# Chapter 2

## Review of Literature

### The concepts and definitions of Quality of Life

Traditional medical research had focused its attention on morbidity, mortality (length of survival), complications, biochemical tests, physical condition, and symptoms and, in the past, return to work. The aim of clinical interventions had been to cured disease and to postponed death. However, if medical care were to be judged on the criteria of increasing longevity, only a small fraction of care delivered would meet the required standard. The 'disease' model is a medical conception of pathological abnormality which is indicated by signs and symptoms (seid et al., 2000). But a person's ill health was indicated by feelings of pain and discomforted or perceptions of change in usual functioning and feeling. Illnesses could be the result of pathological abnormality, but not necessarily so. A person could feel ill without medical science being able to detected disease. Therefore, measurement of health status needs to taken both concepts into account.

Quality of life (QOL) had become steadily more important in health care practice and research. Quality of life was accepted as outcome measure in clinical research. Its measured changes in physical, functional, mental, and social health in order to evaluated the human and financial cost and benefits of new programs and interventions.

The World Health Organization (WHO) has declared health to be "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity" (Bowling, 2005; Fayers&Machin, 2000; Guyatt et al., 1993; Seid et al., 2000; Testa&Simonson, 1996). The concept of Quality of life had developed considerably in the quarter of a century since the field's inception. In general, QOL research consisted of two broad areas. One of these areas, led by medical outcomes researchers, focuses on health- related parameters, or health-related QOL; the other area, led by medical sociologists, focuses on broader determinants of well-being, including sociological and economic determinants (Juniper, 1998;

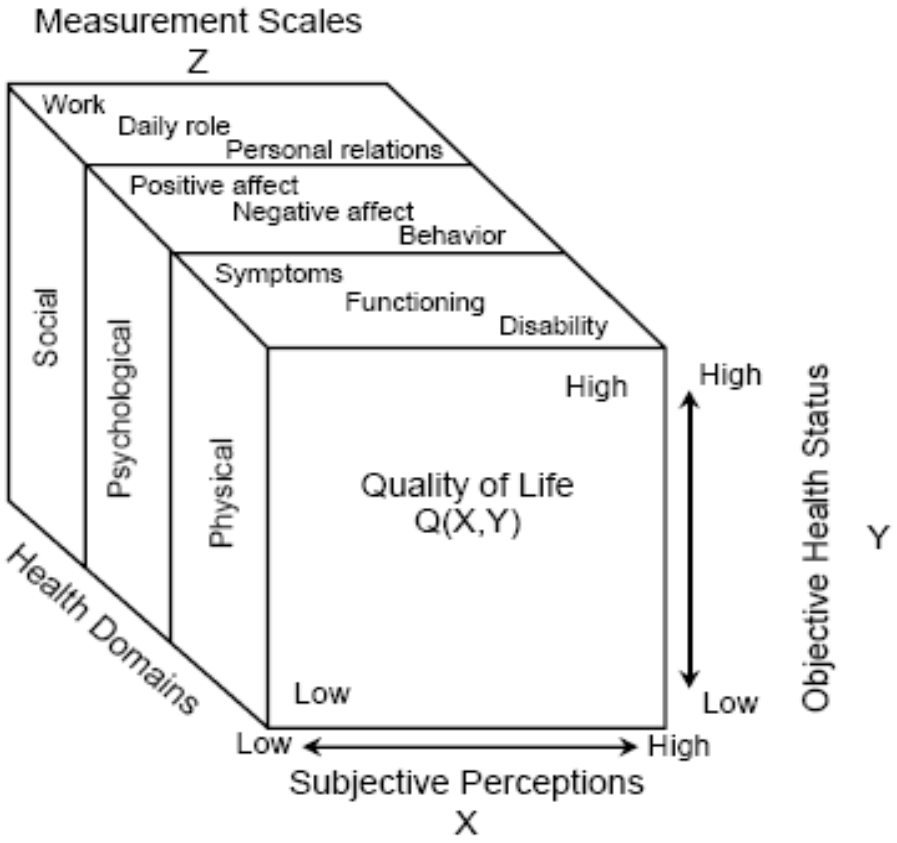
Meltzer, 2001; Schwartz et al., 2002). “The terms ‘quality of life’ and, more specifically, ‘health-related quality of life’ refer to the physical, mental, and social aspect of health, seen as distinct areas that are influenced by a person’s experiences, beliefs, expectations, and perception” (Testa&Simonson, 1996). Thus health-related quality of life (HRQOL) reflected an individual’s subjective evaluation and reaction to health or disease.

However, there was no uniform definition for quality of life, there was general agreement that it called included at least the dimensions of general health, physical functioning, physical symptoms, emotional functioning, and existential issues. Finally, a study on HRQOL depended on the researches’ interests, the disease, the study population, the intervention, and the available instruments.

Measurement of each QOL domains could be assessed in two dimensions: objective assessments of functioning or health status (the y axis in Fig. 1), and more subjective perceptions of health (the x axis). Although the objective dimension was important in defining a patient’s degree of health, the patient’s subjective perceptions and expectations translate that objective assessment into the actual quality of life experienced (or Q, represented schematically by the x and y coordinates in Fig. 2.1) (Testa&Simonson, 1996).

**Figure 2.1**

Conceptual scheme of the domains and variables involved in a Quality-of-Life assessment




Source: "Assessment of Quality-of-Life Outcome" by Marcia A. Testa, 1996, NEJM, 334(13), p.836.

This thesis would focus on health-related quality of life, which involved a broad-based and multidimensional constructed that these dimension sould be assessed by subjective measures and should be evaluated by asking the respondent (that is, whether he/she is a clinician, patient, relative, or care giver) of a series of questions known as items. The respondent was asked what he/she can do (functioning) and what he/she feel (well-being). The construct of HRQOL incorporated the physical, psychological, and social functioning that were affected by the disease or treatment as well as existential aspects of QOL that related to psychological well-being. Physical functioning is most commonly defined as the

performance of or the ability to perform a range of activities of daily living, and it includes physical symptoms resulting either from the disease itself or from treatment. Psychological functioning ranges from severe psychological distress to a positive sense of well-being and may also encompass cognitive functioning. Social functioning refers to quantitative and qualitative aspects of social relationships and interactions and societal integration (Schwartz et al., 2002).

