Indian J Pediatr (November 2017) 84(11):859–864
DOI 10.1007/s12098-017-2384-3

REVIEW ARTICLE

Guest Editor: Bhim S. Pandhi

How to Keep a Child Healthy?

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Received: 17 February 2017 / Accepted: 11 May 2017 / Published online: 23 June 2017

Abstract Keeping a child healthy is the most important priority of every parent. The child can be kept healthy by ensuring exclusive breastfeeding for first 6 mo of life, maintaining healthy weight throughout the childhood, providing adequate and balanced diet, promoting regular physical activity and adequate sleep, keeping a watch on all the parameters of development and referring the child to the specialist whenever deviation from normal is suspected. Proper and timely immunization as per the prevailing guidelines must be done to prevent serious infections. Stress should also be given on promoting oral as well as mental health besides other important general measures to improve the health of the child.

Keywords Child health · Immunisation · Child development

Introduction

A child is the most important person in a parent's life for which they care the most. Everybody wants to keep their children healthy, fit and free from illness. There are various aspects of the word 'Health'; it includes physical as well as mental domains, prevention from infections and allergies as well as from injuries. Here, the authors are presenting few tips for the practitioners to follow and keep a watch on child's health and ways to improve it.

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Ensure Breastfeeding

Breastfeeding is the first step to promote the health of a baby. Exclusive breastfeeding, if practised in all the babies can save 1.5 million lives per year [1]. Breastfeeding the baby has numerous benefits. Exclusive breastfeeding has shown to reduce morbidity and mortality from infectious illness during the first two years of life. Breast milk consists of numerous antibodies and enzymes which enhance the immune system of the child and protects against infections and allergies. Breastfeeding is also important for the neurological development of the child. Breastfeeding has been shown to prevent the development of obesity in early as well as later phase of life, thus reducing the chances of many diseases associated with obesity like high blood pressure, diabetes and several cancers [2].

Maintaining Healthy Weight [3, 4]

Body Mass Index (BMI) is one of the most important tool to assess if a child's growth is normal or not. It shows the relationship between weight as well as height of the child and is a better tool than following only the weight of the child. A child's age and sex also affects his/her BMI and it should also be considered while interpreting the BMI of the child. Normal weight for children lies between the 10th and 90th percentile. A child is overweight if his BMI is between 85th - 95th percentile, severely overweight (obese) with a BMI that is over 95th percentile and underweight if his BMI is under 5th percentile. BMI can be calculated by the formula –

$$\text{BMI} = \text{weight (kg)} / \text{height}^2 \text{ (meter)}$$

Charts for plotting BMI for boys and girls between 5 and 18 y age are available on the site http://iapindia.org/Revised-IAP-Growth-Charts-2015.php.

To calculate the expected 'weight for age' of a child below 1 y of age, formula used is:

$$[Age\ (in\ months) + 9]/2$$

Expected weight of a child between 1 and 7 y of age is calculated by the formula:

$$2 \times Age\ (\text{in}\ years) + 8$$

Expected weight of a child more than 7 y of age can be calculated as:

$$[7 \times Age\ (in\ years) - 5]/2$$

Above written formulas can be used to calculate expected 'weight for age' for children of various ages. Weight and height charts for children of various ages are also available on the site http://iapindia.org/Revised-IAP-Growth-Charts-2015.php.

Weight of a child depends upon his/her genetic makeup, diet and physical activity.

Diet [5, 6]

Diet of a child influences his growth and it is one of the most important factor affecting health during childhood. A balanced diet supplies calories in the form of protein, carbohydrates and fats, as well as minerals and vitamins which are all important for maintaining health of a child. Children who receive proper diet remain healthier in the long term, free from various diseases and deficiencies.

Breast milk is the ideal food for a newborn provided by mother nature. WHO advocates exclusive breast feeding for first six months of life and it should be continued till 2 y age. Semi-solids and solids should be introduced to infants six months onwards. Try to add different varieties of food slowly till the age of one year, after which the child is usually able to eat all the home cooked foods. Homemade foods are preferable to commercially available formula foods as there are concerns of high sodium and sugar content in many commercially prepared foods which may cause harm to the babies.

