



Pain management in the older adult: The relationship between nurses' knowledge, attitudes and nurses' practice in Ireland and Jordan

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ABSTRACT

Background: Research studies regarding nurses' knowledge attitudes and practice in the older adult are limited. Furthermore, none of these studies attempted to investigate the relationship between knowledge attitudes and practice. Furthermore, little studies compared nurses' knowledge, attitudes and practice between Eastern and Western countries.

Aim: To describe the factors associated with nurses' acute pain management practice in the context of caring for older adult patients.

Method: A quantitative, correlational, comparative and cross-sectional survey approach.

Data collection: Data were collected using survey questionnaire.

Sample: A sample of 267 registered nurses from Ireland and Jordan (one private hospital in each country).

Results: A multiple linear regression analysis revealed that nurses' general knowledge and attitude towards pain management was associated with their pain management practice, with a regression coefficient of 0.14 ($p = 0.002$). However, knowledge of pain in the elderly failed to reach a statistically significant relationship with pain management practice. In regards to country and gender, Irish nurses had an average score that was 2.61 points higher than Jordanian nurses ($p < 0.001$), female nurses had an average score that was 0.67 points higher than male nurses ($p = 0.025$). The overall regression model was significant ($p < 0.001$) with an R^2 value of 43.2%, indicating that 43.2% of the variation in scores was explained by knowledge, attitude and practice.

Conclusion: More research studies combining the three concepts (knowledge, attitude and practice) are recommended in the area of pain management.

1. Background and introduction

Regardless of the availability of pain management policies, research has shown that up to half of adult and older adult patients suffer from moderate to severe pain in acute care setting (Duncan, 2011; Wang & Tsai, 2010; Yorke et al., 2004). In one study, 60% of patients in accident and emergency department had to wait for 90 min to receive analgesia (Todd et al., 2007).

The older adult patient population is growing and lives longer. According to a recent statistic by the World Health Organisation (WHO, 2018) the percentage of the people over 60 years old will be doubled to 22% of the total world population. In Ireland more than 11.6% of the people are aged over 65 years (The Irish Central Statistics Office, 2011). This number increased to almost 13% in 2015 according to the Irish

Central Statistics Office website (accessed 2018) because of the advances in the quality of healthcare delivery. In Jordan, older adults aged 65 years and older account for 3.2% of the population (The Jordanian Department of Statistics, 2011). Advances in healthcare mean that people are living longer and older adult patients are more frequently admitted to hospitals for elective surgeries than before (Phelan, 2010). Therefore, more attention has to be given to pain management among the older adult patient populations. In such a vulnerable group of patients, pain can lead to several undesirable consequences such as anxiety, sleeplessness, depression, social isolation and disturbance in their physical activities (Thomas & Cavalieri, 2007; Alm & Norbergh, 2013).

Considering recent research studies, it is obvious that nurses have knowledge deficit of and negative attitudes towards pain management in adult and older adult patients (Al Qadire & Al Khalaileh, 2014; Burns

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et al., 2010; Eid et al., 2014; Gregory & Haigh, 2008; Kiekkas et al., 2015; Lewthwaite et al., 2011; Mocerri & Drevdahl, 2014; Rejeh et al., 2013; Vickers et al., 2014; Voshall et al., 2013; Wang & Tsai, 2010; Zhang et al., 2008). This may have a negative effect on pain management practices, especially in older adult patients. Therefore the current study was conducted to measure nurses' knowledge of and attitudes towards pain management and to describe the factors associated with nurses' acute pain management practice in the context of caring for older adult patients. Furthermore, there is limited studies compared nurses' knowledge of and attitude towards pain management and pain management practices between the east and the west.

2. Aim and objectives

The aim of the study was to describe the factors associated with nurses' acute pain management practice in the context of caring for older adult patients.