**Why do measure Health-related Quality of Life?**

HRQOL assessments had become recognized in clinical practice as a source of valuable supplemental information. It was recently recommended to treat QOL as any other clinical endpoints.

The reasons to measure QOL compared with how it should be done were potentially useful in comparisons of alternative treatments. Where there were no implications for survival, it might be useful to know how quality of life was affected as a consequence of, for example, intermittent or continuous treatment. It might be helpful to quantify the impact on quality of life in order to aid decision making, either by staff or the family. Quality of life measurement was anticipated that quality of life measures had some potential in addition to survival data in evaluations of clinical trials.

The assessment of quality of life had potential in evaluations of interventions. In the current economic climate there was an expectation that advocated of any intervention need to provided hard evidence that the approached works and justified expenditure. Quality of life measures had the potential to fulfill this role.

In addition, quality of life measures could be used as a screening tool to identify the patients with particular difficulties and therefore in need have remedial or counseling help. Moreover, it might be sought in palliative trials that were expected to improved QOL, and the negative changed, such as toxicity and side effects of therapy.

**HRQOL Instrument**

The instruments and techniques used to assess health-related quality of life were varying according to the identity of the respondent, the setting of the evaluation and the type of questionnaire used and the general approach to the evaluation. In general, HRQOL instruments were categorized as generic and disease specific.

Generic instrument could be used in general populations to assess a wide range of domains applicable to a variety of health states, conditions, and diseases. Therefore; it could be comparison across to disease group or between sick and healthy group. Generic measure had the advantage of being based on large sample, and population norms. Disadvantage of generic instrument was lack of sensitivity to changes in specific condition.

In contrast, disease specific measures focused on aspects of health status that were specific to the diseases, to a population of patients, to a certain function, or to condition under study. Moreover; disease specific measures were much more sensitive to the implication of difference treatments and were appropriated for evaluation of interventions or for comparing the impact of alternative treatment.

The way of choose HRQOL was not had uniformity. The decision to use one over another, to use a combination of two or more, to use a profile and/or preference-based method or to use generic measure along with a specific measure will be driven by: the purpose of measurement, characteristic of the population, and environment.

**The selection of HRQOL instruments for use in children**

The Pediatric health-related quality of life measurement must be multidimensional and consist at the minimum of the physical, mental, and social health dimensions delineated by the World Health Organization in 1948. These measures were affected by the age, sex, and socioeconomic status of the respondents. Therefore, the selection of Pediatric HRQOL instrument must follow these criteria: 1) they must be brief, but maintain reliability and validity; 2) they should be ease for use by respondents and for quick, easy scoring and interpretation; and 3) they must be

responsiveness to change. Because children differ from adults in their views, cognitive immaturity, limited social experience, and expected to have different priorities in their lives. In addition; children have change to growth always and have been much energy expenditure.

**The PedsQL™ 4.0 Generic Core Scales version 4.0 (The Pediatric Quality of Life Inventory™) for the Pediatric Quality of Life**

Pediatric HRQOL measurement instruments must have a clear conceptualization of the HRQOL construct for pediatric populations. In addition; Pediatric HRQOL instruments must be sensitive to cognitive developmental stages and include both child self-report and parent proxy-report to reflect their potentially unique perspectives.

The PedsQL™ Measurement Model was designed as a modular approach to measuring pediatric HRQOL, developed to integrate the relative merits of generic and disease-specific modules into one measurement system (Eiser&Morse, 2001(a); Matza et al., 2004; Seid et al., 2000). Although other pediatric HRQOL instrument exist, including generic measures and disease-specific, it has been an explicit goal of the PedsQL™ Measurement Model to develop and test brief measure for the broadest age group empirically feasible, specifically including child self-report for the youngest child possible (Seid et al., 2000).

The PedsQL™ 4.0 builds on and expands a programmatic instrument development effort by Varni and his associated during the past 15 years in pediatric populations. The PedsQL™ 1.0, originally derived from a pediatric cancer database, was designed as a generic quality of life inventory to be utilized non-categorically pediatric populations. Given that instrument development was an iterative processed, the PedsQL™ 2.0 and 3.0 were further advancements in the measurement model, included additional constructs and items, a more sensitive scaling range, and a broader age range for patient self-report and parent proxy report. The PedsQL™ 4.0 had been field tested with children and adolescents in pediatrician's offices, hospital specialty clinics, and community settings. The PedsQL™ 4.0 Generic Core Scales are currently in use in several school districts nationwide, as well as by departments of health in

several states as a way of monitoring the health of large populations of healthy and ill children (Seid et al., 2000).

PedsQL™ instrument could be distinguished between healthy children and pediatric patients with acute or chronic health conditions that introduced to comparisons across pediatric acute and chronic health conditions, as well as to enabled benchmarking with healthy population norms (Connelly&Rapoff, 2005; Varni&Burwinker, 2006; Varni et al., 2002, 2003, 2004).

The 23-item PedsQL™ Generic Core Scales were designed to measure the core physical, mental, and social health dimensions as delineated by the World Health Organization (1948), as well as role (school) functioning. Thus, the PedsQL™ Generic Core Scales encompass the essential core domain for pediatric HRQOL measurement as follow: Physical functioning (8-items), Emotional functioning (5-items), Social functioning (5-items), and School functioning (5-items)

The PedsQL™ 4.0 measurement model emphasized the child's perception. Therefore it's consisting of appropriate forms for children ages 2-4, 5-7, 8-12, and 13-18 years which include both child self-report and parent proxy-report. The PedsQL™ 4.0 self-report is measured in children and adolescents ages 5-18 years, and parent proxy-report of child HRQOL is measured in children and adolescents ages 2-18 years.

