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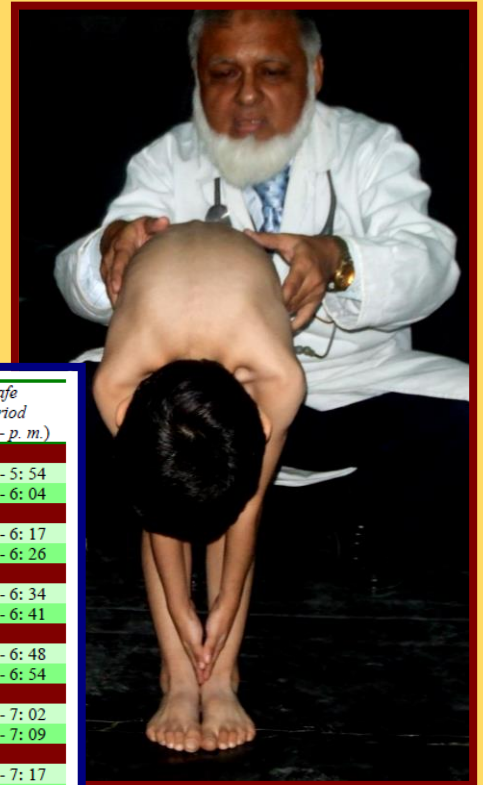
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Association of Balanced Diet and Physical Activity with Fitness of Young Children and their Parents

Fit and active parents should impart healthy habits in their young children, which must continue through the lifespan. This is accomplished through a proper combination of structured physical activity routine and leisure activity, both of them family-centered. Parents and children should be attired appropriately for each of these activities. There is a need for consuming balanced diet in order to be able to fully benefit from physical activity. Families should be educated about eating healthy foods in place of junk items. A mandatory vitamin-D testing in both parents and children is essential so that calcium is properly absorbed in the bones of adults and youngsters, making the proposed diet plans effective.



Date	Safe Period (a. m. - a. m.)	Intermittent Period (a. m. - a. m.)	Prohibited Period (a. m. - p. m.)	Intermittent Period (p. m. - p. m.)	Safe Period (p. m. - p. m.)
JANUARY					
01	7: 17 - 8: 20	8: 21 - 9: 24	9: 25 - 3: 46	3: 47 - 4: 50	4: 51 - 5: 54
15	7: 19 - 8: 23	8: 24 - 9: 28	9: 29 - 3: 54	3: 55 - 4: 59	5: 00 - 6: 04
FEBRUARY					
01	7: 15 - 8: 21	8: 22 - 9: 28	9: 29 - 4: 03	4: 04 - 5: 10	5: 11 - 6: 17
15	7: 07 - 8: 15	8: 16 - 9: 24	9: 25 - 4: 08	4: 09 - 5: 17	5: 18 - 6: 26
MARCH					
01	6: 55 - 8: 11	8: 12 - 9: 28	9: 29 - 4: 00	4: 01 - 5: 17	5: 18 - 6: 34
15	6: 41 - 7: 53	7: 54 - 9: 06	9: 07 - 4: 15	4: 16 - 5: 28	5: 29 - 6: 41
APRIL					
01	6: 24 - 7: 38	7: 39 - 8: 53	8: 54 - 4: 18	4: 19 - 5: 33	5: 34 - 6: 48
15	6: 10 - 7: 26	7: 27 - 8: 43	8: 44 - 4: 20	4: 21 - 5: 37	5: 38 - 6: 54
MAY					
01	5: 56 - 7: 15	7: 16 - 8: 35	8: 36 - 4: 22	4: 23 - 5: 42	5: 43 - 7: 02
15	5: 48 - 7: 08	7: 09 - 8: 29	8: 30 - 4: 27	4: 28 - 5: 48	5: 49 - 7: 09
JUNE					
01	5: 42 - 7: 06	7: 07 - 8: 31	8: 32 - 4: 17	4: 18 - 5: 52	5: 53 - 7: 17
15	5: 41 - 7: 03	7: 04 - 8: 26	8: 27 - 4: 37	4: 38 - 6: 00	6: 01 - 7: 23
JULY					
01	5: 45 - 7: 07	7: 08 - 8: 30	8: 31 - 4: 40	4: 41 - 6: 03	6: 04 - 7: 26
15	5: 51 - 7: 12	7: 13 - 8: 34	8: 35 - 4: 41	4: 42 - 6: 03	6: 04 - 7: 25
AUGUST					
01	5: 59 - 7: 19	7: 20 - 8: 40	8: 41 - 4: 35	4: 36 - 5: 56	5: 57 - 7: 17
15	6: 06 - 7: 24	7: 25 - 8: 43	8: 44 - 4: 29	4: 30 - 5: 48	5: 49 - 7: 07
SEPTEMBER					
01	6: 12 - 7: 28	7: 29 - 8: 45	8: 46 - 4: 18	4: 19 - 5: 35	5: 36 - 6: 52
15	6: 18 - 7: 32	7: 33 - 8: 47	8: 48 - 4: 07	4: 08 - 5: 22	5: 23 - 6: 37
OCTOBER					
01	6: 24 - 7: 36	7: 37 - 8: 49	8: 50 - 4: 54	4: 55 - 5: 07	5: 08 - 6: 20
15	6: 29 - 7: 39	7: 40 - 8: 50	8: 51 - 3: 44	3: 45 - 4: 55	4: 56 - 6: 06
NOVEMBER					
01	6: 39 - 7: 46	7: 47 - 8: 54	8: 55 - 3: 36	3: 37 - 4: 44	4: 45 - 5: 52
15	6: 49 - 7: 55	7: 56 - 9: 02	9: 03 - 3: 30	3: 31 - 4: 37	4: 38 - 5: 44
DECEMBER					
01	7: 00 - 8: 04	8: 05 - 9: 09	9: 10 - 3: 32	3: 33 - 4: 37	4: 38 - 5: 42
15	7: 09 - 8: 13	8: 14 - 9: 18	9: 19 - 3: 35	3: 36 - 4: 40	4: 41 - 5: 45

*Safe- and intermittent-
(guarded and graduated)
sun-exposure duration
← (year-round for Karachi)
during different parts
of the day for boys
and girls under the age
of 7 years*

Young children should be minimally dressed most of the time while at home, during leisure activities and structured exercises as well as in school so that their hair and bodies are exposed to fresh air and sunshine. Guarded-graduated-sun-exposure of skin, a highly efficient and a most effective as well as an inexpensive method of obtaining required doses of vitamin D is recommended to avoid sunburn and skin cancer. Heights and weights of children should be monitored as per international standards.

