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Pediatric & Neonatal NURSING Manual

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Foreword
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CHAPTER 3

Monitoring Vital Signs

Vital signs are the parameters which help to determine the stability/normalcy of the human body. They include temperature, pulse, respiration, blood pressure, saturation (SpO_2) and pain.

Purposes

- To assess for any alteration in vital signs
- To aid in diagnosis and treatment
- To monitor child's progress
- To take prompt action in case of emergency

Articles

A clean tray containing:

- Digital thermometer in a glass bottle
- Container with spirit cotton swabs
- Container with clean cotton swabs
- BP apparatus with appropriate cuff/digital BP monitor
- Stethoscope
- Clean hand towel
- Kidney tray with paper bag.

Procedure

Temperature Measurement

- Wash hands/use alcohol based hand rub
- Explain the procedure to the parent and child (if old enough to understand)
- Wipe the thermometer from bulb to stem with clean cotton swab
- Switch on the digital thermometer
- Dry child's axilla with a clean hand towel.
- Place the bulb of thermometer in the axilla making sure that the bulb is in contact with skinfolds (in case of small children place the thermometer vertically along the bodyline)
- Maintain in position until the beep is heard.
- Remove thermometer from the child's axilla
- Read the temperature value displayed on the screen
- Wipe it with spirit swab from stem to bulb in a circular movement
- Replace the thermometer in the glass container after cleaning with spirit swab
- Note the time and temperature in the child's record as it is (without adding any value)
- Replace articles
- Wash hands.

Oral temperature is not usually taken in case of children.

Special Points to Remember

Chart the findings accurately indicating the site from where the temperature was checked.

Pulse Measurement

- While waiting for the prescribed time for temperature reading, palpate radial artery and count pulse for 1 full minute (counting like 1, 2,.....).
- In infants, if radial pulse is not palpable easily, check brachial or femoral or apical impulse in 5th intercostal space.
- Feel for rhythm and volume.
- Record immediately.

Note: Other sites that can be used for checking pulse are femoral, carotid, popliteal, dorsalis pedis, and posterior tibialis.

Do not use your thumb to count pulse as this may be confused with your own pulse. Normal pulse rates in children including neonates are given here as well as in Table 3.1.

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Table 3.1: Values of normal heart rate and respiratory rate in different age groups

Age	Normal heart rate (beats per minute)	Normal respiratory rate (breaths per minute)
Newborn	100–160	40–60
0–5 months	90–150	25–40
6–12 months	80–140	20–30
1–3 years	80–130	20–30
3–5 years	80–120	20–30
6–10 years	70–110	15–30
11–14 years	60–105	12–20
14+ years	60–100	12–20

Source: www.ncbi.nlm.nih.gov/pmc/articles/PMC493278

Neonates: 140–160/min
Up to 3 years: 120–140/min
Children 3–4 years old: 80–120/min
Children 5–6 years old: 75–115/min
Children 7–9 years old: 70–110/min
Children 10 years and older, and adults (including seniors): 60–100/min

Respiration Measurement (Table 3.1)

- Count number of respiration of the child for 1 full minute, in children below 1 year of age expose the chest wall.
- Count each inhalation and exhalation as one respiration.
- Make sure that child is calm and quiet prior to the procedure.
- Record immediately.

Look for chest retractions (lower chest indrawing), nasal flaring, if child has fast breathing (fast breathing in neonates is more than 60/min and 2 months to 1 year fast breathing is more than 50/min).

Special Points to Remember

- Count for full 1 minute as babies tend to have irregular breathing.
- In older child, keep his forearm on his chest after pulse monitoring and continue to check respiration without his knowledge. One can expose the chest wall if required
- Note the rate, rhythm and depth of respiration.
- Look for any chest retractions, lower chest indrawing, nasal flaring, grunting.

Table 3.2: Estimates of blood pressure values

Age	BP
1–7 years	Systolic blood pressure = age + 90 mm of Hg Diastolic blood pressure = 56 mm of Hg
8–18 years	Systolic blood pressure = 2 × age + 83 mm of Hg Diastolic blood pressure = age + 52 mm of Hg

- In infants check respiration prior to temperature and pulse monitoring as once child may cry leading to variation in HR and RR.

