | 0.203 | .839 | 0.409 | 0.187 | 4.309 | **< .001** |
| Age | 0.024 | −0.147 | −2.565 | **.011** | 0.029 | −0.006 | −0.074 | .941 |
| Year of experience | 0.22 | 0.071 | 1.169 | .244 | 0.029 | −0.096 | 2.770 | **.006** |
| Foundational knowledge | 0.057 | 0.148 | 2.302 | **.022** | 0.052 | 0.031 | 0.473 | .637 |
| Leadership | 0.042 | 0.200 | 3.250 | **.001** | 0.040 | 0.204 | 3.341 | **.001** |
| Collaboration | 0.057 | −0.068 | −1.361 | .174 | 0.061 | −0.058 | −1.022 | .307 |
| Proficiency | 0.096 | 0.196 | 2.778 | **.006** | 0.096 | 0.310 | 4.512 | **< .001** |
| Empathy | 0.052 | 0.013 | 0.259 | .796 | 0.076 | 0.075 | 1.314 | .190 |
| Professional development | 0.062 | 0.238 | 3.890 | **< .001** | 0.055 | 0.160 | 2.770 | **.006** |

Analyzed with linear regression analysis. $R^2$: OR nurses 41.4% and RNAs 36.8%.
Bold treatment indicates statistical significance.

as well as higher scores on two of the six PPCS-R subscales (foundational knowledge and leadership) and lower scores on another (empathy). However, there was no difference in total PPCS-R. One possible explanation for the higher degree of foundational knowledge among OR nurses may be that RNAs in Sweden perform anesthetic care not only in the OR but also at other departments such as radiology and emergency care, as well as during ambulance transports.[48] An OR nurse usually specializes in one or a small number of surgical specialties, such as orthopaedic or thoracic surgery, which may contribute to a higher level of knowledge in that specific surgical field. This surgical specialties also enable OR nurses to feel in control of the situation by forward planning and being prepared for any unexpected event during the surgery.[42] OR nurses' significantly higher scores in the domain of leadership could be because OR nurses in Sweden are responsible for infection control and aseptic principles in the surgical team. Hence, the OR nurse has a leadership position; a clearly defined area of competence that the nurse performs independently. The role of the RNA has been described as subordinate in the context of teamwork, which is incompatible with a leadership position.[21] Moreover, the close collaboration and interaction between the anesthesiologist and the RNA can lead to a specific dynamic and hierarchy, which may impact on the RNA's professional identity.[49] Conversely, RNAs reported a higher degree of empathy than OR nurses. In contrast to OR nurses, RNAs have more contact with the patient both preoperatively as well as intraoperatively and postoperatively. Keeping in touch with the patient, watching over the patient, and being one step ahead have been identified as three core attributes that characterize anesthetic nursing.[41] RNAs have an intimate engagement with patients who are exposed and vulnerable[50] as they act as the patient's representative and link to the surrounding world, and uphold the silent patient's autonomy and self-determination. Clearly this level of engagement requires empathy and an emotional commitment to another human being.[51,52] It has been reported that Swedish RNAs' empathy seems to be stable over time and does not differ across age and gender.[53] It has also been reported that SE is one of several important factors related to high levels of performance in the workplace[29] and can perhaps affect the perceived competence. It is possible that the OR nurses reported higher SE values because OR nurses have a more well-defined role than RNAs in Sweden. Alternatively, there may be a difference in expectation between the two professions because of social relations, norms, and ideals.[54] Another possible explanation is related to behavior-specific SE beliefs.[31] To explain the differences in SE between OR nurses and RNAs, additional dimensions of relationships between self-assessed SE would be of interest. SE can be measured in several dimensions such as social, emotional, and cognitive SE.[55-57] Moreover, our findings revealed a significant statistical association between SE and professional development for both OR nurses and RNAs. Also, the domain proficiency was significantly associated with SE for both professions. These differences in associations are unknown, however, warrant further investigation. We also found significant statistical correlations between gender and SE among RNAs. This association was not seen among the OR nurses. This could be related to the fact that there are significantly fewer men than women working as OR nurses and RNA, men are more noticed and acknowledged and thus more likely to perform more advanced tasks than women. Previous research revealed that male nurses who experienced gender-based stereotypes found that the stereotypes contributed to their job dissatisfaction.[58] However, it has been reported that Swedish RNAs' perceived professional self depends on age and amount of work experience but not on gender.[53] Our results have implications for practice. We have highlighted the importance of reflecting on and to measure self-reported perioperative competence and SE, thus allowing both the team and the individual to identify areas where education and training are necessary to ensure safe care. This study could be an opportunity in how to use the results and how education in clinical activities can be improved. For managers and leaders of perioperative team, these results could be a tool to strengthen certain parts at a group level for all domains that are part of the perioperative care. It is important to highlight areas, which are included in the development of the professions in teamwork to extend patient safety. It is also an opportunity to identify where individual clinical support is needed.

### Limitations

This study has some limitations. The response rate was 39% despite two follow-up reminders, which may have led to a nonresponse bias.[59] The sample used in this study thus cannot be considered to be fully representative of the wider population of Swedish RNAs and OR nurses. Despite that potential participants were contacted and located, for various reasons some of them chose not to participate in the study. One factor that could have affected the response rate was that participants could only respond to the survey via computers, and the questionnaire was not modified to allow answering via smartphone.[59] Another consideration is that more potential participants may have responded to the survey if we had also sent a postal survey, instead of simply using their e-mail address.[59] Inclusion of both the PPCS-R and GES scales meant that the survey included a total of 50 questions, which may have been perceived as overwhelming and thus led to lack of motivation for answering.[59] The $R^2$ value was low, 41.4% among the OR nurses and 36.8% among the RNAs, which means there are other factors that have not been measured or considered that may have contributed. Yet, even if the $R^2$ values were low there were statistically significant correlations. It is therefore possible to still draw conclusions about the correlations between the dependent variable SE and some of the independent values such as professional development and proficiency.

### Conclusions

This study indicates differences in perceived competence and SE between OR nurses and RNAs in Sweden. It also suggests that gender may be an independent factor contributing to SE. These results provide increased knowledge about the perception of self-assessed competence and SE in the perioperative context.

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# Volunteer Your Time to Help Yourself and ASPAN Celebrate Strength and Elevate Practice!

It is the dedication of ASPAN's grassroots members – its committees and strategic work teams – that makes ASPAN the premier resource for perianesthesia nurses. Committed, energetic members are needed to excel in practice, leadership and collaboration within our nursing specialty in the coming years. ASPAN invites you to inspire perianestheisa nursing excellence by completing the online **2020-2021 Willingness-To-Participate (WTP) form.**

Please visit the ASPAN website (www.aspan.org) and log-in to your member account.  Go to **About Us / Organization** for the WTP link. ASPAN's WTP form is available ONLINE ONLY.

**The WTP deadline is October 31, 2019.**  Submitting the online WTP form as soon as possible allows us to match volunteers' skills, time availability and interests to ASPAN's strategic plan projects.

*Note: current volunteers seeking reappointment must submit an online WTP form each year.*

ASPAN offers a wide variety of options in which to share your talents – elevating practice and celebrating strength in your professional and personal goals!  Commit to ASPAN's core purpose by volunteering your skills to advance the unique specialty of perianesthesia nursing.