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Validity Test of an Alternative Method of Quantitative Pain Assessment (MAPKN) In Assessing Intensity of Nociceptive Pain, Mixed Pain, And Neuropathic Pain

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Abstract

Pain is a health problem phenomenon that most often brings patients to see a doctor. Pain intensity is the most often domain which assessed in clinical and research settings. Loeser suggests that four elements (nociception, pain, suffering, pain behaviour) need to be considered when evaluating patients with pain. Based on the biopsychosocial approach and the concept of pain from Loeser, a pain assessment was made and called "Alternative Method of Quantitative Pain Assessment (MAPKN)". The purpose of this study was to determine the validity of MAPKN in assessing the intensity of nociceptive, mixed, and neuropathic pain. This cross-sectional study was conducted at Wahidin Sudirohusodo Hospital, Makassar in January - May 2023. Demographic data, assessment of types of pain complaints by pain detect and pain intensity by NRS and MAPKN were collected. Subjects were grouped into nociceptive, mixed, and neuropathic pain groups. This study was conducted on 415 pain patients consisting of 163 nociceptive pain, 119 mixed pain, and 133 neuropathic pain. In the nociceptive pain group, MAPKN showed sensitivity 92.59%, specificity 96.43%, AUC 0,959 and a p value <0.001. In the mixed pain group, MAPKN showed sensitivity 98.17%, specificity 80.00%, AUC 0,836 and a *p* -value of 0.001. In the neuropathic pain group, MAPKN showed sensitivity 92.06%, specificity of 85.71%, AUC 0,951 and a p<0.001. The AUC value of 0.959 (96%) indicates that the diagnostic value of the MAPKN score in assessing pain intensity in the nociceptive pain group is excellent (>90%-100%). AUC value of 0.836 (83%) indicates that the diagnostic value of the MAPKN score in assessing pain intensity in the mixed pain group is good (> 80%-90%). The AUC value of 0.951 (95%) indicates that the diagnostic value of the MAPKN score in assessing pain intensity in the neuropathic pain group is excellent (>90%-100%). This is in accordance with research conducted by Eka Pranata 2004 that MAPKN has strong discriminant validity in assessing pain intensity. MAPKN is valid and has excellent diagnostic value in assessing nociceptive and neuropathic pain intensity, MAPKN is valid and has good diagnostic value in assessing mixed pain intensity.

Keywords: Validity; Pain; MAPKN; NRS.

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1. Introduction

Pain is a health problem phenomenon that most often brings patients to see a doctor. Acute pain can be considered as a symptom or part of a particular disease. Meanwhile, chronic pain requires a separate approach because it will generate other, more complex problems, according to its clinical picture which includes biological, psychological and social phenomena (Purwata, 2017). Pain intensity is the most often domain which assessed in

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clinical and research settings. Knowledge regarding the psychometric properties of different pain intensity measures across different patient populations is therefore critical for advancing the treatment and scientific understanding of pain. The most commonly used measures of pain intensity are the Visual Analogue Scale (VAS), Verbal Rating Scale (VRS), Numerical Rating Scale (NRS), and Faces Pain Scale-Revised (FPS-R). Each of these scales has evidence supporting their test-retest reliability, and ratings of these scales tend to correlate strongly with each other, supporting their validity (Atisook et al., 2021). Self-report is the gold standard when assessing pain intensity in a patient. Unidimensional and multidimensional self-reports are the most reliable measures of pain severity. The Numerical Rating Scale (NRS), which can evaluate the degree of pain based on the patient's "self-report", is the gold standard for assessing pain in patients who can communicate and can describe their pain (Suzuki, 2017)(Clear, 2022). Rocha et al. conducted a study in 2020 in Brazil regarding pain intensity in 72 patients with dentinal hypersensitivity and found that VAS had a sensitivity of 80.6% and a specificity of 61.1%. Meanwhile, the NRS had a sensitivity of 81.9% and a specificity of 57.6% (Rocha et al., 2020).