Syed Arif Kamal and Shahid Ali Khan

ASSOCIATION OF BALANCED DIET AND PHYSICAL ACTIVITY WITH FITNESS OF YOUNG CHILDREN AND THEIR PARENTS

Meritorious Professor Dr. Syed Arif Kamal  and Shahid Ali Khan 

ABSTRACT

This work focuses on the importance of balanced diet and physical fitness for under-7 children as well as their parents. Fit and active parents should impart healthy habits in their young children, which must continue through the lifespan. This is accomplished through a proper combination of structured physical activity routine and leisure activity, both of them family-centered. Parents and children should be attired appropriately for each of these activities. There is a need for consuming balanced diet in order to be able to fully benefit from physical activity. Families should be educated about eating healthy foods in place of junk items. A mandatory vitamin-D testing in both parents and children is essential so that calcium is properly absorbed in the bones of adults and youngsters, making the proposed diet plans effective. Young children should be minimally dressed most of the time while at home, during leisure activities and structured exercises as well as in school so that their hair and bodies are exposed to fresh air and sunshine. Guarded-graduated-sun-exposure of skin, a highly efficient and a most effective as well as an inexpensive method of obtaining required doses of vitamin D is recommended to avoid sunburn and skin cancer. This paper gives safe- and intermittent-sun-exposure timings for children in the city of Karachi, Pakistan for each month during the entire year. These time durations are computed from astronomical data. Heights and weights of children should be monitored as per international standards on a half-yearly basis to generate monthly height and weight targets based on Growth-and-Obesity Vector-Roadmap 2.1. This should be part of periodic psychological and physical examinations combined with fitness testing. Parents' obesity should be tracked based on Obesity Roadmap 2.1. Such an exercise should, not only, ensure a healthy development, but also, alert the health-care provider to discover cases of severe stunting, excessive wasting and acute malnutrition as well as pseudo-gains of height and mass in young children.

Keywords: family-centered activities, lifestyle adjustment, exercise plans, diet plans, leisure activities, guarded-graduated-sun exposure, growth-and-obesity monitoring

Units

cm: centimeter(s) • ft: foot (feet) • g: gram(s) • in: inch(es) • IU: International Unit (in the context of vitamin-D dosage) • kg: kilogram(s) • l: liter(s) • lb: pound(s) • m: meter(s) • µg: microgram(s) • ml: milliliter(s) • ng: nanogram(s) • oz: ounce(s)

Conversion Factors

1 kg = 10^3 g = 2.205 lb • 1 g = 10^6 µg = 10^9 ng • 1 lb = 16 oz • 1 m = 10^2 cm • 1 ft = 12 in • 1 in = 2.54 cm • 1 l = 10^3 ml • 1 IU = 0.025 µg (of cholecalciferol or ergocalciferol)

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INTRODUCTION

In this paper the authors elaborate the importance of healthy and balanced diet combined with structured physical activities as well as leisure activities for fitness of the entire family. A healthy mind exists in a healthy body, which is capable of creative thinking and critical analysis. This is to be accomplished if the family receives adequate doses of vitamin D through guarded-graduated sun-exposure as well as sun-ripe vegetables and fruits. Regular height and weight monitoring of children as well as weight monitoring of parents is recommended so that monthly targets to achieve certain height and corresponding optimal weight be generated. This paper includes lifestyle adjustment, diet and exercise plans for parents as well as their young children.

PHYSICAL ACTIVITY

There is a need to establish a program of family-centered physical and leisure activities — structured activities in the domains of developing gross and fine motor coordination (*e. g.*, gymnastics), building cardiac endurance (*e. g.*, brisk walking, jogging, running) as well as leisure activities providing light entertainment (*e. g.*, walking, biking, table tennis), which should be reinforced for the young children in school-physical-education programs. This should provide a sound background for life-span physical activity (Siedentop, 2003).

Parents influence physical-activity behavior in their young children through example and practice (Trost & Loprinzi, 2011). By the very nature, children engage in active play, which may be channelized in structured activities (Houser *et al.*, 2016; Mendes *et al.*, 2018). Tandon *et al.* (2012) studied relationships of environment at home with youngsters' sedentary time and screen time as well as physical activity. Silvea *et al.* (2018) concluded in their study that attending physical education sessions is linked to an advanced degree of physical activity and a lesser degree of sedentary behavior during days in school among students from regions at different levels of development. This is a recognized fact that active parents make their children active (Rodrigues *et al.*, 2018). Deniz & Oguzöncül (2019) conducted a study on 1278 pupils in the Akçadağ district of Malatya, Turkey, to determine obesity prevalence among school students of primary and secondary classes. They found out that in the childhood age group, sedentary lifestyle had a significant effect on obesity. Angeles-Agdeppa & Arias (2020) in their study of under-5 infants and children concluded that stunting was the only factor, which predicted overweight and obesity among youngsters. Combination of stunting and obesity is termed as EC II (Energy-Channelization II), proposed for the first time 6-year ago (Kamal *et al.*, 2014), further subdivided in O-EC II (Obesity dominated Energy-Channelization II) and S-EC II (Stunting dominated Energy-Channelization II), 2-year ago (Kamal *et al.*, 2018).

Parents as well as their young children should be properly attired for such activities (Tirloni & Moro, 2010). Parents should change into proper gym kit for structured activities. Leisure activities could be performed in normal clothing, which is not restricting body movement. In the hot and the humid climate of Pakistan, physical-activity clothing for children should neither be loose enough so that the clothing gets tangled into apparatus, furniture or installations, coming over face, while performing headstands (no loose strings, straps or zippers), nor so much form-fitting at the waist as well as around thighs, prohibiting limbs to move freely as well as itching or rise in

Table-1: Recommended hairstyle, footwear and clothing for various activities at home as well as gender-segregated training sessions in school/sport club[¶] (for children under the age of 7 years) – gymnastics attire adapted from Kamal & Khan (2015)

Setting	Boys	Girls
I. GYMNASTICS		
A. Hairstyle		
Indoors	Very short hair	Long hair, to be tied in the form of (hair) bun [®]
Outdoors [£]	Very short hair	Long hair, to be tied in the form of (hair) bun
B. Footwear		
Indoors	Barefoot	Barefoot
Outdoors	Pure-cotton socks ^³ + sneakers (plimsolls) [¢]	Pure-cotton socks + sneakers
C. Clothing		
Boys should be wearing athletic supporter under briefs		
Indoors	Briefs only, stripped-to-waist [§]	Panties (Knickers) only, stripped-to-waist
Outdoors	Briefs only, stripped-to-waist	Panties only, stripped-to-waist
During colder weather, extra clothing (coats, sweaters) for warm-up and cool-down activities		
II. JOGGING/RUNNING/CYCLING		
A. Hairstyle		
Indoors	Very short hair	Long hair left open [@] , only held by hairband
Outdoors	Very short hair	Long hair left open, only held by hairband
B. Footwear		
Indoors	Pure-cotton socks + sneakers	Pure-cotton socks + sneakers
Outdoors	Pure-cotton socks + sneakers	Pure-cotton socks + sneakers
C. Clothing		
Boys should be wearing athletic supporter under briefs		
Indoors	Gym shorts with briefs, stripped-to-waist	Gym shorts with panties, stripped-to-waist
Outdoors	Gym shorts with briefs, stripped-to-waist	Gym shorts with panties, stripped-to-waist
During colder weather, extra clothing (coats, sweaters) for warm-up and cool-down activities		
III. WALKING/SMALL-AREA GAMES/TABLE TENNIS/BADMINTON/TENNIS		
A. Hairstyle		
Indoors	Very short hair	Long hair left open, only held by hairband
Outdoors	Very short hair	Long hair left open, only held by hairband
B. Footwear		
Indoors	Pure-cotton socks + sneakers	Pure-cotton socks + sneakers
Outdoors	Pure-cotton socks + sneakers	Pure-cotton socks + sneakers
C. Clothing		
Boys should be wearing athletic supporter under briefs		
Indoors	Dress shorts with briefs, stripped-to-waist	Miniskirt with panties, stripped-to-waist
Outdoors	Dress shorts with briefs, stripped-to-waist	Miniskirt with panties, stripped-to-waist
During colder weather, extra clothing (coats, sweaters) for warm-up and cool-down activities		