A balanced diet consists of carbohydrates, proteins, vitamins and minerals and also meets the daily caloric needs of the body. This means, 50% of a child's calorie needs should be derived from carbohydrates, 20% from protein and 30% from fats. Caloric needs of a child can be calculated as following:

0–3 kg – 120 kcal/kg
3–10 kg – 100 kcal/kg
11–20 kg – 1000 kcal +50 kcal/kg above 10 kg
>20 kg – 1500 kcal +20 kcal/kg above 20 kg

Proteins are very important for body building in a growing child. Protein requirement at different ages is as given below:

Full term infant – 2-3 g/kg/d
1–10 y – 1-1.2 g/kg/d
>10 y boys – 0.9 g/kg/d
>10 y girls – 0.8 g/kg/d

The diet of a child must have varieties of foods from different sources of vitamins, minerals, proteins and fibre. Dairy and poultry products are rich sources of energy, calcium and protein, while foods such as cereals, vegetables and fruits provide energy as well as minerals, vitamins and fibres. It is very important to maintain adequate hydration, so offer plenty of water. A child should drink glasses of 250 ml water corresponding to their age, like a child of 4 y needs to drink 4 glasses of 250 ml water. Ask about the color of urine to ensure the child is adequately hydrated; it should be clear and not yellow. Limit intake of juices and any sweetened drinks as they may promote development of dental caries and obesity.

Poor eating habits and insufficient physical activity are leading to a rise in obesity among children. Moreover, most of the parents keep on motivating their child for eating frequently even if the child is overweight, not considering the child as obese. Unfortunately, most of these overweight children become obese during their adult life which increases the risk of chronic illnesses and deteriorates the quality of life.

If a child is consuming more calories than what he is expending, there are high chances of him gaining weight. High calorie fast foods and sedentary habits because of television, videogames and laptop together are important risk factors for development of obesity in children now-a-days. Children should avoid and limit the intake of calorie-rich foods such as chips, other fried foods, chocolates or aerated drinks. Overweight and obese child should have a filling but low-fat and low-calorie diet including vegetables, fruits, low-fat dairy products, lean meat, poultry and whole grain foods. If the child has a tendency towards being overweight, make sure that he does not eat too much between the meals. It is best to have two small snacks per day – one in the morning and one in the afternoon. Alternatively if the child is very slim or underweight, offer him more small snacks between the meals.

Promoting Regular Physical Activity [7–10]

Young children and adolescents should engage in physical activity on a regular basis. Centre for Disease Control (CDC) and American Heart Association (AHA) recommend atleast 60 min of moderate to intense vigorous physical activity daily for children between 6 and 17 y of age. Regular physical activity improves strength and endurance, keeps bones healthy, helps in maintaining weight and BMI, prevents

hypertension, high cholesterol level and many chronic diseases like asthma and various cancers, improves immunity, promotes mental health, and even improves academic performance of children.

Children can engage in various kinds of physical activities which improve their cardiovascular or aerobic fitness, strength and endurance, exercises which improve flexibility and provide better motor coordination. Individuals who are physically active during childhood have higher chances of remaining physically active during their later years which prevents obesity and morbidity from various chronic diseases like hypertension, diabetes, hypercholesterolemia, *etc*. Weight bearing exercises which strain bone to a greater extent help in increasing bone mass during growing years of puberty and individuals who gain good bone density during adolescence and young adulthood have lesser chances of osteoporosis during old age.

Regular involvement in various physical activities and sports have been shown to decrease anxiety and depression, higher self esteem and improved cognitive function in children. Sports and exercise is an excellent medium for children to decrease stress and improve self perception of body image and attain better competence.

Promoting Adequate Sleep [11, 12]

Sleep plays a vital role for the health of a child. Adequate sleep is important for the physical as well as mental health of children. During sleep, new pathways are formed in brain which helps in maintenance of learning and memory. A good night's sleep is also important for proper attention and decision-making. Sleep deficiency in children can make them angry and impulsive, hyperactive and can affect their performance in school. Sleep is also necessary for physical health of children. During sleep, hormones are secreted which promote growth of body and repair of body tissues. Deep sleep also maintains balance of appetite controlling hormones. Sleep deficiency has been reported as a causal factor in development of obesity in children and teens. Adequate sleep is also important for maintenance of immune function of the body. Sleep deficient children have been found to be prone to cold and other infections.

The amount of sleep required varies at different ages of life and it may vary from person to person, but below given (Table 1) are the general recommendations for the amount of sleep required.

Healthy sleep habits should be promoted so that the children can have adequate sleep recommended. Below are few tips to ensure adequate deep sleep in children:

- Maintain a bedtime routine
- Avoid heavy meals in dinner

Table 1 Recommended duration of sleep

Age	Recommended duration of sleep per day
Newborn	16–18 h
Preschool-aged children	11–12 h
School-aged children	At least 10 h
Teenage	9–10 h

- Limit intake of tea, coffee and other caffeine containing food items
- Avoid naps during evening or late afternoons
- Switch off television, mobiles, computers and laptops (any bright screen items) 30–60 min before bedtime
- Create a comfortable environment in sleep area with dim lights and suitable temperature
- Relaxing music can be used for children who have difficulty in initiation of sleep