And the objectives were:

1. To measure nurses' knowledge of and attitudes towards pain management and pain management practice.
2. To compare knowledge of and attitudes towards pain management and pain management practices of older adult patients between Irish and Jordanian nurses'.
3. To investigate the relationship between socio-demographic variables (age, gender, level of education, clinical area, years of clinical experience, pain education and country of practice), nurses' knowledge of and attitudes towards pain management and their pain management practices with older adult patients.

3. Methodology

3.1. Research design

Cross-sectional comparative design was used for the current study.

3.2. Sample and setting

A convenience sample technique was used to recruit study participants. 267 registered nurses were recruited, 126 from Ireland and 141 from Jordan. The study was conducted in two large private teaching hospitals in Ireland and Jordan. Each of the targeted hospitals has pain management department.

The sample size calculation was performed using the G-Power 3.1 program (Erdfelder et al., 1996). The sample size for this study was rounded up to 220 participants. Extra 50 participants were recruited to cover missing data.

3.3. Data collection procedure

Appointment was booked with each director of nursing from the two hospitals. The study was explained to the director of nursing and list of nurses' names and their area of work were requested. Survey included information leaflet was sent to each nurse and they were asked to return completed surveys to the director of nursing office. The surveys were collected after two weeks.

4. Instrument

The survey used for the current study consisted of four parts. Socio-demographic survey (part 1) followed by (part 2) the KAS (Ferrell & McCaffery, 2014) and the PES (Sloman et al., 2001) (part 3). Part 4 of the survey included three vignettes (patients A, B and C) followed by the competency survey for each vignette.

In part one, respondents were asked questions relating to their age, gender, highest level of education, clinical area of practice, years in

nursing since graduation as a general nurse and specific pain education received.

Part two of the survey covered the area of nurses' knowledge of and attitudes towards pain management in a general context; the KAS (Ferrell & McCaffery, 1987) was used. The instrument consists of 39 questions, 22 true or false questions, 15 multiple choice questions and 2 case study questions. It contains 5 cancer pain questions and 2 children pain questions, which were omitted. For this study, the two case studies were also omitted and replaced by two vignettes chosen from Farrell and McCaffery's instruments selection on their website (<http://prc.coh.org>) to assess practice, which is highlighted in the fourth section of the survey.

Part three included a survey relates to nurses' knowledge of pain management in older adults which was measured using the (Pain in the elderly) PES (Sloman et al., 2001). The instrument consists of 14 questions with three possible answers: true, false or don't know.

Part four of the survey investigated nurses' pain management practices in the context of older adults; three vignettes were chosen from two surveys (A, B and C).

The first two vignettes A and B, were obtained from 'Controlling Pain Vignettes' (Ferrell & McCaffery, 1998), which investigated nurses' pain management practices. Vignette C was adapted from Ng et al. (2014), investigated nurses' pain assessment practices with cognitively impaired patients. The vignette is a male case study has 6 questions to assess practices of nurses in relation to older adults with cognitive impairment.

The overall scales (A, B and C) combined consisted of 10 questions, with a maximum possible score of 10 (100%). A score of 10 was considered "best practice", while a score of 8 or more was considered good practice and a score less than 8 was considered poor practice.

Part four, also, included self-rated competency prepared by researcher (Alomari, 2017) which asked participants to self-rate in relation to each vignette. Each of the three competency surveys had three questions in relation to how competent the participant felt the assessment of the pain, implementation of pharmacological intervention to manage pain and implementation of nursing intervention to promote patient's comfort in each vignette. Competency was self-rated on a 5-point Likert scale ranging from "Not competent" (score = 0) to "Extremely competent" (score = 4).

5. Inclusion and exclusion criteria

A convenience sample of registered general nurses from all wards was chosen from two hospitals, one in Ireland and one Jordan. The Ability to read and understand the English language was considered for inclusion. Furthermore, full-time nurses, part-time nurses and nurse managers were included to maximise the study sample.

On the other hand Registered nurses working in children's wards, maternity wards and oncology wards were excluded, because pain management for these populations is different than for older adults.