[¶]home (indoor playroom and secluded backyard) as well as gender-segregated training sessions (restricted audience setting — only the instructor and the health team, consisting of doctor, physiotherapist, psychologist, psychiatrist, nurse and medical researcher, are allowed to be present or remotely watch through one-way screen or video monitors) in school/sport club (indoor gymnasium and secluded open spaces)

[®]pony may be used to tie hair in this fashion, leaving upper-neck, shoulders and back uncovered from external auditory meatus to hip joint, allowing teacher to observe posture deviations and curvatures of the spinal column

[£]during pleasant weather (neither too hot nor too cold)

^³disinfectant powder must be applied on dry feet before putting on socks

[¢]where barefoot is not possible

[§]allowing body to breathe; disinfectant powder must be applied on dry skin before putting on underwear

[@]allowing hair to breathe

temperature of private parts. This is, also, established that younger children sweat easily. Committee on Sports Medicine of the American Academy of Pediatrics (1982, 2000) suggested, “clothing of exercising child should be light-weight, limited to one layer of absorbent material in order to facilitate evaporation of sweat and *expose as much skin as possible*.” Therefore, it is suggested that under-7 children engage in physical activity while dressed minimally (Kamal & Khan, 2014; 2015). Table-1 lists recommended hairstyle, footwear and clothing for various activities at home as well as gender-segregated training sessions in school/sport club. There are additional benefits, which could be derived from this practice, *e. g.*, parental awareness of obesity or wasting in their children. Watching their own bodies, the children should be motivated to maintain improved body image, proper posture as well as balanced gait. For physical activities and sport, younger boys and girls should be dressed in form-fitting short underpants only, made of absorbent material, all clothing above the waist removed, which should provide opportunity to the parents to observe free movement and unconscious posture.

Children grow rapidly during early childhood. Exercise clothing, which fits the body, purchased at the start of an academic session, gets body-pressing soon, which may block blood flow and restrict motion. Loose kit appears awkward, at the same time posing to be dangerous for activities involving apparatus. For rapidly growing children, gym kit may need to be acquired more than once during a calendar year. This could pose additional economic burden on hand-to-mouth families with a number of school-going children. Money saved from gym kit may be used for purchasing nutritious food and paying sport-activity fees.

Younger children sweat much earlier. Physical-education sessions in pre-schools, schools and sport academies are, generally, of 30-40-*minute* duration. Exercise clothing worn for the complete activity would become wet from sweat, causing infections and irritations of skin as well as tan-lines on arms and shoulders. Doing physical education in underwear allows the body to breathe and makes the child’s skin smooth. While involved in sand, mud and water activities as well as free play, clothing top becomes wet, unclean and soggy, causing youngsters to get chest infections or catch cold.

Increased tactile stimulation, on bare arms, back and legs, assists children to be trained better. A picture in Atkinson *et al.* (1981) depicting image of phone, transformed into pattern of dots and displayed on an unsighted female’s back skin, in the shapes of numerous very little cones, which are oscillating against her back. The projected pattern allowed her to recognize the object by sensing pattern of dots.

Burton (1977) remarks, “If children wear clothing that permits an unlimited range of motion and allows for considerable tactile stimulation, movement experience is enhanced”. Literature search shows that it was a common practice in England (Davies, 1951; 1954; Miller, 1955; Ministry of Education, 1952; 1953; Russell, 1975), Germany (Vendien & Nixon, 1968) and various countries in Europe during twentieth century. Kirchner (1970) mentioned undressing to underwear practice primary (elementary) of United States, “When they (the parents) saw their children changing, but more importantly, the type of activities and (the) learning included in the lessons, no one asked to change the procedure.” Time for changing into PE gear reduced from 12 to 4 *minutes* after employing this protocol.

Japanese think that children, brought up with maximum exposure of body to fresh air in and outside the classroom, are better prepared and possess necessary confidence to cope with peer pressure and bullying. Hence, they are able to face modern-day challenges. Such youngsters are well mentally balanced and generally do not indulge in violent action. In Tokyo (Japan) there is Hikari kindergarten, which is an example of such a lifestyle. Primary-school students of Hikari run through snow dressed only in shorts, unclothed from the waist up. In Moscow (Russia) Nikitin youngsters are, also, reared in this manner.

Table-2: Recommended hairstyle, footwear and clothing for various activities during public-performance sessions[¥] (for children under the age of 7 years) — gymnastics attire adapted from Kamal & Khan (2015)

Setting	Boys	Girls
I. GYMNASTICS		
A. Hairstyle		
Indoors	Very short hair	Long hair, to be tied in the form of (hair) bun
Outdoors	Very short hair	Long hair, to be tied in the form of (hair) bun
B. Footwear		
Indoors	Barefoot	Barefoot
Outdoors	Pure-cotton socks + sneakers	Pure-cotton socks + sneakers
C. Clothing		
Boys should be wearing athletic supporter under briefs		
Indoors	Briefs only, stripped-to-waist [€]	Asymmetric leotard [£]
Outdoors	Briefs only, stripped-to-waist	Asymmetric leotard
During colder weather, extra clothing (coats, sweaters) for warm-up and cool-down activities		
II. JOGGING/RUNNING/BIKING		
A. Hairstyle		
Indoors	Very short hair	Long hair left open, only held by hairband
Outdoors	Very short hair	Long hair left open, only held by hairband
B. Footwear		
Indoors	Pure-cotton socks + sneakers	Pure-cotton socks + sneakers
Outdoors	Pure-cotton socks + sneakers	Pure-cotton socks + sneakers
C. Clothing		
Boys should be wearing athletic supporter under briefs		
Indoors	Gym shorts with briefs, stripped-to-waist	Gym shorts with panties + vest
Outdoors	Gym shorts with briefs, stripped-to-waist	Gym shorts with panties + vest
During colder weather, extra clothing (coats, sweaters) for warm-up and cool-down activities		
III. WALKING/SMALL-AREA GAMES/TABLE TENNIS/BADMINTON/TENNIS		
A. Hairstyle		
Indoors	Very short hair	Long hair left open, only held by hairband
Outdoors	Very short hair	Long hair left open, only held by hairband
B. Footwear		
Indoors	Pure-cotton socks + sneakers	Pure-cotton socks + sneakers
Outdoors	Pure-cotton socks + sneakers	Pure-cotton socks + sneakers
C. Clothing		
Boys should be wearing athletic supporter under briefs		
Indoors	Dress shorts with briefs, stripped-to-waist	Miniskirt with panties + vest
Outdoors	Dress shorts with briefs, stripped-to-waist	Miniskirt with panties + vest
During colder weather, extra clothing (coats, sweaters) for warm-up and cool-down activities		

[¥]may be watched by parents of both genders — this clothing choice, also, suitable for public parks, playgrounds and play areas located in amusement parks as well as fast-food outlets

[€]could wear dress shorts (over briefs) and socks/sneakers, while going to playgrounds and play areas; shorts and socks/sneakers must be removed before entering the play area

[£]baring dominant arm (right arm for the right-handed children and vice versa), no underwear allowed under leotard — could wear miniskirt and socks/sneakers with asymmetric leotard, while going to playgrounds and play areas; miniskirt and socks/sneakers must be removed before entering the play area

ORGANIZED SPORT

Clubs should be established to promote sport activities, which could be enjoyed equally by parents and their young children. Table-2 describes clothing, footwear and hairstyle suggested for performances viewed by parents and general audience, which should be arranged to encourage children to participate in organized sport. Such sessions should be attended by parents as well as leading sport figures from the community. Posture (Kamal *et al.*, 2015) and gait (Kamal *et al.*, 2016) competitions (Ricotti, 2011) as well as target-achievement competitions for height gain and mass management (Kamal *et al.*, 2020) should be integrated in such sessions, with prizes awarded by national celebrities to promote healthy lifestyle in the younger generation (Kamal *et al.*, 2017a). This should boost the morale of children and bring out hidden talent in the future of nation (Côté, 1999).

