Review of: "Comparison between Analgesia Nociception Index (ANI) and self-reported measures for diagnosing pain in conscious individuals: a systematic review and meta-analysis"

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Potential competing interests: The author(s) declared that no potential competing interests exist.

This study is a systematic review and meta-analysis with the aim to assess the correlation between ANI and self-reported pain measures in conscious individuals. The Methods section is appropriate, however, the Synthesis of results and subgroup analysis have many major flaws:

1. Table 1 Reference #30: Main results was reported as “Linear regression: negative linear relationship between ANI and NRS: ANI − 5.2 versus NRS + 77.9, $r^2 = 0.41$, $P < 0.05$”. The regression equation, according to the full text publication, should be “ANI = -5.2 versus NRS + 77.9, $r^2 = 0.41$, $P < 0.05$”.
2. In Synthesis of results and subgroup analysis group (1): the first subgroup analysis, the authors pooled data of 7 studies assessing conscious individuals who had undergone medical procedures under general anaesthesia to assess the pooled correlation between ANI and NRS. The meta-analysis should include the identical primary outcome which is correlation (r; Pearson or Spearman correlation). From 7 references, 2 references, i.e., reference # 30 and #31, reported the r^2 not the r. The reference #30 reported that “**A *negative linear relationship*** was observed between ANI and NRS (ANI = -5.2×NRS+77.9, $r^2 = 0.41$, $P < 0.05$) while the reference #31 reported that “A statistically significant ***negative linear relationship*** (ANI = 68.1 – 4.2×NRS, $r^2 = 0.33$, $P = 0.01$) was observed”. R refers to the correlation between the observed values of the response variable and the predicted values of the response variable made by the model, while r^2 refers to the proportion of the variance in the response variable that can be explained by the predictor variables in the regression model. The r can be calculated from r^2 as sqr r^2 with a “-“ value since it shows a negative linear relationship.Thus the r in the reference #30 and #31 should be -0.640 and -0.574 and these two values should be pooled for meta-analysis. After re-calculation using MedCalc 20.027, the pooled correlation (random effects, N = 944) is -0.398 (95% CI -0.576 to -0.185, $I^2 = 92.09\%$, $P =< 0.001$) indicating a ***strong negative relationship*** between the two parameters which is totally different from the results of this study.

According to the above comments, the Results, Discussion, and Conclusion of this study should be amended.

Meta-analysis: correlation

Variable for studies	Study
Variable for number of cases	N
Variable for correlation coefficients	Correlation_coefficient

