

Recommendations for selection of self-report of pain intensity measures in children and adolescents: A systematic review and quality assessment of measurement properties

Supplementary Table 1. Search strategy.

MEDLINE(R) 1946 to Present with Daily Update, MEDLINE(R) In-Process & Other Non-Indexed Citations

#	Searches
1	(VAS or NRS or VRS).mp.
2	(visual adj2 analog* adj2 (scale* or score*)).mp.
3	(numeric* adj2 rat* adj2 (scale* or score*)).mp.
4	(verbal* adj2 rat* adj2 (scale* or score*)).mp.
5	(faces adj2 (scale* or score*)).mp.
6	(piece* adj2 hurt adj2 tool*).mp.
7	oucher.mp.
8	FLACC.mp.
9	(Face* adj2 Leg* adj2 Activit* adj2 Cry adj2 Consol*).mp.
10	(Analog* adj2 Chromatic adj2 Continu* adj2 (scale* or score*)).mp.
11	body outline.mp.
12	(pain* adj2 (scale* or score*)).mp.
13	(child* adj2 global adj2 rat* adj2 (scale* or score*)).mp.
14	(colo?r adj2 analog* adj2 (scale* or score*)).mp.
15	(eland adj2 colo?r adj2 tool*).mp.
16	(facial adj2 express* adj2 (scale* or score*)).mp.
17	(glass* adj2 rat* adj2 (scale* or score*)).mp.
18	(poker adj2 chip adj2 tool*).mp.
19	(pain* adj2 ladder*).mp.
20	(Scheffield* adj6 pain* adj2 tool*).mp.
21	(Smiley adj2 analog* adj2 scale*).mp.
22	(4-point* adj2 verbal adj2 descript* adj2 scale*).mp.
23	(four-point* adj2 verbal adj2 descript* adj2 scale*).mp.
24	(visual adj2 analog* adj2 toy*).mp.
25	(5-point* adj2 word* adj2 graphic* adj6 scale*).mp.
26	(five-point* adj2 word* adj2 graphic* adj6 scale*).mp.
27	(6-point* adj2 word* adj2 graphic* adj6 scale*).mp.
28	(six-point* adj2 word* adj2 graphic* adj6 scale*).mp.
29	MSPCT.mp.
30	4-VDS.mp.
31	VNRS.mp.
32	VASOF.mp.
33	(5-WGRS or 6-WGRS).mp.
34	or/1-33
35	Pain Measurement/

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36	exp Pain/
37	pain*.mp.
38	or/35-37
39	34 and 38
40	limit 39 to "all child (0 to 18 years)"
41	(infan* or newborn* or new-born* or neonat* or baby or babies or child* or youth or kid or kids or toddler* or boy* or girl* or adolescen* or teen* or juvenile* or p?ediatric*).mp.
42	39 and 41
43	40 or 42

Embase Classic+Embase 1947 to Present

#	Searches
1	(VAS or NRS or VRS).mp.
2	(visual adj2 analog* adj2 (scale* or score*)).mp.
3	(numeric* adj2 rat* adj2 (scale* or score*)).mp.
4	(verbal* adj2 rat* adj2 (scale* or score*)).mp.
5	(faces adj2 (scale* or score*)).mp.
6	(piece* adj2 hurt adj2 tool*).mp.
7	oucher.mp.
8	FLACC.mp.
9	(Face* adj2 Leg* adj2 Activit* adj2 Cry adj2 Consol*).mp.
10	(Analog* adj2 Chromatic adj2 Continu* adj2 (scale* or score*)).mp.
11	body outline.mp.
12	(pain* adj2 (scale* or score*)).mp.
13	(child* adj2 global adj2 rat* adj2 (scale* or score*)).mp.
14	(colo?r adj2 analog* adj2 (scale* or score*)).mp.
15	(eland adj2 colo?r adj2 tool*).mp.
16	(facial adj2 express* adj2 (scale* or score*)).mp.
17	(glass* adj2 rat* adj2 (scale* or score*)).mp.
18	(poker adj2 chip adj2 tool*).mp.
19	(pain* adj2 ladder*).mp.
20	(Sheffield* adj6 pain* adj2 tool*).mp.
21	(Smiley adj2 analog* adj2 scale*).mp.
22	(4-point* adj2 verbal adj2 descript* adj2 scale*).mp.
23	(four-point* adj2 verbal adj2 descript* adj2 scale*).mp.
24	(visual adj2 analog* adj2 toy*).mp.
25	(5-point* adj2 word* adj2 graphic* adj6 scale*).mp.
26	(five-point* adj2 word* adj2 graphic* adj6 scale*).mp.
27	(6-point* adj2 word* adj2 graphic* adj6 scale*).mp.