Blood Pressure Measurement (Table 3.2)

- Explain the procedure to the child and parents.
- Assess the intended site before applying cuff.
- Expose the arm by slipping off the sleeve.
- Place the BP apparatus at the level of the heart in between the arm and the body.
- Apply the BP cuff snugly with arm extended, 1–2 inch above the elbow.
- Palpate brachial artery with left hand, put the stethoscope onto the ear with the earpiece.
- Place diaphragm of stethoscope over the brachial artery.
- Inflate cuff till pulsation disappears and inflate the cuff further upto 20–30 mm Hg above the point of pulse disappearance.
- Gradually deflate the cuff at the rate of 2–3 mm Hg per second noting the point where sound reappears. This is the systolic pressure.
- Continue to release valve until muffled sound disappears. This is the diastolic pressure.
- Deflate completely and remove the cuff.
- Record BP in record sheet.

Blood pressure levels for boys and girls by age and height percentile is described in Tables 3.3 and 3.4.

Special Points to Remember

- Keep BP apparatus at the level of the heart.
- Select appropriate size of BP cuff (width 40%, length 80% of arm circumference).
- Ensure room is calm and quiet.

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Table 3.3: Blood pressure (BP) levels in boys

Blood Pressure Levels for Boys by Age and Height Percentile*

Age (Year)	BP Percentile ↓	Systolic BP (mm Hg) ← Percentile of height →							Diastolic BP (mm Hg) ← Percentile of height →						
		5th	10th	25th	50th	75th	90th	95th	5th	10th	25th	50th	75th	90th	95th
1	50th	80	81	83	85	87	88	89	34	35	36	37	38	39	39
	90th	94	95	97	99	100	102	103	49	50	51	52	53	53	54
	95th	98	99	101	103	104	106	106	54	54	55	56	57	58	58
	99th	105	106	108	110	112	113	114	61	62	63	64	65	66	66
2	50th	84	85	87	88	90	92	92	39	40	41	42	43	44	44
	90th	97	99	100	102	104	105	106	54	55	56	57	58	58	59
	95th	101	102	104	106	108	109	110	59	59	60	61	62	63	63
	99th	109	110	111	113	115	117	117	66	67	68	69	70	71	71
3	50th	86	87	89	91	93	94	95	44	44	45	46	47	48	48
	90th	100	101	103	105	107	108	109	59	59	60	61	62	63	63
	95th	104	105	107	109	110	112	113	63	63	64	65	66	67	67
	99th	111	112	114	116	118	119	120	71	71	72	73	74	75	75
4	50th	88	89	91	93	95	96	97	47	48	49	50	51	51	52
	90th	102	103	105	107	109	110	111	62	63	64	65	66	66	67
	95th	106	107	109	111	112	114	115	66	67	68	69	70	71	71
	99th	113	114	116	118	120	121	122	74	75	76	77	78	78	79
5	50th	90	91	93	95	96	98	98	50	51	52	53	54	55	55
	90th	104	105	106	108	110	111	112	65	66	67	68	69	69	70
	95th	108	109	110	112	114	115	116	69	70	71	72	73	74	74
	99th	115	116	118	120	121	123	123	77	78	79	80	81	81	82
6	50th	91	92	94	96	98	99	100	53	53	54	55	56	57	57
	90th	105	106	108	110	111	113	113	68	68	69	70	71	72	72
	95th	109	110	112	114	115	117	117	72	72	73	74	75	76	76
	99th	116	117	119	121	123	124	125	80	80	81	82	83	84	84
7	50th	92	94	95	97	99	100	101	55	55	56	57	58	59	59
	90th	106	107	109	111	113	114	115	70	70	71	72	73	74	74
	95th	110	111	113	115	117	118	119	74	74	75	76	77	78	78
	99th	117	118	120	122	124	125	126	82	82	83	84	85	86	86
8	50th	94	95	97	99	100	102	102	56	57	58	59	60	60	61
	90th	107	109	110	112	114	115	116	71	72	72	73	74	75	76
	95th	111	112	114	116	118	119	120	75	76	77	78	79	79	80
	99th	119	120	122	123	125	127	127	83	84	85	86	87	87	88
9	50th	95	96	98	100	102	103	104	57	58	59	60	61	61	62
	90th	109	110	112	114	115	117	118	72	73	74	75	76	76	77
	95th	113	114	116	118	119	121	121	76	77	78	79	80	81	81
	99th	120	121	123	125	127	128	129	84	85	86	87	88	88	89

