

Chapter Number

Childhood Obesity: The Need for Practice Based Solutions – A South African Perspective

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1. Introduction

Obesity is a complex problem with no simple solutions. In the quest to find possible solutions for this growing problem among children, literature has already indicated a gap between evidence-based research and practice-based intervention (Robert Wood Johnson Foundation, 2008). This chapter will provide a focus on childhood obesity in South Africa, and will discuss the extent of this problem within the complex context of the South African demographics. It often happens that when researchers have published the results of intervention studies or clinical trials, they may walk away totally satisfied with positive and promising results. The challenge however, remains to translate these research results for practitioners to be used as “tools” in addressing the existing problem. This chapter, therefore, intends to deal with practice-based solutions and recommendations suggesting some strategies in this part of the world.

In order to understand the problem of childhood obesity better in the context of this country (South Africa) it is important to shortly review the socio-economic conditions that currently prevail in this part of the continent as demographic background information.

2. Demographic background

Human growth and development do not take place in a biological vacuum, but in an environmental context where several factors, including genetic potential can affect the development of the child (Cameron, 2005). It is also proved that many so called “developing countries” around the world, of which South Africa is one, at present, are undergoing epidemiological transition (Goedecke et al., 2006). This process is associated with some typical health risks, not only for the adult population, but also for children (Cameron, 2005). Although South Africa is a country with high potential, and many efforts are made to improve the health and well-being of the people living here, many challenges exist to the health and optimal development of children growing up in this country. This country with 50 million people is described as a developing and middle-income country with high socio-economic disparities (46.3% low socio-economic, 53.7% in middle to high socio-economic) (Zere & McIntyre, 2003), where more than 14 million people were beneficiaries of income support in 2010 and 24.8% were living below the food poverty line in 2008 (Millenium Development Goals, Country Report, 2010). Statistics show that 40% (18.3 million) of the South African population are 18 years and younger. African children accounted for 84% of

1 the total child population, while white (5%) coloured (9%) and Indian (2%) children
2 comprise the rest (South African Child Gauge, 2008/2009). In 2007, two thirds of these
3 children lived in income poverty and about 40% in a household where no adult is
4 employed.

5 Another health burden is HIV, the epidemic that affects health, livelihoods, economic
6 growth, demographic futures, as well as impacting on the lives of individuals, families and
7 workplaces (Millenium Development Goals, Country Report, 2010). HIV and AIDS have
8 had a significant negative impact on life expectancy in South Africa, and have left many
9 families and children economically vulnerable and often socially stigmatized and continue
10 to leave South Africa with a legacy of young adult deaths. AIDS orphans are socially and
11 economically vulnerable children (South African Child Gauge, 2008/2009). The adult
12 incidence of HIV and AIDS for sub-Saharan Africa was 5.2% compared to a global total
13 incidence of 0.8% in 2008. The proportion of HIV positive babies in 2009-2010 was 9.4% and
14 statistics further show that the HIV prevalence among pregnant women aged 15- 24 years is
15 22.8%, with an overall national transmission rate of 11% of HIV to babies born to HIV-
16 infected mothers. HIV is also associated with other life threatening conditions, with
17 tuberculosis being the most common opportunistic infection, with rates exceeding 70%
18 (Millenium Development Goals, 2010). All of the above contribute to South Africa having a
19 high <5 years child mortality rate that is reported to be still much higher than the set target
20 for South Africa by 2015. It is, therefore, not strange that the main priorities of this country
21 are to alleviate poverty and improve primary health care among children in an effort to
22 decrease early childhood mortality.

23 **3. Obesity – A health burden**

24 Recent statistics obtained by the National Health and Nutrition Examination Survey in
25 the USA indicate 21.5% overweight and 10.4% obesity among 2-5 year olds (Ogden et al.,
26 2010a), while increasing tendencies are also reported in this age group in Europe and
27 Australia (Baur, 2001; Maffei et al., 2006; Apfelbacher, 2008; Cretikos et al., 2008). Even
28 bigger increases are reported in developing countries such as Thailand (WHO, 2010) and
29 Chili (Kain et al., 2002). Although this disease is not life threatening during the
30 childhood years, and mainly the result of lifestyle related habits, it is prevalent among
31 affluent and less affluent families and has lifelong consequences with an increasing
32 burden on the healthcare system of a country as the child grows older. This growing
33 epidemic of childhood obesity can, therefore, not be ignored in the health care focus of
34 any country. The Medical Research Council of South Africa (Steyn, 2007) reported that
35 health services spend 8 billion rand per annum involving direct and indirect costs
36 resulting from lifestyle related diseases such as heart disease and stroke (Steyn, 2007).
37 Pienaar (2009) argues that disease prevention is as important as the treatment thereof
38 and should receive high priority in the country. This researcher recommends that
39 strategies should be put in place to prevent diseases from a very young age as research
40 indicates that exposure to health risks due to physical inactivity, which is one of the
41 main causes of childhood obesity, already start in childhood, although the consequences
42 or clinical symptoms may only occur in mid- to later life when the individual reaches the
43 clinical horizon (Rowland, 1990). Kruger et al. (2005) also highlight that obesity needs to
44 be viewed as a disease in its own right and one that warrants intervention even when co-
45 morbidities are not present.

1 Furthermore recent data in the USA, where the national obesity rates have tripled among
2 children and adolescents over the last 30 years, suggest that obesity is now responsible for
3 more disability and activity limitations than smoking. As a direct result of this obesity
4 epidemic, doctors are noticing a significant rise in chronic illnesses among children. Obese
5 children are also more than twice as likely to develop type 2 diabetes than children of
6 normal weight (CDPH, 2010). In California, cost attributable to physical inactivity, obesity
7 and overweight in 2006 was estimated at \$41.2 billion. This suggests, however, that a 5%
8 improvement in each risk factor could result in annual savings of nearly \$2.4 billion (CDPH,
9 2010). This burden is also indicated in many other countries around the world, viz: Australia
10 and UK. In South Africa it is estimated that 30% of ischaemic heart disease, 27% of colon
11 cancer, 22% of ischaemic stroke and 20% of type 2 diabetes were attributable to physical
12 inactivity (Joubert et al., 2007). Thus, considering the major burden/health concern of
13 obesity in child and adulthood as well as the complex co-morbidities originated from
14 obesity, it is imperative that more focus should be directed on the developing child to
15 reinforce healthy lifestyles in order to reduce the burden of non-communicable diseases of
16 adulthood.

17 Kruger et al. (2005) indicated that obesity prevention initiatives should be focused on
18 children to ensure the adoption of a healthy lifestyle from an early age. The challenge to deal
19 with this epidemic should, therefore, rather be to prevent it, highlighting childhood as a
20 critical developmental phase. It is agreed that besides genetic predisposition, lifestyle habits
21 are determined in the first years of a child's life. During this critical phase of human
22 development some developmental "windows of opportunity" occur (Gabbard 1998). When
23 optimal stimulation is not received during these critical periods, the opportunity passes,
24 leaving the individual in many cases with some developmental restrictions. Intervention
25 later in life can improve the situation but the individual may never reach his/her optimal
26 potential in the specific area. The words of the previous Surgeon General of the USA, Dr.
27 Everette Koop, sum up this situation viz. (1996): *"Everything we have ever done in health
28 education, as good as it might be, always has one fault: It's too late."*, again emphasizing that the
29 period of childhood is a critical phase on which to focus.

30 **4. Prevalence of childhood obesity in South Africa**

31 A worldwide increase in childhood obesity is reported, including in South Africa. Kruger et
32 al. (2005) reported in this regard that earlier South African studies (1996-1998) showed a
33 prevalence of about 10% of overweight and obesity among children in this country. More
34 recent statistics indicate higher incidences that are similar to that of developing countries a
35 decade ago (Steyn et al., 2005; Armstrong et al., 2006). Differences are also reported between
36 urban and rural environments, indicating that urbanisation plays a role in the prevalence of
37 obesity, while ethnic and gender differences are also evident from reported statistics.