Reliability was concerned with whether the measure consistently produced the same results, particularly when applied to the same subjects at different time periods when there was no evidence of change. There are several methods to test reliability: 1) internal consistency (Do the components come from the same conceptual domain?), 2) test-retest reliability (Do the responses to a measure differ when administered to the same population on two occasions?), and 3) intra- and inter-rater agreements. The Cronbach's alpha represented internal consistency reliability that exceeded the minimum standard of 0.70 required for group comparison. Sensitivity is the ability to distinguish between individuals and group different health state (discriminatory power) and to detect change individuals or group over time (responsiveness to change in health status). Acceptability includes the time needed to complete the questionnaire, the physical and mental ability of the target population,

the rate of refusal to complete the questionnaire, and the percentage of missing items (มานิต ศรีสุรภานนท์, 2544).

The reliability and sensitivity of the PedsQL$^{TM}$ 4.0 generic core scales were investigated in healthy and chronic health condition in several countries. In healthy population; the Cronbach's alpha of the PedsQL$^{TM}$ 4.0 generic core scales for total score is approaching 0.90 in both self-report and parent proxy-report. In addition; the PedsQL$^{TM}$ 4.0 was demonstrated the distinguished between healthy children and chronic health condition and responsive to clinical change overtime (Bastiaansen et al., 2004; Varni&Burwinker, 2006; Varni et al., 2001; 2002). The internal consistency reliability for chronic disease was investigated. In Attention-Deficit/Hyperactivity Disorder (ADHD), which most common chronic mental health condition, the Cronbach's alpha for total scale score for child self- report and parent proxy-report were 0.92 and 0.92, respectively (Varni&Burwinker, 2006). In Pediatric asthma; the internal consistency reliability for the PedsQL$^{TM}$ 4.0 total scale in both self-report and parent proxy-report were 0.90 and 0.91, respectively (Varni et al., 2004). The Cronbach's alpha for PedsQL$^{TM}$ 4.0 in healthy children for child self-report and proxy-report were 0.86 and 0.89, respectively and in pediatric cerebral palsy (CP) were 0.79 and 0.91, respectively. In addition; The PedsQL$^{TM}$ 4.0 distinguished between healthy children and children with CP. The construct validity of the CP Module was supported and sensitivity of the PedsQL$^{TM}$ was demonstrated among children with different diagnostic categories and gross motor function (Dehghan, 2005; Varni&Burwinker, 2006).

The validity of the PedsQL$^{TM}$ 4.0 Generic Core was demonstrated through known group's comparisons, and correlations with other measures of disease burden. The PedsQL$^{TM}$ self- and proxy report distinguished between children with and without a chronic health condition, and within the group of children with a chronic condition, between those who did or did not have an overnight hospital visit in the last 12 months. Further, both child self- and proxy- reports correlated significantly with the number of days the child was too ill to pursue normal activities, needed someone to care for him or her, missed school in the last month, the number of days the parent missed from work in the last month, and parent reports of problems

pursuing their normal work routine and concentrating at work. The PedsQL$^{TM}$ 4.0 Generic Core was also responsive to clinical change, as demonstrated in the recent field trial. Children with acute limb fractures assessed in the orthopedic clinic were contacted at a 3 months or greater follow-up. For both child self-report and parent proxy report, significantly higher HRQOL scores were found, comparable to the norms for healthy children. Thus, the children demonstrated a return to health after an acute health condition (Seid et al., 2000).

## Obesity

### Definition and classification

Obesity stands for excess body fat. Excess body fat results from an imbalance of energy intake and energy expenditure (total energy expenditure includes energy expended at rest, in physical activity and for metabolism) (Lyznicki et al., 2001). The exact amount of body fat is difficult to measure. Body mass index (BMI) is the most widely used surrogate marker for body fat content. BMI was defined as weight in kilograms divided by height in meters squared ($kg/m^2$) and had been established as a useful standard measure of overweight and obesity (วิชัย ตันไพจิตร, 2006; สถาบันเวชศาสตร์ผู้สูงอายุ กรมการแพทย์, 2548).

Increasing degree of BMI was associated with increasing the risk of many diseases and health conditions in children and was an important early risk factor for much of adult morbidity and mortality. Medical problems are common in obese children and adolescents and can affect cardiovascular health (hypercholesterolemia and dyslipidemia, hypertension), the endocrine system (hyperinsulinism, insulin resistance, impaired glucose tolerance, type 2 diabetes mellitus, menstrual irregularity), sleep apnea and respiratory problems, mental health (depression, low self-esteem), and numerous other obesity-related chronic conditions (Berke&Morden, 2000; Carmago et al., 1999; Field et al., 2001; Freedman et al., 1999; Hannon et al., 2005; Haslam&James, 2005; Kilpelainen et al., 2006; Litonjua et al., 2002; Lyznicki

et al., 2001; Must et al., 1999; Sahakitrungruang, 2007; Tantisira et al., 2003 ; รังสรรค์ ตั้งตรงจิตร, 2550 ; ลัดดา เหมาะสุวรรณ, 2548; อุมาพร สุทัศน์วรวุฒิ, 2548).

The classification of overweight and obesity, according to BMI, is values presented in Table 2.1, which independent of age and sex in adults. Obesity is classified as BMI ≥30.0. The classification show in Table 2.1 is in agreement with recommended by WHO, but includes an additional subdivision at BMI 35.0-39.9 in recognition of the fact that management options for dealing with obesity differ above a BMI of 35. The WHO classification is based primarily on the association between BMI and mortality (WHO, 2000).

Although, BMI useful to measured overweight and obesity, BMI did not distinguish between body mass, edema, and fat mass. Also, BMI failed to measured body fat distribution: it did not show where the excess fat situated in the body. Moreover; BMI naturally increased with increasing age, and also varies by stage of puberty, gender and ethnicity (Horlick, 2001).