IMPORTANCE OF SOUND SLEEP

In order to fully concentrate on studies and vigorously participate in physical activities as well as games in school, it is imperative that under-7 children get 8-10 hours of sound and uninterrupted sleep during night in a dimly lit-room away from electronic devices. Spruyt *et al.* (2019) conducted a study on 6- and 7-year-old youngsters and concluded that an organized sleeping routine was essential for optimal attention span. Duration, regularity and midpoint of sleep were important factors for a fresh and cheerful day.

The authors mentioned in an earlier work (Kamal & Khan, 2014) that younger children should sleep in fire-resistant pajama shorts, which are loose-fitting and made of pure cotton, with nothing on above the waist. While in bed, their upper torsos should be covered with sheet or blanket, if sleeping in air-conditioned rooms. Day clothes or underwear should not be worn while retiring. Hair of girls should be opened up and all accessories (hair bands, hair pin, rings, watches, bangles, *etc.*) removed for safety reasons. Pre-sleep rituals should include performing light exercise, getting shower, having a glass of milk and brushing teeth. Parents should talk to children briefly on how the day was spent and plans for the next day combined with reading a story, so that early signs of depression and frustration could be identified. To make the children sleep soundly, a 3-minute slow-stroke back massage should be performed. This increased tactile stimulation has shown to improve quality and quantity (by as much as 36 minutes) of nighttime sleep (Health Smart, 2013).

MONITORING OF HEIGHT AND WEIGHT

To maintain a healthy lifestyle, 6-monthly monitoring of height and weight of young children as well as weight of parents should be made mandatory by employers providing health cover for the dependent children. Throughout the world monitoring of height and weight of children and parents is given due importance. Chen *et al.* (2019) studied 4 different methods of child nurturing — uninvolved, permissive, authoritarian and authoritative. They concluded that authoritative approach for child-rearing ends up with healthier body weight in children. Kia *et al.* (2019) performed decomposition analysis of inequality in malnutrition among under-5 Iranian children based on height and weight data.

To obtain these measurements as per agreed-upon international standards, the first author has prepared manual for anthropometry (Kamal, 2016), step-by-step pro-

Table-3a: Growth-and-Obesity Vector-Roadmap 2.1 of Z. Z. (SGPP-KHI-20180919-01/01)^η

Gender: Female † • Date of Birth^π: 2014-10-03 • Adult-Army-Cut-off Height: 157.48 cm (19.36^P)[§]
 Father's Height: † 185.80 cm • Mother's Height: † 164.30 cm • Target Height: 168.55 cm (78.28^P)

Checkup	1 st
Photograph [©]	
Scanned Signatures [©]	Z.Z. 
Class	KG-2
Date of Checkup (year-month-day)	2019-10-20
Chronological Age (year-month-day)	05-00-17
Chronological Age (decimal year)	5.05
Dress Code	0/0.5 ^φ
Behavior Code ^φ	1 ^φ
Height (cm) ⇐	109.80
Height (ft-in)	3 ft 7.23 in
CDC Percentile-of-Height ⇔	63.79 ^P
Scaled Percentile-of-Height	73.42 ^P
Estimated-Adult Height (cm)	165.74
Estimated-Adult Height (ft-in)	5 ft 5.25 in
Current-Age-Army-Cut-off Height (cm) ⇐	103.77
Δ Height – Current-Age-Army-Cut-off Height (cm)	+6.03
Current-Age-Mid-Parental Height (cm) ⇐	111.93
Δ Height – Current-Age- Mid-Parental Height (cm)	-2.13
Reference Height (cm)	111.93
Percentile-of-Reference-Height	78.28 ^P
Modified Status (pertaining-to-height)	0
Descriptive Status (pertaining-to-height)	Normal
Net Mass (kg) ⇒	17.70
Net Weight (lb-oz)	39 lb 0.46 oz
CDC Percentile-of-Net-Mass ⇔	44.58 ^P
Scaled Percentile-of-Net-Mass	54.88 ^P
Percentile-of-BMI-based-Optimal-Mass ⇔	75.12 ^P
BMI-based-Optimal Mass (kg) ⇒	19.98
Height-Percentile-based-Optimal Mass (kg) ⇒	19.10
Estimated-Adult Mass (kg)	56.98
Estimated-Adult Weight (lb-oz)	125 lb 10.08 oz
Modified Status (pertaining-to-mass)	-7.33%
Descriptive Status (pertaining-to-mass)	1st-Deg Wasted
Away-from-Normality Index	0.0733
Polar Angle (degree)	180 ⁰
Expanded-Nutritional Status	Wasting
Estimated-Adult BMI (kg/m ²)	20.74
Sum of Scaled Percentiles	128.29
Build	Medium

^ηprocedure to generate Growth-and-Obesity Vector-Roadmap 2.1 available in Kamal *et al.* (2018)

^πyear-month-day

[§]the superscript P denotes percentile

[©]dummy photograph inserted in place of actual one for the purpose of publication; camouflaged initials appear instead of scanned signatures to protect privacy of patient

^φ'Dress Code' 0/0.5 implies that the girl was measured wearing panties only, barefoot, with nothing above the waist; 'Behavior Code' 1 means the child was timid and shy, but coöperative (Kamal, 2016)

Table-3b: Month-wise mass and weight target ranges as well as height targets for Z. Z. based on Growth-and-Obesity Vector-Roadmap 2.1

Target Date ^λ	Height Target		Range of Mass (Weight) Target			
	cm	ft-in	kg	lb-oz		
October 20, 2019	109.80	3 ft 7.23 in	17.70	39 lb	0.46 oz	
November 20, 2019	110.48	3 ft 7.50 in	17.93-17.96	39 lb	8.67 oz - 39 lb	9.60 oz
December 20, 2019	111.13	3 ft 7.75 in	18.16-18.21	40 lb	0.64 oz - 40 lb	2.49 oz
January 20, 2020	111.81	3 ft 8.02 in	18.39-18.47	40 lb	8.88 oz - 40 lb	11.68 oz
February 20, 2020	112.49	3 ft 8.29 in	18.63-18.73	41 lb	1.13 oz - 41 lb	4.89 oz
March 20, 2020	113.12	3 ft 8.53 in	18.85-18.98	41 lb	8.86 oz - 41 lb	13.53 oz
April 20, 2020	113.79	3 ft 8.80 in	19.08-19.26	42 lb	11.27 oz - 42 lb	17.56 oz

^λdark green row represents measured values, which are taken as reference to generate 6 monthly recommendations

cedures of obtaining height and weight illustrated through labeled photographs (Kamal, 2017a, Additional File 2) as well as video series on anthropometry (Kamal,

Table-3c: Obesity Roadmaps 2.1 for parents of Z. Z.