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Age (Year)	BP Percentile ↓	Systolic BP (mm Hg) ← Percentile of height →							Diastolic BP (mm Hg) ← Percentile of height →						
		5th	10th	25th	50th	75th	90th	95th	5th	10th	25th	50th	75th	90th	95th
10	50th	97	98	100	102	103	105	106	58	59	60	61	61	62	63
	90th	111	112	114	115	117	119	119	73	73	74	75	76	77	78
	95th	115	116	117	119	121	122	123	77	78	79	80	81	81	82
	99th	122	123	125	127	128	130	130	85	86	86	88	88	89	90
11	50th	99	100	102	104	105	107	107	59	59	60	61	62	63	63
	90th	113	114	115	117	119	120	121	74	74	75	76	77	78	78
	95th	117	118	119	121	123	124	125	78	78	79	80	81	82	82
	99th	124	125	127	129	130	132	132	86	86	87	88	89	90	90
12	50th	101	102	104	106	108	109	110	59	60	61	62	63	63	64
	90th	115	116	118	120	121	123	123	74	75	75	76	77	78	79
	95th	119	120	122	123	125	127	127	78	79	80	81	82	82	83
	99th	126	127	129	131	133	134	135	86	87	88	89	90	90	91
13	50th	104	105	106	108	110	111	112	60	60	61	62	63	64	64
	90th	117	118	120	122	124	125	126	75	75	76	77	78	79	79
	95th	121	122	124	126	128	129	130	79	79	80	81	82	83	83
	99th	128	130	131	133	135	136	137	87	87	88	89	90	91	91
14	50th	106	107	109	111	113	114	115	60	61	62	63	64	65	65
	90th	120	121	123	125	126	128	128	75	76	77	78	79	79	80
	95th	124	125	127	128	130	132	132	80	80	81	82	83	84	84
	99th	131	132	134	136	138	139	140	87	88	89	90	91	92	92
15	50th	109	110	112	113	115	117	117	61	62	63	64	65	66	66
	90th	122	124	125	127	129	130	131	76	77	78	79	80	80	81
	95th	126	127	129	131	133	134	135	81	81	82	83	84	85	85
	99th	134	135	136	138	140	142	142	88	89	90	91	92	93	93
16	50th	111	112	114	116	118	119	120	63	63	64	65	66	67	67
	90th	125	126	128	130	131	133	134	78	78	79	80	81	82	82
	95th	129	130	132	134	135	137	137	82	83	83	84	85	86	87
	99th	136	137	139	141	143	144	145	90	90	91	92	93	94	94
17	50th	114	115	116	118	120	121	122	65	66	66	67	68	69	70
	90th	127	128	130	132	134	135	136	80	80	81	82	83	84	84
	95th	131	132	134	136	138	139	140	84	85	86	87	87	88	89
	99th	139	140	141	143	145	146	147	92	93	93	94	95	96	97

*The 90th percentile is 1.28 SD, 95th percentile is 1.645 SD, and the 99th percentile is 2.326 SD over the mean. For research purposes, the standard deviations in appendix table B–1 allow one to compute BP Z-scores and percentiles for boys with height percentiles given in Table 3.3 (i.e. the 5th, 10th, 25th, 50th, 75th, 90th and 95th percentiles). These height percentiles must be converted to height Z-scores given by (5% = –1.645, 10% = –1.28, 25% = –0.68, 50% = 0, 75% = 0.68, 90% = 1.28, 95% = 1.645) and then computed according to the methodology in steps 2–4 described in appendix B. For children with height percentiles other than these, follow steps 1–4 as described in appendix B.