**Table 2.1**

Classification of adults according to BMI (WHO 2000)

| Classification | BMI (kg/m2 | Risk of obesity-related comorbidity |
|---|---|---|
| Underweight | <18.50 | Low (but risk of other Clinical problems increased) |
| Normal | 18.50 – 24.99 | Average |
| Overweight: | ≥25.00 | |
| Preobese | 25.00 – 29.99 | Increased |
| Obese, class I | 30.00 – 34.99 | Moderate |
| Obese, class II | 35.00 – 39.99 | Severe |
| Obese, class III | ≥ 40.00 | Very severe |

Children obese were different from obesity in adults in some important respects. The main difference was that all children and adolescents need to grow, a child's weight will double and their height increase by 20% (Mokdad et al., 2003). Moreover; childhood obesity was associated with serious problem with profound health and social consequences as outlined below and increased the chances of becoming an obese adult (Fowler-Brown&Kahwati, 2004; Reilly et al., 2006; Moran, 1999; Whitaker et al., 1997). For children and adolescents (those aged <18 years), BMI was not a static measurement, but varied from birth to adulthood, and was different between boys and girls. Therefore; interpretation of BMI values in children depended on comparisons with population reference data, using cut-off points in the BMI distribution (BMI percentiles).

In 2000, the Centers for Disease Control and Prevention (CDC) release the BMI-for-age growth charts that showed healthy reference standards for BMI during childhood and adolescence, and provided a practical way of tracking an individual's changes in BMI over time. In addition, the definition of obesity used the term "overweight" rather than "obesity" in the child and adolescent populations and classified overweight according to two levels: (1) being at risk for overweight, which corresponded to a body mass index (BMI) from the 85th through the 95th percentiles for age and sex, and (2) being overweight, which corresponded to a BMI greater than the 95th percentile for age and sex, also corresponds approximately to a BMI of 25 $kg/m^2$ by age 18 (CDC, 2000; Flegal et al., 2002; Himes&Dietz, 1994).

European researchers classified overweight as at or above 85th percentile and obesity as at or above 95th percentile of BMI (Dehghan et al., 2005). The UK 1990 reference charts for BMI centiles for boys and girls gived the 91st and 98th centile lines. For routine clinical use, the 98th centile was the recommended cut-off value defining obesity (Mokdad et al., 2003). There were many references to cut-offs BMI values in children, depended on comparisons with population reference data. Table 2.2 showed many definitions of childhood obesity and severe obesity (Moran, 1999). Each involved a measure of fatness (usually BMI) and a reference centile chart where selected centiles define cut-offs for overweight and obesity.

**Table 2.2**

Definitions of Obesity and Severe Obesity

| Index | Obesity | Severe obesity | Relevant information |
|---|---|---|---|
| Mean weight for height | >120 percent | >140 percent | Actual weight is 20 percent or more above the mean weight for children of this height. |
| Weight for height | >85 percentile | >95 percentile | Readily available reference charts. Easy to use but do not differentiate lean body mass from fat. |
| Triceps skin fold | >85 percentile | >95 percentile | Direct measurement of subcutaneous fat. More accurate measurement of obesity but more intra-observer variability. |
| Body mass index (kg per $m^2$) | >=85 percentile | >=95 percentile | Percentiles are age- and gender-specific. Better correlates excess weight to fat in younger children and adolescents. |
| Ponderal index (kg per $m^3$) | >85 percentile | >95 percentile | Percentiles are age- and gender-specific. Better correlates excess weight to fat in older children. |

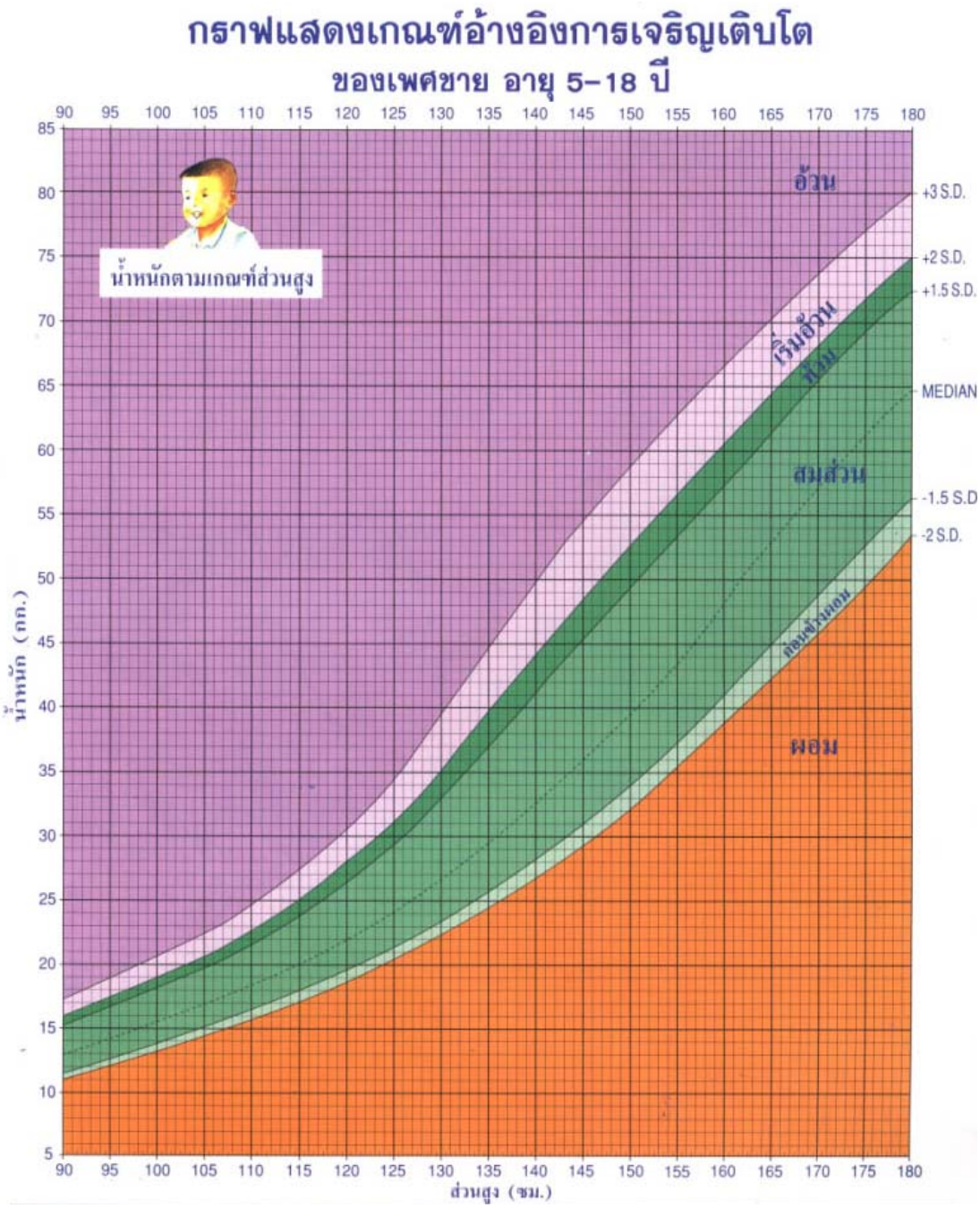
Source: "Evaluation and Treatment of Childhood Obesity," by Rebecca Moran, 1999, *American Academy of Family Physicians*, 59(4).