6. Reliability and validity

Since the instrument was modified, reliability and validity testing were carried out. For reliability, Cronbach's alpha was calculated for each scale. For the KAS Cronbach's alpha was ($\alpha = 0.73$) demonstrated that the scale had good internal reliability. However, for the PES, Cronbach's alpha for the scale was below the acceptable level of 0.70 ($\alpha = 0.49$), an alpha value >0.7 was considered acceptable (Bland & Altman, 1997; DeVellis, 2003).

For pain management practices scale (Ferrell & McCaffery, 1998; Ng et al., 2014) Cronbach's alpha was above the acceptable level of 0.70 (alpha = 0.81), demonstrating that the scale had good internal reliability. Finally, Cronbach's alpha for the competency scale was above the acceptable level of 0.70 (alpha = 0.83), demonstrating that the scale had good internal reliability.

In relation to the instrument validity, the choice of survey

instruments was based upon a comprehensive review of the literature. In addition, the survey was reviewed by experts ($n = 7$) who commented on the survey's face and content validity and provided data used to calculate the CVI/CVS. Three experts from Jordan (a pain management consultant, pain management nurse and intensive care specialist nurse) and four experts from Ireland (two pain management consultants and two pain management nurses) reviewed the instrument. All questions were content valid, regarding the clarity of the instrument, the panel has agreed that all questions were clear. Also, in term of consistency, the instrument questions were consistent according to the panel of experts' feedback.

7. Ethical consideration

Ethical approvals were obtained from the targeted two private hospitals. To maintain the principle of privacy, the information obtained was private and confidential and was treated as such, meaning that nurses were asked not to write any information on the survey that may reveal their identity. Participants were assured of anonymity and confidentiality, and were informed that the completion of the questionnaire can be carried out in private and at the respondents' leisure. All data were stored in a secure, locked safe and the researcher's office computer was protected by password. The study participants were assured that they are not obligate to participate in the study and they have the right to withdraw from the study at any stage without any penalties.

8. Pilot testing

To ensure the study was implemented with minimum difficulties, the researcher needed to carry out a small-scale study; pilot study usually involve using 10% of the actual number of participants targeted from the main study; this is called a pilot study. Based on the sample size calculation, the researcher of the current study decided to conduct a pilot study with twenty participants, each participant was given an envelope containing the information letter about the study an evaluation sheet to evaluate the survey and the survey questionnaire. Following the pilot study, some modifications and amendments were made to the survey. These were mostly related to the design of the survey such as writing each vignette on a separated page. The participants from pilot study were excluded from the main study.

9. Results

270 surveys were distributed, 267 were returned (126 from Ireland and 141 from Jordan) with response rate of 99%. Relationships between variables were examined using descriptive and inferential statistical analysis. SPSS (20) was used to support the analysis of the data.

The majority of respondents were female (64%, $n = 171$), and the percentage of females was significantly higher in the Irish sample (77.8% (Ireland) vs 51.8% (Jordan), $p < 0.001$). The median (IQR: InterQuartile Range) age of respondents was 29 (24 to 42) years, and Irish respondents were significantly older than Jordanian respondents (median (IQR): 40(29 to 47) vs 26(24 to 30), $p < 0.001$). See [Table 1](#) for more details.

Measuring nurses' knowledge of and attitude towards pain management and pain management practice as well as comparing results between Ireland and Jordan:

- (1) Knowledge and attitudes towards pain management in general context

On average, Irish respondents scored more correct answers than Jordanian respondents. Using 80% as the pass rate, 13 respondents passed the test ($n = 12$ from Ireland and $n = 1$ from Jordan). From [Table 2](#) it is evident that Irish respondents performed better on 26 of the

Table 1
Socio-demographic characteristics of the respondents.

