formation on nursing books, visit our website www.jaypeebrothers.com, for detailed information on nursing books, visit our website www.jaypeebrothers.com

Essential Pediatric NURSING

As per the Revised INC Syllabus for BSc Nursing, 2021
(Also Covering the Old Syllabus)



Editor-in-Chief
Piyush Gupta

Editors
Poonam Joshi
Pooja Dewan

FIFTH EDITION

JAYPEE

Contents

1. Child Health and Pediatric Nursing **1**
Poonam Joshi, Swati Kalra, Piyush Gupta

- Introduction to Child Health Problems *1*
- Indicators of Child Health *4*
- Identifying a Sick Child *6*
- Nursing Care of Healthy and Sick Children *8*
- Child in the Hospital 9
- Current Practices and Trends in Child Care *11*
- Principles of Pediatric Nursing *12*
- Pediatric Nursing Process *15*
- Prevention in Child Health *16*
- Current Trends in Pediatric Nursing *17*

2. Communication and Clinical Evaluation **20**
Piyush Gupta, Pooja Dewan

- Effective Communication with the Child and Caretakers *20*
- Eliciting the Case-History *20*
- Process of History-Taking *21*
- Communicating During Physical Examination *25*
- General Physical Examination 27
- Examination of Chest *33*
- Examination of Heart *34*
- Examination of Abdomen *35*
- Neurological Examination *37*
- Musculoskeletal Examination *38*

3. Assessment of Diet and Feeding Practices **43**
Praveen Kumar, Piyush Gupta

- Importance and Objectives of the Dietary History *43*
- Assessment of Diet and Feeding Practices in Infants Less than 6 Months *44*
- Assessment of Dietary Intake in Children More than 6 Months *46*

4. Assessment of Growth and Development **59**
Piyush Gupta, Shilpa Khanna Arora, Poonam Joshi

- Growth and Development *59*
- Need for Studying Growth and Development *60*
- Factors Affecting Growth and Development *61*
- Anthropometry: Measurement of Physical Growth *61*
- Statistical Principles in Growth Assessment *68*
- Growth Charts, Growth Reference, and Growth Standards *68*
- Disorders of Physical Growth *71*
- Assessment of Development *76*
- Theoretic Foundation of Personality Development *82*
- Variations in Normal Development *85*

5. Care of the Newborn **88**
Ruchi Rai, DK Singh

- Care of the Newborn at Birth *88*
- Initial Assessment and Care *91*
- Assessment of Weight and Gestation *92*
- Examination of a Newborn *94*
- Common Problems of Newborns *101*
- Maintenance of Temperature *104*
- Hypothermia *107*
- Hyperthermia/Fever *108*
- Donor Human Milk *108*
- Breastfeeding *109*
- Breastfeeding in Special Circumstances *113*
- Infection Control in Newborns *115*
- Transport of Sick Newborn *117*

6. Care of the High-Risk Newborn **120**
Ajay Kumar, Piyush Gupta

- High-Risk Neonate *120*
- Emergency Triage Assessment and Treatment *121*
- Low Birth Weight Infants *122*
- Management of Low Birth Weight *123*
- Hypothermia (Axillary Temperature <36.5°C) *126*
- Approach to and Care of Common Problems *127*
- Neonatal Hypoglycemia *129*
- Neonatal Septicemia *130*
- Respiratory Distress in Newborn *131*
- Blue or Cyanosed Newborn *132*
- Neonatal Apnea *133*
- Newborn with Jaundice *134*
- Neonatal Seizures *137*
- Bleeding Newborn *139*
- Birth Injuries *140*
- Infants of Diabetic Mother *141*
- Congenital Malformations *143*

7. Infant and Toddler **146**
Piyush Gupta, Jaya Shankar Kaushik, Nidhi Bedi

- Physical Growth *146*
- Normal Development *148*
- Infant and Young Child Feeding *154*
- Complementary Feeding *155*
- Common Feeding Problems *156*
- Sleep and Activity *157*
- Dental Health *157*
- Immunization *158*
- Cold Chain *160*
- Play and Play Material *161*
- Injury Prevention and Control *163*
- Anticipatory Guidance *166*

8. Preschool and School Age Child **169**
Nidhi Bedi, Piyush Gupta
- Growth During Preschool and School Age *169*
- Psychosocial, Cognitive, Spiritual, and Moral Development *171*
- Nutritional Guidance *173*
- Sleep Guidelines *176*
- Physical Activity and Exercise *177*
- Dental Health *178*
- Immunization *179*
- Play and Play Material *179*
- Injury Prevention and Control *180*
- Sex Education *180*
- Day-Care Centers *181*
- School Health *182*
- Common Health Problems *183*
- Anticipatory Guidance *184*

9. Adolescent Health **186**
Piyush Gupta, Dhulika Dhingra
- Understanding Adolescence *186*
- Growth During Adolescence *186*
- Health Needs of Adolescents *190*
- Adolescent Health Problems *191*
- Psychosocial Issues *192*
- Injury Prevention *194*
- Role of Parents In Health Promotion of Adolescents *194*
- Anticipatory Guidance *194*
- National Programs for Improving Adolescent Health *195*

10. Preventive Pediatrics and Welfare of Children **196**
Piyush Gupta, Sumaira Khalil
- Preventive Pediatrics *196*
- Vulnerable Children *197*
- Rights of the Child *197*
- Child Welfare Programs *198*
- Child Welfare Agencies *200*
- Adoption Laws and Services *200*
- Integrated Child Development Services *201*
- Child Health Programs *202*
- Reproductive, Maternal, Newborn, Child and Adolescent Health (RMNCH+A) Program *203*
- Child Abuse and Neglect *205*
- Child Labor *206*
- Street Children *207*
- Juvenile Justice (Care and Protection of Children) Act, 2015 *208*
- Helping a Child Needing Care and Protection *209*

11. Nutritional Disorders **211**
Piyush Gupta, Bhavna Dhingra
- Nutritional Assessment *211*
- The Problem of Undernutrition *213*
- Undernutrition *214*
- Severe Acute Malnutrition *217*
- Moderate Acute Malnutrition *221*
- Vitamin A Deficiency *221*
- Vitamin B Deficiency *222*
- Vitamin C Deficiency: Scurvy *223*
- Vitamin D Deficiency: Rickets *223*
- Iodine Deficiency Disorders *224*
- Iron Deficiency Anemia *225*
- Prevention of Undernutrition *225*
- National Nutrition Programs *227*

12. Behavioral Problems in Children **230**
Bhanu K Bhakhri, Piyush Gupta
- Evening Colic *230*
- Not Eating Well *231*
- Stranger Anxiety *231*
- Thumb Sucking *231*
- Breath-Holding Spells *231*
- Temper Tantrum *232*
- Pica *232*
- Enuresis (Bedwetting) *233*
- Encopresis *233*
- Stuttering, Tics, and Nail Biting *234*
- Anorexia Nervosa *234*
- Bulimia Nervosa *235*
- Masturbation and Problems of Sexual Behavior *235*
- Sleep Problems *236*
- Antisocial Behavior and Conduct Disorder *236*
- Juvenile Delinquency *237*
- Panic Disorder *239*
- Generalized Anxiety Disorder *239*
- Psychosomatic Problems *240*
- Approach to a Child with Behavior Disorder *240*
- Nursing Care of a Child with Behavioral Problem *241*

13. Care of Skin Disorders **244**
Rashmi Sarkar, Nisha V Parmar
- Skin: Normal and Abnormal *244*
- Skin Infections *245*
- Diaper Dermatitis *248*
- Atopic Dermatitis *248*
- Seborrheic Dermatitis *249*
- Acne *249*
- Therapeutic Management of Skin Lesions *250*
- Nursing Care of the Skin *250*

14. Child with Eye Problem **254**
Upreet Dhaliwal, Payal Gupta
- Examination of the Eye *254*
- Conjunctivitis *256*
- Disorders of the Eyelids *256*
- Xerophthalmia *257*
- Refractive Errors and Color Blindness *258*
- Cataract *260*
- Squint *260*
- Dacryocystitis *260*

- Foreign Bodies and Injuries *261*
- Retinopathy of Prematurity *262*
- Administration of Ophthalmic Medications *263*
- Nursing Care of the Eye *263*

