Sys Rev Pharm 2021;12(3):10-15
A multifaceted review journal in the field of pharmacy

Validation Of One-Dimensional With Two-Dimensional Pain Scales In Post-Operative Children: Randomised Control Trial At A Single Based Hospital In Jordan

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ABSTRACT

Context: Acute procedural pain is a very prevalent problem among post-operative children. However, it is still under-assessed and under-treated due to pain assessment complexity of and delayed treatment of pain in post-operative children. Assessing post-operative pain using valid tools to guide child pain management decisions. Despite multiple research studies of postoperative pain in children, it remains unclear whether using one-dimensional alone or multi-dimensional tools contributes to effective assessment and prompt adequate treatment pain in children.

Objectives: This study examined whether there is any difference in time of pain interventions administration between post-operative children assessed with face pain scale alone and those assessed with face pain scale and physiological parameters.

Methods: The sample population consisted of 150 children randomly assigned into study groups (control=75, Intervention=75) using an excel table of sequential randomization. Participants in the control group assessed for post-operative pain using a one-dimensional tool (WBFPS). Participants in the intervention group were assessed using a multi-dimensional scale that included the face pain scale and physiological measurements (HR, RR, O2 Sat, and B/P). The study was conducted at surgical floors, and Paediatric Intensive Care Unit (PICU) in a single-site case setting (King Abdullah University Hospital)

Results: Data from a total of 150 participants were analysed. There was a statistically significant difference in the mean pain score level between the two groups. The mean pain score in the control group was 1.45±1.09 and in the experimental group was 2.96±1.95. The mean time of pain intervention administration in minutes in the experimental group was 30.89 ±23.1, while the mean of the administration time in the control group was 44.69 ±19.5. The mean pain score difference between groups was found to be statistically significant (p= 0.00). The 24.5% of changes in the dependent variables are affected by independent variables. The multi regression used showed a significant impact of the type of assessment tools (p=0.004), type of surgery (0.054), and intraoperative opioids (p=0.000) concerning the duration of pain intervention administration.

Conclusion: The study results show significant positive differences in pain level according to assessment tool type. The use of multi-dimensional instruments that included physiological measurements was more accurate. It led to more effective pain management than one-dimensional instruments that only had face pain scale.

Keywords: Post-operative Pain, Paediatrics, Physiological parameters

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INTRODUCTION

Acute procedural pain is common among children worldwide. Inadequately controlled pain negatively affects the quality of children's life, recovery and increases the risk of post-surgical complications. Since pain is subjective and complex, pain intensity is mainly examined by the self-report in verbal children and adults (1).

Several postoperative pain management interventions and strategies are available, and they are applied by accurate pain assessment. Intensity, location, duration, and affective quality are the dimensions in which pain is assessed (2). Therefore, the measures used to evaluate pain, in turn, correspond to self-reported measures, behavioural observations, and physiological measures (such as heart rate and blood pressure).

The physiological measures being considered supplementary estimates to the behavioural measures. However, accurate evaluation of pain experienced requires behavioural and physiological measures to evaluate different aspects of pain (3,4). The ideal would be a composite measure, including one or more approaches that include multiple pain parameters instruments, including self-report, behavioural observation, and physiological measurement (3).

Self-report has been traditionally heralded as the gold-standard for assessing pain because pain is subjective. In paediatrics it is challenging to determine pain using a one-dimensional tool such as a self-reporting scale. Therefore, research findings recommended using self–report scale combined with another pain scale aiming to have an accurate way to rate pain severity and short time to implement. So, we conducted this study to examine which assessment approach is the most effective to manage postoperative pain among children. Only a few studies had investigated post-operative pain in the