38 The results of a nationally representative study ("National Food Health Consumption
39 Survey" (Labadarios, 1999) of 1-9 year old children indicated that 6.7% of them were
40 overweight and 3.7% were obese. When international BMI standards as proposed by Cole et
41 al. (2000) were applied to these results, 17.1% of the children were classified as overweight
42 and obese (Steyn et al., 2005). Another comprehensive study among 6 and 13 year old
43 children and also based on the same cut-off values indicates a prevalence of 14% and 3.2% of
44 overweight and obesity among boys, while 17.9% and 4.9% of girls were overweight and
45 obese respectively (Armstrong et al., 2006). Statistics in a regional representative sample of

1 7-year old children in one of the nine provinces of South Africa, the North West Province,
2 indicates an overweight and obesity prevalence of 11.64 % (overweight =7.84%; obesity
3 =3.80%) (Kemp et al., 2011), with significant differences between gender and children
4 growing up in different socio-economic environments. The prevalence of obesity is reported
5 to vary between rural and non-rural communities (Monyeki et al., 1999) with higher
6 percentages reported in the non-rural areas. Monyeki et al. (1999) reported the prevalence of
7 overweight in 3 to 10 year old children in disadvantaged communities in the Limpopo
8 Province as low (0% - 2.5% and 0% - 4.3% among boys and girls respectively) while Steyn et
9 al. (2005) reported the highest prevalence of overweight (20.1%) in urban areas and the
10 lowest in farming communities.

11 Studies on overweight and obesity among boys and girls show a gradual increase as girls
12 get older, with significant differences between genders. Statistics on 10-12 year old girls
13 living in the North West Province of SA, indicating 16.52% to be overweight and 4.93% to be
14 obese (Pienaar et al., 2007). The "International Obesity Task Force" reported that 25% of all
15 SA girls in the 13-19 year age group are overweight, compared to 7% of boys (Somers et al.,
16 2006). Somers et al. (2006) further indicated that overweight among 10-16 year old girls
17 (21.1%) was significantly higher than among boys (8.4%), with no significant differences
18 with regard to obesity. A possible explanation is that girls are more prone to overweight and
19 obesity, especially before the onset of the growth spurt at about 10-years of age and after
20 menarche has commenced (Armstrong et al., 2006).

21 Differences are also reported between ethnic groups and those living in different socio-
22 economic conditions (McVeigh et al., 2004 & Armstrong et al., 2006). These researchers
23 reported that White boys and girls showed the highest BMI values, although after the age
24 of 11 years, black girls presented with the highest BMI values. The incidence of
25 overweight and obesity among Black girls increased from 12% at the age of 6-years to 22%
26 at the age of 13-years, while a decreasing trend from 25% to 15% was found among White
27 girls. The "South African Youth Risk Behaviour" study reported the incidence of
28 overweight and obesity among Black, White and Indian girls in the 13-19 year old group
29 as 30%, 34% en 41% respectively (Steyn, 2005). Pienaar et al. (2007) found ethnical
30 differences in a representative sample of 10-12 year old girls living in the North West
31 Province of South Africa, where White girls showed the highest percentage of overweight
32 (21.28%), followed by Indian (17.39%), Black (15.81%) and Coloured girls (9.10%). Indian
33 girls showed the highest prevalence of obesity (8.7%) followed by White (8.51%) and
34 Black girls (4.35%), with no obesity found among coloured girls in this age group. Somers
35 et al. (2006) investigated the prevalence of overweight and obesity among 10-16 year old
36 children in rural environments in the Western Cape Province of South Africa, and found
37 that 15.7% of the children were overweight and 6.2% obese. The prevalence of overweight
38 was also much higher among Black children (21.8%) than Coloured children (13.7%), with
39 similar trend regarding obesity in the two ethnic groups (5.8% versus 6%). Black girls
40 showed the highest percentage (30.8%) of overweight especially in the 16-year old
41 children.

42 **5. Causes of childhood obesity in South Africa**

43 The problem of childhood obesity is very complex in this country due to some historical,
44 socio-economic and other circumstances. Kruger et al. (2005) suggested that various socio-
45 economic and cultural factors may contribute to the obesity epidemic in South Africa. It is,

1 therefore, not limited to a specific ethnic, age or socio-economic group, indicating that
2 cultural, environment and genetic factors should also be taken into consideration when
3 causes of childhood obesity are analysed. Further some of the major factors that may be
4 relevant in this regard will be outlined briefly.

5 **5.1 Poverty**

6 Obesity in the general population is much more likely to result from excess calories
7 consumption and sedentary lifestyle than from any other factors (Kimm, 2004). Most
8 commonly, obesity (overnutrition) leads to an accelerated growth rate and tall stature
9 during childhood with early achievement of normal adult height. Poverty and
10 unemployment on the other hand, generally result in poor levels of nutrition, increased
11 levels of food insecurity and incidences of malnutrition (Millenium Development Goals,
12 2010). A reasonable proxy for income poverty and hunger is child under-nutrition. It is
13 reported that 2.7 million children live in households that reported child hunger (South
14 African Child Gauge, 2008/2009). The underweight-for-age incidence rate (a weight less
15 than 60% of estimated 'normal' weight-for-age) is generally higher than the severe
16 malnutrition incidence rates of a country. Severe malnutrition is reported to average over
17 the period 2001 to 2010 to be between 4.4% and 13.3% for the <5 year old in the different
18 provinces of South Africa (District Health Information System in the Department of Health).
19 These poor levels of nutrition contribute to growth deficiencies such as stunting (retarded
20 growth) and wasting (low weight-for- age). In this regard the Barker hypotheses implicates
21 the fetal in-utero environment as a significant determinant of risk for major chronic diseases
22 such as cardiovascular disease, hypertension, type 2 diabetes and obesity, later in life
23 (Kimm, 2004). In a study done on a Fillipino group of children, low birth weight was
24 associated with higher blood pressure and heavier bodyweight during adolescence (Kimm,
25 2004). Small stature associated with obesity during child and adulthood can, however, result
26 from a diverse set of conditions (Kimm, 2004). These include being born small for
27 gestational age, postnatal malnutrition, hormone abnormalities such as deficiencies of
28 growth hormone or thyroid hormone, late effects after childhood, cancer, certain
29 medications, and genetic syndromes. Common features of growth disorders in the context
30 of obesity include limited growth hormone or thyroid hormone or their action, or limited
31 sensitivity to insulin. Abnormalities of leptin and newly identified appetite-regulating
32 peptides may also lead to poor growth and overweight. Popkin et al. (1996) were the first to
33 highlight that the prevalence of childhood obesity was greater in children who were stunted
34 in communities undergoing nutritional transition. In this regard Naude et al. (2008) reported
35 higher BMI, fat percentages and intra-abdominal fat storage among stunted children
36 compared to non-stunted children in South Africa. From the previous discussion it is
37 obvious that children born under these difficult conditions suffer a high risk of stunting
38 during infancy, and that growth retardation during early childhood is associated with
39 significant dysfunctional improvement during adulthood (Cameron, 2005) including obesity
40 (Popkin et al., 1996). This phenomenon was also supported by a study of Ravelli et al. (1976)
41 on the importance of adequate nutrition during the prenatal period in children born under
42 famine conditions. The most famous of these was the "Dutch Hunger Winter" beginning in
43 October 1944 when food suppliers to the Dutch cities were reduced due to German
44 occupation of the Western Netherlands (Cameron, 2005). During this time the average per
45 capita daily ratio of approximately 1800 kcal/day dropped to 600kcal/day. In the follow-up

1 study of Ravelli et al. (1976) it was indicated that in men (Dutch military conscripts) exposed
2 to famine in the first two trimesters of pregnancy, the prevalence of obesity was
3 dramatically increased compared to those exposed to famine in the third trimester or post-
4 nately. A possible mechanism underpinning this phenomenon is not yet well established
5 but may be linked to the so-called “intra-uterine programming” (Cameron, 2005). Following
6 birth this programming caused them to respond adversely to changes in lifestyle that may
7 result in obesity in later life (Cameron, 2005).