15. Communicable Diseases **267**
Piyush Gupta, Aaradhana
- Nursing Care of a Child with Fever *267*

Common Fevers
- Malaria *269*
- Dengue Fever *273*
- Typhoid Fever *276*
- Chickenpox (Varicella) *278*
- Measles *279*
- Rubella *281*
- Mumps *281*

Vaccine Preventable Diseases
- Diphtheria *282*
- Whooping Cough (Pertussis) *284*
- Tetanus *285*

Chronic Infections
- Tuberculosis *287*
- Human Immunodeficiencyvirus and Acquired Immunodeficiency Syndrome *292*

16. Hematological Disorders **302**
Pooja Dewan
- Elements of Blood *302*
- Anemia *303*
- Iron Deficiency Anemia *303*
- Megaloblastic Anemia *305*
- Hemolytic Anemia *306*
- Hemoglobin Disorders *307*
- Thalassemia *307*
- Sickle Cell Disease *310*
- Autoimmune Hemolytic Anemia *311*
- Aplastic Anemia *311*
- Approach to a Bleeding Child *312*
- Immune Thrombocytopenic Purpura *313*
- Hemophilia *314*
- Malignancies in Children *315*
- Leukemia *317*
- Lymphoma *319*
- Nursing Care of a Child with Cancer *319*

17. Care of Ear, Nose, and Throat **322**
Neelima Gupta, (Late) Arun Goel
- Examination of Ear, Nose, and Throat *322*
- Ear Discharge and Wax *323*
- Otitis Media *323*
- Infections of Nose and Throat *325*
- Acute Infections of Larynx and Trachea *326*
- Epistaxis *327*
- Foreign Bodies *327*
- Speech Defects *329*
- Nose and Ear Drop Administration *329*

18. Respiratory Disorders **331**
Vinod Kumar
- Normal Physiology and Anatomy of the Respiratory System *331*
- Acute Pharyngotonsillitis *331*
- Laryngotracheobronchitis (Croup) *333*
- Bronchiolitis *334*
- Pneumonia *334*
- Empyema *336*
- Bronchial Asthma *337*
- Respiratory Failure *342*
- Smoke Inhalation Injury *343*
- Airway Obstruction *344*
- Foreign Body Aspiration *345*
- SARS-COV-2 Infection in Children 345
- Nursing Care Plan of Child with Respiratory Disorder 346

19. Cardiovascular Disorders **352**
Sakshi Sachdeva, Piyush Gupta
- Fetal Circulation *352*
- Congenital Heart Disease *352*
- Left-to Right Shunts (Acyanotic Heart Diseases) *354*
- Cyanotic Heart Diseases *356*
- Obstructive Lesions *358*
- Acute Rheumatic Fever *359*
- Rheumatic Heart Disease *360*
- Infective Endocarditis *360*
- Systemic Hypertension *361*
- Cardiac Rhythm Disturbance *361*
- Nursing Care of a Child with Heart Failure *363*

20. Gastrointestinal Malformations **367**
Anup Mohta
- Cleft Lip and Cleft Palate *367*
- Tracheoesophageal Fistula *368*
- Congenital Diaphragmatic Hernia *369*
- Hypertrophic Pyloric Stenosis *370*
- Abdominal Wall Defects *371*
- Anorectal Malformations *372*
- Hirschsprung Disease *373*
- Intestinal Malformations *374*

21. Oral Health and Hygiene **376**
Rajeev Kumar, Namita Kalra, Piyush Gupta
- Examination of the Oral Cavity *376*
- Common Diseases of Oral Cavity *378*
- Nursing Care of Oral Cavity *379*

22. Gastrointestinal and Liver Disorders **382**
Vyom Aggarwal, Shrish Bhatnagar, Piyush Gupta

Gastrointestinal Infections
- Acute Diarrhea and Dehydration *382*
- Cholera *386*
- Amebiasis *387*
- Giardiasis *389*
- Worm Infestations *389*

Common Abdominal Problems
- Vomiting *392*
- Pain Abdomen *393*
- Constipation *395*
- Celiac Disease *396*
- Inflammatory Bowel Disease *397*
- Persistent Diarrhea *398*
- Chronic Diarrhea *399*
- Nursing Care of Children with Gastrointestinal Problem *400*
- Jaundice and Hepatitis *402*

Liver Diseases
- Chronic Liver Disease *403*
- Liver Failure *404*
- Liver Abscess *405*
- Nursing Care of a Child with Liver Disease *406*
- Appendicitis *406*

Surgical Problems
- Intussusception, Volvulus, and Malrotation *406*

23. Genitourinary Malformations **410**
Anup Mohta
- Phimosis and Paraphimosis *410*
- Hypospadias *411*
- Ectopia Vesicae *411*
- Hernia and Hydrocele *412*
- Undescended Testis *412*
- Posterior Urethral Valve *413*
- Vesicoureteral Reflux *413*

24. Disorders of the Kidney and the Urinary Tract **416**
Sriram Krishnamurthy, M Rumesh Chandar
- Urinary Tract Infections *416*
- Child with Hematuria *418*
- Acute Glomerulonephritis *418*
- Chronic Glomerulonephritis *420*
- Proteinuria *420*
- Nephrotic Syndrome *422*
- Acute Kidney Injury *424*
- Chronic Kidney Disease *425*
- Kidney Transplantation *427*
- Nursing Care of a Child with Renal Insufficiency (Acute/Chronic) 428

25. Disorders of Fluid and Electrolytes **431**
Prerna Batra, Abhijeet Saha
- Fluid and Electrolyte Balance *431*
- Electrolyte Imbalance *432*
- Acid-Base Disturbances *434*
- Shock *437*
- Nursing Care of a Child with Fluid Electrolyte Disturbance *439*

26. Common Endocrine Disorders **443**
Aashima Dabas
- General Principles *443*
- Disorders of Hypothalamic–Pituitary Axis *444*
- Diabetes Insipidus *446*
- Diabetes Mellitus *446*
- Diabetic Ketoacidosis *450*
- Hypoglycemia *450*
- Nursing Care of a Child with Diabetes Mellitus *451*
- Disorders of Thyroid Glands *451*
- Disorders of Parathyroid Glands *453*
- Disorders of Adrenal Glands *454*
- Disorders of Sexual Differentiation *455*
- Disorders of Puberty *455*
- Nursing Care Plan for a Child with Endocrine Disorder *456*

27. Malformations of the Nervous System **459**
Sheffali Gulati, Sangeetha Yoganathan
- Neural Tube Defects *459*
- Hydrocephalus *461*
- Other Congenital CNS Malformations *463*
- Nursing Care of a Child with CNS Malformation *464*

28. Care of Neurological Problems **468**
Sheffali Gulati, Sangeetha Yoganathan
- Seizure Disorders *468*
- Febrile Seizures *471*
- Nursing Care of a Child with Convulsion *473*
- Pyogenic Meningitis *475*
- Encephalitis *476*
- Acute Flaccid Paralysis *476*
- Coma *477*
- Nursing Care of an Unconscious Child *478*

29. Care of Orthopedic Disorders **482**
Aditya N Aggarwal
- Fractures: Emergency Care *482*
- Definitive Treatment of Fractures *485*
- Application of a Plaster Cast *486*
- Traction: Application and Aftercare *487*
- Acute Osteomyelitis *488*
- Congenital Talipes Equinovarus *488*
- Developmental Dysplasia of Hip *490*
- Child Abuse *491*

30. Poisonings and Burns **493**
Piyush Gupta, Anup Mohta
- Accidental Poisoning *493*
- Common Poisonings *494*
- Prevention of Poisoning *496*
- Nursing Care of a Child with Poisoning *497*
- Snake Bite *498*
- Scorpion Sting *500*
- Drowning *500*
- Burns *501*

31. Children with Special Needs **507**
Jaya Shankar Kaushik, Piyush Gupta
- Definitions *507*
- Developmental Disability *508*

- Diagnosis of Developmental Delay *509*
- Intellectual Disability *510*
- Cerebral Palsy *511*
- Autism Spectrum Disorder *512*
- Attention Deficit Hyperactivity Disorder *516*
- Specific Learning Disorders *517*
- Hearing Impairment *518*
- Vision Impairment *518*
- Down Syndrome *519*
- Turner Syndrome *519*
- Prevention of Disability *520*
- Nursing Care of Children with Special Needs *520*

