

Awareness of general nurses in management of postoperative pain through patient controlled analgesia - Comparison among the Czech Republic and the Kingdom of Saudi Arabia

ABSTRACT

Background: Postoperative pain management is one of the largest worldwide challenges faced by healthcare professionals and is one of the most common problems that accompany patients in the postoperative period.

Objectives: We evaluated the awareness of general nurses on the management of postoperative pain through PCA (patient-controlled analgesia) on a multicultural level among general nurses from the Czech Republic (CZ) and the Kingdom of Saudi Arabia (KSA).

Materials and Methods: A cross-sectional study was performed by the distribution of the questionnaires. We distributed 403 questionnaires in CZ and 550 questionnaires in KSA. Statistical analysis was performed by program STATA15 at the significance level $\alpha = 0.05$.

Results: The study included total of 833 respondents ($N = 360$ CZ; $N = 473$ KSA). In both countries, the majority of the respondents were female (CZ 89, 7%; KSA 92, 4%). The average age was similar in both countries (38.6 years in CZ and 35.6 years in KSA). We found out that the use of the treatment through PCA differs between both countries according to the type of department ($P < 0.05$). We verified that the frequency of use of the PCA method differs in the post-anesthesia care unit between CZ and KSA ($P = 0.000$).

Conclusions: According to the available results, we can state that the general nurses in KSA care for patients with the PCA much more often and have more experience with the PCA than general nurses from CZ.

Key words: Adult, knowledge, patient-controlled analgesia (PCA), postoperative pain management, registered nurses

Introduction


The management of postoperative pain is one of the largest challenges worldwide that healthcare professionals face in

healthcare facilities.^[1] Postoperative pain is one of the most common problems that accompany patients in the postoperative

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How to cite this article: Mackova (Porter) D, Al Harbi M, Tawfeeq NA, Pokorna A. Awareness of general nurses in management of postoperative pain through patient controlled analgesia - Comparison among the Czech Republic and the Kingdom of Saudi Arabia. Saudi J Anaesth 2022;16:10-6.

Access this article online	
Website: www.saudija.org	Quick Response Code 
DOI: 10.4103/sja.sja_318_21	

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Submitted: 05-May-2021, **Revised:** 26-May-2021, **Accepted:** 07-Jun-2021, **Published:** 04-Jan-2022

period.^[2] Ensuring the effectiveness of postoperative pain management is a global problem and challenge in every healthcare facility in the world. Once the patients are not receiving adequate treatment for the postoperative pain, then there is a negative impact on the physical, psychological, and emotional health of the patients. If the patient has sufficient treatment of the acute pain, not only is there a reduction of the complications caused by acute postoperative pain, but also, among other things, there is a reduction in the patient's emotional suffering, which includes symptoms such as fear, anxiety, frustration, and so on.^[3,4] Inadequate treatment affects the overall condition of the patients, including the cardio-pulmonary system and deterioration of the overall patient's condition.^[2] However, inadequate treatment of acute pain prolongs recovery time leading to the discomfort of the patient and the length of hospitalization and rehabilitation is extended. With long-term of postoperative pain, the patient's quality of life decreases.^[5,6] General nurses play a major part in the adequate management of postoperative pain in patients. Their role is unique and very important.

In the early 1990s, the concept of multimodal analgesia was established across the world including patient-controlled analgesia (PCA) for the proper treatment of pain in the postoperative period.^[3] PCA has been established since 1971 to control moderate to severe pain.^[7] PCA is patient-controlled analgesia that allows the patient to administer the opioids as needed.^[2,8] General nurses set the pump according to the physician orders and the patient receives medication by pressing the pump button. The patients cannot overdose, because the pump will have administered medication according to the time setting programmed by the general nurses.^[9,10] PCA is mostly prescribed to the patients after major surgical procedures, where the patients will be in moderate to severe pain intensity.^[8] An important part is proper education of the patients before surgery—how the PCA pump works and how to control the pump. In addition to the patient's education, the general nurses must be educated and competent with the PCA. They must know how to manage pain through the PCA, how to document, and what side effects patients can experience.^[6,11,12] It is extremely important that the general nurses are observing the effectiveness and safety during the period when the patient is on the PCA. The most important observation is scoring pain by using a proper pain assessment tool, sedation score, respiratory rate, and any other side effects.^[13,14] Our study focused on whether general nurses have sufficient knowledge and awareness of the treatment of postoperative pain through the PCA method and how often they manage patients with the PCA. The study compared the awareness of general nurses using PCA management in two different

countries, the Czech Republic (CZ) and the Kingdom of Saudi Arabia (KSA). The main author currently works in the KSA, where she gained experience using effective PCA and correct pain management in postoperative care. The authors have already published a literature review focusing on the management of postoperative pain.^[15]

Materials and Methods

Aim

To evaluate the knowledge and experience of the general nurses with the management of postoperative pain through PCA among a selected group of general nurses in the Czech Republic and the KSA.