8 Other indicators of overweight and obesity are mothers that smoke and the absence of
9 breastfeeding (Burke, 2006). To minimize mother-to-baby transmission of the HIV virus,
10 breastfeeding practices are not recommended among HIV positive mothers. A link was also
11 confirmed between low educational level and a higher BMI in a group of economically
12 active South Africans representing four different ethnic groups in the country (Senekal et al.,
13 2003).

14 **5.2 Urbanisation and diet**

15 Kruger et al. (2005) reported that the obesity epidemic in South Africa reflects globalization
16 which is the primary driving mechanism towards nutritional transition. These researchers
17 indicated that more freedom of movement of especially the black population and an
18 increase in exposure to the global market economy led to a shift from traditional foods, low
19 in fat and rich in fibre, towards meat and dairy products containing high levels of saturated
20 fats and more highly refined foods. Globalization may, therefore, increase the risk amongst
21 the urban population by creating an environment which is conducive to the consumption of
22 food rich in fat and sugar (Bourne et al., 2002; MacIntyre et al., 2002). Urbanisation is also
23 linked to a higher income which contributes to a higher fat intake and an increase in
24 sedentary behaviour (Kain et al., 2004; Van der Merwe, 2004). It is further indicated that in
25 townships and among street vendors, cheap fatty meat and snacks and few fruit and
26 vegetables are sold (Kruger et al., 2005).

27 **5.3 Cultural differences**

28 The diverse culture of the 4 major ethnic groups in South Africa (Asian, black, coloured and
29 whites/Caucasian) contributes to deepen the complexity of the problem. Kruger et al. (2005)
30 indicate that culture shapes eating habits. In some cultures social gatherings encourage
31 overeating and certain foods (luxurious foods rich in fat and energy) are associated with
32 social status and become more acceptable among urban South Africans. In some of the
33 groups, overweight (and obesity) reflects the “good” life viz, wealth, good standing,
34 attractiveness and absence of HIV/AIDS, which is associated with respect, dignity and
35 affluence, therefore, a bigger body size is more acceptable (Senekal et al., 2001; Puoane &
36 Hughes, 2005). In this scenario a paradigm shift is necessary to convince individuals about
37 the health consequences of obesity and overweight.

38 **5.4 Sedentary behaviour and physical inactivity**

39 Sedentary behaviour is identified as one of the most important contributing factors of
40 childhood obesity (Steyn, 2005). Dodd (2007) reported that the increased prevalence among
41 children can mainly be attributed to a decrease in energy expenditure and increased
42 sedentary behaviour. Although South Africa has high percentages of children living in poor

1 socio-economic circumstances, 53.7% are brought up in middle to high socio-economic
2 conditions (Zere & McIntyre, 2003). Children growing up in such households are more
3 likely to participate in passive pastimes such as TV watching and computer games.
4 Television viewing of more than 3 hours per day and the absence of Physical Education in
5 SA schools are reported to contribute to more sedentary behaviour and obesity among
6 school going children (Medical Research Council, 2002). In addition, Van der Merwe (2004)
7 indicated that 40% of all advertisement during TV programmes for children, is about food
8 products with a high fat and or suger content, which encourage a higher energy intake.
9 Trends have also changed where in most households, both parents are working and
10 children have to stay at daycare centres or in after-school programmes, which restrict them
11 to participate in after school activity programmes (Pienaar, 2009). High crime rates, unsafe
12 environments and stranger fear is a reality in South Africa with a profound effect on
13 children moving freely and unrestricted around and playing outside (Bourne et al., 2002;
14 Sabin et al., 2004). This contributes to parents being afraid of using public transport which
15 decreases walking and bicycling activities among children.

16 In South Africa 17% of primary school children and 29% of secondary school children have
17 to travel more than 30 minutes to reach the school nearest to them. Many children in low
18 socio-economic situations have to walk to school by necessity, and benefit from this activity,
19 but this is associated with hardship and when such children have an option later in their
20 life, they will choose easier options to commute, contributing to a more sedentary lifestyle
21 (Lennox et al., 2007). Very high percentages of TV watching (especially watching soap
22 operas) is also reported among adolescents living in poor socio-economic circumstances,
23 especially girls. This behaviour provides an easy escape from their daily reality, but
24 contributes to sedentary lifestyles (Lennox et al., 2007). This trend is similar in America
25 which indicates the highest percentages of obesity among children living in poor socio-
26 economic conditions (Ogden et al., 2010b).

27 **5.5 Familial obesity**

28 Studies indicate that parental overweight and obesity are the biggest risk factor for
29 overweight and obesity among children (Van der Merwe, 2004). The “American Academy of
30 Child and Adolescent Psychiatry” indicates that when both parents are obese, the risk for
31 the child to be also obese is 80%, and 50% when one parent is obese (AACAP, 2010). This
32 relationship is also reported to be higher with the mother (Padez et al., 2005). The cultural
33 perception of overweight and obesity as acceptable, make this factor an important
34 contributing factor to overweight in this country.

35 **6. Evidence-based practice to intervention-based practice**

36 This part will focus on a summary of research findings regarding the success of different
37 intervention strategies and the knowledge that practitioners can gain from these results in
38 order to treat childhood obesity more effectively. Successful strategies, barriers and
39 challenges will be further identified in the treatment process of childhood obesity.

40 Before commencing with this discussion it is, however, important to provide a
41 conceptualization of the health paradigms. In order to understand the roles of various
42 health disciplines in illness, health and well-being, and to understand how the treatment of
43 childhood obesity and the manifestations of this condition fits into the illness/well-being

continuum and health paradigm, it is important to discuss the illness/well-being continuum briefly and its position in the various health paradigms viz. the pathogenic and fortogenic paradigm. This will provide the reader with a better understanding of where practitioners that treat childhood obesity are positioned in this health paradigm and of the specialized training and skills that such practitioners need to treat this condition effectively.

6.1 The health paradigms – A conceptualisation

The World Health Organisation (WHO) already postulated a definition of health in 1947 indicating that “Health is a condition of optimal physical, psychological and social well-being and not merely the absence of disease”. From this definition it is clear that illness and well-being focus on two different entities in the individual’s health and well-being. This is clearly illustrated in the illness/well-being continuum as illustrated by Robbins et al. (1991)(Fig 1.).

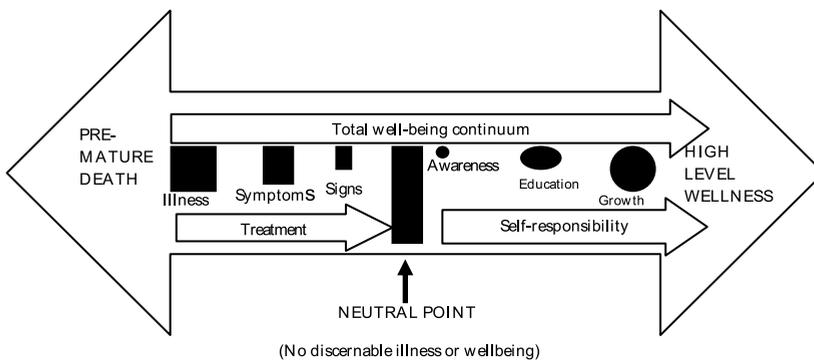
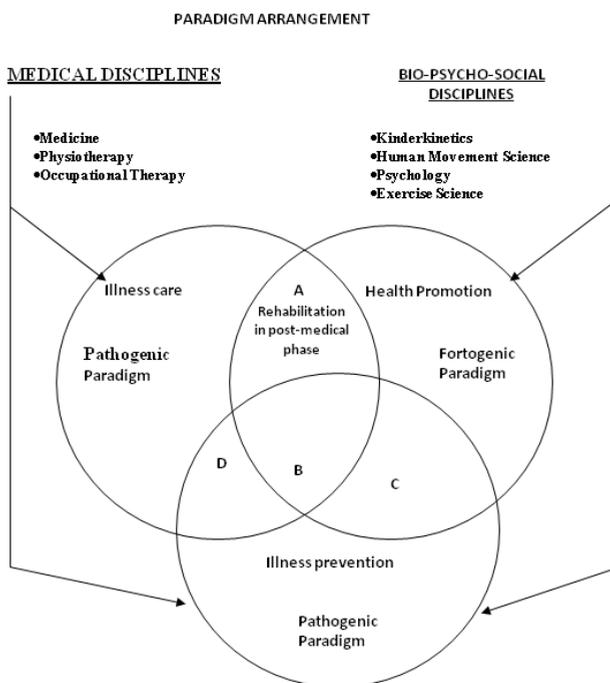


Fig. 1. The illness/well being continuum (Robbins et al., 1991)

In the past the responsibility for the individual’s health was solely the responsibility of the doctor. When any signs, symptoms and illness occurred the patient went to the doctor for medical attention in order to treat the signs/symptoms and to restore life to the neutral point where no signs of the illness are noticeable. However, in this scenario no effort is being made from the patient’s side to improve his own health and well-being by embracing a healthy lifestyle such as healthy eating habits and regular exercise.