	Total		Jordan		Ireland		p-Value ²
	(n = 267)		(n = 141)		(n = 126)		
	n	(%) ¹	n	(%) ¹	n	(%) ¹	
Age (years):		(24 to		(24 to		(29 to	
median (IQR)	29	42)	26	30)	40	47)	<0.001 ³
Min to max	21 to 59		21 to 56		22 to 59		
Gender							<0.001*
Female	171	(64.0)	73	(51.8)	98	(77.8)	
Male	96	(36.0)	68	(48.2)	28	(22.2)	
Highest level of education							<0.001*
Nursing certificate	45	(16.9)	26	(18.4)	19	(15.1)	
Diploma	37	(13.9)	24	(17.0)	13	(10.3)	
Degree (BSc)	159	(59.6)	90	(63.8)	69	(54.8)	
Higher diploma	19	(7.1)	0	(0.0)	19	(15.1)	
Masters	7	(2.6)	1	(0.7)	6	(4.8)	
Clinical area							<0.001*
Medical	94	(35.2)	66	(46.8)	28	(22.2)	
Post-op/surgical	64	(24.0)	12	(8.5)	52	(41.3)	
ICU/CCU/HDU	36	(13.5)	24	(17.0)	12	(9.5)	
Theatre/							
interventional	34	(12.7)	16	(11.3)	18	(14.3)	
Day-care	19	(7.1)	11	(7.8)	8	(6.3)	
Orthopaedics	12	(4.5)	4	(2.8)	8	(6.3)	
Emergency room	8	(3.0)	8	(5.7)	0	(0.0)	
Years in nursing since graduation as a general nurse							<0.001*
Less than one year	33	(12.4)	26	(18.4)	7	(5.6)	
1–5 years	99	(37.1)	84	(59.6)	15	(11.9)	
6–10 years	35	(13.1)	11	(7.8)	24	(19.0)	
11–15 years	35	(13.1)	13	(9.2)	22	(17.5)	
16–20 years	16	(6.0)	3	(2.1)	13	(10.3)	
More than 20 years	49	(18.4)	4	(2.8)	45	(35.7)	
Pain education							0.014 ^{4,*}
None	75	(28.1)	49	(34.8)	26	(20.6)	
Education related to pain management as part of an undergraduate programme	48	(18.0)	0	(0.0)	48	(38.1)	
In-service education regarding pain management	131	(49.1)	61	(43.3)	70	(55.6)	
Pain management course less than 6 weeks	36	(13.5)	31	(22.0)	5	(4.0)	
Pain management qualification (e.g. higher diploma)	3	(1.1)	2	(1.4)	1	(0.8)	

n = Number of participants, % = percentage.

¹ Unless otherwise stated.

² From Fisher's exact test unless otherwise stated.

³ From Mann-Whitney U test.

⁴ p-Value is based on grouping of education into pain education; none vs some.

* $p \leq 0.05$.

30 questions. The average number of questions answered correctly was 15.5 questions (out of a possible maximum of 30, SD = 4.8, range 0–26). In terms of percentages, the average percentage answered correctly was 51.7% (SD = 16.1%, range 0–86.7%). The summary statistics of the respondents' scores on the scale overall and split by country are given in [Table 2](#).

Table 2
Summary statistics for the knowledge and attitudes of pain management scale (KAS).

Population	n	Possible range	Observed range	Mean	(SD)	Median	(IQR)	Percentage of correct answers
Overall	267	0 to 30	0 to 26	15.5	(4.84)	15	(12 to 19)	51.7%
Jordan	141	0 to 30	0 to 26	12.3	(3.66)	13	(10 to 14)	40.9%
Ireland	126	0 to 30	10 to 25	19.2	(3.06)	19	(17 to 22)	64%

SD = standard deviation, IQR = interquartile range, n = number of participants.

(2) Knowledge of pain management in the older adult

The average number of questions answered correctly was 7.4 (out of a possible maximum of 14, SD = 2.45, range = 0–13). In terms of percentages, the average percentage answered correctly was 53.1% (SD = 17.5%, range = 0–92.9%). On average, Irish respondents scored better than Jordanian respondents. Using 80% as the pass rate, 11 respondents passed the test, all of whom were from Ireland. The summary statistics of the respondents' scores on the scale overall and split by country are given in [Table 3](#).