Pain is a unique sensation, because the degree of severity of pain is not determined only by the intensity of the stimulus but also by the feelings and emotions at that time. Pain is not simply a sensory or emotional experience, but a combination of both of them. Pain is a subjective experience that is influenced by physical, psychological and environmental factors assessed from a biopsychosocial perspective (Clear,2022). In a 2019 UK study of 79 patients it was found that compared to the general population, patients experiencing chronic pain had significantly lower mean QoL scores across all SF-36 domains: impairment in physical functioning, impairment in professional life, disturbances in relationships and family life, disturbances in social life, disturbances in sleep, and disturbances in mood (all $p < 0.05$). The impact of chronic pain causes a worse quality of life among patients with chronic pain compared to the general population (Hadi et al., 2019). Unidimensional instruments can be used for fast response in measuring pain in relation to its intensity, but does not measure emotional, affective, psychological and behavioral aspects (Masulo et al., 2019).

Loeser suggests that four elements need to be considered when evaluating patients with pain. These elements include nociception, pain, suffering, and pain behavior. Nociception is a signal sent to the brain from the periphery to alert the body that there is some degree of injury or tissue damage. Pain is a subjective experience that occurs after the brain processes nociceptive input. The last two components of pain to consider are suffering and pain behavior. Suffering is an individual's emotional response to nociceptive signals and pain behavior is the actions that people take in response to the experience of pain. Loeser's four elements of pain describe the biological, psychological, and sociological factors that can create or influence an individual's experience with pain. Loeser's findings prove that the Biopsychosocial Model of pain offers the most comprehensive philosophy and provides the necessary framework for initiating appropriate therapy to adequately manage patients with chronic pain (Trachsel et al., 2021).

Based on the biopsychosocial approach and the concept of pain from Loeser, a pain assessment was made based on several components, such as pain complaints, disturbances in daily activities (Activities of Daily Living), occupational disturbances and disturbances to the social environment. The method is called "Alternative Method of Quantitative Pain Assessment (MAPKN)" and was validated in 2004 with the results of MAPKN and VAS having strong discriminant validity, MAPKN and VAS were able to distinguish the five groups of diagnoses (Tension Type Headache, Migraine, Combined Headache, Ischalgia, and Polyneuropathy), MAPKN and VAS are sensitive to capture changes in the degree of pain after treatment, MAPKN has the ability to quantify pain equivalent to VAS.

MAPKN is a scoring system using numbers from 0 to 10, consisting of components of pain complaints, emotional disturbances, Activity Daily Living (ADL) disturbances, occupational disturbances, and environmental disturbances (Table 1). The total score is the sum of each component sequentially, based on consistency, inconsistency, or the absence of components experienced. Pain is considered consistent if complaints in the form of pain, emotional disturbances, ADL disturbances, occupational disturbances, and environmental disturbances are experienced more than or equal to 1 time per week and lasts more than 1 minute. The total score is taken according to the highest order of the MAPKN components experienced.

Table 1. Alternative Method of Quantitative Pain Assessment (MAPKN)

Pain	Emotional Disturbance	ADL Disturbance	Occupational Disturbance	Environtment and Social Disturbance	Total score
-	-	-	-	-	0
±	-	-	-	-	1
+	-	-	-	-	2
+	±	-	-	-	3
+	+	-	-	-	4
+	+	±	-	-	5
+	+	+	-	-	6
+	+	+	±	-	7
+	+	+	+	-	8
+	+	+	+	±	9
+	+	+	+	+	10

Information : - : None
± : Inconsistent
+ : Consistent

To assess the extent to which this pain assessment method meets the criteria and the need for pain assessment in the clinic, we conducted a study entitled "Validity Test of an Alternative Method of Quantitative Pain Assessment (MAPKN) in assessing the intensity of nociceptive pain, mixed pain, and neuropathic pain" by testing the sensitivity and specificity in different populations and knowing whether the results are compatible with the Numerical Rating Scale (NRS) as the gold standard for assessing pain intensity.

2. Method

This research was cross-sectional studies conducted at Dr. Wahidin Sudirohusodo Hospital in Makassar, an teaching hospitals and other health facilities in Makassar City, starting in January 2023 until May 2023. The study population was all patients with pain complaints who visited or were treated at Dr. Wahidin Sudirohusodo Hospital in Makassar, an teaching hospitals and other health facilities in Makassar City. The research sample is the research population that meets the inclusion criteria. The inclusion criteria in this study were all patients with pain complaints who visited Dr. Wahidin Sudirohusodo Hospital in Makassar, an teaching hospital and other health facilities in Makassar City, is willing to be a research subject, at least has graduated from elementary school and is at least 12 years old. Exclusion criteria in this study were patient with headaches, experiencing communication disorders, illiterate and numeric.