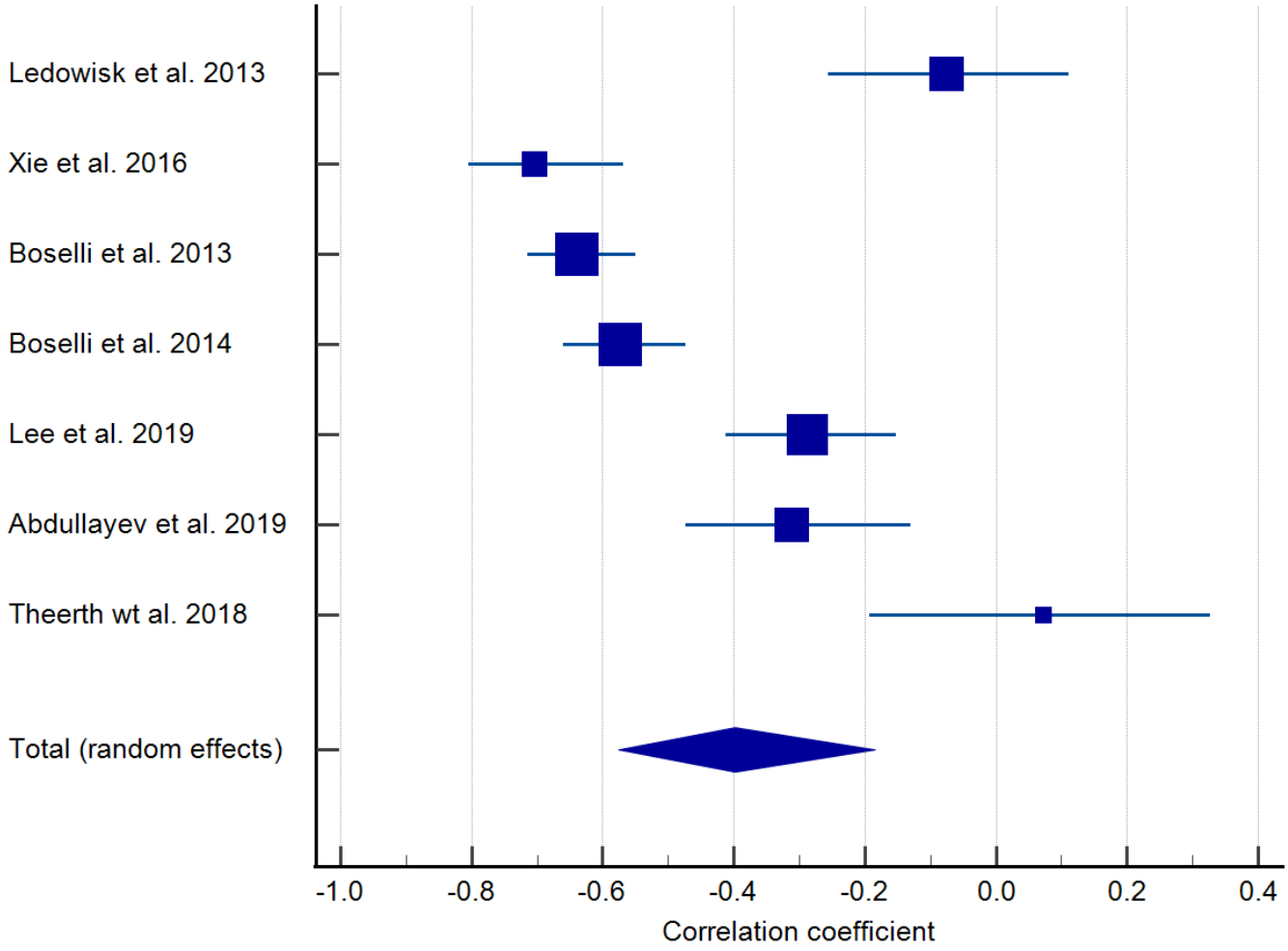
Study	Sample size	Correlation coefficient	95% CI	z	P	Weight (%)	
						Fixed	Random
Ledowisk et al. 2013	114	-0.0750	-0.255 to 0.110			12.03	14.33
Xie et al. 2016	74	-0.705	-0.804 to -0.568			7.69	13.64
Boselli et al. 2013	200	-0.640	-0.715 to -0.550			21.34	14.91
Boselli et al. 2014	200	-0.574	-0.660 to -0.473			21.34	14.91
Lee et al. 2019	192	-0.288	-0.413 to -0.153			20.48	14.88
Abdullayev et al. 2019	107	-0.312	-0.474 to -0.130			11.27	14.24
Theerth wt al. 2018	57	0.0720	-0.192 to 0.326			5.85	13.09
Total (fixed effects)	944	-0.439	-0.489 to -0.385	-14.299	<0.001	100.00	100.00
Total (random effects)	944	-0.398	-0.576 to -0.185	-3.519	<0.001	100.00	100.00

Test for heterogeneity

Q	75.8867
DF	6
Significance level	P < 0.0001
I^2 (inconsistency)	92.09%
95% CI for I^2	86.26 to 95.45

Publication bias

Egger's test	
Intercept	5.7554
95% CI	-9.7472 to 21.2579
Significance level	P = 0.3837
Begg’s test	
Kendall's Tau	0.2928


Ledowisk et al. 2013
Xie et al. 2016
Boselli et al. 2013
Boselli et al. 2014
Lee et al. 2019
Abdullayev et al. 2019
Theerth wt al. 2018
Total (random effects)
-1.0
-0.8
-0.6
-0.4
-0.2
0.0
0.2
0.4
Correlation coefficient