Middle Eastern area, but none of these studies were conducted in Jordan (4). This has left a large gap in clinical practice in children's clinical settings. It deems necessary to have research that would investigate appropriate tools to be used by nurses to child's pain post-surgery. Consequently, this research raised the need to explore the proper approaches to be followed while assessing post-operative pain at the surgical units and PICUs in a single-site hospital in Jordan.Post-operative pain is a significant health problem. Several factors have led to insufficient postoperative pain control, including a lack of knowledge of adequate pain assessment and measurements. Misconceptions and expectations of patients, inconsistencies in pain assessment, using painkillers as needed (PRN), and lack of painkillers protocol in children are all factors accounted to individual differences and demands of adequate management of acute procedural pain among children. Untreated acute pain can cause acute neuro-cell-mediated changes, neuronal remodelling, long-term psychological and emotional discomfort, and chronic pain syndrome (5). To cope with postoperative pain, nurses should effectively assess the severity of pain in different children age groups. Pain management at child hospitals in Jordan utilizes different approaches to manage post-operative pain, including opioids and/or non-opioids. Postoperative pain assessment using one dimensional scale versus multidimensional scale was not been previously evaluated to the best of our knowledge. Therefore, lack of understanding of pain assessment approaches' accuracy may lead to both over and under treatment of postoperative children's pain. The purpose of this study is to compare the effectiveness of a one-dimensional pain assessment tool as compared to a multidimensional pain assessment tool with the hope of optimizing pain management, improving patients satisfaction, and boost pain relief outcomes. This study's objective is to examine any difference in pain interventions administration time among postoperative children. The pain was assessed with two different pain assessment approaches: one-dimensional instruments (WBFPS) vs. multi-dimensional instruments (WBFPS and physiological parameters).

MATERIALS AND METHODS

Study design

A randomized control study was conducted to examine whether face pain scale alone or face pain scale and physiological changes assessment are timelier, effective in managing postoperative pain among children at a hospital-based hospital in Jordan.

Sampling method

Out of 225 children approached, 150 children were included in this study and randomly assigned to control or intervention groups. Data was collected from one site hospital in northern regions in Jordan. The sample size was determined using G power analysis. sample size was detected using power analysis, the probability of committing type II error is minimized (6,7).

Given an alpha level of 0.05, and an anticipated effect size of 0.5, and the desired statistical power level of 0.80, the minimum required sample size is 115. Twenty percent of the sample size will be added to the required number of participants to control for any drop out of participants. Therefore, the total sample size was 150 participants. The sample size was equally divided into both control and intervention groups. The control group was assessed for postoperative pain using the face pain scale alone, and the intervention was assessed using both the face pain scale and physiological changes.The eligible participants were children patients: (1) who undergone operation or surgical procedure, (2) six years or older, (3) and who were able to self-report and verbally-communicate. Postoperative children who cannot self-report pain or diagnosed with chronic diseases like DM, heart diseases, or cystic fibrosis were excluded from the study.

Procedure

Parents/children who agreed to participate in the study were asked to sign consent forms. The researcher was with eligible children's legal guardians when they signed the consent forms to answer any questions required. The parents of eligible children informed that participation in the study is not mandatory, and they have the right to withdraw from the study at any time. Patients' sociodemographic information such as gender, age, and school

Instrument

The study tool is composed of the following sections: demographics, types of surgery, type of anesthisia, intra-operative opioid, vital signs, post pain assessment scale, and postoperative pain management time in minutes. The Wong-Baker Pain Scale (WBFPS) is a face pain scale that presents six faces with an increasing degree of pain from left to right. Each face was attributed scale from 0 to 10 indicated on scale (9). The Wong-Baker Pain Scale was developed for children, and it can be used with all children who were three years old and above (5). It is useful for children because they may not understand rating their pain on a scale of 0-10, but they would be able to understand the faces and the emotions they represent and point to the one that best matches their level of pain (9). Children were asked to choose the face that best describes their own pain. The Wong-Baker Pain Scale (WBFPS) is a reliable and valid tool to measure pain intensity. It reflected pain interference and pain unpleasantness and was not associated with any additional non-pain intensity factors (9). Based on the faces and written descriptions, the child chooses to select the face that better describes their pain level (5,9).

Physiological measurements of pain are easy and simple indicators of pain, especially in post-operative settings, and meters for assessing cardiovascular and respiratory rates were on hand (10). The physiologic meters of pain are the cardiovascular and respiratory indicators, including increased heart rate, increased respiratory rate, increased blood pressure, and decreased oxygen saturation level. These indicators provide information about the response to noxious stimuli, which can be caused by pain (11). However, assessment of physiologic meters as the only indicator of a child's pain might be misleading because crying and fear, might influence the parameters (12). Therefore, physiologic meters must be persistently used in conjunction with some other pain assessment tools when it is possible (11).

Nurses tend to use more physiologic parameters as pain indicators in children rather than behavioural parameters or family input (13). In the ICU environment, cardiovascular and respiratory measurements are readily available on monitor screens, making the physiologic assessment easy for nurses (13). The instruments making are including physiologic changes as a parameter, are

mainly developed for hospital use. (14). One example is the Maunuksela Pain Scale, which has been developed to assess pain intensity by evaluating breathing, blood pressure, heart rate, facial expression, behaviour, and response to pain treatment in hospital settings (15).