Father's Date of Birth: † 1983-06-24 • Mother's Date of Birth: † 1979-11-03

Checkup	Father †	Mother †
Date of Checkup (year-month-day)	2019-10-20	2019-10-20
Chronological Age (year-month-day)	36-03-26	39-11-17
Chronological Age (decimal year)	36.32	39.96
Dress Code	2/2 ^λ	2/2 ^λ
Behavior Code	0 ^λ	0 ^λ
Height (cm) ⇐	185.80	164.30
Height (ft-in)	6 ft 1.15 in	5 ft 4.69 in
CDC Percentile-of-Height ⇔	89.85 ^P	55.51 ^P
Scaled Percentile-of-Height	93.65 ^P	65.80 ^P
Adult-Army-Cut-off Height (cm) ⇐	162.56	157.48
Adult-Army-Cut-off Height (ft-in)	5 ft 4.00 in	5 ft 2.00 in
Percentile-of-Army-Cut-off Height ⇔	2.72 ^P	19.36 ^P
Net Mass (kg) ⇒	96.40	78.70
Net Weight (lb-oz)	212 lb 8.99 oz	173 lb 8.54 oz
CDC Percentile-of-Net-Mass ⇔	95.27 ^P	92.20 ^P
Scaled Percentile-of-Net-Mass	97.15 ^P	95.20 ^P
Percentile-of-BMI-based-Optimal-Mass ⇔	80.72 ^P	71.51 ^P
BMI-based-Optimal Mass (kg) ⇒	82.85	64.79
Corrected-BMI-based-Optimal Mass ^ε (kg)	82.85	69.79
Height-Percentile-based-Optimal Mass (kg) ⇒	88.71	59.90
Corrected-Height-Percentile-based-Optimal Mass ^ε (kg)	88.71	64.90
Modified Status (pertaining-to-mass)	+8.67%	+12.77%
Descriptive Status (pertaining-to-mass)	1st-Deg Obese	2nd-Deg Obese
BMI (kg/m ²)	27.92	29.15
Sum of Scaled Percentiles	190.80	161.00
Build	Big	Big

^λ'Dress Code' 2/2 implies that the parents were measured wearing T-shirt and trousers, barefoot; 'Behavior Code' 0 means they were relaxed and coöperative

^ε5 kg mass is added to mother's BMI-based-optimal mass as well as height-percentile-based-optimal mass to account for possible pregnancy and the associated mass of fetus; no correction needed for father

Table-3d: Month-wise mass and weight target ranges for Z. Z.'s father based on Obesity Roadmap 2.1

Target Date	Father †	
	kg	lb-oz
October 20, 2019	96.40	212 lb 8.99 oz
November 20, 2019	94.70-95.10	208 lb 13.13 oz - 209 lb 10.96 oz
December 20, 2019	93.06-93.83	205 lb 3.20 oz - 206 lb 14.42 oz
January 20, 2020	91.37-92.53	201 lb 7.44 oz - 204 lb 0.47 oz
February 20, 2020	89.68-91.23	197 lb 11.74 oz - 201 lb 2.57 oz
March 20, 2020	88.09-90.01	194 lb 3.89 oz - 198 lb 7.63 oz
April 20, 2020 ^δ	86.40-88.71	190 lb 8.19 oz - 195 lb 9.73 oz

2017b). CDC Growth Tables and Charts for height and weight of boys and girls have been extended to include percentiles from 0.01^P to 99.99^P, so that extreme cases could be handled (Kamal & Jamil, 2014 — Additional File 3). 3-year ago, percentiles were scaled applicable for the Pakistani boys and girls were introduced (Kamal *et al.*, 2017b), since CDC percentiles represented population of United States. These charts could be used to generate Growth-and-Obesity Vector-Roadmaps of youngsters and Obesity Roadmaps of parents (version 2.1), which provide monthly targets for height gain and mass management (Kamal *et al.*, 2018), evolved from the very first organized protocol of generating profiles of growth and obesity (Kamal *et al.*, 2011). These roadmaps, also, indicate if a young child is able to qualify for service in the Armed Forces of Pakistan — boy's CDC height percentile should be 2.72^P or above, girl's percentile should be 19.36^P or above. (Kamal *et al.*, 2017a). Tables-3a-e give sample Roadmaps of Z. Family, which include 6 monthly recommendations for Z. Z. to pick up height in *centimeters/feet and inches* and recommended ranges for Z. Z. to put on mass in *kilograms/weight in pounds and ounces* (Table-3b). Case number displayed in Table-3a is not the one appearing in report given to Z. Z.'s parents. Tables 3d, e list 6-monthly recommendations for her parents to shed off masses in *kilograms/weights in pounds and ounces*.

STRUCTURED DIET PLAN

Tandon *et al.* (2016) reviewed literature, which related diet and physical activity with development of cognition in youngsters and reached at the conclusion that healthy diets and physical activity for under-7 boys and girls are associated with improved intellectual outcomes among youngsters. The young minds learn by attitudes and practices of parents. Tracy & Strutzel (2018) remark, "When our kids

Table-3e: Month-wise mass and weight target ranges for Z. Z.'s mother based on Obesity Roadmap 2.1

Target Date	Mother †	
	kg	lb-oz
October 20, 2019	78.70	173 lb 8.54 oz
November 20, 2019	77.00-77.19	169 lb 12.67 oz - 170 lb 3.18 oz
December 20, 2019	75.36-75.72	166 lb 2.74 oz - 166 lb 15.54 oz
January 20, 2020	73.67-74.21	162 lb 6.98 oz - 163 lb 10.28 oz
February 20, 2020	71.98-72.71	158 lb 11.28 oz - 160 lb 5.07 oz
March 20, 2020	70.39-71.30	155 lb 3.44 oz - 157 lb 3.29 oz
April 20, 2020 ^δ	68.70-69.79	151 lb 7.74 oz - 153 lb 14.08 oz

^δlower limit of 6-month-mass-management target for father not set at 82.85 kg (BMI-based-optimal mass) and for mother not set at 64.90 kg (corrected-height-percentile-based-optimal mass) as the model does not recommend losing more than 10 kg mass within 6 months

were growing up, we never had Cokes or soft drinks in our home, and we exercised

Table-4: Lifestyle adjustment, diet and exercise plans for children aged below 7 years