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28	(six-point* adj2 word* adj2 graphic* adj6 scale*).mp.
29	MSPCT.mp.
30	4-VDS.mp.
31	VNRS.mp.
32	VASOF.mp.
33	(5-WGRS or 6-WGRS).mp.
34	or/1-33
35	exp pain/ or exp pain assessment/
36	pain*.mp.
37	35 or 36
38	34 and 37
39	limit 38 to (infant or child or preschool child <1 to 6 years> or school child <7 to 12 years> or adolescent <13 to 17 years>)
40	(infan* or newborn* or new-born* or neonat* or baby or babies or child* or youth or kid or kids or toddler* or boy* or girl* or adolescen* or teen* or juvenile* or p?ediatric*).mp.
41	38 and 40
42	39 or 41

PsycINFO 1806 to Present

#	Searches
1	(VAS or NRS or VRS).mp.
2	(visual adj2 analog* adj2 (scale* or score*)).mp.
3	(numeric* adj2 rat* adj2 (scale* or score*)).mp.
4	(verbal* adj2 rat* adj2 (scale* or score*)).mp.
5	(faces adj2 (scale* or score*)).mp.
6	(piece* adj2 hurt adj2 tool*).mp.
7	oucher.mp.
8	FLACC.mp.
9	(Face* adj2 Leg* adj2 Activit* adj2 Cry adj2 Consol*).mp.
10	(Analog* adj2 Chromatic adj2 Continu* adj2 (scale* or score*)).mp.
11	body outline.mp.
12	(pain* adj2 (scale* or score*)).mp.
13	(child* adj2 global adj2 rat* adj2 (scale* or score*)).mp.
14	(colo?r adj2 analog* adj2 (scale* or score*)).mp.
15	(eland adj2 colo?r adj2 tool*).mp.
16	(facial adj2 express* adj2 (scale* or score*)).mp.
17	(glass* adj2 rat* adj2 (scale* or score*)).mp.
18	(poker adj2 chip adj2 tool*).mp.
19	(pain* adj2 ladder*).mp.

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20	(Scheffield* adj6 pain* adj2 tool*).mp.
21	(Smiley adj2 analog* adj2 scale*).mp.
22	(4-point* adj2 verbal adj2 descript* adj2 scale*).mp.
23	(four-point* adj2 verbal adj2 descript* adj2 scale*).mp.
24	(visual adj2 analog* adj2 toy*).mp.
25	(5-point* adj2 word* adj2 graphic* adj6 scale*).mp.
26	(five-point* adj2 word* adj2 graphic* adj6 scale*).mp.
27	(6-point* adj2 word* adj2 graphic* adj6 scale*).mp.
28	(six-point* adj2 word* adj2 graphic* adj6 scale*).mp.
29	MSPCT.mp.
30	4-VDS.mp.
31	VNRS.mp.
32	VASOF.mp.
33	(5-WGRS or 6-WGRS).mp.
34	or/1-33
35	exp pain/ or pain measurement/
36	pain*.mp.
37	35 or 36
38	34 and 37
39	limit 38 to (100 childhood or 120 neonatal or 140 infancy <2 to 23 mo> or 160 preschool age or 180 school age or 200 adolescence)
40	(infan* or newborn* or new-born* or neonat* or baby or babies or child* or youth or kid or kids or toddler* or boy* or girl* or adolescen* or teen* or juvenile* or p?ediatric*).mp.
41	38 and 40
42	39 or 41

EBM Reviews - Cochrane Central Register of Controlled Trials April 2016

#	Searches
1	(VAS or NRS or VRS).mp.
2	(visual adj2 analog* adj2 (scale* or score*)).mp.
3	(numeric* adj2 rat* adj2 (scale* or score*)).mp.
4	(verbal* adj2 rat* adj2 (scale* or score*)).mp.
5	(faces adj2 (scale* or score*)).mp.
6	(piece* adj2 hurt adj2 tool*).mp.
7	oucher.mp.
8	FLACC.mp.
9	(Face* adj2 Leg* adj2 Activit* adj2 Cry adj2 Consol*).mp.
10	(Analog* adj2 Chromatic adj2 Continu* adj2 (scale* or score*)).mp.
11	body outline.mp.