Although the physiological indicators in pain assessment are essential, the universal reliability of these indicators alone without using any other pain scale is questionable. This is because other factors than pain could elicit the increased physiological parameters (respiratory rate, heart rate). This may lead to the problem of ensuring this pain assessment method's reliability if it is used alone. However, the use of another behavioural pain scale could improve the reliability of physiological measurements. In the current study, therefore, we used a multidimensional approach to measure pain in one study group. Control group children for whom WBFPS was used, and experimental group included all children for whom WBFPS was used with physioloigcal measurements that had vital signs.At each study date, the researcher developed a list of eligible participant names and corresponding codes. After having obtained a list of all eligible participants, the researcher randomly assigned the participants to control and intervention groups. Eligible patients were randomized by a computer-generated list and sealed envelopes. Patients were randomized into either Group A (those who assessed using one-dimensional pain scale post-operative) or Group B (those assessed using multidimensional pain scales post-operation) using a web-based random number generator. The researcher met the nurses and gave a brief introduction about the purpose of the study, its procedure, how to use the WBFPS and record the physiologic changes. Attendance and educational of parents, residency location, health insurance coverage, type of current surgery, history of surgery, child ability to communicate, and financial status were collected via face-to-face interview of the legal guardians and from child medical records before they approach the operation room. Data collection about postoperative pain started immediately after the participant is fully recovered post the surgery at the paediatric intensive care unit or paediatric surgical floor. The nurses measured the participants' level of pain using either the WBFPS alone or the WBFPS with physiologic changes. The pain assessment continued over two days after the surgery for each included participant. The researcher checked each included child's medical files to record the exact time of pain intervention administration and record pain intensity before and after each pain management intervention. The time to administer pain interventions was measured in minutes; and post intervention pain scale was measured by both pain approaches

Statistical analysis

Data analysis was performed using SPSS version 23.0 (IBM Corp., Armonk, NY, USA). The student t-test (independent samples, one-tailed) was used to assess differences between study variables. Descriptive statistics included frequencies, percentages, means, ranges, and standard deviations (SDs), were used to describe the demographic data and pain scores. Confounder and effect modifiers (i.e., age, Intra Operative Opioid, Type of Anaesthesia, Type of Surgery, and Type of Assessment Tool Used) were analyzed using regression analysis. Tests were conducted to determine if there is an impact between the independent and dependent variable (time of administering pain management intervention).

ANOVA test was used to analyze variance of the overall score of independent variables on time to administer the intervention. Tests were conducted to determine if there is an impact between the independent and dependent variable time of administering pain management intervention after assessing pain using different approaches. Findings were considered statistically significant when $p \leq 0.05$.

Ethical Considerations

This study was approved by the Jordan University of Science and Technology (JUST) research committee, and from the Institutional Research Board of King Abdullah University Hospital, Jordan. (IRB#:777/2018).

RESULTS

Demographic characteristics

Data from a total of 150 participants were analysed. The sample was compromised by 52% male and 48% female children. Overall, 69.45% of the participant's age ranged from 7-10 years old. For most participants (34.7%), their weight ranged 27-29 kgs, while 32% of participants' average weight ranged from 30-33kgs. More than half of the participants (57.3%) had general anesthesia during the operation. More than half of participants (57.3%) had intra-operative opioid. Most participants (60%) had adequate knowledge about the type of surgery and any associated complications.Most experimental group participants (60%) had low O2 saturation post-operation, 64% had high Respiratory Rate, 52% had high Blood pressure, and 50.7% had high Heart Rate. Independent Samples t-test analysis showed a significant difference in the mean of pain scores between the study groups. The mean pain score in the control group was 1.45 ±1.09 and in the experimental group was 2.96 ±1.95. The tool used in the experimental group shows the pain severity accurately than the control group. This difference in the mean pain score was found to be statistically significant (p= 0.00). (See table 1). Accordingly, the findings also show that administering pain intervention was shorter in the experimental group compared to the control group. The difference in post-procedure medication administration time was found to be statistically significant between the two groups (p=0.00). The mean time of pain intervention administration in minutes in the experimental group was 30.89 ±23.1, while the mean time in control group was 44.69 ±19.5.