In 2000, Thailand released reference charts for BMI percentiles for boys and girls from the recent survey of Thai children of the Ministry of Public Health of Thailand. The standard growth charts of Thai children for boys and girls were demonstrated in Fig. 2.2 and Fig. 2.3 (กรมอนามัย กระทรวงสาธารณสุข, 2543). The classification of overweight was as at or above 90th percentile and obesity as at or above 97th percentile (Jirapinyo et al., 2005a, 2005b; Sahakitrungruang, 2007; กรมอนามัย กระทรวงสาธารณสุข, 2543; สถาบันเวชศาสตร์ผู้สูงอายุ กรมการแพทย์, 2548). For routine clinical use, the recommendation of cut-off value defining of overweight was as at or above 110 percent and below 120 percent and obesity was as at or above 120

percent (Guyatt et al., 1993; Testa&Simmonson, 1996, แสงโสม สีนะวัฒน์, 2545; ลัดดา เหมาะสุวรรณ, 2546).

**Figure 2.2**

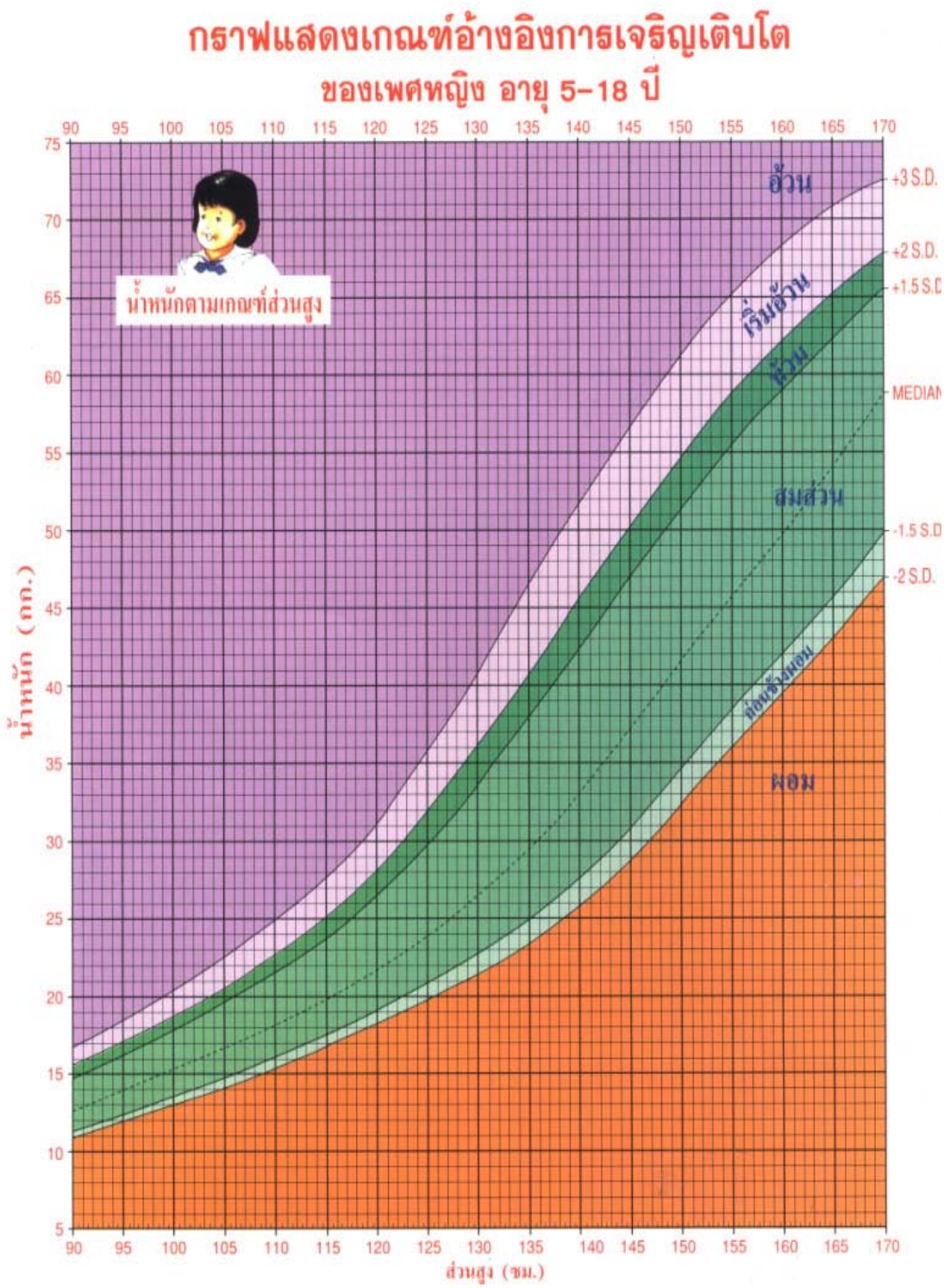
Showed standard growth charts of Thai children for boys




Source: “Standard growth chart weight for height of Thai children,” *Ministry of Public Health of Thailand*, 2000.