The patient who met the inclusion criteria and willing to participate in the study will be assessed for the type of pain using the painDetect instrument. Subjects were grouped into nociceptive pain, mixed pain, and neuropathic pain. Researchers assessed pain intensity in each pain group according to what was stated in the NRS and MAPKN instrument. The collected data was processed using SPSS (Statistical Package for the Social Sciences) version 26 and MedCalc software, using the descriptive area under the curve(AUC) analysis method and Bland-Altman plot.

3. Result

This research was conducted on all patients with pain complaints who visited or were treated Dr. Wahidin Sudirohusodo Hospital in Makassar, an teaching hospitals and other health facilities in Makassar City, starting in January 2023 until May 2023 with a total of 415 research subjects, consisting of 163 patients with nociceptive pain, 119 patients with mixed pain, and 133 patients with neuropathic pain.

Table 2 shows the male patients in the nociceptive pain group were 73 (44.8%), mixed pain were 52 (43.7%) and neuropathic pain were 57 (42.9%). The female patients in the nociceptive pain group were 90 (55.2%), mixed pain were 67 (56.3%), and neuropathic pain were 76 (57.1%). Patients with age range of 12-30 years in the nociceptive pain group were 22 (13.5%), mixed pain were 23 (19.3%), and neuropathic pain were 17 (12.8%) . Patients with age range of 31-50 years in the nociceptive pain group were 50 (30.7%), mixed pain were 38 (31.9%), and neuropathic pain were 38 (28.6%). Patients with age range of 51-70 years in the nociceptive pain group were 76 (46.6%), mixed pain were 48 (40.3%), and neuropathic pain were 66 (49.6%). Patients aged > 70 years in the nociceptive pain group were 15 (9.2%), mixed pain were 10 (9.0%), and neuropathic pain were 12 (9.0%). Based on onset of pain, for the onset ≤ 3 months, there were 88 (54.0%) in the nociceptive pain group, 60 (50.4%) patients were mixed pain, and 42 (31.6%) patients with neuropathic pain. For the onset > 3 months in the nociceptive pain group were 75 (46.0%), mixed pain were 59 (49.6%), and neuropathic pain were 91 (68.4%). Based on the severity of pain, patients with mild pain in the nociceptive pain group were 28 (17.2%), mixed pain were 11 (9.2%), and neuropathic pain were 7 (5.3%). Patients with moderate pain in the nociceptive pain group were 65 (39.9%), mixed pain were 49 (41.2%), and neuropathic pain were 38 (28.6%). Patients with severe pain in the nociceptive pain group were 70 (42.9%), mixed pain were 59 (49.6%), and neuropathic pain were 88 (66.2%).

Table 2. Characteristics of subjects based on gender, age, onset, and pain severity in the nociceptive,mixed, and neuropathic pain groups

Characteristics			Type of Pain		
			Nociceptive	Mixed	Neuropathic
Gender	Male	n (%)	73 (44.8%)	52 (43.7%)	57 (42.9%)
	Female	n (%)	90 (55.2%)	67 (56.3%)	76 (57.1%)
Age	12-30 years	n (%)	22 (13.5%)	23 (19.3%)	17 (12.8%)
	31-50 years	n (%)	50 (30.7%)	38 (31.9%)	38 (28.6%)
	51-70 years	n (%)	76 (46.6%)	48 (40.3%)	66 (49.6%)
	> 70 years	n (%)	15 (9.2%)	10 (8.4%)	12 (9.0%)
Onset	≤ 3 Month	n (%)	88 (54.0%)	60 (50.4%)	42 (31.6%)
	> 3 Month	n (%)	75 (46.0%)	59 (49.6%)	91 (68.4%)
Severity	Mild	n (%)	28 (17.2%)	11 (9.2%)	7 (5.3%)
	Moderate	n (%)	65 (39.9%)	49 (41.2%)	38 (28.6%)
	Severe	n (%)	70 (42.9%)	59 (49.6%)	88 (66.2%)
Total		n (%)	163 (100%)	119 (100%)	133 (100%)

Source: Primary Data

Table 3 shows that in the nociceptive pain group, the mean NRS score was 5.99 and the mean MAPKN score was 6.10 with a p value of 0.227 (p>0.05). In the mixed pain group, the mean NRS score was 6.39 and the mean MAPKN score was 6.64 with a p value of 0.074 (p>0.05). In the neuropathic pain group, the mean NRS score was 7.15 and the

mean MAPKN score was 7.25 with a p value of 0.242 (p>0.05). From these results it can be concluded that there is no significant difference between NRS and MAPKN in assessing pain intensity in the nociceptive, mixed, and neuropathic pain groups.