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Table 3.4: Blood pressure (BP) levels in girls

Age (Year)	BP Percentile ↓	Systolic BP (mm Hg)							Diastolic BP (mm Hg)						
		← Percentile of height →							← Percentile of height →						
		5th	10th	25th	50th	75th	90th	95th	5th	10th	25th	50th	75th	90th	95th
1	50th	83	84	85	86	88	89	90	38	39	39	40	41	41	42
	90th	97	97	98	100	101	102	103	52	53	53	54	55	55	56
	95th	100	101	102	104	105	106	107	56	57	57	58	59	59	60
	99th	108	108	109	111	112	113	114	64	64	65	65	66	67	67
2	50th	85	85	87	88	89	91	91	43	44	44	45	46	46	47
	90th	98	99	100	101	103	104	105	57	58	58	59	60	61	61
	95th	102	103	104	105	107	108	109	61	62	62	63	64	65	65
	99th	109	110	111	112	114	115	116	69	69	70	70	71	72	72
3	50th	86	87	88	89	91	92	93	47	48	48	49	50	50	51
	90th	100	100	102	103	104	106	106	61	62	62	63	64	64	65
	95th	104	104	105	107	108	109	110	65	66	66	67	68	68	69
	99th	111	111	113	114	115	116	117	73	73	74	74	75	76	76
4	50th	88	88	90	91	92	94	94	50	50	51	52	52	53	54
	90th	101	102	103	104	106	107	108	64	64	65	66	67	67	68
	95th	105	106	107	108	110	111	112	68	68	69	70	71	71	72
	99th	112	113	114	115	117	118	119	76	76	76	77	78	79	79
5	50th	89	90	91	93	94	95	96	52	53	53	54	55	55	56
	90th	103	103	105	106	107	109	109	66	67	67	68	69	69	70
	95th	107	107	108	110	111	112	113	70	71	71	72	73	73	74
	99th	114	114	116	117	118	120	120	78	78	79	79	80	81	81
6	50th	91	92	93	94	96	97	98	54	54	55	56	56	57	58
	90th	104	105	106	108	109	110	111	68	68	69	70	70	71	72
	95th	108	109	110	111	113	114	115	72	72	73	74	74	75	76
	99th	115	116	117	119	120	121	122	80	80	80	81	82	83	83
7	50th	93	93	95	96	97	99	99	55	56	56	57	58	58	59
	90th	106	107	108	109	111	112	113	69	70	70	71	72	72	73
	95th	110	111	112	113	115	116	116	73	74	74	75	76	76	77
	99th	117	118	119	120	122	123	124	81	81	82	82	83	84	84
8	50th	95	95	96	98	99	100	101	57	57	57	58	59	60	60
	90th	108	109	110	111	113	114	114	71	71	71	72	73	74	74
	95th	112	112	114	115	116	118	118	75	75	75	76	77	78	78
	99th	119	120	121	122	123	125	125	82	82	83	83	84	85	86
9	50th	96	97	98	100	101	102	103	58	58	58	59	60	61	61
	90th	110	110	112	113	114	116	116	72	72	72	73	74	75	75
	95th	114	114	115	117	118	119	120	76	76	76	77	78	79	79
	99th	121	121	123	124	125	127	127	83	83	84	84	85	86	87

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Age (Year)	BP Percentile ↓	Systolic BP (mm Hg)							Diastolic BP (mm Hg)						
		← Percentile of height →							← Percentile of height →						
		5th	10th	25th	50th	75th	90th	95th	5th	10th	25th	50th	75th	90th	95th
10	50th	98	99	100	102	103	104	105	59	59	59	60	61	62	62
	90th	112	112	114	115	116	118	118	73	73	73	74	75	76	76
	95th	116	116	117	119	120	121	122	77	77	77	78	79	80	80
	99th	123	123	125	126	127	129	129	84	84	85	86	86	87	88
11	50th	100	101	102	103	105	106	107	60	60	60	61	62	63	63
	90th	114	114	116	117	118	119	120	74	74	74	75	76	77	77
	95th	118	118	119	121	122	123	124	78	78	78	79	80	81	81
	99th	125	125	126	128	129	130	131	85	85	86	87	87	88	89
12	50th	102	103	104	105	107	108	109	61	61	61	62	63	64	64
	90th	116	116	117	119	120	121	122	75	75	75	76	77	78	78
	95th	119	120	121	123	124	125	126	79	79	79	80	81	82	82
	99th	127	127	128	130	131	132	133	86	86	87	88	88	89	90
13	50th	104	105	106	107	109	110	110	62	62	62	63	64	65	65
	90th	117	118	119	121	122	123	124	76	76	76	77	78	79	79
	95th	121	122	123	124	126	127	128	80	80	80	81	82	83	83
	99th	128	129	130	132	133	134	135	87	87	88	89	89	90	91
14	50th	106	106	107	109	110	111	112	63	63	63	64	65	66	66
	90th	119	120	121	122	124	125	125	77	77	77	78	79	80	80
	95th	123	123	125	126	127	129	129	81	81	81	82	83	84	84
	99th	130	131	132	133	135	136	136	88	88	89	90	90	91	92
15	50th	107	108	109	110	111	113	113	64	64	64	65	66	67	67
	90th	120	121	122	123	125	126	127	78	78	78	79	80	81	81
	95th	124	125	126	127	129	130	131	82	82	82	83	84	85	85
	99th	131	132	133	134	136	137	138	89	89	90	91	91	92	93
16	50th	108	108	110	111	112	114	114	64	64	65	66	66	67	68
	90th	121	122	123	124	126	127	128	78	78	79	80	81	81	82
	95th	125	126	127	128	130	131	132	82	82	83	84	85	85	86
	99th	132	133	134	135	137	138	139	90	90	90	91	92	93	93
17	50th	108	109	110	111	113	114	115	64	65	65	66	67	67	68
	90th	122	122	123	125	126	127	128	78	79	79	80	81	81	82
	95th	125	126	127	129	130	131	132	82	83	83	84	85	85	86
	99th	133	133	134	136	137	138	139	90	90	91	91	92	93	93