**Figure 2.3**

Showed standard growth charts of Thai children for girls



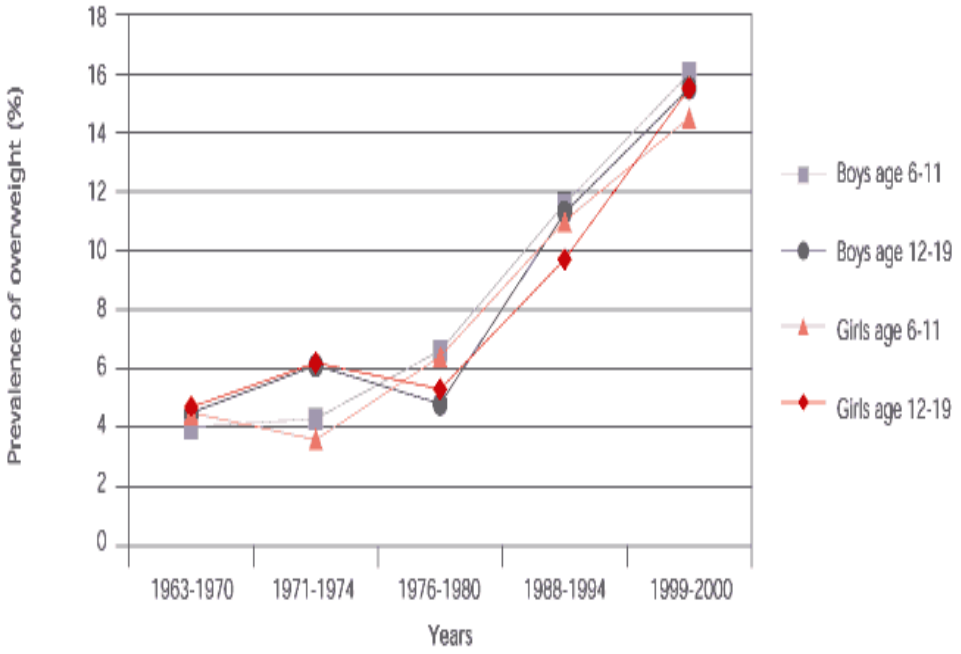

Source: "Standard growth chart weight for height of Thai children," *Ministry of Public Health of Thailand*, 2000.

**Prevalence of obesity**

The prevalence of overweight and at-risk status among children and adolescents had rapidly increased over the past 40 years. Figure 2.4 demonstrated prevalence estimates for overweight in persons six to 19 years of age had tripled since the 1960s (CDC, 2000; Ogden et al., 2002).

**Figure 2.4**

Prevalence of overweight among children and adolescents six to 19 years of age




Source; "Prevention and Treatment of Overweight in Children and Adolescents", Angela Fowler-Brown and Leila C. Kahwati, *American Academy of Family Physicians*, 2004, 69(11).

Childhood obesity was rapidly increasing worldwide. During the past three decades, the number of overweight children in the Unites States had more than doubled. In 1983, 18.6 percent of preschool children in the United States were defined as overweight, and 8.5 percent were defined as obese; by 2000, 22.0 percent of preschool children were overweight and 10.0 percent were obese (Deckelbaum&Williams, 2001). Data from the National Longitudinal Survey of Youth indicated that the prevalence of overweight had increased by 21.5 percent

among non-Hispanic black children, 21.8 percent among Hispanic children, and 12.3 percent among non-Hispanic white children (Strauss&Pollock, 2001). In 1999 – 2000, the prevalence of obesity among children and adolescent were 15.5%, 15.3%, and 10.4% among 12 – 19, 6 – 11, and 2 - 5 years olds, respectively (Ogden et al., 2002). In 1999 -2002, prevalence of obesity in children aged 6 – 19 years and adults were 16.0% and 30.4%, respectively (Hedley et al., 2004). Moreover, the prevalence of obesity (BMI $\geq$ 30 kg/m$^2$) in adults increased from 12.0 % in 1991 to 17.9% in 1998, and in 2001 was 20.9% compared with 19.8% in 2000, and increased of 5.6% in only one year (Mokdad et al., 1999, 2001, 2003).

In 2003, the data from Health Survey for England (HSE 2003) presented the prevalent of obesity both children aged 2-15 years and adults. The prevalence of obesity among children was 22% in boys and 18% girls of non-white ethic groups, respectively. In adult, the prevalence of obesity (BMI $\geq$ 30 kg/m$^2$) among men was 22.0% and 23% among women, respectively (Zaninotto et al., 2006).

In Canada, the prevalence of adult obesity increased from approximately 11% in 1972 to 24% (age-adjusted) in 2005. The prevalent of obesity among children and adolescents increased from approximately 3% among boys and girls in 1978/79 to 8% in 2004 based on international BMI cut-off points (Mokdad et al., 2006).

In Japan, the frequency of obese children increased from approximately 5% in 1974 to 10% in 1995. Moreover; 32% of the obese boys and 41% of the obese girls grow into obese adults (Kotani et al., 1997).

In Thailand, The prevalence of childhood obesity over 97th percentile for weight-for-height was 22.7% in urban and 7.4% in rural areas (Sakamoto et al., 2001). The data from Health Research Network presented the prevalence of obesity of 342 schools in 2005. The prevalent of obesity among school pupils was 12% and the prevalent of obesity in boys more than girls. In addition; the prevalent of obesity in Bangkok was 15.5% (ลัดดา เหมาะสุวรรณ, 2548). Similarly; a longitudinal study in Thailand showed that the prevalence of overweight at Grade7 of boys and girls were 13.6% and 9.9% and the prevalence of boys and girls at Grade 12 were 14.0% and 10.4%, respectively. The prevalence of obesity in the first year in school in boys and girls were 26.8% and 13.5%, and prevalence in Grade 12 were 15% and 10.8%,

respectively (Jirapinyo et al., 2005(a)). In 2008, a cross-sectional study in Phutthamonthon districts, Nakhon pathom showed that the prevalence of obesity among the sample was 8.7%, fat was 6.04% and slightly fat was 5.65% (Nguyen et al., 2008).