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12	(pain* adj2 (scale* or score*)).mp.
13	(child* adj2 global adj2 rat* adj2 (scale* or score*)).mp.
14	(colo?r adj2 analog* adj2 (scale* or score*)).mp.
15	(eland adj2 colo?r adj2 tool*).mp.
16	(facial adj2 express* adj2 (scale* or score*)).mp.
17	(glass* adj2 rat* adj2 (scale* or score*)).mp.
18	(poker adj2 chip adj2 tool*).mp.
19	(pain* adj2 ladder*).mp.
20	(Scheffield* adj6 pain* adj2 tool*).mp.
21	(Smiley adj2 analog* adj2 scale*).mp.
22	(4-point* adj2 verbal adj2 descript* adj2 scale*).mp.
23	(four-point* adj2 verbal adj2 descript* adj2 scale*).mp.
24	(visual adj2 analog* adj2 toy*).mp.
25	(5-point* adj2 word* adj2 graphic* adj6 scale*).mp.
26	(five-point* adj2 word* adj2 graphic* adj6 scale*).mp.
27	(6-point* adj2 word* adj2 graphic* adj6 scale*).mp.
28	(six-point* adj2 word* adj2 graphic* adj6 scale*).mp.
29	MSPCT.mp.
30	4-VDS.mp.
31	VNRS.mp.
32	VASOF.mp.
33	(5-WGRS or 6-WGRS).mp.
34	or/1-33
35	Pain Measurement/
36	exp Pain/
37	pain*.mp.
38	or/35-37
39	34 and 38
40	(infan* or newborn* or new-born* or neonat* or baby or babies or child* or youth or kid or kids or toddler* or boy* or girl* or adolescen* or teen* or juvenile* or p?ediatric*).mp.
41	39 and 40
42	new.uf.
43	41 and 42

Web of Science

Science Citation Index Expanded (SCI-EXPANDED)

Social Sciences Citation Index (SSCI)

Conference Proceedings Citation Index- Science (CPCI-S)

Conference Proceedings Citation Index- Social Science & Humanities (CPCI-SSH)

Set Searches

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# 37	TS=(infan* or newborn* or new-born* or neonat* or baby or babies or child* or youth or kid or kids or toddler* or boy* or girl* or adolescen* or teen* or juvenile* or pediatric or paediatric*)
# 36	#35 AND #34
# 35	TOPIC: (pain*)
# 34	#33 OR #32 OR #31 OR #30 OR #29 OR #28 OR #27 OR #26 OR #25 OR #24 OR #23 OR #22 OR #21 OR #20 OR #19 OR #18 OR #17 OR #16 OR #15 OR #14 OR #13 OR #12 OR #11 OR #10 OR #9 OR #8 OR #7 OR #6 OR #5 OR #4 OR #3 OR #2 OR #1
# 33	TOPIC: ((5-WGRS or 6-WGRS))
# 32	TOPIC: (VASOF)
# 31	TOPIC: (VNRS)
# 30	TOPIC: (4-VDS)
# 29	TOPIC: (MSPCT)
# 28	TOPIC: ((six-point* NEAR/2 word* NEAR/2 graphic* NEAR/6 scale*))
# 27	TOPIC: ((6-point* NEAR/2 word* NEAR/2 graphic* NEAR/6 scale*))
# 26	TOPIC: ((five-point* NEAR/2 word* NEAR/2 graphic* NEAR/6 scale*))
# 25	TOPIC: ((5-point* NEAR/2 word* NEAR/2 graphic* NEAR/6 scale*))
# 24	TOPIC: ((visual NEAR/2 analog* NEAR/2 toy*))
# 23	TOPIC: ((four-point* NEAR/2 verbal NEAR/2 descript* NEAR/2 scale*))
# 22	TOPIC: ((4-point* NEAR/2 verbal NEAR/2 descript* NEAR/2 scale*))
# 21	TOPIC: ((Smiley NEAR/2 analog* NEAR/2 scale*))
# 20	TOPIC: ((Scheffield* NEAR/6 pain* NEAR/2 tool*))
# 19	TOPIC: ((pain* NEAR/2 ladder*))
# 18	TOPIC: ((poker NEAR/2 chip NEAR/2 tool*))
# 17	TOPIC: ((glass* NEAR/2 rat* NEAR/2 (scale* or score*)))
# 16	TOPIC: ((facial NEAR/2 express* NEAR/2 (scale* or score*)))
# 15	TOPIC: ((eland NEAR/2 (color or colour) NEAR/2 tool*))
# 14	TOPIC: (((color or colour) NEAR/2 analog* NEAR/2 (scale* or score*)))
# 13	TOPIC: ((child* NEAR/2 global NEAR/2 rat* NEAR/2 (scale* or score*)))
# 12	TOPIC: ((pain* NEAR/2 (scale* or score*)))
# 11	TS="body outline"
# 10	TOPIC: ((Analog* NEAR/2 Chromatic NEAR/2 Continu* NEAR/2 (scale* or score*)))
# 9	TOPIC: ((Face* NEAR/2 Leg* NEAR/2 Activit* NEAR/2 Cry NEAR/2 Consol*))
# 8	TS=FLACC
# 7	TS=oucher