(3) Pain management practices

The average number of questions answered correctly was 5.1 (out of a possible maximum of 10, SD = 2.9). The lowest number answered correctly was 0 and the highest number answered correctly was 10. On average, Irish respondents scored better than Jordanian respondents. Four respondents (1.5%), all from Ireland, achieved the maximum score of 10 points for "best practice". Seventy one respondents (26.6%) achieved a score of 8–9 for "good practice" and the rest of the participants (72%, n = 192) achieved a score of less than 8 which is considered "poor practice". When split by country, 7.1% (n = 10) of respondents from Jordan and 48.4% (n = 61) of respondents from Ireland achieved a "good practice" score. The summary statistics of the scale are given in [Table 4](#).

(4) Self-rated competency in pain management

Scores on the competency scale could range from 0 to 4, with higher scores representing greater competency. The summary statistics of the scale are given in [Table 5](#). Overall, the mean score on the competency scale was 2.2 (possible range: 0 to 4, SD = 0.55), indicating that respondents felt that they were competent at managing the patients' pain. On average, Irish respondents self-rated their competency higher than Jordanian respondents.

9.1. Regression analysis to test relationship between knowledge, attitude and practice

Multiple linear regression model was applied to investigate the relationships between socio-demographic variables, KAS, PES, self-rated competency and practices of pain management with older adults. [Table 6](#) represents the results of relationships included in the regression analysis. Age and clinical areas were not included in the final model because age was highly correlated with the three scales (KAS, PES and practices scale) and Clinical area was not included because there were many categories, and the counts in some of the categories were low. However, their relationships were tested within the univariate analysis.

Table 3
Summary statistics for the knowledge of pain in elderly scale (PES).

Population	n	Possible range	Observed range	Mean (SD)	Median (IQR)	Percentage
Overall	267	0 to 14	0 to 13	7.4 (2.45)	7 (6 to 9)	53.1%
Jordan	141	0 to 14	0 to 11	6.1 (2.05)	6 (5 to 7)	43.5%
Ireland	126	0 to 14	3 to 13	8.9 (1.94)	9 (8 to 10)	63.8%

n = Number of participants, SD = standard deviation, IQR = interquartile range.

Table 4
Summary statistics for the pain management scale.

Score	n	Possible range	Observed range	Mean (SD)	Median (IQR)
		0 to 10			
Overall	267		0 to 10	(2.86) 5.1	(3 to 8)
Jordan	141		0 to 9	(2.41) 3.3	(1 to 5)
Ireland	126		1 to 10	(1.97) 7.0	(6 to 8)

n = Number of participants, SD = standard deviation, IQR = interquartile range.

Table 5
Summary statistics for the self-rated competency scale.

Score	n	Possible range*	Observed range	Mean (SD)	Median (IQR)
		0 to 4			
Overall	267		1 to 4	2.2 (0.55)	2.1 (1.89 to 2.44)
Jordan	141		1 to 3.33	2.1 (0.38)	2.0 (1.78 to 2.33)
Ireland	126		1 to 4	2.3 (0.67)	2.1 (2 to 2.67)

* Higher score represents greater competency, n = number of participants, SD = standard deviation, IQR = interquartile range.

The multiple linear regression model show R² value of 43.2% (p = 0.007), indicating that 43.2% of the variation in scores was explained by knowledge, attitude and practice. However, only the knowledge and attitude (KAS) variable was statistically significant (p = 0.002). For every extra question answered correctly on the KAS, the score on the practices of pain management scale increased by 0.14 (95% CI: 0.06 to 0.23). The KAS variable explained 2.2% of the variation in scores. Country and gender were also statistically significantly associated with scores on the pain management practices scale. Irish nurses had an average score that was 2.61 points (95% CI: 1.65 to 3.57) higher than Jordanian nurses (p < 0.001). Country uniquely explained 6.1% of the variation in scores. For gender, female nurses had an average score that was 0.67 points (95% CI: 0.09 to 1.26) higher than male nurses (p = 0.025). Gender uniquely explained 1.1% of the variation in scores.