Table 1: The Means and Standard Deviations (SD) of pain level among study groups

Group	Type of assessment tool used	No. of group members	Means	SD
Control group	WBFPS	75	1.45	1.094
Experimental group	WBFPS + physiological parameters	75	2.9	1.948
Time to Administer Intervention (Minutes)	WBFPS	75	44.69	19.522
	WBFPS +	75	30.89	23.104

physiological parameters

	Group	t	df	Sig. (2-tailed)
WBFPS	**The experimental group** **The control Group**	-5.840	148	0.000
Time administer pain intervention (min)	**The experimental group**	-3.951	148	0.000

The value of the coefficient of determination (R^2) reaches value of (0.245). This indicates that 24.5% of changes in dependent variable are affected by independent variables. the confounding factors (including age, Intra Operative Opioid, Type of Anaesthesia, Type of Surgery, Type of Assessment Tool Used) was found to have significant impact on the outcome parameter (r^2 = 0. 245, standard error of estimate= 19. 969). (See table 2)

Table 2: Multiple linear regression analysis of factors associated with pain.
Model summary (a)

Model	R	R^2	Adjusted R^2	STD Error of Estimate
1	0.504	0.245	0.228	19.969

Analysis of variance was used, aiming to identify the explanatory model of independent variables (Intra Operative Opioid, Age of Patient, Type of Anaesthesia, Type of Surgery, and Type of Assessment Tool Used) of statistical through examined (F). The Examined (F) value was equal to (9.785) with a possibility value (p=0.00), and this shows that there is a significant impact existing at the significance level (p≤ 0.05). (See table 3)

Table 3: Analysis of Variance of the Overall Score of independent variables on time to administer intervention variables. [a]

Model	Sum of Squares	*df*	Mean Square	F	P*
Regression	18980.288	5	3796.058	9.785	0.000[b]
Residual	55864.306	144	387.947		
Total	74844.593	149			

*p <0.05.

a. Dependent Variable: Time to administer intervention in minutes.

b. Predictors: (Constant), Intra operative opioid, age of patient, type of anaesthesia, type of surgery, type assessment tool.

The multi regression found a statistically significant impact of the type of assessment tools (p=0.004), type of surgery (0.054), and intra operative opioids (p=0.000) on time of pain intervention administration. (See table 4).

Table 4: Coefficients Multivariate Regression

Model	Unstandardized Coefficients		Standardized Coefficients	t	P	Collinearity Statistics	
	B	SD. Error	Beta			Tolerance	VIF
(Constant)	70.865	10.116		7.005	0.000		
Type of Assessment Tool Used	-10.013	3.427	-0.224	-2.922	**0.004**	0.881	1.135
Age of Patient	0.477	0.896	0.039	.532	0.596	0.960	1.041
Type of Anesthesia	-3.931	3.760	-0.080	-1.046	0.297	0.895	1.118
Type of Surgery	-1.281	0.659	-0.146	-1.945	**0.054**	0.917	1.091
Intra Operative Opioid	-14.683	3.352	-0.329	-4.380	**0.000**	0.921	1.086

a. Dependent Variable: administer time pain intervention (minutes). significance level (p≤ 0.05).

DISCUSSION

Until an accurate approach followed to assess postoperative pain level, pediatric patients at surgical wards continue to suffer from unmanaged post-operative pain (16). Post-operative pain is one of the reasons for prolonged recovery time in children (16). Inadequate pain assessment is the main reason for inadequate and delayed pain intervention administrations (17). As healthcare providers, it is crucial to follow accurate ways to assess and treat postoperative pain efficiently and timely. Research study supported that an accurate pain assessment method is significantly affecting adequate management of pain, and time of pain management implementation is more frequent (18-20). One dimensional pain scale has been traditionally heralded as the gold-standard for assessing pain. However, this study revealed disadvantages in the one-dimensional tools

regarding pain assessment in post-operative paediatric wards.The current study found that there are significant positive differences in pain level according to the type of assessment tool that has been used. The application of multidimensional pain measures is a pre-requisite for adequate post-operative pain management. This finding is supported by other research findings conducted on children (21,22).