Promoting Child Development [13–15]

Every child should be screened for any lag in development. Points to be taken care of include:

- Recording proper developmental history and following it over time
- Proper examination of the child keeping in view points about development
- Keeping in mind the risk factors which can affect the development like prematurity, neuromuscular problems, *etc*.
- Using screening tests for development
- Documenting each and every finding in a precise manner

General practitioners and pediatricians can play a key role in identifying conditions which can affect development of a child. These children require early identification if there is any lag in development, proper addressing of the problem and referral to a specialist. Different screening tools can be used to aid in identifying the problem and this should be assessed during each well-child visit. A practitioner should take history and do examination for each domain of development:

1) Gross Motor Skills

As the child grows from birth to higher age, there is attainment of different gross motor skills like progressively increasing strength and coordination. A child first attains head control, then starts to roll over and achieves sitting, crawling and walking as he develops. Delay in any of these gross motor milestones or any asymmetry in movement or tone should be noted.

2) Fine Motor Skills

Similar to attaining gross motor skills there is improvement in fine motor functions of fingers and better coordination in hand-eye movements with growing age. These include activities like grasping, inferior and superior pincer grasp, feeding with a spoon and likewise. Playing with toys and different objects should be promoted in babies as it improves their fine motor skills.

3) Cognitive, Linguistic and Communication Skills

Each newborn should be screened for hearing before 1 mo of age as impaired hearing may affect development of speech in a child. If there is any doubt regarding hearing even at a later age, it should be confirmed by tests ideally by an audiologist. There is gradual progress in visual acuity from hyperopia in neonatal period to adult 20/20 vision by 5–6 y age. Language development starts with cooing at 2–3 mo age, babbling at 4–6 mo and speaking few words with meaning by 1 y age.

Reading and talking to children and singing songs to them promotes better linguistic development. It has been reported that children who are read to frequently by parents or grandparents achieve nearly 300 words by 2 y age which is higher in number than those who do not have this stimulation. So, practitioners should ask parents to make reading to children a daily routine.

The following are the red flag signs (Table 2) which should alert the healthcare professional that the child is not developing normally and he needs attention and referral to a specialist.

Ensure Timely Immunisation

Immunisation is one of the most effective ways of protecting a child from serious diseases. By immunising a child, the child is saved from developing that disease and at the same time the spread of that disease in community is also prevented; so it is beneficial for child as well as community. With the help of immunisation serious disease like smallpox has been eradicated from the world and polio from our country. With newer vaccines emerging every year in market, practitioners have an added responsibility to discuss about benefits and needs of each vaccine with the parents and then decide accordingly. The current National Immunisation Schedule recommended is shown in Table 3 [16].

Promoting Oral Health [13, 17, 18]

Dental caries and tooth decay are common problems encountered in children which can affect a child's health and quality of life. Tooth decay can cause pain and discomfort, interfere with sleep and eating and make them irritable. Whenever a child presents for check-up for any reason, a short oral inspection must be done by the practitioner to assess the condition of gums and teeth and children with dental caries or tooth decay must be advised to meet dentist for the same.

Dental caries can be prevented by following general measures:

1. Do not bottle feed. Bottle feeding causes pooling of milk in mouth and promotes caries and decay in teeth.
2. Limit intake of sweet juices, soda drinks and sugary sticky food items specially candies and chocolates.
3. Clean the teeth of children with the help of a soft toothbrush as soon as tooth erupts (without toothpaste for children below 18 mo and with little amount of fluoride toothpaste in children more than 18 mo). Supervise brushing of tooth in children up to 7 y of age and assist them in proper cleaning of teeth. Teeth should be cleaned at least twice a day for minimum two minutes each time and cleaned with water after meals. Nothing should be given to eat or drink at bedtime after brushing.

Table 2 Red flag signs in development

	6 mo	9 mo	12 mo	18 mo	Any age
Motor Development	Lack of steady head control after 4 mo age	Inability to sit		Inability to walk independently	Scissoring, frog-leg posture, W-sitting, bunny hopping
Adaptive/Cognitive Development	Failure to turn to sound or voice				
Language Development	Failure to turn to sound or voice	Lack of babbling consonant sounds		Not understanding simple commands	
Social Development	Lack of smiles or other joyful expressions	Lack of reciprocal (back-and-forth sharing of) vocalizations, smiles, or other facial expressions	Failure to respond to name when called; Absence of babbling; Lack of reciprocal gestures (showing, reaching, waving)	Lack of simple pretend play. Lack of spoken language/gesture combinations	Loss of previously acquired babbling, speech, or social skills