Design

A survey was taken by using a cross-sectional questionnaire between the general nurses working in the surgical departments with the patients in the postoperative period in the CZ and the KSA.

Tools used for data collection/participants

For our study, we did not find any standardized questionnaire that would meet our criteria to achieve the aims of the study. The study deals with the knowledge and experience of general nurses with postoperative pain management, where an integral part is the experience and awareness of general nurses with postoperative pain management through PCA.

We created our questionnaire to achieve our aims. The questionnaire contained 34 items on nine pages (including the informed consent and explanation for answering the questions) that were used to identify important data in our study. The questionnaire was divided into two parts, where the first part contained questions related to the demographic data, the second part of the questionnaire consisted of questions concerning the knowledge, experience, and awareness of general nurses with postoperative pain management. The questionnaire also included informed consent, an explanation for answering the questions, and the approximate time for filling the questionnaire. The questionnaire was voluntary and it was an open survey. We focused on which general nurses are experiencing patients with PCA, how often, and what are the most common medications prescribed for PCA. The selected findings are presented in the Results section. The respondents who participated in the questionnaire survey were general nurses from surgical departments of any type (Standard surgical departments, Daycare Surgery Unit, Post-Anesthesia Care Unit, and Surgical ICUs) where patients are in the postoperative period. The minimum length of practice of general nurses was 2 years. Participants were general nurses

of multicultural nationalities as the study took place in CZ and KSA.

Collection of data

We have distributed in total 953 questionnaires ($n = 403$ in CZ and $n = 550$ in KSA). We have excluded in total 120 questionnaires (43 from CZ which was 11% and 77 from KSA which was 14%) due to incomplete answers in the questionnaires or not meeting the inclusion criteria for the study. For the statistical analysis, we included a total of 833 questionnaires (360 from CZ with a response rate of 89% and 473 from KSA with a response rate of 86%). The time frame of data collection from both countries was from June 2018 to December 2019. The link to the questionnaire was distributed online via an e-mail address in cooperation with hospitals. The link was also posted on social media as help by general nurses to get more respondents. The online survey has a review step or an option to come back to the previous page/questions. All the data, including not completed questionnaires, are stored in a safe place and the copy is on the external disk, where nobody, except the main author, has access.

Ethical approvals

All essential procedures related to the questionnaire survey have been reviewed and approved by the Ethics Committee—IRB approval. See the section ethical consideration.

Study variables and measures

The statistical analysis of the study was performed by using the STATA 15 program. The normality of variables was valorized by the means of the visual assessment of histograms, which was adequate given the central limit theorem and the number of respondents from both countries. The category of variables was tested using the Chi-square test. For the statistical analysis, we used arithmetic means and the ANOVA range for the independent sample. All the tests were two-tailed; $P < 0.05$ was considered statistically significant on the significance level of 5% with no further alterations.

Validity and reliability

The sample of the respondent is a sufficient size 953 questionnaires (403 in CZ and 550 in KSA) to perform statistical analysis and operations. All the data were verified through the statistically significant P value. However, we did not use the standardized questionnaire, as no proper standardized questionnaire for our study was found. All questions in our questionnaire were exploratory. The questionnaire is based on mostly descriptive categorical questions with only a few scale questions which are independent of each other. The questionnaire was developed based on the available

clinical guidelines, which focused on postoperative pain management. Overall, the questionnaire was developed to assess practical tasks in accordance with international guidelines. As there are no other questionnaires that can be used as golden standard, concurrent and predictive criterion validity is not applicable.^[16] The prior distribution of the questionnaire enabled us to conduct the pilot study effectively. In total, we distributed 30 questionnaires in each country to evaluate if the items were understood correctly.