To combat the problem of obesity among children, the primary focus should be on the right hand side of the continuum (Fig. 1). This comprises of providing the child with the necessary developmentally appropriate motor skills and creating an understanding of healthy behaviour and convert the knowledge and behaviour into effective strategies for health enhancement (Crawford, 2008), hereby educating the child and allowing him/her to grow to eventually accept self-responsibility for his/her own well-being. It is in this respect that Dr Koop, former Surgeon General of the USA, suggested that this health and well-being “message” should reach the very young child in order to develop healthy lifestyle habits. It is, therefore, clear that the main focus of a profession dealing with childhood obesity should fall on the right hand side of the continuum, which is focused on health promotion and, therefore, primarily can be described in the fortogenic paradigm which seeks “strong” (healthy) points to be enhanced (‘Forte’ means ‘strong’). To understand the role of paediatric exercise science in the various health paradigms, the following conceptualisation (Fig. 2) may be useful.



1
2 Fig. 2. The role of kinderkinetics in the various health paradigms (Adapted from Strydom et
3 al., 2009)

4 In Fig. 2, the three constructs regarding health, viz, *illness care*, *illness prevention* and *health*
5 *promotion* are arranged into the two paradigms namely the pathogenic and fortogenic
6 paradigm. In the concept “*illness care*” it is suggested that a pathology is already present and
7 the main focus is to cure the problem. In the case of *illness prevention* no pathology existed,
8 only the threat of a pathology is present (immunisation against a certain illness such as polio
9 is a typical example). In both constructs, because pathology forms the main focus of the
10 treatment, the traditional health care professionals such as doctors, nurses and
11 physiotherapists may be mainly responsible for treatment. In the *health promotion* construct
12 no pathology or threat is present, and the aim is purely to improve health and well-being.
13 This construct falls exclusively within the fortogenic paradigm where the aim is primarily to
14 improve health and well-being by taking self-responsibility. As stated earlier the primary
15 focus of Kinderkinetics falls in this paradigm. However, it is important to understand that
16 the application of this discipline is also relevant in the pathogenic paradigm where the
17 actions may be more of therapeutic value indicated by areas that overlap (Fig 2).

18 Area A (Fig 2) would, therefore, suggest the rehabilitation or improvement of a pre-diagnosed
19 condition. A child suffering from type 1 diabetes mellitus (which is associated with obesity) is
20 a typical example in this scenario. While the pathology is medically treated and managed by
21 the traditional health care professionals, the young child is motivated to participate in
22 scientifically designed exercise programmes, tailored for his/her developmental needs, taking
23 into account the barriers imposed on the child by the specific pathological condition. By
24 participating in physical activity the pathology (type 1 diabetes) will not be totally cured but

1 the benefits of exercise for this condition are already well described. It may also motivates the
2 child to lead a physically active life into adulthood, preventing various health threats
3 associated with a sedentary lifestyle (hypokinetic diseases) and strive to improve quality of
4 life. It may also be during this phase when the young child is introduced to physical activity
5 that the perception that the illness which is present (diabetes) need not be an ordeal but that
6 the child may lead a 'normal' and productive life and that it is his/her responsibility to follow
7 the necessary precautions to manage the disability. In many cases the perception of the child
8 being a "disabled" as a result of the illness is a major obstacle for the parents to overcome, as
9 they tend to be overprotective of such a child. Participating in a specialized environment and
10 in programmes conducted by specialised trained health professionals, the parents may have
11 peace of mind that the person who is working with the child is adequately trained.

12 Area B (Fig. 2) suggests a situation where the child may suffer from a pre-diagnosed
13 condition that may be positively affected by physical activity so that it may lead to a
14 possible improvement of the condition. An example here is the obese child. An increase in
15 physical activity may improve the condition and also lead to improvement of the child's
16 well-being. In Area C no pathology is currently present but the threat existed, which may
17 lead to health consequences if the problem is ignored. An example in this case is the clumsy
18 child. If such children are not exposed to activity provided by a trained professional who
19 can assess their developmental barriers and can treat them effectively by equipping them
20 with appropriate motor skills, a love for activity and an understanding of the importance of
21 an active lifestyle, the clumsy child may continue to withdraw himself from movement and
22 physical activity, eventually suffering from various hypokinetic diseases later in life.

23 **6.2 Evidence-based intervention: Successes, challenges and principles**

24 **6.2.1 Successes**

25 In this section the outcomes of different obesity intervention studies on children with regard to
26 the nature, the extent, the successes and the challenges will be discussed briefly, after which
27 important principles that can guide the intervention process will be highlighted. Campbell et al.
28 (2001) reported a research environment that is still void of current statistical power to set clear
29 guidelines for the prevention of obesity across a variety of risk groups. Obesity prevention is,
30 however, recommended as the best strategy in the combatting of obesity among children (Bosch
31 et al., 2004; Boon & Clydesdale, 2005), although in reality this strategy is not always possible.

32 The literature describes obesity treatment in prevention or curative settings, and as treatment
33 based on singular (physical activity, diet or behaviour modification) or multi-component
34 aspects (combinations of the aforementioned three components). Furthermore, studies report
35 the results of childhood obesity treatment in clinical, family or school based settings.

36 A systematic review of 7 studies (4 shorter and 3 over a longer period) by Campbell et al.
37 (2001) and 28 studies by Connelly et al. (2007) (11 successful, 17 unsuccessful) indicated
38 mixed success rates. However, it was concluded by Connolly et al. (2007) that the factor that
39 contributed most to the effectiveness of the treatment was compulsory physical activity with
40 a moderate to high intensity. An overview by Jerum and Melnyk (2001) of randomised
41 controlled studies that focused on the prevention of childhood obesity indicated that health
42 workers such as doctors and nurses should play a more prominent role in the prevention of
43 obesity and that multi-component treatments are more successful than single component
44 treatment. The importance of parent involvement is also highlighted over the whole spectrum
45 of obesity intervention (Jerum & Melnyk, 2001; Golan et al., 2006).

1 It seems that multi-disciplinary interventions that include physical activity, diet and
2 behaviour modification, contributed to better results in comparison to studies that only
3 focused on singular aspects. School-based programmes are found to be effective in
4 combatting obesity by increasing the physical activity levels of the children and improving
5 healthy eating habits. It can, therefore, be concluded that physical activity plays an
6 important role in the prevention and treatment of overweight and obesity and the the type
7 of treatment as well as the intensity and duration of the activity are very important.