Table 3 National immunisation schedule

S.No.	Vaccine	Protection	No. of doses	Vaccination schedule
1	BCG (Bacillus Calmette Guerin)	Childhood Tuberculosis	1	At birth (up to 1 y if not given earlier)
2	Pentavalent [Diphtheria, Pertussis, Tetanus (DPT), Hepatitis B and Haemophilus influenza b (Hib)]	Diphtheria, Pertussis, Tetanus, Hepatitis B, *Haemophilus influenzae* type B associated Pneumonia and Meningitis	3	Three doses at 6, 10 & 14 wk
3	DPT (Diphtheria, Pertussis and Tetanus Toxoid)	Diphtheria, Pertussis and Tetanus	2	Two booster doses at 16–24 mo and 5 y of age. Three primary doses at 6, 10 & 14 wk are part of *Pentavalent vaccine.*
4	Hepatitis B	Hepatitis B	1	Birth dose for institutional deliveries within 24 h. Three primary doses at 6, 10 & 14 wk are part of *Pentavalent vaccine.*
5	OPV (Oral Polio Vaccine)	Polio	5	Birth dose for institutional deliveries. Three primary doses at 6, 10 & 14 wk and one booster dose at 16–24 mo of age. Given orally.
6	IPV (Inactivated Polio vaccine)	Polio	1	One dose at 14 wk, along with OPV3. Injectable dose given.
7	Japanese Encephalitis[a]	Japanese Encephalitis	2	9–12 mo of age and 2nd dose at 16–24 mo
8	Measles	Measles	2	9–12 mo of age and 2nd dose at 16–24 mo
9	Vitamin A	Night Blindness	9	1st dose at 9 mo, 2nd dose at 18 mo, 3rd to 9th dose given at 6 monthly interval upto 5 y.
10	Rotavirus[b]	Rotavirus diarrhea	3	Three doses at 6, 10 & 14 wk. Given orally.
11	TT (Tetanus Toxoid)	Tetanus	2	10 y and 16 y of age - For pregnant woman, two doses are given (one dose if previously vaccinated within 3 y)

[a] In endemic districts

[b] In phased manner in selected states

Promoting Mental Health [13]

Mental health of a child is equally important as the physical health of a child and it should be addressed carefully at each healthcare visit. Mental health can be affected due to various factors like any chronic illness in child or any family member, disharmony among family members, maternal depression, genetic factors causing congenital developmental delay, or skill deficiency. Underdetection of mental health issues may affect future life of the child and may lead to substance abuse or improper conduct. Primary health care giver should promptly identify mental health issues in a child by observing and discussing the behavior of the child and provide necessary intervention or referral to a specialist. The healthcare professional can gain an insight into the behavioral problem of a child by following an 'ABC approach'; A-Antecedents or factors leading to such behaviour, B- Behaviour itself and C-Consequences or gains from such behavior. Steps which can maintain or promote mental health of a child are:

1) A warm and supportive relationship between parents and child
2) Promoting self-esteem of the child
3) Help in development of coping skills
4) Promoting peer relationships
5) Communicate with child frequently– it helps the child to articulate feelings and problems faced by him
6) Maintain a loving family environment

Besides above written measures to promote the health of a child, some general measures which can be taken to prevent illness and promote health in children are described here.

- Prevent exposure to smoke: Exposure to cigarette smoke can exacerbate respiratory problems like asthma and bronchitis in children as well as increase the chances of sudden infant death syndrome (SIDS), so keep home smoke free.
- Prevent contact with sick persons: A child is likely to develop many infections from direct contact with a sick person or child, so try to keep child away from acutely infectious person.
- Hand washing: It is one of the most effective methods to keep germs at bay and preventing infectious diseases. Teach them to wash their hands after using restroom and before eating anything.

- Prevent application of kajal in eyes of babies as it may cause damage to cornea, can cause irritant contact dermatitis and excessive lead storage in body [19]
- Oil massage: Daily oil massage in newborn and infants helps in better skin barrier function, better thermoregulation, improves neuromotor development, provides nutrition and help in weight gain. It also calms the baby, improves sleep and strengthens emotional bonding. Oils such as coconut oil, olive oil and safflower oil are safe for massage of babies [20].

All the babies must be examined at birth from head to toe by the attending doctor. Further, it is recommended to visit a doctor at age of 6, 10, 14 wk, 6 mo, 9 mo and then 3 monthly till 2 y age. Beyond 2 y age, visit a doctor at least yearly. During these well child visits child may be immunised, growth and development can be assessed and any other issues with the child can be discussed with the healthcare professional.

Contributions AP prepared and BDG finalised the manuscript. BDG will act as guarantor for the paper.

Compliance with Ethical Standards

Conflict of Interest None.

Source of Funding None.

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