Results

For the statistical analysis, we had samples of 833 nurses ($N = 360$ from the CZ and $N = 473$ from KSA). All the important identification data of the respondents are mentioned in Tables 1 and 2. Some of the differences found were regarding the level of education. In both countries, most participants had a bachelor's degree (CZ 34.7% and KSA 72.1%), however, this was different for the secondary school of nursing which was 0% in KSA, but 30.0% in CZ. The finding shows that in KSA most respondents had a university degree, while in the CZ, the education of the respondents was more diverse. In the CZ, we had five different nationalities between the respondents, such as Czech, Slovak, Polish, Greek, and

Table 1: Characteristics of research sample (CZ $n=360$; KSA $n=473$)

Demographic data			
Gender	Country	<i>n</i>	%
Female	CZ	323	89.7
	KSA	437	92.4
Male	CZ	37	10.3
	KSA	36	7.6
Age			
Average	CZ	38.6 years	
	KSA	35.68 years	
Minimum Age	CZ	21 years	
	KSA	23 years	
Maximum Age	CZ	64 years	
	KSA	59 years	
Education			
Level of education	Country	<i>n</i>	%
Secondary school of nursing	CZ	108	30.0
	KSA	0	0
Diploma degree	CZ	63	17.5
	KSA	119	25.16
Bachelor's degree	CZ	125	34.7
	KSA	341	72.09
Master's degree	CZ	55	15.3
	KSA	12	2.54
Other education	CZ	9	2.5
	KSA	1	0.21
	KSA	15	3.17

Note: "Other education" Doctorate degree

Hungarian. In the KSA, the nationalities were wider, and in total, 16 different nationalities, such as Saudi, British, Canadian, Czech, Finnish, Indian, Irish, Jordanian, Malaysian, Philippines, Portuguese, Puerto Rican, Slovak, South African, South Korean, and Spanish.

We assumed that there will be differences in the use of PCA among the general nurses from CZ and KSA. The questionnaire contained four questions dealing with this topic and the results of some of them are described here. We tried to find out whether the use of treatment through PCA differs according to the type of department where general nurses work or according to their education.

Experience with PCA

The aim was to find out if the general nurses in CZ and KSA are familiar with this method, which is essential for the effective management of postoperative pain. Based on the data analysis, we verified that the general nurses from KSA are more aware and more often in contact with PCA than the general nurses from CZ. Most respondents from CZ are not aware of this method. For example, if we compared the standard surgical departments, general nurses from KSA use PCA in 85%; only 15% do not use and do not have experience with the PCA in these departments. While the results from CZ revealed that general nurses from the standard surgical departments use PCA only in 16%, another 84% of general nurses do not use and do not have experience with PCA. Another finding was related to the post-anesthesia care unit wherein KSA general nurses answered that they use PCA 100%, while in CZ in the same department only 11% of the general nurses stated they use this method, 53% of the general nurses do not use it and 37% of the general nurses from this the department are not aware of this method [Table 3].

The main differences related to the experience with PCA and the education of general nurses are summarized in Table 4.

The frequency of the PCA usage

We analyzed how often general nurses care for patients with the PCA. The respondents had three choices, "often," "not very often," and "rarely." General nurses from standard surgical departments in CZ responded to the possibility of "often" only in 7%, the possibility "not very often" and "rarely" in both cases was answered in 47%. Respondents from KSA working in the standard surgical departments responded to the possibility of "often" in 36%, "not very often" in 34%, and "rarely" in 30%. General nurses from the daycare surgery unit from both countries had very similar outcomes. On the contrary, different answers occurred again among the respondents in the post-anesthesia care unit. In KSA, 85% of the respondents chose the option "often," 12% chose the

Table 2: Characteristics of research sample (CZ n=360; KSA n=473)

Occupation			
Length of work experience			
Average length	CZ	17.45 years	
	KSA	12.35 years	
Minimal length	CZ	3 years	
	KSA	3 years	
Maximal length	CZ	45 years	
	KSA	40 years	
Department	Country	n	%
Surgical department	CZ	96	26.67
	KSA	177	37.42
Daycare surgery unit	CZ	9	2.50
	KSA	18	3.81
Post-anesthesia care unit	CZ	38	10.56
	KSA	73	15.43
Surgical ICUs	CZ	101	28.06
	KSA	190	40.17
Other units	CZ	116	32.22

"Other units" includes departments such as medical surgical ICU step-down, Hematology transplant department, Neurosurgery ICU, Cardiac surgery ICU and Cardiac surgery department

Table 3: Experience with PCA and departments (CZ n=360; KSA n=473)