32. Care of Children with Chronic or Terminal Illness 522
Poonam Joshi

- Chronic Illness in Children *522*
- Terminally Ill or Dying Child *524*
- Nursing Care of Child with Chronic Illness *525*
- Grief Reactions *526*
- Nursing Care of a Child with Terminal Illness or Dying Child *528*
- Role of Nurse in Grieving Process *530*

33. Nursing Procedures 532
Lokesh Guglani, Nidhi Bedi, Piyush Gupta

- Informed Consent and Assent *532*
- Standard Safety Precautions *533*
- Positioning and Restraint *537*
- Vital Signs *538*
- Neonatal Resuscitation *540*
- Pediatric Basic Life Support *546*
- Intake/Output Charting *548*
- Intravascular Access *549*
- Blood Transfusion *551*
- Administration of Medications *551*
- Fluid Therapy *554*
- Fluid Administration with Infusion Pump *556*
- Sampling Procedures *556*
- Nasogastric Tube Insertion *559*
- Feeding *559*
- Oxygen Administration *560*
- Airway Management *560*
- Airway Clearance Techniques *561*
- Chest Physiotherapy *561*
- Catheterization *561*
- Elimination Procedures *562*
- Wound Care *563*
- Phototherapy *563*
- Care of the Newborn Under Infant Warmer *563*
- Care of a Child in Intensive Care Unit *564*
- Preparation for Surgery *564*

34. Integrated Management of Neonatal and Childhood Illness 568
Ashok K Patwari

- What is Integrated Management of Neonatal and Childhood Illness (IMNCI)? *568*
- IMNCI Clinical Guidelines *568*
- IMNCI Case Management Process *569*
- Assess, Classify and Treatment of Sick Young Infant (Age up to 2 Months) *570*
- Assess and Classify Sick Child (Age 2 Months to 5 Years) *575*
- Treatment Procedures for Sick Children (2 Months to 5 Years) *576*
- Revised IMNCI Guidelines *581*

Index *585*

CHAPTER 2

Communication and Clinical Evaluation

Piyush Gupta, Pooja Dewan

Specific Learning Objectives

After reading this chapter, you should be able to:

- Use effective communication skills while interacting with the child and caretakers.
- Elicit the complete case-history of the child.
- Perform general physical examination of the child.
- Perform specific examination of the child and refer the child to the specialist.

Chapter Outline

- Effective Communication with the Child and Caretakers
- Eliciting the Case-History
- Process of History-Taking
- Communicating during Physical Examination
- General Physical Examination
- Examination of Chest
- Examination of Heart
- Examination of Abdomen
- Neurological Examination
- Musculoskeletal Examination

2.1 EFFECTIVE COMMUNICATION WITH THE CHILD AND CARETAKERS

Communication with the child and caretakers is the most important tool to develop rapport with them. It is must for a nurse to learn skills for effective communication with the children and their parents so that the family develops confidence in her. Nurses with good communication skills identify the problems with patients more accurately and have a greater job satisfaction. Key tasks that require effective communication include eliciting the history; counseling for promoting child health, e.g., breastfeeding, accident prevention; instructing to give treatment and checking the understanding; facilitate decision making, e.g., HIV, genetic counseling; and for breaking news, e.g., diagnosis of disability or death. Three important skills needed for good communication are highlighted in **Box 2.1.**

BOX 2.1: Essential skills for effective communication.

- Listening and giving attention
- Talking and presenting clearly
- Discussing and clarifying

1. Building Rapport with Child and Parents

The first step is to ensure privacy and respect confidentiality. Mutual trust can be established only if you respect children and their parents. Calling the patient by name rather than "your child" is a good way of giving respect to the individual. Greet the parents and make a small talk about any local issue so as to help the parents and child to relax. Sit down while talking. Smile appropriately. In case the child is still anxious, offer him a toy. Allow the child to be seated in his/her mother's lap while you elicit the history and proceed to examination.

2. Nonverbal Communication

Nonverbal communication means showing your attitude through postures, gestures, and expression. Pay attention and make eye contact with the child as you examine him/her; and with the mother while talking to her. Keep your head at the same level as the parent. Do not appear hurried. Touch the baby/mother appropriately. Do not talk to parents with a barrier (e.g., a table) in between.

2.2 ELICITING THE CASE-HISTORY

After establishing rapport, you should find the reason for the patient's visit (i.e., presenting complaints). Encourage the parents to be exact about the sequence in which the problems

JAYPEE BROTHERS

BOX 2.2: Tips for history-taking.

- ❑ Ensure privacy and confidentiality
- ❑ Respect the patient and parents
- ❑ Use simple language
- ❑ Listen actively, let the parents talk
- ❑ Ask open-ended questions
- ❑ Clarify any ambiguous information
- ❑ Remain neutral to controversial issues
- ❑ List the problems and summarize

occurred. Ask for the approximate date of key events and about the parent's perception of the problem. A few tips for history-taking are listed in **Box 2.2.**

1. Use Open-ended Questions with a Few Specific Close-ended Questions

Questions which are answered by "yes" or "no" are close-ended question. These may not yield much information and often do not get to the main concerns. Ask question which cannot be replied with "yes" or "no". For example, ask "*Tell me about the type of stools your child is passing*?" instead of asking "*Is your child having loose stools*?" Open-ended questions help in eliciting the concerns and parents' perception of the illness.

Table 2.1 shows a few examples of effective and ineffective questions/statements during communication with parent/patient.

2. Listen Actively

Try to learn to listen. Attentive listening gives you ample time and opportunity to imbibe and understand what the parents told you. Become aware of your own listening habits. Concentrate on what the parents/child is saying. Listen for the total meaning, including feelings. Active listening promotes mutual understanding, increases attention span, and help the parents to open up. Do not interrupt needlessly. Do not argue, and do not give advice unless requested.

3. Give Encouraging Response

Encourage talking by looking interested. Use phrases as "*OK*", "*I understand*", "*please carry on*". This suggests that you are concerned. If the mother says something that you do not understand, then rephrase what she has said and ask her if she meant what you have understood. For example:

- ❖ Mother—Mary is not feeling all right.
- ❖ Nurse—Let me understand what you mean when you said Mary does not feel alright.

TABLE 2.1: Examples of effective questions to be asked during communication.

Appropriate question/statement	*Inappropriate question*
• What question can I answer for you now? • Please tell me any doubt or clarification that you want me to answer. • How will you give this tablet to your child? • Describe the seizure event that occurred yesterday. • What is the most interesting activity in your school?	• Do you have any query? • Do you want to ask any question? • Have you understood how to give the medicine to your child? • Is your child better today? • Do you like your school?

4. Be Empathetic

Try to put yourself in the same situation as the patient/ mother to understand their feeling. This is called empathy. The parents will develop a trust with you, if you are empathetic. For example, to a mother whose child is having diarrhea, you can say "*I can see you are feeling scared that your child may develop dehydration*".

5. Reflective Listening

Reflecting is the process of paraphrasing and restating both the feelings and words of the speaker. You should understand the parent's concerns and then voice them for her/him again in your language. This will allow the parent to "hear" their own thoughts and to focus on what they say and feel. It will also assure them that you are listening and will help you win their trust and confidence. For example, a mother may be concerned that she does not produce enough breast milk for her infant. It would be appropriate for you to mirror her concern and tell her "So I understand that you are worried that your baby is not getting adequate nutrition," instead of telling her "Your baby is getting enough milk".

6. List the Problems

Summarize the information obtained and let the parents know what you have understood. Ask them if you have understood and listed all the problems clearly or not. This gives them an opportunity to correct any misunderstanding.

7. Use Words that Patient/Parents will Understand

Try to talk in the local language. Avoid use of medical terms.

2.3 PROCESS OF HISTORY-TAKING

History-taking is most important art that a nurse should master, to get to the core of the illness and provide relief. History helps to arrive at diagnosis; and also gives an opportunity to build confidence of child and parents by relieving their anxiety.

History-taking is not merely collection of data concerning health and disease, but the process of getting information is also important. The interview should be a pleasant experience and help in making a lasting relationship. Whenever suitable, talk with the child to know his/her problems, like an individual. History-taking should be in a respectable environment for the child and parents/caregivers.