Table 3. Comparison of Mean NRS and MAPKN Values in the Nociceptive, Mixed, and Neuropathic Pain Groups

Type of Pain		Mean	SD	Median	Minimum	Maximum	p value
Nociceptif	NRS	5.99	2.42	6.00	1.00	10.00	0.227
	MAPKN	6.10	2.71	7.00	1.00	10.00	
Mixed	NRS	6.39	2.03	6.00	1.00	10.00	0.074
	MAPKN	6.64	2.18	7.00	2.00	10.00	
Neuropathic	NRS	7.15	2.02	8.00	2.00	10.00	0.242
	MAPKN	7.25	2.14	8.00	2.00	10.00	

Source: Primary Data

Analysis Area Under the Curve (AUC) of MAPKN in Nociceptive, Mixed, and Neuropathic Pain groups

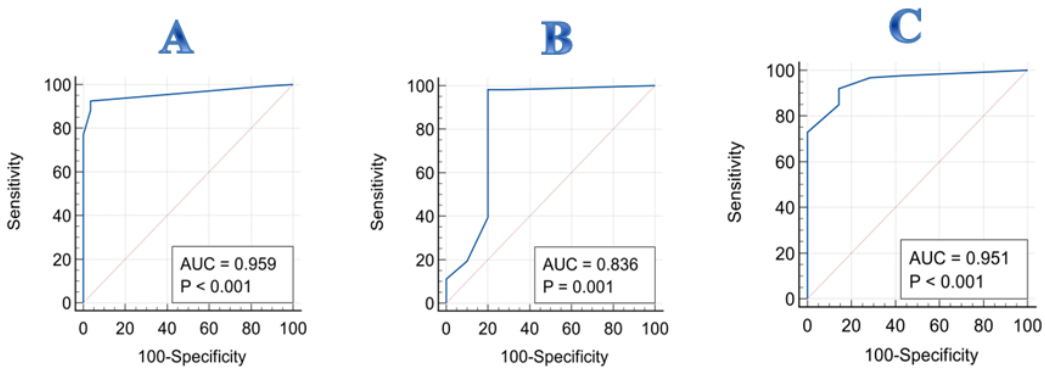

Figure 1. AUC Value of MAPKN based on ROC curve; A. Nociceptive pain groups, B. Mixed pain groups, C. Neuropathic pain groups

From Figure 1 it can be seen that the Area Under the Curve (AUC) value resulting from the ROC curve in the nociceptive pain group is 0.959 with a p value <0.001. The AUC value of 0.959 (96%) indicates that the diagnostic value of the MAPKN score in assessing pain intensity in the nociceptive pain group is very good (>90%-100%). The Area Under the Curve (AUC) value resulting from the ROC curve in the mixed pain group was 0.836 with a p value of 0.001. The AUC value of 0.836 (83%) indicates that the diagnostic value of the MAPKN score in assessing pain intensity in the mixed pain group is good (> 80% -90%). The Area Under the Curve (AUC) value resulting from the ROC curve in the neuropathic pain group is 0.951 with a p value <0.001. The AUC value of 0.951 (95%) indicates that the diagnostic value of the MAPKN score in assessing pain intensity in the neuropathic pain group is very good (>90%-100%).

Table 4 shows that in the nociceptive pain group, MAPKN showed a sensitivity of 92.59%, a specificity of 96.43%, AUC 0,959 and a p value <0.001. In the mixed pain group, MAPKN showed a sensitivity of 98.17%, a specificity of 80.00%, AUC 0,836 and a *p* -value of 0.001. In the neuropathic pain group, MAPKN showed a sensitivity of 92.06%, a specificity of 85.71%, AUC 0,951 and a p<0.001. From these results it can be concluded

that MAPKN has high sensitivity and specificity in assessing pain intensity in the nociceptive, mixed, and neuropathic pain groups.