Department	Country	The experience of using the PCA			P*
		Yes	No	I don't know	
Surgical department	CZ	16%	39%	46%	0,000
	KSA	85%	15%	0%	
Daycare surgery unit	CZ	22%	44%	33%	0,009
	KSA	6%	94%	0%	
Post-anesthesia care unit	CZ	11%	53%	37%	0,000
	KSA	100%	0%	0%	
Surgical ICUs	CZ	32%	44%	25%	0,000
	KSA	56%	43%	1%	
Others	CZ	16%	43%	41%	0,000
	KSA	40%	53%	7%	

Note: "Others" includes departments such as medical surgical ICU step-down, Hematology transplant department, Neurosurgery ICU, Cardiac surgery ICU and Cardiac surgery department * Chi-square test

option "not very often," and only 3% of the respondents chose the option "rarely." However, general nurses from the same department in CZ chose the option "often" only in 25%, "not very often" also in 25%, and the option "rarely" in 50%.

We have verified that the frequency of using the PCA method differs in the post-anesthesia care unit between CZ and KSA ($P = 0.000$).

The most commonly used medication in PCA

Last but not the least, we were interested in what kind of medications are prescribed most frequently for PCA. The respondents had a choice of morphine, hydromorphone,

fentanyl, and option “other.” In both countries, in nearly all types of departments, the most commonly prescribed medication for PCA was morphine. In KSA, the most commonly used medication in every department was morphine. In CZ, the most commonly used medication was morphine in every department except the daycare surgery department, where the most common medication was hydromorphone and fentanyl. All results of the most commonly used medication in PCA in the individual departments are summarized in Table 5.

Discussion

The study highlighted the differences in the knowledge, experience, and awareness of general nurses with the management of postoperative pain through PCA in CZ and KSA. The total number of respondents used for the statistical analysis and subsequent comparison of data was 883 (CZ $N = 360$; KSA $N = 473$). We found out, among other things, how often general nurses care for patients with PCA and what is the most prescribed medication used for PCA. The

study showed us significant differences regarding this kind of method between the two countries. We came to very surprising results regarding the experience of general nurses with PCA. The general nurses working in the post-anesthesia care unit in KSA answered 100% that they have experience and receive patients with PCA, while only 11% of the general nurses from CZ working in the same department answered that they have experience in receiving patients with PCA. We assumed that general nurses from the post-anesthesia care unit would encounter PCA most often and have greater experiences than any other general nurses from other departments because they are admitting all kinds of patients immediately after surgeries and their competencies are wide. Authors of one international study described that patients in the post-anesthesia care unit did not have sufficient pain control in the early postoperative period, despite having PCA. According to their findings, patients discharged from the post-anesthesia care unit suffered and complained from moderate to severe pain in 24 hours post-surgery. We can assume that the results of their study may have been caused by the lack of awareness and education of general nurses in the post-anesthesia care unit. Similar conclusions may show similar results to our study, where respondents from the post-anesthesia care unit in CZ admit patients with PCA in a very low percentage.^[1]

Another study, specifically from South Korea, which also examined the knowledge of general nurses with PCA, concluded that the knowledge of the general nurses is not sufficient to ensure adequate pain management to the patients in the postoperative period and that the PCA training programs need to be established. About 91.2% of the general nurses wanted to complete PCA training to provide sufficient postoperative treatment to the patients in the postoperative period.^[17] The results of our study confirmed a statistical significance between the two countries in all departments, namely standard surgical department ($P = 0.000$), daycare

Table 4: Experience with PCA and level of professional education (CZ $n=360$; KSA $n=473$)

Nursing Education	Country	The experience of using the PCA			P*
		Yes	No	I don't know	
Secondary school of Nursing	CZ	21%	32%	47%	- **
	KSA	0%	0%	0%	
Diploma degree	CZ	27%	35%	38%	0,000
	KSA	74%	25%	1%	
Bachelor degree	CZ	18%	49%	33%	0,000
	KSA	69%	30%	1%	
Master degree	CZ	16%	60%	24%	0,000
	KSA	92%	8%	0%	
Others	CZ	0%	56%	44%	0,007
	KSA	100%	0%	0%	

Note: * Chi-square test; - ** Not enough response to compare; “Others” doctorate degree $n=3$ CZ and $n=1$ KSA

Table 5: The most commonly used medication in PCA (CZ $n=360$; KSA $n=473$)