**Obesity and Health problem**

The impact of adolescent overweight extends into adulthood. Adolescents who were overweight had an increased risk of morbidity from coronary artery disease and arthritis in adulthood, independent of their weight as adults (Must et al., 1992), and were more likely to be overweight as adults. Obesity in adulthood was perhaps the most serious of all consequences because it was associated with increased mortality and morbidity from a variety of conditions such as cardiovascular disease (Berke&Morden, 2000; Field et al., 2001; Haslam&James, 2005; Moran R., 1999; Sahakitrungruang, 2007; รังสรรค์ ตั้งตรงจิตร, 2550 ; ลัดดา เหมาะสุวรรณ, 2548; อุมาพร สุทัศน์วรวุฒิ, 2548). Overweight in adolescence also was associated with adverse social and economic consequences in adulthood (Gortmaker et al., 1993).

**Obesity and quality of life**

The impact of obesity on overall daily functioning and quality of life was best measured by general health perceptions using several HRQOL domains, including general health, physical, social, and emotional functioning, and vitality. Individuals with obesity uniformly perceived their general health as poorer than do healthy-weight individuals (Kolotkin et al., 1995). Moreover, a continuum had been observed between mildly, moderately, and severely (morbidly) obese individuals and worsening perceived health status. Schwimmer et al. administered PedsQL$^{TM}$ questionnaire to 106 children and adolescents between ages of 5 and 18 years seeking academic children's hospital for evaluation of obesity. Compared with healthy children and adolescents, obese children and adolescents reported significantly lower health-related quality of life in all domains (Schwimmer et al., 2003). Swallen et al.

administered PedsQL$^{TM}$ questionnaire to 4,743 adolescent grades 7 to 12 during 1994 – 1995 school year. Adolescents who were overweight had significantly worse self-reported health (Swallen et al., 2005). A cross-sectional data collected in 2000 within the Health of Young Victorians study from Australia, Williams et al. found that parent-proxy and child self report PedsQL scores decreased with increasing child weight (Williams et al., 2005).

**Prevention and Treatment obesity**

Because environmental and developmental factors played important roles in the development of obesity in genetically susceptible individuals, the provider and parents should play critical roles in obesity prevention. In addition, the best way to significantly affect the prevalence of obesity was to prevent it. Therefore, the issue of obesity should be addressed during every well-child examination. Parents should know that both bottle- and breast-fed infants could be overfed, although overfeeding was more common in infants fed by bottle. Parents should be taught to respect their child's appetite and to understand that it was not necessary for an infant to finish every bottle. Breast feeding and delaying the introduction of solid foods might decrease the risk of future weight problems. Food should not be used for non-nutritive purposes such as comfort or reward. Children should not be offered sweets as a reward for finishing a meal, as this teaches them to place a higher value on dessert foods and might make desserts more desirable to them. Family meals should be oriented toward a healthy diet with 30 percent or less of calories derived from fat. Parents should limit the amount of television that the child is allowed to watch and should encourage active play in its place. Table 2.3 lists tips for parents that can be provided during routine well-child visits (Moran R., 1999).

**Table 2.3**

Preventing Obesity: Tips for Parents

| |
|---|
| • Respect your child's appetite: children do not need to finish every bottle or meal. |
| • Avoid pre-prepared and sugared foods when possible. |
| • Limit the amount of high-calorie foods kept in the home. |
| • Provide a healthy diet, with 30 percent or fewer calories derived from fat. |
| • Provide ample fiber in the child's diet. |
| • Skim milk may safely replace whole milk at 2 years of age. |
| • Do not provide food for comfort or as a reward. |
| • Do not offer sweets in exchange for a finished meal. |
| • Limit amount of television viewing. |
| • Encourage active play. |
| • Establish regular family activities such as walks, ball games and other outdoor activities. |

Source: "Evaluation and Treatment of Childhood Obesity," by Rebecca Moran, 1999, *American Academy of Family Physicians*, 59(4).

Computers and technology were prominent parts of the educational and work environment in many fields, reducing physical activity in daily life. Nevertheless, several specific areas of lifestyle could be useful for obesity prevention and could be controlled by the family. The provider should be an important role in identifying these lifestyle targets and supporting healthy lifestyle habits for all families in their practice. The recommendations were appropriated whether or not a child or family is at risk for obesity. Table 2.4 outlines some important targets for anticipatory guidance to prevent obesity (Hoppin, 2005).

**Table 2.4**

Universal anticipatory guidance for obesity prevention

| Age Group | Lifestyle Targets |
|---|---|
| Pregnancy | Advocate good nutrition (sufficient protein, moderate maternal weight gain)<br>Advocate good glycemic control (gestational diabetes)<br>Encourage plans for breastfeeding |
| Infants | Encourage sustained breastfeeding (> 3-6 months)<br>Discourage early introduction of solid foods (emphasize vegetables)<br>Goal: moderate rates of weight gain, including in low-birthweight infants (throughout childhood). Rapid catch-up growth may be detrimental |
| Toddlers | Nutritional:<br>Continue to broaden diet, emphasize vegetables, fruits<br>Minimize intake of juice and other sweetened beverages<br>Physical Activity:<br>Establish habits of physical activity (playground, outdoor time)<br>Establish healthy television habits (< 1 hour/day; not at meals, minimize number of televisions in household)<br>Behavioral:<br>Emphasize family-based meals, avoid cooking special meals for kids<br>Do not use food as a reward or punishment<br>Do not encourage eating beyond satiety (no "clean plate club")<br>Provide parental modeling of healthy diet (emphasizing vegetables), physical activity, and minimal television viewing<br>Offer positive reinforcement for healthy choices, avoid criticism |
| School-age children | All of the above plus:<br>Physical activity:<br>Investigate local opportunities for adding organized sports to lifestyle (town programs, YMCA, school). Goal: at least 1 structured activity every season.<br>Offer options, including individual sports if team sports not practical or enjoyed by child (martial arts, dance)<br>Participate in physical activities with children: recreational sports, outdoor play, walking, or bicycling |

| **Age Group** | **Lifestyle Targets** (Continues) |
|---|---|
| | Behavioral:<br>Support healthy body image, emphasizing strength and health rather than weight and appearance |
| Adolescents | Watch out for and discourage:<br>Nutritional:<br>Excessive take-out or restaurant meals<br>Meal skipping or inadequate meals (which often lead to out-of control eating later in the day)<br>"Grazing" rather than meal-based eating habits<br>Withdrawing from sports or other physical activity |

When a child did developing to obese, a serious attempt to treat it should be undertaken. Table 2.5 lists the components of a successful treatment plan.