Table 4. Sensitivity, Specificity, and AUC Value of MAPKN in Nociceptive, Mixed, and Neuropathic Pain Groups

	MAPKN							
Type of Pain	Sensitivity(%)	Specificity (%)	PPV (%)	NPV (%)	LR+	LR-	AUC	p value
Nosiseptif	92,59	96,43	99,21	72,97	25,93	0,08	0,959	<0,001
Campuran	98,17	80,00	98,17	80,00	4,91	0,02	0,836	0,001
Neuropatik	92,06	85,71	99,15	37,50	6,44	0,09	0,951	<0,001

Source: Primary Data

Analysis of MAPKN validiity based on comparison of NRS and MAPKN values in the Nociceptive, Mixed, and Neuropathic Pain groups, using Bland-Altman plot

Table 5. Bland-Altman Analysis of MAPKN and NRS

	Mean Difference	Limit of Agreement	Concorcande Correlation Coefficient	Regression Equation
Nosiseptif	-0.1043	-2.3947 – 2.1861	0.8956	y = 0.6114 + -0.1184 x
Campuran	-0.2521	-2.9188 – 2.4146	0.7862	y = 0.2551 + -0.07788 x
Neuropatik	-0.09774	-2.0106 – 1.8151	0.8893	y = 0.3265 + -0.05893 x

Source: Primary Data

Table 5 shows that the validity analysis used the Bland-Altman plot by comparing the NRS value and the MAPKN value, the mean difference between the NRS-MAPKN values in the nociceptive pain group was -0.1043 with a limit of agreement -2.3947 – 2.1861, the mean difference in value The NRS-MAPKN in the mixed pain group was -0.2521 with a limit of agreement -2.9188 – 2.4146, and the mean difference in NRS-MAPKN values in the neuropathic pain group was -0.09774 with a limit of agreement -2.0106 – 1.8151.

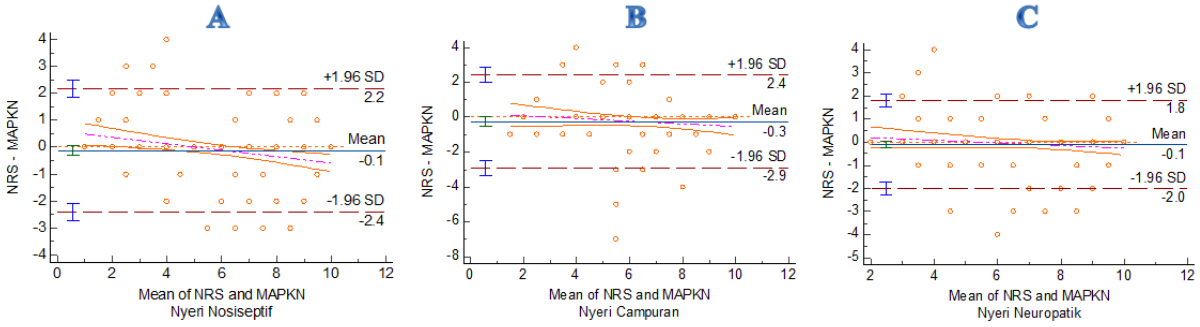

Figure 2. Bland-Altman Plot of NRS-MAPKN; A. Nociceptive pain B. Mixed pain C. Neuropathic pain

Figure 2 shows that in nociceptive pain group, the Limit of Agreement is between the range - 2.4 - 2.2. It can be concluded that MAPKN score is valid for assessing pain intensity in the nociceptive pain group. In mixed pain group, the Limit of Agreement is between the range - 2.9 –2.4. It can be concluded that the examination of the MAPKN score is valid for assessing pain intensity in the mixed pain group. In neuropathic pain group, the Limit of Agreement is between the range - 2.0 - 1.8. It can be concluded that the examination of the MAPKN score is valid for assessing painintensity in the neuropathic pain group.