	Height Management	Mass (Weight) Management
Lifestyle Adjustment	2-3-hour family time on a daily basis, with cell phones and tablets kept away (conversation; table tennis; stroll in the park; free play in playground; cycling — Table 2, IIIA-C ^a); recommended daily dose of vitamin D (600 IU) through 10-15-minute guarded-graduated sun-exposure (early morning or late afternoon — Table 6 lists safe periods of exposure); facing away from sun and eyes protected through UV-cut-off glasses (UV stands for ultraviolet), hair spread out and opened up and bare (dried) feet (to prevent fungus infection) — Table 1, IIA-C; 3-4-hour play in fresh air — Table 1, IIIA-C ^a ; hair and body massage with olive oil before bathing; 8-hour, uninterrupted night-time sound sleep (range 6-10 hours) dressed in fire-resistant pajama-shorts only (briefs/panties style, loose-fitting clothing), unclothed from the waist up; 3-minute, slow-stroke back massage to improve quality and quantity of sleep — before retiring to bed (girls') hair unbraided and opened up, for safety reasons all hair accessories, jewelry, watch, belt removed; glass of milk consumed before bedtime; teeth brushed 5 times — upon rising, after breakfast, lunch and dinner each as well as before going to bed; additional brushing after consuming candies/ chocolates/cookies/juices/milk; 10-minute day-dreaming after lunch with eyes closed stretched on floor/bed — Table 1, IA-C ^a , 10-minute leisure walk with parents inside home lawn/corridor, maximum 2-hour screen time (one hour computer/video games — Table 1, IIIA-C ^a ; one hour TV/DVD — computer monitor at eye level, neck and back straight as well as normal to thighs); 2-strap school bags properly worn on back with each strap on a shoulder (unnecessary books, copies and journals taken out); pure cotton undergarments and socks (disinfectant powder to be applied to dry body parts and wiped feet before putting on underwear/socks), pure leather mocasin shoes with foot support — tight undergarments, clothes, shoes and slippers (flip-flops) should not be worn, slippers got wet during ablution should be replaced immediately with dry ones to be put on carefully dried and wiped feet, in particular, between toes (same goes with clothes drenched in rain, etc.); absolutely NO high heels for girls — cause toes to bend inward	
Diet Plans	3 relaxed (<i>wait for food, not let the food wait for you</i> ; no eating/drinking while walking or standing; eat when very hungry, abstain when some appetite remains, respect the food, <i>stay on dinner table/dinner spread till the food is taken away</i> ^β — it would be of interest to note that some of these protocols had been present for the last 1400 years in the religion of Islam) and balanced meals, which should include fresh fruits and green vegetables; minimize consumption of bakery items, sweets and desserts; 10-12 glasses of water daily — NO carbonated drinks, except one 250-ml bottle in a month To gain height, diet plan should include calcium-, protein- and fiber-rich diet (chicken, fish, fresh fruit and milk)	To put on mass (weight), diet plan should include milk, potato items (baked/boiled, not fried) and protein-rich diet; to shed off mass, diet plan should include salad, yogurt and skimmed milk
Exercise Plans	Exercises for 5 minutes each after waking up, at the end of every hour and before going to bed — bending on sides, focusing eyes far away and moving eyeballs, moving fingers and wrists after computer work/writing, stretching, touching toes without flexing knees, exercising neck muscles (left, right, up, down), light exercises during TV/DVD watching; structured, guarded-graduated family-centered gymnastic exercises, preceded by warm-up and followed by cool-down routines — half-an-hour indoors and half-an-hour outdoors in exercise-friendly clothing (Tables 1, 2); table tennis; jogging; cycling To pick up height, child should perform light-stretching exercises (bar hanging, mild-stretching, summersault, cartwheel)	To increase mass (weight), heavy exercises performed for shorter duration, consistently; to lose mass (weight), child should perform light exercises for longer duration, consistently

^ahairstyle, footwear and clothing for this activity listed in the relevant sections of Table 1 or 2

^βif the protocols typed in italics are followed to letter, food is going to be processed and consumed, while the digestive organs are in 'steady state', not in 'non-equilibrium' (Kamal, 2011; Kamal *et al.*, 2020)

Table-5: Lifestyle adjustment, diet and exercise plans for parents

	Mass (Weight) Gaining	Mass (Weight) Losing
Lifestyle Adjustment	2-3-hour family time on a daily basis, with cell phones and tablets kept away (conversation — educating children about environmental-resource preservation: trees and forests, water reservoirs, clean-fresh air, plastic pollution; religious tolerance; ethnic diversity; empathy to feeling of others; joy of sharing); strolling in the park; relaxing on benches; active and carefree lifestyle; lesser screen time — computer monitor at eye level, neck and back straight as well as normal to thighs; pure cotton undergarments and socks (disinfectant powder to be applied to dry body parts and wiped feet before putting on underwear/socks), pure leather mocasin shoes with foot support — tight undergarments, clothes, shoes and slippers (flip-flops) should not be worn, slippers got wet during ablution should be replaced immediately with dry ones to be put on carefully dried and wiped feet, between toes (same goes with clothes drenched in rain); mothers should put on high heels only during parties — cause toes to bend inward; outdoor activities combined with light reading and social interactions; 7-hour uninterrupted night-time sound sleep (range 5-9 hours), before retiring to bed, mother should have hair unbraided and opened up, for safety reasons all hair accessories, jewelry, watch, belt removed; glass of milk consumed before bedtime; teeth brushed 5 times — upon rising, after breakfast, lunch and dinner each as well as before going to bed; additional brushing after consuming candies/chocolates/cookies/juices/milk	
Diet Plans	3 relaxed (wait for food, not let the food wait for you; no eating/drinking while walking or standing; eat when very hungry, abstain when some appetite remains; respect the food, stay on dinner table/dinner spread till the food is taken away) and balanced meals, which should include fresh fruits and green vegetables; minimize consumption of bakery items, sweets and desserts; 10-12 glasses of water daily — NO carbonated drinks, except one 250-ml bottle in a month To put on mass (weight), diet plan should include milk, potato items (baked or boiled, but not fried) and protein-rich diet	To shed off mass (weight), diet plan should include salad, yogurt and skimmed milk
Exercise Plans	Exercises for 5-minute duration each after waking up, at the end of every hour and before going to bed — bending on sides, focusing eyes far away and moving eyeballs, moving fingers and wrists after computer work and writing, stretching, touching toes without flexing knees, exercising neck muscles (left, right, up, down); structured, guarded-graduated family-centered gymnastic exercises, preceded by warm-up and followed by cool-down routines — half-an-hour indoors and half-an-hour outdoors in exercise-friendly clothing (form-fitting, made of absorbent material); table tennis — instilling sportsman spirit beyond wining/losing; jogging; cycling To put on mass (weight), the parents should perform heavy exercises for shorter duration, consistently	To shed off mass (weight), parents should perform light exercises for longer duration, consistently

all the time. We have exercise equipment. We go for walks. We swim. We read all the time. Our kids are seeing that this is the norm: you read a lot, you exercise a lot, and you eat good foods. We didn't have to lecture to them; we just didn't give them an alternative." Hartmann *et al.* (2013) discussed the significance of food-preparing abilities for picking out well-adjusted meals and snacks. Sealy (2010) held focus groups with parents of young children to learn about practices and attitudes regarding availability of food and concluded that social workers should take a proactive active role in decreasing obesity prevalence. Rodrigues *et al.* (2016) studied forms of food consumption and their behavioral as well as socioeconomic factors in under-9 youngsters from Portugal. Penagini *et al.* (2013) recommended gluten-free diet as nutritionally adequate and balanced diet for children. Lanigan *et al.* (2019) discussed the role of reinforcement of healthy nutritional habits in preschoolers in increasing

consumption of healthy foods. Kim *et al.* (2019) investigated the value of instruction on nutritional foods provided by course facilitators in changing food-intake patterns and state of nutrition in under-7 youngsters. Committee on Nutrition and the Council on Sports Medicine and Fitness (2011) encourage pediatricians to put the message across to their clients as well as their caregivers the differences between beverages and to avoid the energy and sport drinks. Water is the best drink for hydration. Ghanghro (2019) highlighted the importance of milk of buffalo for under-13 youngsters. Alam *et al.* (2019) studied aspects of living style linked to excess weight among students of certain non-public pre-college institutions located in the capital of Bangladesh. These included skipping breakfast, frequency of street-food, fast-food and carbonated-drink consumption, outside home eating, liking of home made food as well as use of cell phone/television viewing during eating. According to them, these unhealthy habits are causing overweight and obesity as well as stunting.