**Table 2.5**

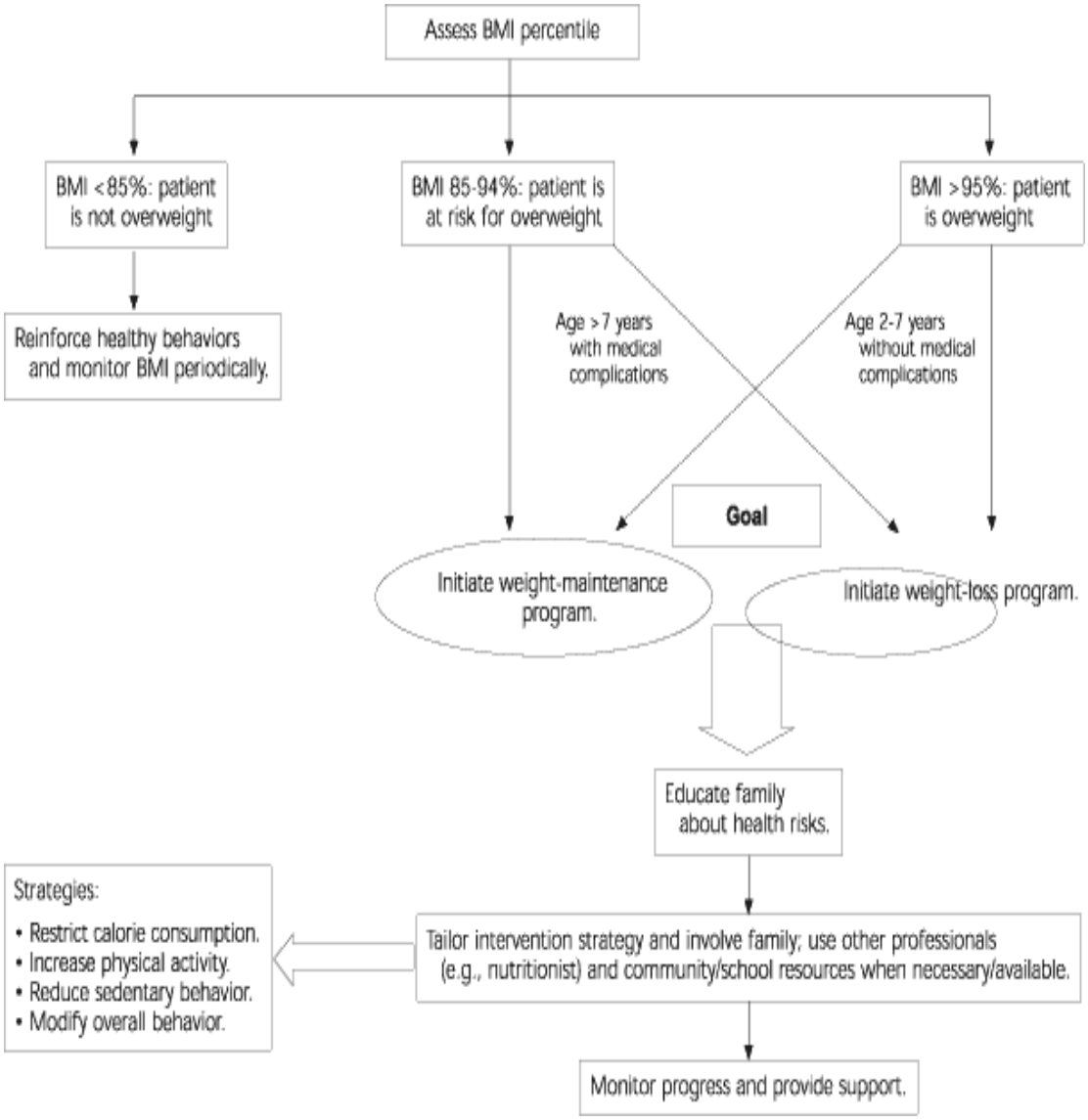
Components of a Successful Weight Loss Plan

| **Component** | **Comment** |
|---|---|
| Reasonable weight-loss goal | Initially, 5 to 10 lb, or a rate of 1 to 4 lb per month. |
| Dietary management | Provide dietary prescription specifying total number of calories per day and recommended percentage of calories from fat, protein and carbohydrates. |
| Physical activity | Begin according to child's fitness level, with ultimate goal of 20 to 30 minutes per day (in addition to any school activity). |
| Behavior modification | Self-monitoring, nutritional education, stimulus control, modification of eating habits, physical activity, attitude change, reinforcements and rewards. |
| Family involvement | Review family activity and television viewing patterns; involve parents in nutrition counseling. |

To address the problem of overweight, experts recommended that physicians determined the BMI for all children and adolescents in their practices and offer appropriated interventions to those who were overweight or at risk for overweight showed in Fig. 2.5, which were algorithm for assessing and managing overweight in children and adolescents (Barlow et al., 1998).

**Figure 2.5**

Assessment and management of overweight in children and adolescents




Source; "Prevention and Treatment of Overweight in Children and Adolescents", Angela Fowler-Brown and Leila C. Kahwati, *American Academy of Family Physicians*, 2004, 69(11).