8 The treatment of established obesity is, however, more complex and needs more intensive
9 treatment. Clinical intervention based on a multi-disciplinary approach seems to be
10 succesful (Eliakim et al., 2002; Nemene et al., 2005; Sacher et al., 2005; Korsten-Reck et al.,
11 2005; Dreimane, et al., 2007; Eneli et al., 2008; Knöpfli et al., 2008; Weigel et al., 2008). It is
12 also reported that interventions are more successful when the child is motivated to lose
13 weight (Boon & Clydesdale, 2005), and that interventions on obese children with concerned
14 parents are more successful than for instance school-based multi-disciplinary interventions
15 where children sometimes are not even aware of the fact that they have a weight problem.
16 Studies indicated that at least 12 weeks and a frequency of 3-5 times per week are required
17 to provoke positive effects. Most studies use weight loss as a precursor of the success of the
18 treatment. However, it is reported that obesity intervention has more advantages than only
19 a positive change in body composition. An overall decrease of the metabolic syndrome was
20 for instance reported among 10 to 17-year old children with a mean body fat percentage of
21 37.5%, after an intensive 2-week in-patient intervention in which no changes were found in
22 the body fat percentage (Chen et al., 2006). A literature review by Eneli et al. (2008) showed
23 similar results with only a small change in BMI, although improvements were seen in the
24 lipid profile, blood pressure and insulin resistance.

25 **6.2.2 Challenges**

26 Obesity treatment requires considerable lifestyle related modifications which has to be
27 sustainable in order to be successful. The sustainability of the effects of childhood obesity
28 treatment is however reported as poor. The maintenance of the effects after the treatment
29 phase is therefor a major challenge to overcome (Crawford, 2008). It often happens that
30 when a controlled treatment ends, which is usually in the form of research, children are
31 expected to follow a home programme by themselves. A main challenge for obese children
32 is then to stay committed to make time to participate in the prescribed regular daily physical
33 activity of moderate to high intensity level for at least 30 minutes, on their own, and
34 sometimes in an unsympathetic environment. In addition, their expectations and setting of
35 realistic goals are usually unrealistic, and because of this they can easily become frustrated.
36 A possible reason for this might be that children younger than 12 years are still in the pre-
37 operational and concrete mental-operations stages of cognitive development as described by
38 Piaget (Sherrill, 2004). This implies less mature stages of thinking and reasoning without
39 abstract thought. With regard to health behaviour, Crawford (2008) states that children in
40 these stages of cognitive development will experience barriers to plan for the future because
41 they cannot form mental images of the positive and negative consequences of certain health
42 behaviours. These reasoning skills are in turn, needed to assume a more internal locus of
43 control regarding their own personal health management choices. Children thus require
44 different techniques to get them to take responsibility for their health. In addition they also
45 tend to be more extrinsically motivated in general and it is not clear when they shift to a

1 more internal motivation with regard to health goals (Crawford, 2008). As obese children
2 are often negative towards participation in physical activities, this is a major challenge to
3 overcome because of the importance of physical activity in their treatment. The content of
4 the physical activity program should therefore be scientifically grounded but delivered in
5 such a manner that the child will associate movement with enjoyment in order for this part
6 of their treatment to provide enough external motivation to them to persist with it. Without
7 a positive attitude towards participation in physical activity, it will be hard to motivate
8 obese children to increase their activity levels and to stay active.

9 Furthermore, obese children with co-morbidities are at risk for contra-indications and
10 should not participate in unsupervised physical activity programmes with high intensities
11 which is required for weight loss. In addition, the development of age appropriate motor
12 skills, strength, fitness and proper body posture are important goals in the treatment of
13 obese children in order to equip them with the necessary motor repertoire based on their
14 developmental level and abilities to be able to participate in sports programmes and
15 recreational activities with their peers. They should therefore be assessed and a programme
16 should be described to them based upon this assessment which is tailored to their specific
17 needs. It is therefore imperative that the health care professional should have a thorough
18 scientific background and understanding of the obese child regarding the physical,
19 emotional, cognitive and physiological barriers these children have to deal with and which
20 they have to overcome in order for an intervention to be sustainable and to contribute to
21 permanent lifestyle changes. In this regard high levels of social support (network of family,
22 friends, health professionals and community resources by providing appropriate
23 information and encouragement) and self efficacy are indicated to be important predictors
24 in adherence (Crawford, 2008).

25 **6.2.3 Principles of prevention programmes**

26 Kruger et al. (2005) provide important recommendations and discussed various principles
27 for the treatment of obesity in South Africa. However, the applicability of some of the
28 recommendations will be more challenging and will need some adaptations to be effective
29 when applied to children. They reported that at the first WHO Expert Consultation on
30 Obesity, the development and implementation of effective obesity prevention strategies
31 were identified as an immediate action priority. To guide this process, these researchers
32 indicated that South African researchers and health workers should take note of the
33 proposed principles upon which obesity prevention should be based. These principles will
34 be used as a guide in the discussion of the way forward.

- 35 1. Interventions should focus on education and address environmental and social factors
36 to promote and support behaviour change.
- 37 2. Increased physical activity.
- 38 3. Sustainability of programmes is crucial to ensure positive change in diet, activity and
39 obesity levels over time.
- 40 4. Political support, inter-sectoral collaboration and community participation are essential
41 for success.
- 42 5. Local actions within the context of national initiatives allow programmes to meet needs,
43 expectations and opportunities.
- 44 6. All parts of the population must be reached.
- 45 7. Programmes must be adequately resourced.

8. Integration of new programmes within existing initiatives.
9. Programme planning should be evidence-based.
10. Programmes should be properly monitored, evaluated and documented to ensure dissemination and transfer of experience.

Kruger et al. (2005) also report that the US Institutes of Medicine suggested three levels of prevention to ensure the correct focus for obesity prevention which include:

1. *Universal prevention* interventions, focused on everyone in an eligible population irrespective of their current level of risk. This may be family-based, school-based, work site-based or community-wide. Secondly, *selective prevention* interventions, focusing on the prevention of obesity in selected high-risk groups, based on known biological, psychological or social/ cultural risk factors, which will focus on the development of lifetime behavioural patterns that will prevent obesity, and thirdly, *targeted prevention* that focuses on individuals who are overweight and aims to prevent weight gain, as well as the development of co-morbidities.

Different modes of delivery of prevention programmes are also reported by Kruger et al. (2005). These include:

1. *Do-it-yourself in self-initiated or group settings*. This self-help programmes are seen as low-intensity, cheaper intervention methods, associated with better longer term compliance but poorer weight loss outcomes than higher-intensity methods.
2. *Non-clinical programmes* provided to individuals/groups by trained professionals, not necessarily registered healthcare professionals. Information on diet, exercise and behaviour modification is provided at regular meetings. These programmes are popular and often commercially franchised.
3. *Clinical programmes* provided by registered healthcare professionals with specialized training in weight management. These could involve a consultation with a dietician, medical doctor or a multi-disciplinary team.

Kruger et al. (2005) finally stressed that all obesity treatment programmes should aim to empower individuals/groups to take responsibility for making permanent lifestyle changes towards healthy dietary intake and physical activity through behaviour modification, and recommend the inclusion of the following essential components in such programmes.

Component	Description/guidelines
Reasonable weight goals Healthful eating component	Individualised, realistic, maintainable, contribute to general well-being. Based on the 2004 South African food-based dietary guidelines. Limiting energy, fat and alcohol intakes.
Physical activity component	Accumulate 45–60 min of moderate-to-vigorous activity on most days – accumulating 10 min here and there is acceptable. Increased physical activity of daily living, fitness and recreational activity, strength and flexibility exercises.
Behavioural and psychological component	Long-term lifestyle (dietary and physical activity) changes; self-concept, body image, stress management, communication and environment management, cognitive behavioural skills necessary to bring about change. To ensure success the 'stage of change' of the individual/ target group needs to be considered.