The use of multidimensional tools that included face pain scales for post-operative children was a valid tool for 7-12 years old children following the first day of surgery (10-11). However, the use of face pain scale alone could not accurately validate the severity of post-operative pain in children. This could be related to the fact that small children could lack the skills for reporting pain accurately cannot judge their pain intensity accurately in the scales.Physiological parameters of pain are easy and simple indicators of pain, especially in postoperative settings. The meters for assessing cardiovascular and respiratory rates are on hand. Although the physiological indicators in pain assessment are essential, the universal reliability of these indicators is questionable. Study findings supported that using physiological measurements alone as a pain indicator is misleading physiologic meters, and it must be always used in conjunction with other behavioural pain assessment tools. (10, 22 23). This is because other factors could influence physiological parameters alone in children such as crying and fear (10, 22,23)

Study findings found that when a one-dimensional face pain tool (e.x. FLACC, FACES) were used alone, the scores were valid. However, when both tools' scores were compared, the findings show that there were significant differences in relation to time of medication administration to manage pain (10,24). When both scales were used along with physiological parameters, the duration of pain management interventions was shorter and, pain controlling was more effective (10,24). This finding supporting the current study that highlights the effectiveness of using FPS with physiological changes resulted in shorter time to implement pain management interventions. Using the multidimensional tools that included face pain scales and physiological parameters helps to reduce the child's postoperative pain level. This is related to the fact that using a multidimensional tool reduces the time required to administer pain intervention. Pain assessment tools were rarely used, and nurses did not recognize all available pain assessment tools in children. Therefore, health care providers including nurses, should know about available pain assessment options to better deal with children's pain (13, 25). Accordingly, it is highly recommended that nurses should assess pain using the combination of behavioural pain assessment tools and physiology measurements.

CONCLUSION

Understanding the nature of postoperative pain crises by health care providers will help offer the best management of pain. Thus, accurate and early pain assessment and management can improve the recovery time of children. The one-dimensional pain assessment approach should not be used alone to reflect the severity of pain in children. To ensure the comprehensive assessment and the delivery of an appropriate management of child's pain in postoperative settings, a multidimensional tool should be applied. The use of multidimensional scales that included face pain scales and physiological measurements has several advantages. First, they are reliable and objective and thus the accurate way to rate pain severity. Second, they help nurses to take short time to implement.Nurses play an essential role in the pain assessment of a paediatric patient. They are responsible for assessing the pain postoperative, and should, obtain the knowledge and skills of proper pain assessment. Surprisingly, there is an impact of nurses' lack of knowledge on postoperative pain management as the inadequate pain assessment and misconceptions about pain assessment and treatment approaches affect adequate management of postoperative pain among children.Like any study, this study has limitations associated with design, sampling size, and sampling methods. Even though the sample size was adequate, more participants from other selected hospitals would have given more strength to the study. The study was conducted in one geographical area (Irbid city, Jordan) covered one hospital, limiting the generalizability of the findings.

ACKNOWLEDGMENTS

We are grateful to all nurses who participated in the study. This study was supported in part by the Deanship of Research at Jordan University of Science and Technology. Grant number (777-2018). The authors would also like to extend their appreciations to all who contributed to this researcher's success. Many thanks to the nursing staff at the hospitals where this research was conducted and the head nurse who was very instrumental in recruiting of patients. Finally, yet significantly, thanks should go to the patients and their guardians, for whom this work was undertaken to help ease the pain and suffering they endure.

Conflict Of Intrest

The authors declare no conflict of interest arose in this study.

REFERENCE

1. Merkel, S. & Malviya, S. (2000). Paediatric Pain, Tools, and Assessment. *Journal of Perianesthesia Nursing.* 15(6), 408-414.
2. Champion, D., McKell, M. & Pell, M. (1998). Prediction and assessment of the
3. severity of post-operative pain and of satisfaction with management. *Pain*, 75(2-3),
4. 177-185.
5. Whittaker, A. (2008). Pleasure and pain: medical travel in Asia. *Global Public*
6. *Health*, *3*(3), 271-290.
7. Kehlet, H., Jensen, T. S., & Woolf, C. J. (2006). Persistent postsurgical pain: risk
8. factors and prevention. *The lancet*, *367*(9522), 1618-1625.
9. 5. Charles, C., Reid, G., McGrath, P. & Finley, G. (2009). Development and Preliminary Validation of a Postoperative Pain Measure for Parents. *Pain*. 68(2), 307-313.
10. 6. Polit, D., & Beck, C. (2012). Nursing research: Generating and assessing evidence for nursing practice (9th ed.). Philadelphia, PA:Wolters Kluwer Health/Lippincott Williams & Wilkins.
11. 7. Polit, D.F., & Beck, C.T. (2014). Essentials of nursing research:Appraising evidence for nursing