Department	Country	Medication used in PCA				P*
		Morphine	Hydromorphone	Fentanyl	Others	
Surgical department	CZ	80%	0%	13%	7%	0,003
	KSA	97%	1%	2%	0%	
Daycare surgery unit	CZ	0%	50%	50%	0%	0,223
	KSA	100%	0%	0%	0%	
Post-anesthesia care unit	CZ	50%	0%	25%	25%	0,000
	KSA	100%	0%	0%	0%	
Surgical ICUs	CZ	66%	3%	13%	19%	0,062
	KSA	72%	11%	17%	0%	
Others	CZ	53%	0%	26%	21%	0,000
	KSA	83%	17%	0%	0%	

Note: “Others” in departments includes departments such as medical surgical ICU step-down, Hematology transplant department, Neurosurgery ICU, Cardiac surgery ICU and Cardiac surgery department. “Others” in medication includes Dipidolor, Sufenta and Tramal; * Chi-square test

surgery ($P = 0.009$), post-anesthesia care unit ($P = 0.000$), surgical ICUs ($P = 0.000$) and “others” ($P = 0.000$). Statistical significance between the two countries regarding PCA experience and education was also confirmed.

We tried to find other international studies investigating how often general nurses encounter patients with PCA, but we did not find any study published on this subject. However, we asked our respondents how often they receive patients with PCA, and according to their response, we confirmed the statistical significance between the two countries in only one department which was the post-anesthesia care unit ($P = 0.000$), the statistical significance was not confirmed in the other departments.

The last finding regarding the experience with PCA was related to the most common medications prescribed to the patients for the PCA. The respondents had a choice of several options, but every choice was the opioid. From the available results, we can declare that in both countries the predominant response was morphine as the most commonly prescribed and administered medication for PCA. Alongside the option of morphine, the respondents also chose fentanyl, hydromorphone, and item “others,” where the respondents mentioned dipidolor, sufenta, and tramal. From all the available international studies related to PCA and medications prescribed for PCA, we can see that the selected medications are always opioids. For this reason, we can state that it is again necessary to pay attention to proper education and training of general nurses with the PCA. They need to be aware and familiar with the side effects opioids can have and the treatment in case patients develop any side effects during the administration of opioids. The authors of the study have already described that morphine is the most commonly used medication in PCA, and therefore, patients can experience side effects such as nausea, vomiting, itching, respiratory depression, etc.^[18]

Strengths and limitations

The main strength of this study is to help understand the current issue with the management of postoperative pain on a global scale. Much research is devoted to and focuses on pain management but still appears insufficient as patients continue to suffer from postoperative pain daily. Another strength of the study is the level of obtained data, which can help healthcare facilities to improve education and the competence of general nurses with postoperative pain management through PCA.

Conclusion

The results of our study revealed significant differences in the experience and awareness of general nurses regarding

the management of postoperative pain through PCA between two different countries. We learned, that general nurses working in KSA care for patients with PCA much more often and have higher knowledge and experience with the PCA method than the general nurses from CZ. The conclusion highlights that it is important to pay more attention to the education of general nurses with PCA in CZ. Treatment of postoperative pain with PCA is evaluated by general nurses as a very effective method in the postoperative period after major surgeries, where moderate to severe pain is expected.

From the results, we understand how important it is to continue to learn about the treatment of postoperative pain and to continue to educate general nurses, and especially physicians, to prescribe PCA for pain management more often. Awareness and adequate knowledge of the effectiveness of this method are very important for medical and non-medical professionals working with patients in the postoperative period. The management of postoperative pain through PCA is also followed by cooperation with the Acute Pain Service Team (APS), which was also focused in our research. The results regarding the APS cooperation are base for the further publication.

Ethical considerations

All essential procedures related to the questionnaire survey have been reviewed and approved by the Ethics Committee. All the necessary approval process started prior to the data collection. The Ethics Committee in the King Abdullah International Medical Research Center in the Kingdom of Saudi Arabia approved the project no. SP18/028/R on 20th March 2018. The Ethics Committee in University of Ostrava in the Czech Republic approved the project no. EK c.19/2018 on 12th April 2018.

Contribution Details

Concept and details (DP), Literature search (DP), Data analysis and interpretation (DP, MH, NT, AP), Investigation (DP), Manuscript preparation (DP, MH, NT, AP), Manuscript writing (DP), Manuscript editing (MH, NT, AP), Responsibility for the integrity of the work, guarantor” (AP).

Financial support and sponsorship

The study was supported by university grant. Name of the project: Pain Management in the Postoperative Period, Knowledge and Experience of General Nurses. (Czech Republic and Kingdom of Saudi Arabia), SGS05/LF/2019-2020, Medical Faculty University of Ostrava, Czech Republic.

Conflicts of interest

There are no conflicts of interest.

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