*The 90th percentile is 1.28 SD, 95th percentile is 1.645 SD, and the 99th percentile is 2.326 SD over the mean. For research purposes, the standard deviations in appendix table B–1 allow one to compute BP Z-scores and percentiles for girls with height percentiles given in Table 3.4 (i.e. the 5th, 10th, 25th, 50th, 75th, 90th, and 95th percentiles). These height percentiles must be converted to height Z-scores given by (5% = –1.645, 10% = –1.28, 25% = –0.68, 50% = 0, 75% = 0.68, 90% = 1.28, 95% = 1.645) and then computed according to the methodology in steps 2–4 described in appendix B. For children with height percentiles other than these, follow steps 1–4 as described in appendix B.

Source: The fourth report on the diagnosis, evaluation, and treatment of high blood pressure in children and adolescents, US Department of Health and Human Services, National Institutes of Health, National Heart, Lung, and Blood Institute, Revised 2005.

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Saturation (SpO_2) Monitoring

Saturation monitoring (SpO_2) refers to the process of monitoring the percent of oxygenated hemoglobin being carried in the child's red blood cells. The optimal value of SpO_2 is between 95-98%. Any value less than 92% results in hypoxemia, and therefore is a major concern for HCP. Any child who has a recorded SpO_2 persistently outside the targeted range should have their oxygen therapy adjusted by HCP to maintain SpO_2 within the specified range, however infants with congenital cyanotic heart disease (CCHD) can have target saturation below normal even less than 80% in some conditions.

The equipment used for SpO_2 monitoring is pulse oximeter. The detailed information about pulse oximeter, and its functioning and maintenance is provided in Chapter 42.

Pain Assessment in Children

Pain is an unpleasant sensory and emotional experience by the child, which is associated with actual or potential tissue damage. Pain assessment is an evaluation of the reported or observed pain by the child and the study of the factors alleviating and exacerbating the pain. It has been considered as the fifth vital parameter by the WHO. We will be learning about pain assessment in this section.

Purposes of Pain Assessment

- To make correct diagnosis of the child with pain
- To determine the most efficacious pain management program for the child
- To improve the level of comfort in child

Types of Pain Assessment Scale

There are different types of pain assessment scales used for children from neonate to adolescent age as their ability to describe pain changes as they grow older and mature cognitively, linguistically and behaviorally. On the basis of these abilities in children, we can use different types of pain assessment as discussed below.

- Behavioral pain assessment
- Physiological pain assessment
- Self report (pain rating scales, visual analogue scale)

Behavioral Pain Assessment

Behavioral pain assessment pain in infants and pre-verbal children (do not have language skills) or children with mental clouding and confusion. It is observer rated pain scale. Some scales include both behavioral and physiologic parameters.

Examples of some of the scales used for children including neonates in health care settings are given below.