The history-taking should have a sequence, from present to past including all the events affecting health and disease. Information is obtained first about the sick child, then the

JAYPEE BROTHERS

BOX 2.3: Ten components of history-taking.

1. General information
2. Presenting or chief complaints
3. History of present illness and treatment history
4. Past history
5. Antenatal, natal and postnatal history
6. Developmental history
7. Immunization history
8. Nutrition and dietary history
9. Family history and pedigree charting
10. Social history

family, and then about the social background to which the child belongs.

The ten components of history-taking are highlighted in **Box 2.3**.

1. General Information

Start with the general information and background — name of child, mother and father, sex, age, date and time of birth, complete postal address, telephone, and mobile numbers. The general information should include date and time of history-taking, name of *informant* and his/her relationship with the child.

2. Chief Complaints

These include the current problems with which the child is brought to the health facility. Record them in patients/parents own words, in chronological order along with duration. When the presenting complaints are more than one, try to identify most important problem. Arrange complaints in the order of their appearance. Duration should be specific rather a time interval (e.g., 10 days instead of 1–2 weeks). Also, provide the status of complaints till date (**Box 2.4**).

3. History of the Present Illness

Once all the chief complaints are listed, each symptom should be analyzed in detail. Each symptom should be assessed under the following headings. Onset (exact date and time of onset), nature of onset (acute, insidious or chronic), duration, frequency, consistency (intermittent, continuous or remittent), severity, evolution (progression, static or regression), aggravating and relieving factors, any diurnal variation, associated symptoms, and response to treatment.

Review of Systems

The system review enables to identify involvement of other organs and system which are either simultaneously affected, or affected due to complication, or affected independently. Details are given in **Box 2.5**.

BOX 2.4: Chief complaints.

❑ Fever	for 10 days
❑ Yellowish discoloration of eyes	for 7 days
❑ Pain abdomen and loss of appetite	for 5 days

BOX 2.5: Ask for these symptoms to review the various body systems.

- ❑ **General:**
  - ➢ *Growth and development:* Whether this child is growing and achieving milestones normally in comparison to others of same age or not.
  - ➢ *Appetite:* How parents describe appetite of this child. Most parents will complain of poor appetite; always correlate this with weight change and activity of child.
  - ➢ *Sleep:* Whether adequate, recent change, remains sleepy in day.
  - ➢ *Physical activity:* Normal, decreased, overactive, hyperactive.
  - ➢ *Behavior:* Normal, quiet, shy, out-spoken, friendly, quarrelsome.
  - ➢ *School:* School performance and relationship with peers, opinion of teachers.
- ❑ **Gastrointestinal tract (GIT) and abdomen:** Nausea, vomiting, abdominal fullness, diarrhea, constipation, retrosternal or abdominal pain, pain during swallowing or defecation, jaundice, worms in stool, bleeding per rectum.
- ❑ **Respiratory system:** Cough, dyspnea, stridor, snoring, wheezing, chest pain; and family history of tuberculosis, asthma, eczema, pets and smoking.
- ❑ **Cardiovascular system:** Breathlessness, cyanosis, palpitation, edema over feet, cough, recurrent pneumonia, joint pain, pain in right hypochondrium, abdominal distension.
- ❑ **Nervous system:** Seizures, loss of consciousness, paralysis, speech problems, vision or hearing problems, abnormal movements, sensory disturbances, gait abnormalities, bowel and bladder disturbances, pain in neck, abnormal posture, headache, vomit, neck retraction.
- ❑ **Urinary system:** Change in urinary frequency and amount, color of urine, edema, pain in micturition, flank pain or mass, nocturnal enuresis.
- ❑ **Genital system:** Age appropriate growth and changes in primary and secondary sex characters; menstruation in girls, pain discharge and swelling related to genitalia.
- ❑ **Blood:** Pallor (anemia), fatigue, dyspnea, palpitation, edema, bleeding from various sites (skin, nose, GIT), swelling in neck, groin, etc., (lymph nodes), dietary intake (mainly milk diet will lead to iron deficiency anemia), drugs which may cause bleeding or bone narrow depression, family history of blood disorders, e.g., thalassemia, sickle cell anemia, etc.
- ❑ **Miscellaneous:** Skin eruption and itching, joint pain and swelling, frequent falls and fluid intake.

4. History of Past Illness

Ask about and record all medical illnesses which have occurred in the past, before onset of present illness. Ask for all the events which have a significant impact on health and disease. For example, if the child presents with fever and seizures, elicit history of any seizures in the past.

5. Antenatal, Natal and Postnatal History

Obtain information on all other important event in the child's life till date. Start from the birth—also include important points before and after birth (*antenatal, natal and postnatal history*).

Events during these periods can have effect on fetal growth and development, neonatal morbidity and mortality and some of the effects may be permanent.

JAYPEE BROTHERS

Antenatal History

History of antenatal period should include information on maternal nutrition (whether diet was adequate and balanced) weight gain, illness (tuberculosis, hepatitis, asthma, epilepsy, toxemia of pregnancy, urinary tract infection, cardiac disease, HIV, syphilis, other STD; any obstetric complications, diabetes mellitus and hypertension), and drugs received by mother. Record information about antenatal check-ups, iron-folic acid supplementation, and tetanus vaccination. Obtain history of exposure to radiation, previous abortion, and adequacy of fetal movements.

Birth History

Birth history should include place and mode of delivery, period of gestation, person conducting the delivery, color of amniotic fluid, duration of labor, particularly of 2nd stage (from rupture of membranes to delivery of newborn), resuscitation required and its details, Apgar score, initiation of breastfeeding within first hour of birth, rooming in, birth weight, maternal fever, drugs given to mother like oxytocin, analgesic and whether delivery was spontaneous or induced. Also, ask for any history of instrumentation, time for expulsion of placenta. Ask whether there was any apparent birth injury.

Postnatal History

Postnatal history should include details of cry after birth, extent of resuscitation required, time taken after birth to pass urine and meconium, when breastfeeding was started, any prelacteal feeds given, any problem in newborn period like breathing difficulty, poor feeding, jaundice, cyanosis, or seizures. Ask, when did the cord fall? Was any treatment sought for any problem in the first month of life?

Box 2.6 summarizes the points to be asked in antenatal, birth, and postnatal history.

BOX 2.6: Points to be elicited for antenatal, natal, and postnatal history.

Antenatal history

- *First trimester*
  - Fever with rash (TORCH infection)
  - Swelling in occipital region (occipital adenopathy for rubella)
  - Drug intake
  - Radiation exposure
  - Alcohol/tobacco/substance abuse
  - Bleeding per vaginum
- *Second trimester*
  - Headache, swelling of feet, blurring of vision, hypertension [pregnancy induced hypertension (PIH)]
  - Polyuria, polydipsia, deranged glucose readings (diabetes mellitus)
  - Fetal movements, bleeding per vaginum, blood transfusion
  - Weight gain
- *Third trimester*
  - Maternal fever
  - Bleeding per vaginum [antepartum hemorrhage (APH), placenta previa]
  - Leaking per vaginum, foul smelling liquor (chorioamnionitis)
  - Diarrhea/urinary problem (ascending infection)

Natal or birth history

- Place and mode of delivery
- Person conducting delivery
- Duration of labor
- Immediate cry

Postnatal history

- Birth weight
- Preterm or full-term or post-term
- Resuscitation requirement
- Initiation of breastfeeding
- Respiratory difficulty, cyanosis, jaundice, feeding difficulty

6. Developmental History

Ask for developmental milestones the child has achieved. You should first ask for those milestones which the child should have achieved according to his chronologic age. For example, if the age of child is 1 year ask for his ability to stand without support, walking with support, use of 2–3 words. Developmental milestones should be assessed in all four fields, i.e., motor (gross motor, fine motor), adaptive and cognitive, language, and personal–social fields.

Always proceed in a stepwise manner exploring achievements in the four fields, separately. It is possible that development in one field is normal and delayed in the other. You can identify gross delay according to scheme given in **Table 2.2**. If development delay is identified in this screening, detailed history and assessment should be advised.

7. Immunization History

The objective of taking immunization history is to ascertain whether the child is fully immunized appropriate for age (**Table 2.3**). This would help in recommending the missed doses. It is also likely that the current presenting problem is related to recent vaccination, e.g., axillary lymphadenitis

TABLE 2.2: Red flags in development: Upper age limit for milestones to enable screening for development delay.