practice (8th ed.). Philadelphia,PA: Lippincott Williams & Wilkins
12. 8. Von Baeyer, C. & Spagrud, L. (2006). Systematic Review of Observational (Behavioral) Measures of Pain for Children and Adolescents Aged 3 to 18 Years. *Pain.*127(1-2), 140–150.
13. 9. M. J. Hockenberry, D. Wilson, and M. L. Winkelstein, *Wong's Essentials of Pediatric Nursing*, St. Louis, Mo, USA, 7th edition, 2005.
14. 10. Chambers, C., Reid, G., McGrath, P. & Finley, G. (1996). Development and
15. Preliminary Validation of a Postoperative Pain Measure for Parents. *Pain*. 68(2), 307
16. 313.
17. 11. Merkel, S. & Malviya, S. (2000). Paediatric Pain, Tools, and Assessment. *Journal*
18. *of Perianesthesia Nursing.* 15(6), 408-414.
19. 12. Von Baeyer, C. & Spagrud, L. (2006). Systematic Review of Observational
20. (Behavioral) Measures of Pain for Children and Adolescents Aged 3 to 18 Years.
21. *Pain.*127(1-2), 140–150.
22. 13. Coffman, S., Alvarez, Y., Pyngolil, M., Petit, R., Hall, C. & Smyth, M. (1997).
23. Nursing Assessment and Management of Pain in Critically Ill Children. *The Journal*
24. *of Acute and Critical Care.* 26(3), 221-228.
25. 14. Lehikoinen, N. M. (2007). *Parents Postoperative Pain Measure-mittarinvaikutus*
26. *1-6-vuotiaidenpäiväkirurgisessatoimenpiteessäolleidenlastenkivunlievitykseenkotona*,
27. Masters Thesis. University of Kuopio.
28. 15. Nikanne, E. & Kokki, H. (1999). Lapsenkipupitäähoitaa. *Suomen Lääkärilehti.*
29. 54(13), 1663-1667.
30. 16. Abdulrasheed A Nasir, Emmanuel A Ameh, Lukman O Abdur-Rahman, Israel K Kolawole, Olanrewaju O Oyedepo, James O Adeniran.. Postoperative pain management in children: A survey of practices of pediatric surgeons in Nigeria. Journal of clincal sciemnce.2017;14(3):138-143. 17. Jaime L Baratta. Clinical Consequences of Inadequate Pain Relief: Barriers to Optimal Pain Management. Plastic & Reconstructive Surgery.134(4S-2 Current Concepts in Pain. 2014
31. 18. Wayne Varndell, Margaret Fry, Doug Elliott. Pain assessment and interventions by nurses in the emergency department: A national survey. Journal of Clinical Nursing.2020,29(13-14): 2352-2362
32. 19. Ware, Epps, Herr & Pachard, 2006 Ware, L., Epps, C., Herr, K., & Pachard, A. (2006). Evaluation of the Revised Faces Pain Scale, Verbal Descriptor Scale, Numeric Rating Scale, and Iowa Pain Thermometer in Older Minority Adults. Pain Management Journal, 4, 117-125.
33. 20. Coll, Ameen, & Mead, 2004 Coll, A., Ameen, J., & Mead, D. (2004). Postoperative pain assessment tools in day surgery: Literature review. Journal of Advanced Nursing, 46, 124-133
34. 21. Stevens, B. J., Harrison, D., Rashotte, J., Yamada, J., Abbott, L. K., Coburn, G.,
35. Stinson, J., Le May, S., & CIHR Team in Children's Pain (). Pain assessment and
36. intensity in hospitalized children in Canada. *The journal of pain*. 2012;*13*(9), 857–
37. 865. https://doi.org/10.1016/j.jpain.2012.05.010
38. 22. de Oliveira, M. V., de Jesus, J. A., & Tristao, R. M. (2012). Psychophysical parameters of a multidimensional pain scale in newborns. *Physiological measurement*, *33*(1), 39–49. https://doi.org/10.1088/0967-3334/33/1/39
39. 23. Alexandra Beltramini; Kolia Milojevic; Dominique Pateron. Pain Assessment in Newborns, Infants, and Children. Pediatric Annals. 2017;46(10):e387-e395. https://doi.org/10.3928/19382359-20170921-03
40. 24. Willis Martha , Merkel S, Voepel-Lewis T, Malviya S. FLACC Behavioral Pain Assessment Scale: a comparison with the child's self-report. Pediatr Nurs.2003;29(3):195-8.
41. 25. D'emeh M, Yacoub M, Darawad W, Al-Badawi H, Shahwan B. Pain-Related Knowledge and Barriers among Jordanian Nurses: A National Study. Health,2016,8: 548-55. http://www.scirp.org/journal/healthhttp://dx.doi.org/10.4236/health.2016.86058