10. Discussion

Nurses in the current study and in previous studies showed a knowledge deficit of and negative attitudes towards pain management, as reflected in their total KAS scores. An overall result of 51.7% in the

Table 6

The relationships between socio-demographic variables nurses' knowledge and attitudes (KAS), knowledge of pain in the elderly (PES), self-rated competency and the practice of pain management with older adults (n = 267).

Variable	Regression coefficient	(95% CI)	p-Value*
Country			<0.001
Jordan (ref)	0		
Ireland	2.61	(1.65 to 3.57)	
Gender			0.025
Female (ref)	0		
Male	-0.67	(-1.26 to -0.09)	
Highest level of education			0.534
Nursing certificate (ref)	0		
Diploma	-0.51	(-1.48 to 0.47)	
Degree (BSc)	-0.06	(-0.81 to 0.68)	
Higher diploma/masters	-0.57	(-1.68 to 0.55)	
Years of nursing experience			0.300
Less than 1 year (ref)	0		
1-5 years	-0.81	(-1.70 to 0.08)	
6-10 years	-0.45	(-1.58 to 0.67)	
11-15 years	-1.07	(-2.16 to 0.02)	
>16 years	-0.67	(-1.74 to 0.41)	
Pain education			0.805
None	0		
Some	0.08	(-0.53 to 0.69)	
Knowledge and attitudes (KAS)	0.14	(0.06 to 0.23)	0.002
Knowledge of pain in elderly (PES)	-0.05	(-0.20 to 0.10)	0.543
Self-rated competency	0.33	(-0.17 to 0.83)	0.196
Model summary			
p-Value for overall model	<0.001		
R ² (%)	45.9		
Adjusted R ² (%)	43.2		

Possible range of scores 0-10 for dependent variable with higher scores indicating better pain management practices with hypothetical vignettes.

* = Significant results were P-value ≤ 0.05, CI = confidence interval.

current study was within the range of average percentage answered correctly in previous studies, which ranged from 39.6% (Zhang et al., 2008) to 86.3% (Al-Shaer et al., 2011). Jordanian nurses scored 40.8% which was lower than previous results from Middle Eastern countries i.e. 48.3% (n = 211) (Al Qadire & Al Khalailah, 2014), 48% (n = 70) (Al Qadire & Al Khalailah, 2014) and 42% (n = 593) (Eid et al., 2014). Similarly, Irish nurses scored a 63.9% average percentage of correct answers which was lower than two previous Irish studies 73.8% and 65.7% respectively (Matthews & Malcolm, 2007; Vickers et al., 2014). A knowledge deficit regarding pain management seems to be a shared phenomenon among nurses across the globe.

Four studies used the PES previously with average percentage score ranging from 41.7% (Yu & Petrini, 2007) to 71% (Sloman et al., 2001). The result of the current study fell between these results, with an average percentage score of 53.1%. Sloman et al. (2001) did not address the pass percentage for the survey but confirmed that the percentage of correct answers at 71% was considered poor. Therefore 80% and over was set as an acceptable knowledge considering Ferrell and McCaffery's (2014) survey on pain management which indicates that the acceptable knowledge of pain results should be over 80%.

This result indicated that nurses have significantly poorer knowledge of pain management in the context of older adults. Such poor knowledge is not justified in institutions that follow high standards of pain

management set by the Joint Commission International (JCI, 2014). It is obvious from the current study results that there is a significant gap in knowledge of pain management in older adults between Jordan (Middle East) and Ireland (Europe), where the Jordanian nurses score was 43.5% and the Irish nurses score was 63.8% in the current study. Since only four previous studies have used the PES, this is not enough data to generalise the substandard scores of nurses' knowledge of pain management in the context of older adults in the current study.