Age (months)	*Gross motor*	*Adaptive*	*Social skills*	*Languages and hearing*
3	Some head control, supports weight on forearms	Opens hands spontaneously	Smile appropriately	Coos, responds to loud sound
6	Rolls over in either direction	Reaches out to objects	Shows like and dislikes	Babbles, laughs
9	Sits with support, pulls to stand	Transfers objects	Plays pat-a-cake	Imitates sounds, responds to own name, says bisyllables
12	Crawls, stands with support	Releases an object on command	Waves bye-bye, plays peek-a-boo, comes when called	1–2 meaningful words
18	Walks with one held hand	Feeds from a spoon	Mimics actions of others	At least 6 words
24	Walks steadily	Builds a tower of four or more blocks	Plays with others	2–3 words sentences

JAYPEE BROTHERS

TABLE 2.3: National immunization schedule.

Vaccine	*When to give*	*Maximum age*	*Dose*	*Route*	*Site*
BCG	At birth	1 year	0.05 mL (0.1 mL >1 month age)	ID	Left upper arm
Hepatitis B—birth dose	At birth	Within 24 hours	0.5 mL	IM	Anterolateral mid-thigh
Oral polio vaccine (OPV)—0/Birth dose	At birth	Within the first 15 days	2 drops	PO	Oral
OPV—1, 2 and 3	6, 10 and 14 weeks	Up to 5 years	2 drops	PO	Oral
Fractional injectable polio vaccine (fIPV) 1 and 2	6 and 14 weeks	Up to 1 years	0.1 mL	ID	Right upper arm
*Pentavalent vaccine—1, 2 and 3	6, 10 and 14 weeks	Up to 1 years	0.5 mL	IM	Anterolateral mid-thigh
$Rotavirus vaccine—1, 2 and 3	6, 10 and 14 weeks	Up to 1 years	5 drops	PO	Oral
Measles/measles rubella (MR) 1st dose	9 completed months–12 months	Up to 5 years	0.5 mL	SC	Right upper arm
Vitamin A (1st dose)	At 9 completed months	Up to 5 years	1 mL (1 lakh IU)	PO	Oral
#Japanese encephalitis (1st dose)	At 9 completed months–12 months	Up to 15 years	0.5 mL	SC	Left upper arm
DPT 1st booster	16–24 months	Up to7 years	0. 5 mL	IM	Anterolateral mid-thigh
Measles/MR (2nd dose)	16–24 months	Up to 5 years	0.5 mL	SC	Right Upper arm
OPV booster	16–24 months	Up to 5 years	2 drops	PO	Oral
Vitamin A (2nd to 9th dose)	16–18 months and then every 6 months	Up to 5 years	2 mL (2 lakh IU)	PO	Oral
#Japanese encephalitis (2nd dose)	16–24 months	Up to 15 years	0.5 mL	SC	Left upper arm
DPT 2nd booster	5–6 years	Up to 7 years	0.5 mL	IM	Upper arm
Td/TT	10 years and 16 years	Up to 16 years	0.5 mL	IM	Upper arm

*Pentavalent vaccine is a combined vaccine and includes DPT, Hepatitis B and H influenza B vaccine.
$Phased introduction in few states.
#JE vaccine is given in select endemic districts.

(BCG: bacillus Calmette–Guérin; ID: intradermal; PO: per oral; SC: subcutaneous; IM: intramuscular)

following BCG vaccine; mild rash after measles vaccine; and high fever, convulsion, and encephalopathy following DPT vaccination.

Obtain immunization history under following headings: Name of vaccine administered, given where, by whom, if any vaccine is missing—reason for the same, and any adverse events following vaccination. Also look for the presence of BCG scar, usually on the left upper arm. It is better to see the vaccination card and not rely on verbal information as to the dates of vaccination.

8. Nutrition and Dietary History

Your aim in taking nutritional and dietary history is to find whether this child is getting adequate and balanced nutrition appropriate for the age. This will help identify nutritional disorders as well as in formulating a diet plan. Components of nutrition and dietary history are listed in **Box 2.7**. Collect information appropriate for age, as below:

For Newborns and Infants Below 6 Months

Ask about time of initiation of breastfeeding, frequency and duration of feeds, exclusive breastfed or not, and whether feeding directly from breast or expressed breast milk.

BOX 2.7: Nutrition and dietary history.

- ❑ Breastfeeding
- ❑ Complementary feeding
- ❑ Quality and quantity of feeds
- ❑ Protein and calorie intake per day
- ❑ Diet balanced or not
- ❑ Fast food
- ❑ Vegetarian or mixed
- ❑ Food beliefs, fads and allergies

For Children between 6 Months and up to 2 Years

Ask about time of initiation, quality, thickness, frequency, quantity of complementary foods, whether fat/oils added or not, any source of animal protein in diet, who feeds the child, whether breastfeeding continued or not.

For Children Above 2 Years

Obtain dietary intake by 24 hours dietary recall. Record all food intake by the child in actual terms from the time he gets up and till he gets back to bed. Calculate calorie and protein intake and compare with the recommended intake. Assess whether the diet is balanced (by asking about whether child consumes food from all the food groups, i.e., cereals and

JAYPEE BROTHERS

pulses, fruit and vegetables, milk and dairy products, nuts, and fats, and sugars. Ask, if there is any intake of fast foods. Also enquire about food beliefs, fads, and allergies and whether family is vegetarian or nonvegetarian.

Chapter 3 provides a detailed description of obtaining the dietary history in different age groups.

9. Personal and Family History

Personal and family history include personal information of child. Ask about the child's habits with regard to eating, sleeping, bowels and micturition, and behavior with the siblings, family, and friends.

Ask age of parents, their educational status, occupation, income, number of siblings, their age and sex. Find out details of events related to health, illness, nutritional status, and birth order of this child. Health of mother and father and if they are suffering from any disease like tuberculosis, diabetes, hypertension, asthma, ischemic heart diseases, etc. should be noted. You should elicit history of any close family member suffering from or suffered in recent past with open tuberculosis or received treatment for tuberculosis.

Details of abortions and deaths of children or any close relative and most likely causes should be noted. The cause should be identified on the basis of symptoms preceding death and any medical record available. You should also collect information about type of family, such as nuclear or joint, and details of health and illness of family members. Also ask of habits of parents and other members regarding smoking, tobacco chewing, and alcohol use. **Box 2.8** enlists important points in family history.

Consanguinity

Consanguinity ["*con-* (with) *sanguine* (blood) -ity"] refers to the property of being from the same lineage as another person. In that respect, "consanguinity is the quality of being descended from the same ancestor as another person". The products of a consanguineous relationship or marriage are at greater risk of certain genetic disorders, because relatives share a proportion of their genes. More close is the relation between mother and father, more is the risk of genetic disorder. Degree of consanguineous relationships is categorized as first degree, second degree, or third degree **(Table 2.4)**.

BOX 2.8: Family history and pedigree charting.

- Type of family
- Total members with relation
- Age of mother and father
- Name, age and sex of siblings
- Health and diseases in members
- Abortion, stillbirths
- Deaths in close relatives
- Tuberculosis, diabetes mellitus
- Obesity, hypertension, heart disease
- Pedigree up to 3 generations

TABLE 2.4: Degree of consanguinity.

Degree of relationship	*Percentage of shared genes*	*Example*
First degree	50%	Parents, children, siblings
Second degree	25%	Uncle, aunt, nephew, niece, grandparents
Third degree	12.5%	First cousins

Pedigree Charting

A pedigree provides graphic depiction of family. A three generation pedigree should be obtained for every new patient as a screening tool to identify possible inheritable disorders and risk to patient. An extended pedigree may be needed to identify risk of certain disorders. Family history and pedigree charting help to identify inherited disorders, like autosomal dominant (one of the parent is affected phenotypically), autosomal recessive (parents are normal phenotypically, but siblings may be affected), X-linked recessive (only boys are affected) and others. Common symbols used for drawing pedigree charts are depicted in **Figure 2.1**.

10. Social History

Assessment of the socioeconomic status is an integral part of the socioeconomic history. This includes three aspects: Parental occupation, education, and family income. *Kuppuswamy scale* is the most commonly used tool for assessment of socioeconomic status **(Table 2.5).** Ask about home, toilet, drinking water source, television viewing, family interests, hobbies, hopes, fears, holidays, religious practices, details of house, like made of mud or concrete or cement, number of rooms, ventilation, water sources, electricity, cooking fuel, and child rearing practices.