1 For effective implementation of the above treatment principles among children, specific
2 recommendations should, however, be *added* with regard to the *weight goals and eating habits*
3 and *physical activity components* because children have developmental limitations on different
4 levels. With regard to weight goals and healthy eating patterns, it should be remembered that
5 children's bodies are in a growing phase and that weight loss will not necessarily be the most
6 suitable goal, depending on the extent of the obesity problem. Although individual differences
7 and circumstances should always be taken into consideration, it is suggested that the eating
8 habits and patterns of young children should rather be managed by lifestyle changes which
9 incorporate changing of eating habits rather than they being expected to follow a strict diet.
10 Steyn (2007) reports in this regard the National guidelines of the Department of Health which
11 states that the weight of children aged between 2 and 7 years who have no complications
12 should be maintained, because there will be weight loss as a result of an increase in length. If
13 there are however, complications such as high blood pressure, insulin resistance or
14 orthopaedic problems, weight loss will be necessary. In children over 7 years, weight loss
15 should be started when the BMI of the child' lies above the 95th percentile, or otherwise the
16 international age specific cut-off values for obesity of Cole et al. (2000) can be used as a quick
17 screening method. The AED (2011) also recommends that interventions should aim for the
18 maintenance of individually appropriate weights, that is, that children will continue to grow at
19 their natural rate and follow their own growth curve, underscoring that a healthy weight is not
20 a fixed number but varies for each individual. The South African version of the stoplight
21 (robot) diet is suggested for use among children towards healthier dietary intake (Steyn, 2007).
22 Foods are categorised in this diet in categories of use, in limited, moderate or restricted
23 amounts, and parents and children are asked to keep record of all that is eaten, which makes
24 them aware of the quantity and quality of foods being consumed. The guidelines of the ACSM
25 (2000) for the structuring of obesity programmes are also valuable with regard to the weight
26 and eating management of obese children. This includes a recommendation of maintaining a
27 minimal intake of about 1200 calories per day, and engaging in a daily exercise program that
28 expends 300 or more calories per day. For weight-loss goals, exercise of long duration
29 /moderate intensity is generally considered best (ACSM, 2000). The AED (2011) highlights
30 that weight is not a behaviour and therefore not an appropriate target for behaviour
31 modification in school and community based interventions. They recommend that interventions
32 should be weight-neutral, thus not have specific goals for weight change but aim to increase
33 healthy living at any size. Children across the weight spectrum benefit from limiting time
34 spent watching television and eating a healthy diet. Children therefore need education to
35 understand what realistic goals are with regard to weight management and that they will have
36 to make a commitment to adhere to their goals, also with regard to participating in physical
37 activity.

38 Regarding the guidelines for physical activity component of treatment programmes, the
39 developmental needs of obese children regarding their motor skills development or the lack
40 of it because of their overweight problem, should receive attention. This is a unique
41 requirement of childhood treatment programmes in comparison to adult programmes. The
42 activities included in a programme, therefore, need to focus on increased levels of
43 participation in conjunction with opportunities to enhance basic motor skills that are needed
44 for sport participation or recreational activities. Weight bearing activities which can improve
45 bone health should also be included in the activity programme. Guidelines as suggested by
46 Short et al. (1999) for aerobic functioning among 6-17 year old children can be use as a

1 guideline in determining the intensity level of the physical activity programme of obese
 2 children or with regard to daily physical activity that is expected from them, depending on
 3 their age (Table 1). Parizkova (2005) report in this regard that exercise must be vigorous
 4 enough to impose an adequate training load on the cardiorespiratory system, and stress that
 5 this part of a programme should be adequately monitored.

6 Lastly with regard to the behavioural and psychological component of treatment programs,
 7 the immature cognitive understanding and reasoning skills of children as described earlier,
 8 might influence children's commitment to changes in their personal health management. The
 9 Academy for Eating disorders (2011) recommend that the ideal intervention should be based
 10 on an integrated approach that addresses risk factors for the spectrum of weight-related
 11 problems, including screening for unhealthy weight control behaviours; and promotes
 12 protective behaviours, such as decreasing dieting, increasing balanced nutrition, encouraging
 13 mindful eating, increasing activity, promoting positive body image and decreasing
 14 weight-related teasing and harassment. Behavioural changes that are expected from them
 15 should, therefore, be carefully managed. The AED (2011) also recommend that interventions
 16 should also be created and led by qualified health care providers who acknowledge the
 17 importance of a health focus over a weight focus when targeting lifestyle and weight concerns
 18 in youth. In this regard, the modes of delivery of prevention programmes as suggested by
 19 Kruger et al. (2005), will also be challenging for children because they are mostly based on self-
 20 help programmes and the implementation of knowledge gained from regular meetings.
 21 Delivery of programmes in this way will be challenging for children to comply with or to
 22 understand. Sustainable programmes, especially with regard to physical activity, managed by
 23 a trained health care professional who understands the limitations of children and who can
 24 address it appropriately within a supportive family environment (Steyn 2007), might be the
 25 only workable solutions to address these developmental deficiencies of children.
 26

Group	Frequency	Intensity	Duration
Adolescents (13-17)	3-5 days per week	55-90% HR max (115-180 beats/min) 12-16 RPE 10-15METs	20-60min per day (accumulated: >10 min per bout)
Older children (10-12)	4-7 days per week	55-70% HR max (115-145 beats/min) 12-13 RPE 5-7METs	30-60+min per day (accumulate, intermittent)
Younger children (6-9)	4-7 days per week	De-emphasized; participants is encouraged	30-60min+min per day (accumulate, intermittent)
Adjustments for youngsters with diabetes	No change unless disability can be exacerbated by regular activity	Reduced as a function of fitness level; adjust THRZ for individuals using arms-only activity and for individuals with SCI quadriplegia	Accumulate more intermittent activity or reduce total time if necessary

27 *These values represent moderate physical activity; ideally, this level will be exceeded to vigorous
 28 levels at times.

29 Table 1. Guidelines for developing aerobic functioning

1 Reprinted, by permission, from F.X. Short, J. McCubbin, and G. Frey, 1999,
2 Cardiorespiratory endurance and body composition. In *The Brockport physical fitness training*
3 *guide*, edited by J.P. Winnick and F.X. Short (Champaign, IL: Human Kinetics).

4 **7. Practice-based solutions – The way forward**

5 As described, childhood obesity is a challenging problem to combat especially in a country
6 like South Africa where the health care system is challenged with numerous complexities.
7 From the above discussion it is clear that it is important to intervene at a young age in order
8 to establish a healthy lifestyle among children. However, children cannot be treated as mini-
9 adults, because of their developmental needs and limitations on various levels that have to
10 be taken into consideration when addressing this problem. Intervention of childhood
11 obesity (prevention and treatment), therefore, calls for comprehensive and innovative
12 strategies. A few practice-based solutions that are implemented successfully in this country
13 will be discussed in the following section.

14 **7.1 Paediatric exercise science: The development of a new health care profession in** 15 **South Africa**

16 In combating the obesity epidemic among children, an increase in physical activity plays an
17 important role, both in primary and secondary intervention. A real challenge is to provide
18 evidence-based physical activity intervention to children during early childhood (3-12
19 years). For the very young child, a physical activity intervention should be age and
20 developmentally appropriate. Therefore, the professional who administers the intervention
21 during this stage should be thoroughly trained in childhood development and paediatric
22 exercise science. The literature has already indicated a gap between evidence-based research
23 and practice-based intervention (Robert Wood Johnson Foundation, 2008). It is often seen
24 that when researchers have published the results of their intervention studies or clinical
25 trials, they walk away totally satisfied with positive and promising results. The challenge,
26 however, remains for somebody to translate these research results for practitioners to be
27 used as “tools” in addressing the existing problem.

28 The treatment offered should be based on an individual assessment of each child and then
29 tailored to the requirements of the developmental stage and the severity of the problem.
30 This should *i.a* include the following: obtaining a medical and family history, a physical
31 activity profile and information about the eating habits of the child to determine possible
32 reasons for his overweight problem. Situational influences relevant to the health behaviour
33 such as cultural influences should also be taken into consideration. Secondly, his body
34 composition (weight, height, hip and waist-circumferences, skinfolds and BMI), current
35 motor and physical abilities (strength, strength endurance, cardiovascular endurance and
36 flexibility) and basic motor skills needed for sport participation as well as his body posture
37 should be assessed to determine individual goals for treatment. Thirdly, the baseline
38 principles of intervention strategy with regard to frequency, duration, mode of delivery and
39 type of activities should be followed (Parizkova, 2005). Older children may be requested to
40 select preferred sporting activities that can be included as a part of their treatment regime in
41 order to make it more enjoyable for them making them feel part of the decision making
42 process of their treatment. Such a programme should be offered in a controlled and child-
43 friendly environment with considerable support from the health care professional who

1 conducts the programme. The basic and underlying philosophy of treatment in this regard
2 is to expose the young child to physical activity adapted to his/her individual needs while
3 creating a child-friendly atmosphere. In this environment professionally trained individuals
4 have to support and motivate the child to participate and enjoy the prescribed activities
5 within a scientifically based programme. If any health risks associated with obesity such as
6 hypertension or other cardiovascular risks are identified during the initial screening process,
7 such a child should be referred to a medical practitioner who has to clear the child clinically
8 for participation in an exercise programme.