In relation to the Pain management practices among older adult patients, they were measured using three vignettes for both cognitively impaired and cognitively intact older adult patients (Ferrell & McCaffery, 1998; Ng et al., 2014). Although participants considered themselves competent (mean = 2.2 on a competency scale) in pain management practices, the results revealed that Irish participants scored (mean = 6.98) higher than Jordanian participants (mean = 3.34) out of a possible 10, which reflects poor pain management practice in the context of older adults. This could be related to the poor knowledge of pain management nurses have or their attitudes towards pain management among older adult patients. Another possible reason is that the vignettes were hypothetical practice, which may not reflect what nurses may do in reality (Terry, 2012). Furthermore, lack of association between self-rated competence and good practice suggests that participants may be over-confident which may compromise patients care.

The current study univariate analysis found that there is a strong positive relationship between participants' knowledge of and attitudes towards pain and their pain management practices with older adults using Pearson's correlation coefficient ($r = 0.564, p < 0.001$). Hence, the more knowledge and attitudes participants have in pain management, the better practice they perform. The relationship between KAS and pain management practices was further confirmed by multivariate analysis ($r = 0.14, 95\% \text{ CI: } 0.06 \text{ to } 0.23, p = 0.002$). The KAS variable explained 2.2% of the variation in scores. This was similar to a very recent Jordanian study (Alzghoul & Abdullah, 2015) which used different tools. This result supports Alzghoul and Abdullah's (2015) study findings regarding the application of the KAP model on pain management in Jordanian nurses, which showed a strong positive relationship between knowledge, attitudes and practices. The study indicated a positive relationship between nurses' knowledge of pain management and pain management practices ($\beta = 0.328, t = 6.606, p < 0.001$) and nurses' attitude towards pain management and pain management practices ($\beta = 0.578, t = 11.996, p < 0.001$).

Regarding the relationship between nurses' knowledge of pain in older adults and pain management practice with older adults, the univariate analysis revealed a moderate positive relationship ($r = 0.412, p < 0.001$). However, using multivariate analysis, there was no association between knowledge of pain in older adult and pain management practice ($p = 0.543$). The relationship between knowledge of older adults' pain and pain management practice with older adults failing to reach statistical significance could be due to the survey itself or due to areas that the survey was used for (non-older adults' wards). Furthermore, the tool which was used for the current study to investigate nurses' knowledge of pain in older adults (PES) was a short survey consisting of 14 questions, and the reliability of the scale was low ($\alpha = 0.49$). In addition The PES is 15 years old and was developed from existing literature (Sloman et al., 2001). Exploring the relationship between knowledge and practice of pain management with older adult patients has rarely been investigated previously. Hence, there are no studies that can be compared to the current study to support or contradict its findings. However, this could be taken as a starting point for further research with a review of the tool use of psychometric tests to ascertain the appropriateness of the questions and further study with larger sample size with multiple healthcare institutions involved.

11. Conclusion

The current study results indicate that nurses who had better

knowledge of pain management performed better in pain management practice vignettes. This result raises the need for investing in education at undergraduate level, postgraduate level and clinical level to improve knowledge which will consequently improve practice. However, it is not clear whether the current study survey has captured the actual pain management practice which raises the flag to implement further research studies to investigate actual practice.

The researcher recommended further studies to compare knowledge and practice across countries globally which in turn will reduce the knowledge and practice gap between countries and allow easier adaptation programmes for nurses who travel for work.

CRedit authorship contribution statement

Domam Al Omari: main researcher, literature review, research methodology and discussion of results.

Atallah Alhabahbeh, data collection and data analysis.

Maha Subih: data analysis and presentation of findings, review and editing.

Ahmad Aljabery: data collection, review and editing.

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Declaration of competing interest

None.

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