2.4 COMMUNICATING DURING PHYSICAL EXAMINATION

Generally you would have built rapport with the parents and the child by the time you start examining the child. You may need to ask the parents to undress an infant or a young child . Explain what you are going to do to the child. Children may get upset by seemingly innocuous things like BP apparatus and stethoscope. You must let the child handle the stethoscope or hammer so that she is not intimidated by these. Keep the child comfortable and warm during the examination.

Remember to provide privacy to the child. In case of infants you will need to explain to mothers what you are going to examine and how she should hold the infant. If the infant is crying and needs to be quiet, ask the mother to quieten the child.

Share Information

Share information with the parents on diagnosis and management, in consultation with your team. The nurse needs to be honest about it. Start with giving important

JAYPEE BROTHERS

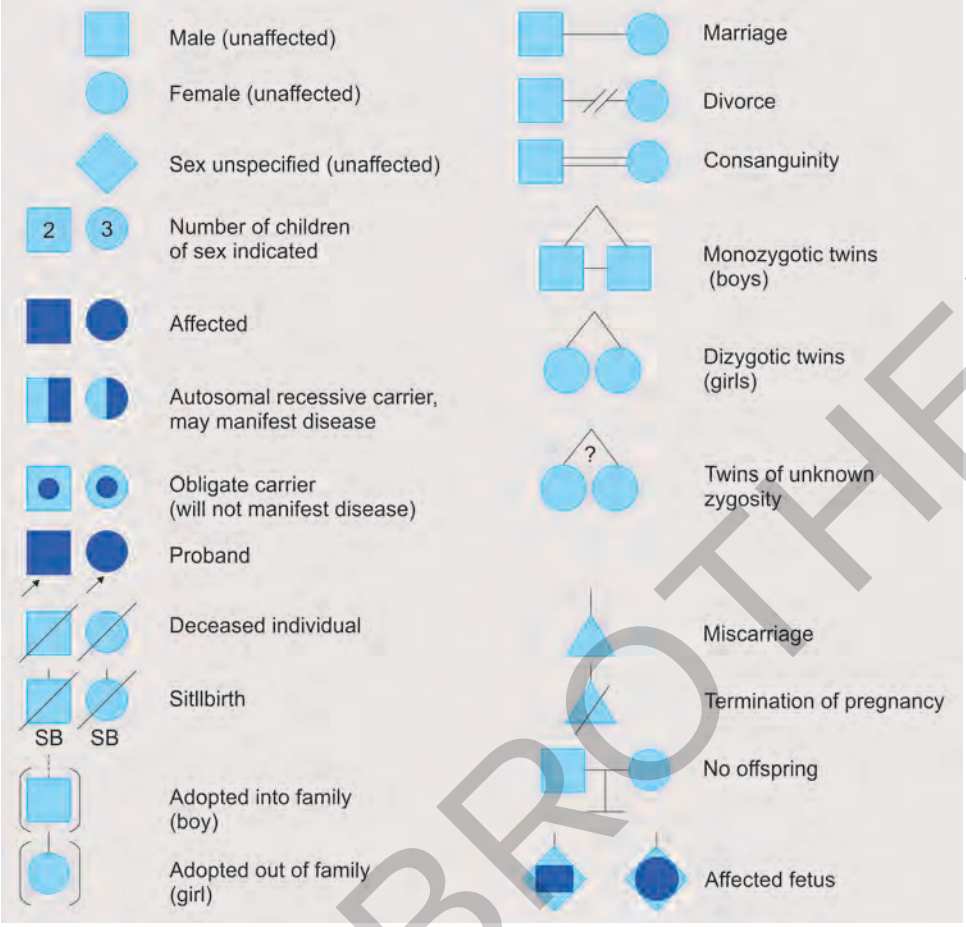

Fig. 2.1: Symbols used for pedigree charting.

TABLE 2.5: Kuppuswamy socioeconomic status scale* (2020).

Occupation	*Score*
Legislators, senior officials and managers	10
Professionals	9
Technicians and associate professionals	8
Clerks	7
Skilled workers and shop and market sales workers	6
Skilled agricultural and fishery workers	5
Craft and related trade workers	4
Plant and machine operators and assemblers	3
Elementary occupation	2
Unemployed	1
Education of the head	*Score*
Profession or honors	7
Graduate	6
Intermediate or diploma	5
High school certificate	4
Middle school certificate	3
Primary school certificate	2
Illiterate	1
Updated monthly family income in rupees (2020)	*Score*
≥199,862	12
99,931–199,861	10
74,755–99,930	6
49,962–74,755	4
29,973–49,961	3
10,002–29,972	2
≤10,001	1

Contd...

Score socioeconomic class	*Score*
Upper (I)	26–29
Upper middle (II)	16–25
Lower middle (III)	11–15
Upper lower (IV)	5–10
Lower (V)	<5

**Source*: Saleem SM. Modified Kuppuswamy's Socioeconomic Scale: Updated for the Year 2020. Indian J Forensic Community Med. 2020;7:1.

information first and check what has been understood. Follow the ALPAC approach given below:

- ❖ Ask and listen.
- ❖ Praise and build confidence.
- ❖ Advise–inform in simple language. Demonstrate, if a task needs to be done.
- ❖ Check understanding and invite feedback.

Before giving the information, it is a good idea to ascertain what the parents already know. For example, a mother of a child who has diarrhea may be asked if she has prepared ORS earlier and how she made it. This helps in reinforcing what she is doing correcting and rectifying any deficiency.

- ❖ Outline the salient aspects of information in your mind.
- ❖ Use words and examples that are likely to be understood by the parents.

JAYPEE BROTHERS

- Take in account the parent's expectations, and fears while talking.
- Include only as much information that can be handled at one time.
- Be aware of the nonverbal communication and make them congruent with verbal message.
- Select a noise-free environment, especially if the information is complex or important.
- Get feedback and check if essential points have been understood.

At the end, you should ask for any other concerns which the parent or child may have. You should also inform the parents about when to come for follow-up before they leave the clinic.

2.5 GENERAL PHYSICAL EXAMINATION

A keen and systematic examination holds the key to the patient's diagnosis. It is, therefore, important to make the environment pleasant and the atmosphere friendly for examining the child. The examination room must be warm, well-lit and comfortable. Avoid putting curtains of yellow or blue color in the examination room as they may interfere with the assessment of jaundice and cyanosis in the child.

Equipment/Examination Kit

Before beginning examination, you need to equip yourself with certain tools which are needed during examination. These include a stethoscope, torch light, fiber glass inch-tape, weighing machine, spatula, sphygmomanometer, clinical thermometer, developmental assessment tools like a red ring (6.5 cm diameter) and blocks (2.5 cm cubes, red).

Position of the Child

Older children are usually cooperative and allow examination in different positions. Children up to 1 year may be allowed to be seated in the mother's lap during examination. Between the age of 1 and 3 years, child may be examined in standing position or in mother's lap. For children older than 3 years, examination can be performed on examination table.

1. Tips for Examination

- Ensure that your hands are washed and warmed before examining the child.
- Have plenty of patience and observe keenly.
- Do not impose yourself on the child. Allow some time for interaction to build a rapport before you start examining the child.
- You should observe the child as discreetly as possible.
- Use a suitable toy/toys like a rattle, blocks, softball, soft toys, paper and pencil or engage in conversation.
- You can also strap a toy on to your stethoscope to distract the child.
- Make frequent eye contact with the child.
- If a child is to be undressed in order to examine him, you should undress him/her keeping his/her modesty into consideration. Also, you can ask the mother to undress her child to prevent undue anxiety on part of the child.
- If a child cries or is uncomfortable during examination, you must wait and spend more time to be friend him and win the confidence.
- Any painful examination or threatening maneuver- like per rectal examination or auscultation should be performed at the end of clinical examination.
- Obtain consent from the parents of all children and assent from the child (if >7 years old).