9 This approach calls for a comprehensive strategy managed by an appropriately qualified
10 professional. In South Africa a new field of study has developed over the past 2 decades,
11 seeking to bridge the gap between research and implementation. From this field of study a
12 “new health profession” has emerged, called “Kinderkinetics” – derived from the terms
13 “kinder” as in “children” and “kinesis” as in “movement”. The focus of this profession
14 primarily falls on the field of pediatric exercise science – using exercise/activity as a
15 therapeutic, profilactic and health promotion modality.

16 Students in this profession are trained at 4 South African Universities/tertiary institutions
17 following a 4 year degree integrated with laboratory and practical experience in various
18 centres, which requires hands-on experience in order to obtain professional registration. At
19 present, qualified professionals are registered by a professional body, the South African
20 Professional Institute for Kinderkinetics (SAPIK) to practice as Kinderkineticists. The scope
21 of this discipline falls primarily within the health promotion paradigm (fortogenic),
22 providing scientifically-based exercise programmes to stimulate the young child according
23 to his/her psycho-physical developmental stage in order to obtain optimal development.
24 However, the scope also includes children with pre-diagnosed clinical problems such as
25 obesity, diabetes mellitus, HIV, Down Syndrome and other ailments where children may
26 have special needs and/or barriers regarding their physical activity and motor
27 development, hence overlapping in the pathogenic paradigm.

28 This fairly new discipline (Kinderkinetics) has already gained substantial recognition as
29 a potential health discipline and more than 150 practitioners are already working in this
30 field, ranging from self-employment in private practices to employment in school and
31 pre-school environment. In practice many referrals are received from other health
32 professionals, such as paediatricians, general practitioners, occupational therapists,
33 teachers and parents. The SAPIK is currently in the process of applying for official
34 recognition of this profession from a Statutory Health Professions Council in South
35 Africa in order to ethically legalise referrals from other health practitioners mentioned,
36 as ethical rules of those health professionals prohibit mutual referral and cooperation
37 between registered versus unregistered practitioners. These negotiations with the
38 Statutory Health Professions Council are already in an advance stage and will hopefully
39 be successful.

40 **7.1.1 Applied research**

41 The profession of Kinderkinetics is guided by applied research where the growth and motor
42 development and physical activity of children, as well as interventions to improve
43 shortcomings that are identified in this regard, have already been extensively researched
44 within the field of pediatric exercise science. In this regard obesity among children of
45 different age groups and from different perspectives for a better understanding of the

1 problem have been published. This *ia* include the prevalence of childhood obesity in
2 different age groups (Du Toit & Pienaar, 2003), relationship of childhood obesity with the
3 motor (Du Toit & Pienaar, 2003); fitness, (Truter et al., 2010); psychological (Pienaar &
4 Eggar, 2007; Kemp & Pienaar, 2010), physiological (Kemp & Pienaar, 2010) and academic
5 abilities (Du Toit et al., 2011), as well as relationships of obesity with diagnosed motor
6 delays such as Developmental Coordination Disorder among children (Pienaar et al., 2007).
7 The most recent study that will be published shortly indicates significant relationships
8 between hypertension, overweight and obesity among a representative group of 7-year old
9 children in this country (Kemp et al. 2011, in press).

10 After accumulating all this evidence, the next action taken was the planning of research in
11 which an obesity intervention programme could be developed and assessed. A
12 programme based on the principles of physical activity participation, behaviour
13 modification and dietary guidelines was then compiled and the outcomes evaluated. The
14 energy expenditure of the group was monitored by Actical software in order to determine
15 the effectiveness of the intensity of the physical activity part of the programme, but also to
16 analyse the activity patterns of the children during the week and weekend and to
17 determine possible changes in their activity patterns resulting from the programme. This
18 intervention on 9-12 year old children was conducted over a period of 13 weeks at a
19 frequency of three times per week with a home program and parent meetings regarding
20 school lunch boxes and physical activity guidelines. The physical activity intervention
21 was delivered on two days of the week, while behaviour modification regarding their
22 eating patterns, self perception and physical activity habits was the focus of the third day
23 of the week. Dietary modification by means of empowering the children with knowledge
24 of different foods, healthy eating patterns, improvement of self-perception and goal
25 setting strategies to improve physical activity were addressed through play and activity
26 themes on this day. A home program was provided to them that they had to follow for the
27 two additional days of the week. Significant improvement was found in the children's
28 body composition (body fat percentage) while, waist- and upper arm-circumferences
29 decreased significantly. A non-significant decrease of 2.9 kg was also found in body
30 weight. The self-perception of the group improved significantly as assessed by the Harter
31 Scale (Kemp & Pienaar, 2010). The compliance to the programme decreased when the
32 supervised part ended, again highlighting the need for professional supervision and
33 sustained motivation of children in obesity treatment regimens. This protocol is now
34 implemented as an obese intervention by Kinderkineticists, with specific adjustments
35 with regard to age appropriateness of the level, selection and inclusion of motor activities
36 and the intensity level of physical activities. The treatment programme can also be used
37 effectively for inactive children by only modifying the intensity of the programme, as it
38 incorporates all the necessary fitness components such as strength and strength
39 endurance, cardiovascular endurance, flexibility and the development of basic motor
40 skills needed for sport participation.

41 **7.1.2 Implementation**

42 The need for the expertise, provided by this discipline in this country with its extreme
43 diversity, not only in population and ethnic groupings, but also in socio-economic status, is
44 substantial. Challenges to bring this service to the deep-rural and remote areas of the
45 country still ask for innovative thinking. A first step in childhood obesity treatment will

1 have to be national initiatives acknowledging the severity of the problem, policy support
2 and community engagement on the level of implementation. The training of mid-level
3 professionals, who can assist the Kinderkineticist in the screening and recruiting process
4 and in the sustainability of programmes by supervising and monitoring it is essential. The
5 training of such workers is envisaged as a sub-register that will be part of the professional
6 registration of Kinderkinetics in the future. The training of multi-skilled professionals who
7 can work multi-disciplinary with the Kinderkineticists such as nurses in health care clinics
8 or in the school system or of Life Orientation teachers who can do screening for
9 abnormalities, is also a possibility to ensure early identification and referral of obese
10 children, as well as of other children at-risk for developmental problems.

11 **7.2 Obesity prevention**

12 The important message of obesity prevention by embracing a healthy lifestyle should be
13 echoed through the school system, as most children can be reached through the school
14 curriculum. The AED (2011) recommends that interventions should not be marketed as
15 “obesity prevention”, but rather interventions should be referred to as “health
16 promotion,” as the ultimate goal is the health and well-being of all children, and health
17 encompasses many factors besides weight. Physical education (PE) was, however, phased
18 out of South African schools to make more time available for the “so-called” academic
19 subjects, and with that, teachers with the necessary training to make children aware of the
20 importance of a healthy lifestyle and to provide them with the necessary skills and
21 physical activity, also declined. Since 2010 PE was reinstated in the school curriculum
22 where this message can be portrayed, and screening for overweight can be done with the
23 necessary education or referral for help. Interventions should focus on making children’s
24 environments healthier rather than focusing solely on personal responsibility, which
25 include serving healthy meals, providing opportunities for fun physical activities,
26 implementing a no-teasing policy, and providing students and school staff with
27 educational sessions about body image, media literacy, and weight bias (AED, 2011).
28 However, this is going to be a long process as teachers for this profession have to be
29 trained from scratch and schools have to be equipped with the necessary resources to
30 teach this subject effectively.