CRIES Scale (Table 3.5)

Score ranges from 0-10, higher the pain score greater is the intensity of pain

Neonatal Infant Pain Scale (NIPS) (Table 3.6)

Maximum score of 7, consider pain if score is ≥ 4 points

Premature Infant Pain Profile Scale (PIPPS) (Table 3.7)

The PIPP scale is used for infants ≤ 37 weeks of gestation. The infant is observed for 15 seconds immediately before and after the painful procedure or before or after the pain medication (30 minutes after IV and 1 hour after oral medication).

Table 3.5: CRIES Scale

Item	0	1	2
Crying	No	High pitched, consolable	Inconsolable
Required FiO_2	No	<30%	>30%
Increased heart rate and blood pressure	No	11-20% higher	>20% higher
Expression	None	Grimace	Grimace/grunt
Sleepless	No	Wakes up frequent interval	Constantly awake

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The total pain score is then calculated:

6 or less = Minimal to no pain 7-12 = Mild pain >12 = Moderate to severe pain.

For accurate pain assessment in newborns, one can videotape the behavior of the neonate and for accurate measurement of physiological parameters pulse oximeter or cardiac monitor can be used.

FLACC Scale (Table 3.8)

The acronym FLACC stands for Face, Legs, Activity, Cry and Consolability. This scale can be used for children from 2 months onwards. In this scale each category is scored on a 0-2 scale with the score ranging from 0-10.

Table 3.6: Neonatal Infant Pain Scale (NIPS)

NIPS	0	1	2
Facial expressions	Relaxed	Contracted	-
Cry	Absent	Mumbling	Vigorous
Breathing	Relaxed	Different than basal	-
Arms	Relaxed	Flexed/ stretched	-
Legs	Relaxed	Flexed/ stretched	-
Alertness	Sleeping/ calm	Uncomfortable	-

Physiological Pain Assessment

The physiological parameters such as heart rate (HR), respiratory rate (RR), blood pressure (BP), oxygen saturation (SpO_2) and palmer sweating provide useful information about the general distress in children. The limitation of this scale is the inability to distinguish between physical response to pain and other forms of stress that the child could have during hospitalization. Therefore it can be said that the physiological measurements provide the indirect estimate of pain the child is having.

Self Report

Self report of pain is also a reliable indicator of pain assessment. It is used for those children who are able to express their pain. There are two types of self report scales available for the children after 8 years of age.

- ***Wong Baker face pain scale (Fig. 3.1):*** The scale consists of 6 cartoon faces with word description ranging from smiling face on the left side indicating "*no hurt*" to a frowning, tearful face on the right side indicating "*worst hurt or pain*" face. The child is asked to choose the face that best reflects his pain. The faces are also numbered using 0,2,4,6,8,10.
- ***Numerical rating scale (Fig. 3.2):*** This scale is another self report, used to assess the child's experience of pain. This scale

Table 3.7: Premature Infant Pain Profile Scale (PIPPS)

Gestational age	≥36 weeks	32-35 weeks	28-31 weeks	<28 weeks
Behavioral state	Active awake Eyes open Facial movements	Quiet awake Eyes open No facial movements	Active sleep Eyes closed Facial movements	Quiet sleep Eyes closed No facial movements
Maximum heart rate	0-4 BPM increase	5-14 BPM increase	14-24 BPM increase	≥ 25 BPM increase
Minimum SpO_2	0.2-4% decrease	2.5 -4.9% decrease	5- 7.4% decrease	≥7.5% decrease
Brow bulge	None 0-9% of time	Minimum 10-39% of time	Moderate 40-69%	Maximum ≥ 70% of time
Eye squeeze	None 0-9% of time	Minimum 10-39% of time	Moderate 40-69%	Maximum ≥ 70% of time

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Table 3.8: FLACC Scale

Activity	Scoring		
	0	1	2
Face	No particular expression	Occasional grimace or frown, withdrawn	Frequent to constant frown, clenched jaw, quivering chin
Leg	No position or relaxed	Uneasy, restless, tense	Kicking or legs drawn up
Activity	Lying quietly, normal position, moves easily	Squirming, shifting back and forth, tense	Arched, rigid or jerking
Cry	No crying (awake or asleep)	Moans or whimpers, occasional complaint	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging, or talking to, distractable	Difficult to console or comfort