2. Initial Assessment

Note the facies, posture, and any obvious finding first. The initial assessment should indicate whether the child *looks well or not*? If no, what are the obvious abnormalities. The typical facies of a patient of Down syndrome, posturing of a patient of tubercular meningitis, and the characteristic swelling of the body of a patient of nephrotic syndrome (**Fig. 2.2**) are often sufficient to diagnose the clinical condition. Note the following:

- Note the behavior of the child. This will include the level of activity, alertness, personality, attention span, and response to commands.
- Is the child well-nourished or looks malnourished (**Fig. 2.3**)?
- Assess whether the child looks dehydrated. This can be indicated by sunken eyes and dry wrinkled skin.
- Assess the child's posture (opisthotonus, decerebrate, decorticate, ambulatory), mobility, gait (wide-based, limping), and sensorium (restless, comatosed).
- Is the child having respiratory distress or cyanosis?
- Is the child's color normal or having pallor, jaundice, or cyanosis?
- Does the child's face look normal? Look for mongoloid facies or any obvious facial dysmorphism (e.g., Down syndrome).
- Note the child's hygiene in terms of cleanliness.



Fig. 2.2: A child with generalized edema with periorbital swelling.

JAYPEE BROTHERS



Fig. 2.3: A malnourished child with severe wasting.



Fig. 2.4A to C: Clinical thermometers: (A) Standard thermometer; (B) rectal thermometer; and (C) digital thermometer.

BOX 2.9: Vital parameters.

- Temperature
- Arterial pulse
- Respiration
- Blood pressure
- Capillary refill time
- Hydration
- Oxygen saturation

3. Vital Parameters

An accurate assessment of vital parameters (**Box 2.9**) is important in order to offer effective treatment to the patient. This includes assessment of temperature, arterial pulse, respiration, blood pressure, capillary refill time, and state of hydration.

Temperature

Normal body temperature is 37°C or 98.6°F and ranges between 36.6°C (97.9°F) to 37.2°C (99°F). A child whose rectal temperature is more than 38°C/100.4°F is *febrile*. Temperature more than 41.5°C/107°F indicates *hyperpyrexia*. In newborns, the normal temperature is 36.5–37.5°C. Temperature below 36°C is *hypothermia*. Axillae are the preferred sites to measure temperature in children. The standard mercury thermometer must be left for 3–5 minutes in the axilla for correct assessment of body temperature. While taking temperature in axilla, take care to direct the tip of the thermometer toward the apex of the axilla.

The other sites which may be used for measuring the temperature are rectum or tympanic membrane (ear canal). The rectal temperature is more than the oral temperature by 0.5°C while the axillary temperature is 1°C below the rectal temperature. Note that a rectal thermometer is different from the standard thermometer. The clinical oral thermometer has a long tip while the rectal thermometer has a bulbous tip **(Figs. 2.4A to C)**. Rectal thermometer is not preferred as there is risk of infection and perforation. Before inserting the thermometer, wash it with an antiseptic or in cold water and shake the mercury down.

Digital Thermometer

Now, mercury thermometers are not being used, hence you may have to use a digital thermometer.

- Observe hand hygiene
- Explain what you intend to do and try to make the child comfortable
- Turn the thermometer on, you will hear a beep sound and the display on the screen will appear (functional check). The thermometer will show the last temperature recorded for the next 3 seconds (memory).
- After the 1 second function check and the 3 second display of the last temperature, the display will start flashing indicating that it is ready to use.
- Now, place the tip under the child's axilla, taking care to direct the tip of the thermometer toward the apex of the axilla. Make sure the underarm is dry and there is no material between the chest and arm. Point the thermometer upward and place the tip well into the patient's underarm. Fold patient's arm over chest to hold the thermometer in place.
- Hold the thermometer in place until you hear the beep signal indicating the reading is finished.
- Read the digital reading on the thermometer.
- Clean the thermometer tip with 70% alcohol and keep it ready for next use.

Arterial Pulse

Radial pulse is the most usual to be assessed for its ease of access. Femoral pulse is felt especially in neonates or in children with circulatory collapse or shock. Other pulses to be assessed are brachial, carotid, popliteal, posterior tibial, and dorsalis pedis. Describe the pulse for *rate* (beats per minute), *rhythm* (regular, irregular), and *volume* (normal, low or high). Assess the pulse rate for a complete minute.

Make sure the child is relaxed and comfortable and has not been running, playing or crying within the preceding 20 minutes. For assessing the radial pulse, hold the hand out with the palm facing upward and elbow relaxed. Now lightly press the index and middle fingers of the other hand on wrist, just

JAYPEE BROTHERS

TABLE 2.6: Normal sleeping pulse rate.

• Preterm neonate	120–160 bpm
• Term neonate	100–140 bpm
• 1 month to 1 year	100–120 bpm
• 1–5 years	90–110 bpm
• 5–10 years	80–100 bpm

below the base of the thumb and try to feel the pulsations in radial artery. Using a stopwatch or a watch with a second hand, count the number of pulsations that you feel over 60 seconds which is the pulse rate. For the carotid pulsations, gently press the side of your neck just below the mandible using your index and middle fingers. Try to describe the rhythm as regular or irregular. Also, try to describe the volume (strength) of the pulse which although is a very subjective measurement, but with experience you will be able to compare it with what has been felt previously in other patients. Describe the pulse as "weak," "faint," "strong," or "bounding."

The normal sleeping pulse rate for various age groups of children is given in **Table 2.6**.

Respiration

The respiratory rate and color of the skin give an indication of the adequacy of ventilation and perfusion. The respiratory rate should be counted for complete 60 seconds when the child is at rest or sleeping. Always count the respiratory rate after measuring the pulse rate. The respiratory rate may be assessed once the child is at ease and can be assessed with the child sitting, lying down or standing. Use the second hand on your watch or a timer on your phone to keep track of the child's breathing for exactly 1 minute. Once the minute starts, count every time you see the chest rise. Only count the inhales or the exhales, but not both. The rise and the fall of the abdomen or chest is counted as one full breath. The normal respiratory rates are given in **Table 2.7**. Tachypnea refers to fast respiration as defined by cut- offs given in **Table 2.8.**

Assess whether respiration is regular, shallow, fast, or deep and rapid. Check whether accessory muscles of respiration are working by looking for nasal flaring, recession of intercostal muscles, subcostal recession, supraclavicular, and tracheal tug. Tracheal tug is the inward movement of trachea during inspiration.

Listen for any obvious adventitious sounds during respiration audible without a stethoscope. Different respiratory sounds include the following: *snoring, rattling, grunting, groan, stridor,* and *wheeze.* A description of these sounds follows in **Table 2.9**. Observe whether they occur during expiration, inspiration or in both the phases of respiration. Respiratory adventitious sounds usually are indicative of obstruction to the airway.

Blood Pressure

The proper technique for taking a blood pressure reading in children is the same as for measuring blood pressure in adults (**Fig. 2.5**). The inflatable bladder should cover the circumference of the arm without overlapping. It should not exceed two-thirds the distance between axilla and cubital fossa. A cuff size of width 2.5–4 cm (size 3) is usually appropriate for neonate; 4–6 cm wide cuff for infants, 7.5–9 cm wide cuff for younger children and 10 cm wide cuff for adolescents. The bladder length is twice the width. A rough estimate of the bladder width and length would be 40% an 80% of the MUAC, respectively.

Normal values for blood pressure in children are summarized in **Table 2.10**. A rough guide to estimation of average (50th centile) systolic and diastolic blood pressures in children older than 1 year is as follows:

- ❖ Systolic blood pressure = 90 + (age in years × 2)
- ❖ Diastolic blood pressure = 55 + (age in years × 2)

TABLE 2.7: Normal respiratory rate.

• Preterm neonates	40–60 breaths per minute
• Term neonates	30–50 breaths per minute
• 1 month to 1 year	20–40 breaths per minute
• 1–5 years	20–30 breaths per minute
• 5–10 years	15–20 breaths per minute

TABLE 2.8: Cut-off for tachypnea.

• 0–2 months	RR >60/min
• 2 months to 1 year	RR >50/min
• >1 year	RR >40/min

TABLE 2.9: Respiratory sounds.