4. Discussion

4.1. Subject Characteristics

This study was conducted on 415 patient with pain, consisting of 163 patients with nociceptive pain, 119 patients with mixed pain, and 133 patients with neuropathic pain. In nociceptive pain groups, male patients were 73 (44.8%) and female were 90 (55.2%). In the mixed pain group, male patients were 52 (43.7%) and female patients were 67 (56.3%). In the neuropathic pain group, male patients were 57 (42.9%) and female were 76 (57.1%). These results shows that in the nociceptive, mixed, and neuropathic pain groups, there were more female than male patients. This is in accordance with a study conducted by Keefe et al in America in 2020 on 168 people with osteoarthritis genu where there were 72 male and 96 female. All participants completed the Arthritis Impact Measurement Scales (AIMS), undergoing a standard 10-minute observation session to assess pain behavior. Studies find that there are significant differences in pain sensation, pain behaviors, and physical disability in men and women with OA. Women had significantly higher levels of pain and physical disability, and exhibited more pain behaviors during observation sessions than men (Keefe et al., 2000) . The influence of sex hormones is a significant source of pain variability which may have different effects on men and women. This is not surprising given the distribution of sex hormone types and their receptors in the peripheral and central nervous system areas associated with nociceptive transmission. Although the effects of estradiol and progesterone on pain sensitivity are relatively complex (both direct pro-nociceptive and anti-nociceptive effects on pain), testosterone appears to be more anti-nociceptive and protective, especially considering the relationship between decreased androgen concentrations and chronic pain (Bartley & Fillingim, 2013).

In this study, based on the characteristics of age, in the nociceptive pain group, the highest percentage was found in the age range of 51-70 years with 76 patients (46.6%). In the mixed pain group, the highest percentage was found in the age range of 51-70 years with 48 patients (40.3%). In the neuropathic pain group, the highest percentage was found in the age range of 51-70 years in 66 patients (49.6%). It can be concluded that in the three pain groups, the highest percentage was found in the age range of 51-70 years. This is almost in accordance with a multicenter study in Turkey in 2015 of 1163 pain sufferers and it was found that 52.5% of patients (n = 610) in this study were from neuropathic pain and around 67.5% of patients were in the 65-74 age group (Kutsal, 2016). Increasing age appears to be associated with an increase in the pain threshold and a decrease in the function of endogenous pain-inhibitory mechanisms. This is evidenced by a meta-analysis study in 2016 which aimed to measure evidence of age-related changes in pain perception, by measuring pain threshold indexes and pain tolerance thresholds in healthy young and old adults. 31 studies on pain threshold and 9 studies assessing pain tolerance threshold were identified. Pain threshold increases with age, which is indicated by large effect sizes. In contrast, pain tolerance thresholds did not show substantial changes with age. Thus, researchers have strong evidence that aging reduces pain sensitivity for lower pain intensity (Lautenbacher et al., 2017).

From the results of the study, it was found that 88 patients (54.0%) had pain onset ≤ 3 months in the nociceptive pain group, 60 patients (50.4%) in mixed pain, and 42 patients (31 %) in neuropathic pain. Patients with onset > 3 months in the nociceptive pain group were 75 patients (46.0%), mixed pain were 59 (49.6%), and neuropathic pain were 91 (68.4%). This shows that in acute pain (≤ 3 months), the most common types of pain are nociceptive pain and mixed pain, whereas for neuropathic pain it is more often found in patients with an onset of > 3 months (chronic pain). However, in a 2018 Iranian study of 5326 patients, it was found that 70.8% of participants reported pain and 31.7% experienced chronic pain. The prevalence of chronic neuropathic and nociceptive pain is 13.7% and 30%, respectively (Salman Roghani et al., 2019). In a large cross-sectional study of middle-aged adults in the UK Biobank in 2019, the prevalence of neuropathic pain was 9.2% of all patients, and accounted for 18.1% of chronic pain patients (Baskozos et al., 2023).

This study shows that mild pain was most commonly found in nociceptive pain, moderate pain was most commonly found in mixed pain, while severe pain was most commonly found in neuropathic pain. This is consistent with a cross-sectional study conducted by Inoue et al. in 2017 in Japan on 5437 patients with pain and found pain intensity was significantly higher in participants who had chronic pain with a neuropathic pain component (7.1 ± 1.2 SD) than

participants without neuropathic pain (6.1 ± 1.1 SD) (p <0.001). Although chronic pain with a neuropathic pain component was associated with greater pain intensity than chronic pain without a neuropathic pain component, researchers found no difference in pain duration between the two groups (Inoue et al., 2017).