31 **7.3 Improved sustainability of obesity intervention**

32 Kruger et al. (2005) report that lifestyle modification as an isolated tool for weight
33 management has a high drop-out rate with less than 5% of patients remaining successful
34 after 5 years. If lifestyle modification is this challenging to adults, young children will
35 need much more encouragement, support and supervision to change their lifestyle
36 because of their poorer cognitive understanding of the consequences of the problem of
37 overweight and hence the lack of self-responsibility and commitment to do something
38 about it. It can, therefore, hardly be expected from overweight and obese children to
39 comply with a treatment programme which includes lifestyle modifications including
40 physical activity, dietary and behaviour modification on different levels, on their own.
41 Health promotion awareness campaigns that urge children to be more active because of
42 the health consequences of physical inactivity will hence not be enough to motivate them
43 to become more active and stay active. Practitioners need to design programmes and
44 apply it in such a way that it is attractive to these children and thereby motivate them to

1 participate as part of their understanding and commitment to a lifestyle change. Obese
2 children are normally not keen to be active for various reasons such as physical
3 discomfort, previous negative experiences, anxiety and a low self-esteem (Parizkova,
4 2005). Obesity treatment also requires many changes on different levels which make it
5 difficult for children to stay motivated while engaging in such programmes, especially the
6 part that requires high levels of physical exertion. All these changes that are required
7 from them, can thus be overwhelming and will require several emotional coping
8 responses from the child to deal with it. Boon and Clydesdale (2005) recommend in this
9 regard that changes should be introduced one at a time because the ability of children to
10 concentrate on one change will then be easier as fewer rules have to be remembered.
11 Continuous support of children by means of re-assessment and the setting of realistic
12 goals is therefore imperative. The younger the child the bigger the challenge will be for
13 results because of their developmental limitations and the higher the need for a ongoing
14 and supervised treatment programme will be. Interventions should also focus on making
15 children's environments healthier rather than focusing solely on personal responsibility
16 (AED, 2011). It is also recommended that obese children should participate in small
17 groups as this is conducive to the need for group activities with peers of a similar size and
18 shape, and provide support and opportunity for social interaction. In so doing such
19 children do not feel isolated or different from their peers as they are matched with
20 children with similar abilities and problems which make it easier to participate in
21 activities that are strenuous.

22 Research experience (Kemp & Pienaar, 2010; Truter et al., 2010) indicate that although many
23 children were identified as obese and invited to participate in an obesity intervention, free of
24 charge, parents were still hesitant to provide permission for their children to benefit from
25 this opportunity. It is understandable that parents want to protect their children from
26 unnecessary labels that could affect their emotional development or self-confidence
27 negatively. Main obstacles are, therefore, the acknowledging of the problem of childhood
28 obesity by parents as well as the urgency to address it, and further to support the child once
29 overweight or obesity is established as a health concern that needs to be addressed. Family
30 involvement on various levels is considered to be critical in the treatment of childhood
31 overweight. Practitioners must remember that when parents provide informed consent for
32 their child to participate in a treatment programme, it should not necessarily be considered
33 as active involvement on the part of the parent. Parental involvement is considered to be
34 critical to influence the home environment (dietary modification) and to monitor and
35 motivate children to comply with programmes and to support them to change their lifestyle
36 behaviour and physical activity modification. It is reported in this regard that if the family is
37 not ready to support the programme, success will be unlikely (Kain et al., 2004; Crawford,
38 2008).

39 The accessibility of facilities where treatment programmes are offered is important for the
40 sustainability of programs. In the USA it is already indicated that clinical options at
41 hospitals are not effective in the challenge of childhood obesity among children living in
42 poor socio-economic environments (California Department of Public Health, 2010). They
43 claimed that the service should rather be delivered in the environment of the child living in
44 lower socio-economic circumstances. Nearby community centres, churches or school yards
45 are recommended as possible venues with mid-level workers who can assist in non-clinical

1 programmes. Health care facilities in remote areas can also be used for basic screening and
2 to provide education and referral help for the parents.

3 Specific knowledge of the target populations and the best way to engage them in change is
4 essential, therefore, specific issues, and social and cultural values (cultural view of ‘ideal
5 body image’) need to be taken into consideration. The question of what will increase the
6 probability of the group to be motivated to participate or comply with changes is essential to
7 be answered in this regard.

8 Awareness campaigns that stress the urgency of dealing with this problem by taking action
9 and the responsibility of the parent in this decision are, therefore, much needed priorities.

10 Kruger et al. (2005) indicated that stakeholders from government (Departments of
11 Education, Health and Safety and Security) need to understand the factors contributing to
12 decreased physical activity among children and the effects of inactivity on health and
13 should initiate programmes to increase physical activity among South Africans, while
14 stakeholders from the health professions, non-government organisations and communities
15 should also become involved in these efforts.

16 **7.4 Community engagement**

17 The majority of children in South Africa live in environments that are not conducive to
18 their health and well-being and it is, therefore, a challenge to reach these children who are
19 in many areas considered at-risk and in need of developmental help. Statistics show that
20 nearly 40% of children live a long distance from their nearest primary health care clinic
21 (South African Child Gauge, 2008/2009). Strategies to improve community engagement
22 for the purpose of primary prevention should, therefore, be implemented. Expanding
23 high quality preventative services in both clinical and community settings are, therefore,
24 important for successful prevention. In this scenario it is anticipated that a qualified
25 practitioner can make a significant contribution as he/she is specifically trained. Mid-
26 level workers that can assist this healthcare professional in providing more basic services
27 for the obese child, and multi-skilled workers such as nurses who can be trained to do
28 basic screening and risk field analysis and to refer the child for help in remote areas is
29 recommended. In this regard it is indicated that in all interventions aimed at preventing
30 and managing overweight and obesity, systematic assessment and evaluation should form
31 a routine procedure. The incorporation of BMI and waist-circumference as part of a risk
32 factor analysis to be used at primary healthcare level may be the first step in the
33 recognition of chronic, non-communicable diseases by the Department of Health (Kruger
34 et al., 2005). Traditional and community leaders should be involved in providing
35 strategies and support. The AED recommend in this regard that representatives of the
36 community should be included in the planning process to ensure that interventions are
37 sensitive to diverse norms, cultural traditions, and practices. Furthermore, clinical
38 training grants should be provided by the government for in-service training and non-
39 governmental initiatives should be seek to obtain resources, to ensure successful service
40 delivery at community level. These also include commitments from the government to
41 making neighborhoods safer, providing access to nutritious foods, constructing sidewalks
42 and bicycle lanes, building safe outside play areas, and encouraging parents to serve
43 regular family meals, create a non-distracting eating environment, and provide more
44 active alternatives to TV viewing (AED, 2011).

8. Conclusion

Pienaar (2009) stated that the 20st century will challenge movement specialists worldwide, to not only provide services and support to children who are diagnosed with serious activity/movement deficiencies and who meet the legal requirements to be classified as disabled, but also to address other individual needs of children that require professional help. Therefore, children who are not identified by government for special assistance, but who have individual needs that require specialized assistance, should also be able to acquire the specialised knowledge of trained health care professionals such as Kinderkineticists in SA. These will include children with poor fitness levels, overweight and obese, insufficient motor development, poor motor skills or individuals with poor functional posture, injuries or specific medical conditions.

Childhood obesity will never be easy to address, but passionate and specialised professionals who understand the level of problems of children who battle with overweight and who can support them on a scientific and professional level in their quest to overcome the problem, may make a considerable contribution to improve the health burden. The need of children in South Africa for this important impetus in their overall development as a human being inspires professionals to keep on convincing government and other officials to take national action, and hopefully to get the necessary policies and resources in place, to ensure the implementation of a scientifically-based service to a very vulnerable population.

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