Tables-4 and -5 give diet plans along with lifestyle adjustment and exercise plans for young children and their parents.

VITAMIN –D DEFICIENCY

In order to fully benefit from the proposed diet plans and absorption of calcium available in food and make strong skeleton, it is imperative that young children as well as their parents should not be vitamin-D deficient. Untreated vitamin-D deficiency may be cause of many diseases. Day *et al.* (2019) explored parental understanding of shortage of this essential vitamin in under-7 youngsters. Elson & Hammoud (2018) in their paper determined that deficit of this vitamin is associated with many problems in newborns and the women, who delivered them. Mandlik *et al.* (2018) report a large incidence of vitamin-D deficient, 6-12-year-old students in semi-rural district located near Pune, India. The Consensus Report of the Institute of Medicine recommends daily intake of 600 IU (International Unit, put forward by World Health Organization in 1931) to preserve skeleton in order to avoid during early childhood tuberculosis and rickets, during later childhood and adolescence spinal deformities as well as during adulthood osteomalacia and during old age osteoporosis (Kamal & Khan, 2018). Ranges for normalcy, deficiency and toxicity have been established for adults for 25-hydroxy vitamin D — ‘severely deficient’ if under 5 ng/ml, ‘moderately deficient’ if equal to or greater than 5 ng/ml but less than 20 ng/ml, ‘mildly deficient’ if more than or equal to 20 ng/ml but less than 40 ng/ml, ‘normal’ if equal to or greater than 40 ng/ml but less than 100 ng/ml, toxic if greater than 100 ng/ml. For early childhood the normal value is quoted around 25 ng/ml. Regular testing is needed in parents and their young children to determine if their vitamin-D levels are up to the mark.

Remedial measures include supplements (sometimes cause severe vitamin-D toxicity; when given a shot in arm, at times produce inflammation and further problems), vegetables and fruits produced in sunshine (not very effective) as well as exposure to rays of sun, which is guarded and graduated. This should be taken when sun rays are at an angle less than 18° from the horizon to prevent sunburn and skin cancer. At such angles, the rays of sun are not coming straight and pass through an atmospheric region, which has a high density. They are not so strong and damaging beams are not reaching the skin as they are either absorbed or removed from the main flux (Rybicki & Lightman, 1979). It is of utmost importance that the sun is handled

Table-6: Safe-[⊗] and intermittent-[⊕] (guarded and graduated) sun-exposure duration (year-round for Karachi) during different parts of the day for boys and girls under the age of 7 years [⊘]

Date	Safe Period (a. m. - a. m.)	Intermittent Period (a. m. - a. m.)	Prohibited Period (a. m. - p. m.)	Intermittent Period (p. m. - p. m.)	Safe Period (p. m. - p. m.)
JANUARY					
01	7: 17 - 8: 20	8: 21 - 9: 24	9: 25 - 3: 46	3: 47 - 4: 50	4: 51 - 5: 54
15	7: 19 - 8: 23	8: 24 - 9: 28	9: 29 - 3: 54	3: 55 - 4: 59	5: 00 - 6: 04
FEBRUARY					
01	7: 15 - 8: 21	8: 22 - 9: 28	9: 29 - 4: 03	4: 04 - 5: 10	5: 11 - 6: 17
15	7: 07 - 8: 15	8: 16 - 9: 24	9: 25 - 4: 08	4: 09 - 5: 17	5: 18 - 6: 26
MARCH					
01	6: 55 - 8: 11	8: 12 - 9: 28	9: 29 - 4: 00	4: 01 - 5: 17	5: 18 - 6: 34
15	6: 41 - 7: 53	7: 54 - 9: 06	9: 07 - 4: 15	4: 16 - 5: 28	5: 29 - 6: 41
APRIL					
01	6: 24 - 7: 38	7: 39 - 8: 53	8: 54 - 4: 18	4: 19 - 5: 33	5: 34 - 6: 48
15	6: 10 - 7: 26	7: 27 - 8: 43	8: 44 - 4: 20	4: 21 - 5: 37	5: 38 - 6: 54
MAY					
01	5: 56 - 7: 15	7: 16 - 8: 35	8: 36 - 4: 22	4: 23 - 5: 42	5: 43 - 7: 02
15	5: 48 - 7: 08	7: 09 - 8: 29	8: 30 - 4: 27	4: 28 - 5: 48	5: 49 - 7: 09
JUNE					
01	5: 42 - 7: 06	7: 07 - 8: 31	8: 32 - 4: 17	4: 18 - 5: 52	5: 53 - 7: 17
15	5: 41 - 7: 03	7: 04 - 8: 26	8: 27 - 4: 37	4: 38 - 6: 00	6: 01 - 7: 23
JULY					
01	5: 45 - 7: 07	7: 08 - 8: 30	8: 31 - 4: 40	4: 41 - 6: 03	6: 04 - 7: 26
15	5: 51 - 7: 12	7: 13 - 8: 34	8: 35 - 4: 41	4: 42 - 6: 03	6: 04 - 7: 25
AUGUST					
01	5: 59 - 7: 19	7: 20 - 8: 40	8: 41 - 4: 35	4: 36 - 5: 56	5: 57 - 7: 17
15	6: 06 - 7: 24	7: 25 - 8: 43	8: 44 - 4: 29	4: 30 - 5: 48	5: 49 - 7: 07
SEPTEMBER					
01	6: 12 - 7: 28	7: 29 - 8: 45	8: 46 - 4: 18	4: 19 - 5: 35	5: 36 - 6: 52
15	6: 18 - 7: 32	7: 33 - 8: 47	8: 48 - 4: 07	4: 08 - 5: 22	5: 23 - 6: 37
OCTOBER					
01	6: 24 - 7: 36	7: 37 - 8: 49	8: 50 - 4: 54	4: 55 - 5: 07	5: 08 - 6: 20
15	6: 29 - 7: 39	7: 40 - 8: 50	8: 51 - 3: 44	3: 45 - 4: 55	4: 56 - 6: 06
NOVEMBER					
01	6: 39 - 7: 46	7: 47 - 8: 54	8: 55 - 3: 36	3: 37 - 4: 44	4: 45 - 5: 52
15	6: 49 - 7: 55	7: 56 - 9: 02	9: 03 - 3: 30	3: 31 - 4: 37	4: 38 - 5: 44
DECEMBER					
01	7: 00 - 8: 04	8: 05 - 9: 09	9: 10 - 3: 32	3: 33 - 4: 37	4: 38 - 5: 42
15	7: 09 - 8: 13	8: 14 - 9: 18	9: 19 - 3: 35	3: 36 - 4: 40	4: 41 - 5: 45

[⊗]safe-exposure duration is when the sun has not reached 18° after rising or is at an angle less than 18° before setting; children may be exposed to direct sunlight (suitable for summer months)