Sound	*Cause*	*Character*
Snoring	Oropharyngeal obstruction	Inspiratory, low pitched, irregular
Grunting	Expiration against a closed glottis partially	Expiratory, occurs in hyaline membrane disease
Rattling	Secretions in airways	Inspiratory, may be felt by placing over the chest
Stridor	Obstruction in larynx/ trachea	Inspiratory, sometimes an expiratory component
Wheeze	Lower airway obstruction	Whistling sound, predominantly expiratory

Capillary Filling Time

This test is performed at bedside to assess the peripheral perfusion of tissues. Press with your thumb against a bony prominence (sternum or forehead) for 5 seconds to allow the skin to be blanched, and note the time taken for the skin to regain its color. The skin regains its usual pink color within 3 seconds, if the perfusion is good. You can also blanch the finger pulp or nail beds, but ensure that hands are warm.

A capillary filling time (CFT) more than 3 seconds is considered prolonged and indicates poor perfusion. CFT is prolonged in severe dehydration, and shock.

Assessment of Hydration

Any child presenting with a history of diarrhea should be evaluated for dehydration. The following clinical signs are used to assess the hydration:

JAYPEE BROTHERS



Fig. 2.5: Measurement of blood pressure in a child, in supine or sitting position; the manometer should beat the level of the heart.

TABLE 2.10: Normal blood pressure values.

	Systolic blood pressure	*Diastolic blood pressure*
Neonates	A rough estimate of the mean arterial blood pressure in term neonates is equal to the gestational age, though values vary with age, and weight of the baby	
1 month to 1 year	80 mm Hg	50 mm Hg
1 year–5 years	85 mm Hg	55 mm Hg
5–10 years	95 mm Hg	60 mm Hg

- **Child's general condition/sensorium:** Assess if the child is alert, lethargic or restless/irritable or drowsy. Offer water to drink. Note whether the child accepts readily (thirsty) or refuses drink.
- Observe the eyes and note whether sunken.
- **Elasticity of skin/skin turgor:** Pinch the skin over the abdomen midway between the umbilicus and side, and release it. The skin goes back either very slowly (longer than 2 seconds) or slowly (skin stays up even for a brief instant) or immediately.

Classify dehydration as *No*, *Some* or *Severe,* based on **Table 2.11**.

Oxygen Saturation

It is a useful bedside tool to assess hypoxemia in a patient. It measures the percentage saturation of hemoglobin bound with oxygen in blood.

Method

An oxygen saturation probe is attached to a pulse oximeter applied across a capillary rich area, like pulp of finger/toe or ear lobule. A red and infrared rich light source allows light to pass through tissue and depending upon the concentration of the oxygenated hemoglobin, some of the light is absorbed and what comes out at the receiving end of the probe is analyzed by a microprocessor. Values are expressed as percentage of oxygen saturation of hemoglobin. A saturation of less than 90% in under-five children indicates hypoxia.

TABLE 2.11: Assessment of dehydration.

	No dehydration	*Some dehydration*	*Severe dehydration*
Sensorium#	Alert, well	Irritable, restless	Lethargic, unconscious
Eyes#	Normal	Sunken	Very sunken
Tears	Present	Absent/present	Absent
Oral mucosa and tongue	Moist	Dry	Very dry
Skin pinch#	Goes back immediately	Goes back slowly*	Goes back very slowly**
Thirst	Normal, not thirsty	Drinks eagerly	Not able to drink
Urine output	Normal	Decreased	Very decreased/absent

#According to IMNCI, at least 2 of the following signs should be present to classify as some or severe dehydration.
Skin pinch: Check the elasticity of the skin using the "skin pinch test." Locate the area on the child's abdomen between the umbilicus and the side of the abdomen; then pinch the skin between the thumb and index finger. Pick up all the layers of the skin for one second, and then release it and observe the return of the skin fold. This test is not useful in malnourished and obese children and in infants.
*When released the skinfold stays up briefly.
**When released the skinfold stays up longer than 2 seconds.
The oral mucosa may be otherwise dry in a child who is a mouth-breather, and may be wet in a dehydrated child who has just vomited or if he has been drinking fluids.

JAYPEE BROTHERS

for detailed information on nursing books, visit our website www.jaypeebrothers.com, for detailed information on nursing books, visit our website www.jay

Essential
Pediatric NURSING

Salient Features

- Updated content keeping in mind the needs of nursing students, nursing staff and tutors
- Novel concepts like family-centered nursing care, atraumatic nursing care, communication, anticipatory guidance, and child advocacy are emphasized
- Detailed elaboration of basics and pathophysiology of diseases to enable clarity of concepts
- Major thrust on providing pediatric nursing care plans and details of common nursing procedures
- Provides information in a simple, lucid and practical manner
- Text is amply supported with tables, diagrams, clinical photographs and algorithms
- Provides a list of important questions as well as multiple choice questions (MCQs) at the end of each chapter to guide the students for the preparation of examinations
- The improved content and examination-oriented questions will be particularly useful for the BSc and MSc Nursing students
- Dedicated to the caring nurses who see the patient and not just the disease, "Caring is the essence of nursing".

Editor-in-Chief

Piyush Gupta MD FNNF FIAP FAMS is Professor and Head, Department of Pediatrics, University College of Medical Sciences, Delhi, India. A renowned academician, teacher, researcher, author and editor has contributed immensely to child survival, nutrition, clinical epidemiology, newborn health and medical education for 30 years. His expertise is sought by the Government of India, WHO, UNICEF, PHFI, DBT, NBE and ICMR. He has edited 40 books [including *PG Textbook of Pediatrics, Pediatrics (for Undergraduates), Clinical Methods in Pediatrics, Textbook of Community Medicine, Emergencies in Pediatrics, Principles of Medical Education* and *How to Write a Thesis*]; authored 300 book chapters and 280 papers in indexed journals; and delivered 25 orations. NAMS has awarded him the KL Wig Oration and Abhaya Indrayan award. Royal College, UK; and American Academy of Pediatrics have also awarded him. Indian Academy of Pediatrics, National Academy of Medical Sciences, and National Neonatology Forum, India; have conferred Fellowships on him. In 2018, he was conferred the "Teacher of Excellence" by the Vice-President of India. He has conceived faculty development workshops in Research Methodology and Scientific Writing and trained 1000+ health professionals across the nation. He has served as the Editor-in-Chief of *Indian Pediatrics* for 6 years. He has served as the Joint Secretary of South Asia Pediatric Association and the International Editorial Board member for *The Journal of Pediatrics*. He is now the National President of Indian Academy of Pediatrics (2021).

Editors

Poonam Joshi RNRM PhD in Nursing FCRMEBM FACEN-INDIA is Principal, College of Nursing, All India Institute of Medical Sciences, Kalyani, West Bengal, India. A nurse educator, specialized in Pediatric Nursing, has published more than 80 research and review papers, coauthored a book in Nursing Education and a Pediatric and Neonatal Nursing Procedure Manual. She contributed in Essential Newborn Nursing for Small Hospitals (ENBC), 3rd edition, webinars on ENBC and podcasts in e-learning in Neonatal Nursing for WHO. She has authored a chapter on *Neonatal Resuscitation Program in Manual of Newborn Nursing*, published by the Neonatology Chapter of Indian Academy of Pediatrics; revised course material for Maternal and Child Health Nursing at Indira Gandhi National Open University; and developed course for diabetic educators. She has been awarded with NG Gadekar award for Best Staff Nurse and Nurse Researcher Award at AIIMS, New Delhi.

Pooja Dewan MD MNAMS FIAP is Professor, Department of Pediatrics, University College of Medical Sciences, Delhi, India. A respected teacher and researcher, she has published more than 80 research papers in reputed national and international journals. She has a keen interest in medical education, biomedical editing and biomedical ethics. She has been an active member of the editorial board of Indian Pediatrics, official journal of the Indian Academy of Pediatrics, for over a decade. She is currently serving as an Associate Editor for Indian Pediatrics since 2014. She was awarded *Membership of the National Academy of Medical Sciences*, India, in 2012. She has also received fellowship instituted by the Royal College of Paediatrics and Child Health (UK) in 2014 and the prestigious Fellowship of the *Indian Academy of Pediatrics* in 2015. Her clinical interests include pediatric hemato-oncology and pediatric HIV.

Printed in India

Available at all medical bookstores
or buy online at www.jaypeebrothers.com



JAYPEE BROTHERS
Medical Publishers (P) Ltd.
EMCA House, 23/23-B, Ansari Road,
Daryaganj, New Delhi - 110 002, INDIA
www.jaypeebrothers.com

Join us on facebook.com/JaypeeMedicalPublishers