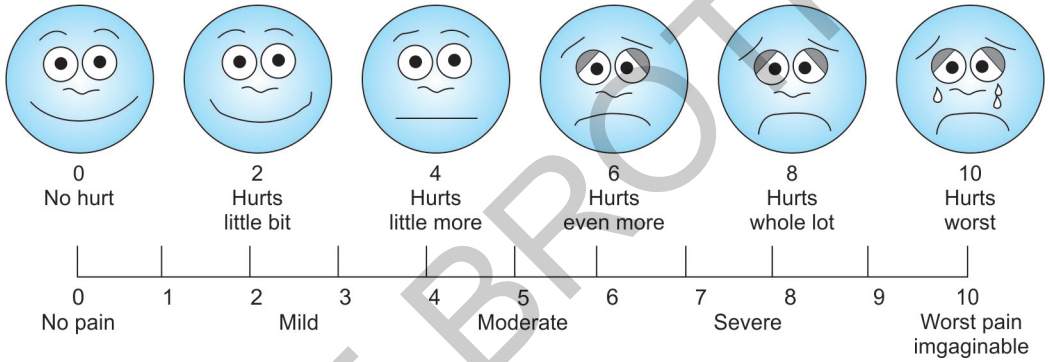

Fig. 3.1: Facial pain scale

is presented as a horizontal scale between 0-10 with word anchors of no pain at the left side and moderate pain in the middle and worst possible pain at the end (right) of the scale. Child is asked to rate his pain using number from 0 to 10.

Similar to numeric rating scale, there is paisa scale ranging from 0-100 paisa and child is asked to quantify pain on the scale of paisa.

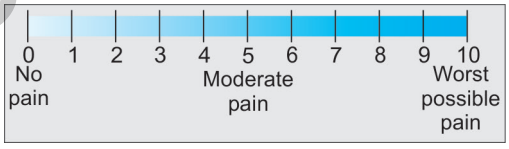

Fig. 3.2: Numerical rating scale

Advantages of these scales include simplicity, reproducibility, easy comprehensibility, sensitivity to small changes in pain. The scale is very appropriate for children at 5 or more years, who can count and have concept about numbers can use this scale.

- ***Visual analogue scale (VAS) (Fig. 3.3):*** Visual analog scale (VAS) is similar to

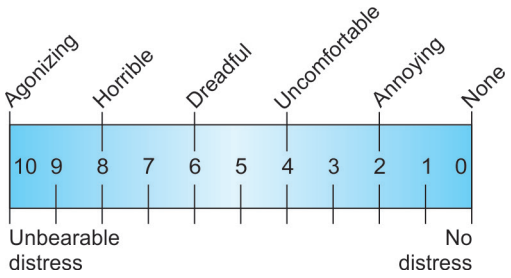

Fig. 3.3: Visual analogue scale (VAS)

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verbal numerical scale except that the child marks on a measured line, one end of which is labeled as **NO PAIN** and other end as the **WORST IMAGINABLE PAIN**, where the pain falls. It is more valid for research purposes and less used in day to day practice as it is more time consuming and requires motor control.

Hierarchy of Pain Assessment Techniques

First position in hierarchy of pain assessment technique is self report by the child and the observation of physiological parameters, followed by observer's report and surrogate report by parents.

- Self Report and variation in physiological parameters
- Observer's report of child's behavior
- Surrogate reporting (by parents)

Pain dairies also help in evaluating the relationship between pain and daily activity. The experienced pain can be described using numerical rating scale, during activities (walking, standing, sitting and routine works). The evaluation of pain in child can be done on hourly basis. Use of medications and child's emotional response should also be recorded. It reflects on the child's pain more accurately than a retrospective description.

Myths Related to Pain in Children

There are certain myths about pain in children, which need to be clarified.

- Infants do not feel pain
- Pain cannot be assessed in children
- Children tolerate pain better than adults
- If a child says that he is in pain but does not appear to be in pain, there is no need for pain relief
- Children get used to pain killers
- If a child can be distracted, he is not in real pain
- Pain relief medicines are too dangerous and addictive for children.

We can say that children do feel pain; their tolerance is no different from adults. We should make use of above described age appropriate pain scales to quantify the pain in children. Pain relief medicines should be used to provide to comfort to the children.

Points to Remember

- History of pain should include child's description of pain intensity, quality, location, timing, duration and aggravating and relieving factors.
- Perform frequent and consistent assessment as a part of daily clinical care to ensure rapid titration of therapy and preemptive.

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