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# 6	TS=(piece* NEAR/2 hurt NEAR/2 tool*)
# 5	TS=(faces NEAR/2 (scale* or score*))
# 4	TS=(verbal* NEAR/2 rat* NEAR/2 (scale* or score*))
# 3	TS=(numeric* NEAR/2 rat* NEAR/2 (scale* or score*))
# 2	TS=(visual NEAR/2 analog* NEAR/2 (scale* or score*))
# 1	TOPIC: ((VAS or NRS or VRS))

CINAHL

#	Query	Limiters/Expanders
S43	S40 or S42	Search modes - Boolean/Phrase
S42	S39 AND S41	Search modes - Boolean/Phrase
S41	TX (infan* or newborn* or new-born* or neonat* or baby or babies or child* or youth or kid or kids or toddler* or boy* or girl* or adolescen* or teen* or juvenile* or pediatric* or paediatric*)	Search modes - Boolean/Phrase
S40	S34 AND S38	Limiters - Age Groups: Infant, Newborn: birth-1 month, Infant: 1-23 months, Child, Preschool: 2-5 years, Child: 6-12 years, Adolescent: 13-18 years Search modes - Boolean/Phrase
S39	S34 AND S38	Search modes - Boolean/Phrase
S38	S35 OR S36 OR S37	Search modes - Boolean/Phrase
S37	TX pain*	Search modes - Boolean/Phrase
S36	(MH "Pain+")	Search modes - Boolean/Phrase
S35	(MH "Pain Measurement")	Search modes - Boolean/Phrase
S34	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33	Search modes - Boolean/Phrase
S33	TX (5-WGRS or 6-WGRS)	Search modes - Boolean/Phrase

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S32	TX VASOF	Search modes - Boolean/Phrase
S31	TX VNRS	Search modes - Boolean/Phrase
S30	TX 4-VDS	Search modes - Boolean/Phrase
S29	TX MSPCT	Search modes - Boolean/Phrase
S28	TX (six-point* N2 word* N2 graphic* N6 scale*)	Search modes - Boolean/Phrase
S27	TX (6-point* N2 word* N2 graphic* N6 scale*)	Search modes - Boolean/Phrase
S26	TX (five-point* N2 word* N2 graphic* N6 scale*)	Search modes - Boolean/Phrase
S25	TX (5-point* N2 word* N2 graphic* N6 scale*)	Search modes - Boolean/Phrase
S24	TX (visual N2 analog* N2 toy*)	Search modes - Boolean/Phrase
S23	TX (four-point* N2 verbal N2 descript* N2 scale*)	Search modes - Boolean/Phrase
S22	TX (4-point* N2 verbal N2 descript* N2 scale*)	Search modes - Boolean/Phrase
S21	TX (Smiley N2 analog* N2 scale*)	Search modes - Boolean/Phrase
S20	TX (Scheffield* N6 pain* N2 tool*)	Search modes - Boolean/Phrase
S19	TX (pain* N2 ladder*)	Search modes - Boolean/Phrase
S18	TX (poker N2 chip N2 tool*)	Search modes - Boolean/Phrase
S17	TX (glass* N2 rat* N2 (scale* or score*))	Search modes - Boolean/Phrase
S16	TX (facial N2 express* N2 (scale* or score*))	Search modes - Boolean/Phrase
S15	TX (eland N2 (color or colour) N2 tool*)	Search modes - Boolean/Phrase
S14	TX ((color or colour) N2 analog* N2 (scale* or score*))	Search modes - Boolean/Phrase
S13	TX (child* N2 global N2 rat* N2 (scale* or score*))	Search modes - Boolean/Phrase
S12	TX (pain* N2 (scale* or score*))	Search modes - Boolean/Phrase
S11	TX body outline	Search modes - Boolean/Phrase

Recommendations for selection of self-report of pain intensity measures in children and adolescents: A systematic review and quality assessment of measurement properties