4.2. Analysis Area Under the Curve (AUC) of MAPKN in Nociceptive, Mixed, and Neuropathic Pain groups

In this study we used the Area Under the Curve (AUC) descriptive analysis method where the AUC value was obtained from the Receiver Operating Characteristic (ROC) curve. The ROC curve is generated from the tug-of-war between sensitivity and specificity at various cut points (Dahlan, 2018). In this study, the cut-off points obtained for the MAPKN score in the nociceptive pain group were ≥ 3 and < 3, in the mixed pain group were ≥ 3 and < 3, and in the neuropathic pain group were ≥ 4 and < 4.

Based on the results of the study, the nociceptive pain group found sensitivity was 92.59%, specificity was 96.43%, and Area Under the Curve (AUC) value resulting from the ROC curve was 0.959 with a p value <0.001. The AUC value of 0.959 (96%) indicates that the diagnostic value of the MAPKN score in assessing pain intensity in the nociceptive pain group is very good (>90%-100%). In this case, if MAPKN scoring is performed on 100 patients, this examination will provide the correct conclusions in determining pain intensity in 96 patients. In the mixed pain group, sensitivity was 98.17%, specificity was 80.00%, the Area Under the Curve (AUC) value resulting from the ROC curve in the mixed pain group was 0.836 with a p value of 0.001. The AUC value of 0.836 (83%) indicates that the diagnostic value of the MAPKN score in assessing pain intensity in the mixed pain group is good (> 80%-90%). In this case, if the MAPKN scoring is performed on 100 patients, then this examination will provide the correct conclusions in determining pain intensity in 83 patients. In the neuropathic pain group, sensitivity was 92.06%, specificity was 85.71%, the Area Under the Curve (AUC) value resulting from the ROC curve in the neuropathic pain group was 0.951 with a p value <0.001. The AUC value of 0.951 (95%) indicates that the diagnostic value of the MAPKN score in assessing pain intensity in the neuropathic pain group is very good (>90%-100%). In this case, if MAPKN scoring is performed on 100 patients, this examination will provide the correct conclusions in determining pain intensity in 95 patients. With its high sensitivity, specificity, and AUC value, it can be concluded that based on the AUC analysis, MAPKN has good diagnostic value in assessing pain intensity in both the nociceptive, mixed, and neuropathic pain groups. This is in accordance with research conducted by Eka Pranata in 2004 which states that MAPKN has strong discriminant validity in assessing pain intensity (Pranata, 2004).

4.3. Analysis of MAPKN validiity based on comparison of NRS and MAPKN values in the Nociceptive, Mixed, and Neuropathic Pain groups, using Bland-Altman plot

In addition to using the AUC analysis, we also used the Bland-Altman analysis method by comparing the NRS values and MAPKN values. The main output of the Bland-Altman analysis is the limit of agreement. The limit of agreement is said to be good if it is smaller or the same as expected. From the results of the study, the mean difference in NRS-MAPKN values in the nociceptive pain group was -0.1043 with a limit of agreement -2.3947 – 2.1861, the mean difference in NRS-MAPKN values in the mixed pain group was -0.2521 with a limit of agreement -2.9188 – 2.4146, and the mean difference in NRS-MAPKN values in the neuropathic pain group was -0.09774 with a limit of agreement -2.0106 – 1.8151. The limit of agreement is said to be good if it is smaller or the same as expected. From the results of the study it was found that the limit of agreement was smaller/same than expected, so it can be concluded that MAPKN is valid in assessing pain intensity in both the nociceptive, mixed, and neuropathic pain groups.

5. Conclusion

Based on the results of the analysis and discussion, the following conclusions can be drawn are Alternative Method of Quantitative Pain Assessment (MAPKN) is valid and has excellent diagnostic value in assessing nociceptive pain intensity, (Alternative Method of Quantitative Pain Assessment (MAPKN) is valid and has good diagnostic value in

assessing mixed pain intensity, Alternative Method of Quantitative Pain Assessment (MAPKN) is valid and has excellent diagnostic value in assessing neuropathic pain intensity.

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