S10	TX (Analog* N2 Chromatic N2 Continu* N2 (scale* or score*))	Search modes - Boolean/Phrase
S9	TX (Face* N2 Leg* N2 Activit* N2 Cry N2 Consol*)	Search modes - Boolean/Phrase
S8	TX FLACC	Search modes - Boolean/Phrase
S7	TX oucher	Search modes - Boolean/Phrase
S6	TX (piece* N2 hurt N2 tool*)	Search modes - Boolean/Phrase
S5	TX (faces N2 (scale* or score*))	Search modes - Boolean/Phrase
S4	TX (verbal* N2 rat* N2 (scale* or score*))	Search modes - Boolean/Phrase
S3	TX (numeric* N2 rat* N2 (scale* or score*))	Search modes - Boolean/Phrase
S2	TX (visual N2 analog* N2 (scale* or score*))	Search modes - Boolean/Phrase
S1	TX (VAS or NRS or VRS)	Search modes - Boolean/Phrase

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Supplementary Table 2. Excluded self-report pain intensity measures not meeting Cohen’s “well-established” assessment criteria.

Measure	First author and year of publication
3-Face Scale	von Baeyer 2013[45]
Adjectival Scale	Goodenough 2005[21]
Analogue Chromatic Continuous Scale	Beyer 1990, Beyer 1998, Grossi 1983[5,6,22]
Body Posture Pain Scale	Zabalía 2010[49]
Body Outline	O’Donnel 1985[34]
Charleston Pediatric Pain Pictures	Belter 1988[3]
Children’s Anxiety and Pain Scales	Chambers 1999, Kuttner 1989[9,29]
Children’s Global Rating Scale	Carpenter 1990[8]
Computer Faces Scale	Cravero 2012, Fanciullo 2007, Gulur 2009[10,15,23]
Descriptive Scale	Goodenough 1997[20]
Eland's Projective Tool	Hester 1979[25]
Eland Colour Tool	Eland 1981[12]
Facial Expression Scale	Suraseranivongse 2005[40]
Faces Scale	Chambers 1999, LeBaron 1984[9,31]
Faces Scale	Douthit 1990[11]
Faces Scale	Chambers 1999, Maunuksela 1987[9,33]
Faces Scale	Tree-Trakarn 1987[43]
Finger Span	Franzen 1989[17]
Finger Span Measure	Goodenough 2005[21]
Glasses Rating Scale	Whaley 1987, Wong 1988[46,48]
Graphic Numerical Rating Scale	Whaley 1987[46]
Linear Analogue Pain Scale	Broadmann 1988[7]
Iconic Pain Assessment Tool Version 2	Laloo 2013[30]
Khon Kaen University Pediatric Pain Assessment Tool	Jongudomkarn 2008[27]
Multiple Size Poker Chip Tool	St-Laurent-Gagnon 1999[39]
Numeric Rating Scale (0-5)	Ellis 2011[13]
Numeric Rating Scale Thermometer	Szyfelbein 1985[41]
Pain Ladder	Hester 1990[6]
Princess Margaret Hospital Pain Assessment Tool	Robertson 1993[38]
Red-and-White Visual Analog Scale	Hamunen 2008[24]
Scheffield Children’s Hospital Pain Tool	Goddard 1996[19]
Simple Descriptive Scale	Wong 1988[48]

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Simplified Faces Pain Scale	Emmott 2017[14]
Simplified Concrete Ordinal Scale	Emmot 2017[14]
Smiley Analogue Scale	Pothmann 1990[36]
Sydney Animated Facial Expression	Goodenough 2005, Hicks 2001[21,26]
The Rainbow Pain Scale	Mahon 2015[32]
Verbal Descriptor Scale	Berntson 2001[4]
Verbal Descriptor Scale	Goodenough 1997, Goodenough 2005[20,21]
Verbal Descriptor Scale	Flaherty, 1996[16]
Verbal Numerical Rating Scale	Vetter 1992[44]
Verbal Rating Scale	Page 2012[35]
Verbal Rating Scale	Bailey 2010[1]
Verbal Rating Scale	Suraseranivongse 2005[40]
Visual Analogue Scale of Faces	Barretto 2004[2]
Visual Analogue Toy	Goodenough 1997, White 1985[20,47]
Word Description Scale	Garbaibeh 2002[18]
Word Descriptor Scale	Keck 1996[28]
Word Graphic Scale	Keck 1996[28]
Word Graphic Scales	Ramritu 2000[37]
Word Graphic Rating Scale	Tesler 1991[42]
Word Graphic Rating Scale	Whaley 1987[46]

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