[⊕]Intermittent-exposure duration is when the sun is at an angle between 18° and 36° (end-points included) after rising or between 36° and 18° (end-points included) before setting; children may be allowed to play in the shade with brief periods of sun exposure (suitable for winter months)

[⊘]with 251 clear sunny days per year in this part of the world, children should be encouraged to get sun-exposure by moving around (not staying still), engaged in light exercises/free play, eyes protected with UV-cut-off glasses, uncovered from waist up, dressed in briefs/panties only and barefoot, if proper grassy ground is available — if sitting for drawing, jigsaw puzzles, painting, singing, story telling/listening, their backs should be towards the sun, teacher should face the sun; parents should periodically check skins of their young children for sunburn and skin cancer using markers A-E for body scars, *i. e.*, [A] asymmetry, [B] (irregular) borders, [C] (blackish) color, [D] (larger) diameter and [E] eruption; particular attention should be given to the ones changing shape and size, not in proportion to growth of body — children must not be allowed to play in the sunshine without sunscreen of proper SPF (Sun-Protection Formula) value during the prohibited period

with discretion (Brady, 1958). At the initial stage, begin with exposure of ten *minutes*, gradually, reaching to twenty *minutes* and, finally, to half-an-hour, associated with fresh air exposure of two to three *hours*.

FITNESS

Fitness could be visualized as the ability of being appropriate to perform a given athletic activity. Health-related fitness consists of 5 aspects, which correspond to a better state of well-being, in comparison with the ability of do sport — body composition, cardiovascular endurance, flexibility, muscular endurance and muscular strength. Skill-related fitness may be subdivided into 6 aspects, based on their significance for performing the more technical aspect of sport. These are speed, reaction time, agility, balance, coördination and power.

In order to achieve maximum from the work out, the child athlete should stick to the fundamental rules of training — overloading (stressing bodies more than normal to make adaptive changes), specificity (specific to sport/activity), reversibility (keep up the training) and variance (varying the activities).

Westphal & Woodward (2010) mention non-existence of an all-inclusive model of fitness of nuclear family encompassing spiritual-conceptual, sociological, psychological and biological components. Roach & Keats (2018) reported no difference in pleasure scores of two groups, the first one having a planned active play with structure skill-station and the second one free-play control condition.

For the family-centered-fitness program for parents and under-7 children, specific activities must be selected, which could be performed in the available residential setup. Mats, hanging bars and vaults could be easily arranged in the apartment setting for gymnastic activities (ideal to be started from the age of 5 *years*) as well as a large table for table tennis. For houses with lawns available, badminton, basketball and tennis as well as running competitions could be arranged. More enthusiastic families may obtain family membership in local sport clubs. However, it is strongly recommended to subject the entire family to pre-participation physical examination (which must include measurement of mass and stature + testing of vitamin-D deficiency) and fitness testing so that children reap maximum benefits from the program (Kamal & Khan, 2014; Kamal *et al.*, 2017b). Warm-up and cool-down routines should be strictly followed in all exercise routines, which must be guarded and graduated (Kamal & Khan, 2013). Such a training routine should produce fitnesses related to health and skill (performance considerations), while preventing exercise-related injuries (safety considerations).

RECOMMENDATIONS AND FUTURE DIRECTIONS

It is the joint responsibility of educational administrators and the parents to have only registered and police-cleared van drivers (to make sure they are not involved in any incident of child molestation) transport children to and from the educational set-up, which includes pre-school, school, day-care and tuition centers. Parents should give special attention if their child is first in or last out. Educational institutions should organize training programs for parents to spot signs of depression and frustration in children, which at times emerge because of bullying or abuse (verbal, physical or sexual) as well as over-burden from school-work.

Futuristic health- and fitness-centric primary schools must be ready to deal in the current overweight pandemic in under-7 students (Bartelink *et al.*, 2019; Hodgkinson *et al.*, 2019). Schools should adopt clothing styles for children in the classrooms, which allow them maximum contact with nature in terms of fresh air and sunshine (Frumkin *et al.*, 2017). Formal dressing inculcates discipline, which is not recommended for younger children. Casual dressing fosters creativity, whereas strip-to-waist policy induces emotional balance. Schools should organize open-air classes as well as PE and sport activities during safe and intermittent sun-exposure periods with the younger children minimally dressed (Kamal & Khan, 2014). Table 7 gives recommended hairstyle, footwear and clothing for gender-segregated classrooms in preschool and school.

Parents should understand family dynamics as well as family entropy (Bates *et al.*, 2019) and start to develop 24-hour guidelines for their younger children in terms of hygiene (washing of hands and mouth with soap for at least 20 seconds 6-times a day — just after rising before getting dressed, before and after breakfast/lunch/dinner/snacks and before retiring for night after changing into pajama shorts),

Table-7: Recommended hairstyle, footwear and clothing for gender-segregated classrooms in preschool and school (for children under the age of 7 years)
— adapted from Kamal & Khan (2018)

Setting	Boys	Girls
FOR 1 DAY OF THE WEEK, OUT OF A 5-DAY WEEK		
Hairstyle		
Indoors	Very short hair	Long hair, left open, only tied by pony
Outdoors ³	Very short hair	Long hair, left open, only tied by pony
Footwear		
Indoors	Pure-cotton socks + dress shoes [∇]	Pure-cotton socks + dress shoes
Outdoors	Pure-cotton socks + dress shoes	Pure-cotton socks + dress shoes
Clothing		
Boys should be wearing athletic supporter under briefs		
Indoors	Dress shorts with briefs + T-shirt [#]	Skirt with panties + T-shirt [#]
Outdoors	Dress shorts with briefs + T-shirt	Skirt with panties + T-shirt
During colder weather, extra clothing (coats, sweaters) at the start of class		
FOR 4 DAYS OF THE WEEK, OUT OF A 5-DAY WEEK		
Hairstyle		
Indoors	Very short hair	Long hair, left open, only held by hairband
Outdoors	Very short hair	Long hair, left open, only held by hairband
Footwear		
Indoors	Pure-cotton socks + dress shoes	Pure-cotton socks + dress shoes
Outdoors	Pure-cotton socks + dress shoes	Pure-cotton socks + dress shoes
Clothing		
Boys should be wearing athletic supporter under briefs		
Indoors	Dress shorts with briefs, stripped-to-waist ^γ	Skirt with panties, stripped-to-waist ^γ
Outdoors	Dress shorts with briefs, stripped-to-waist	Skirt with panties, stripped-to-waist
During colder weather, extra clothing (coats, sweaters) at the start of class		

³secluded open-air classrooms, during pleasant weather (neither too hot nor too cold)

[∇]pure leather (mocasion) shoes with foot support

[#]formal dressing (shirts with ties/blouses with ties) should start when the students are 7-year-old; the clothing recommended in this table allows circulation of air, in particular, for the upper torso, and is easy to remove for gymnastic activities, which are conducted in briefs/panties, stripped-to-waist

^γstrip-to-waist classroom should encourage students to maintain upright sitting posture (practiced in Hikari kindergarten in Tokyo, Japan)

unclothed body inspection and recording of temperature (before departing for pre-school/school and upon return to pinpoint any cuts, bruises, rashes, sprained muscles, broken bones, *etc.*), structured activities and free play (after looking at different guidelines available on-line, *e. g.*, Draper *et al.*, 2019). They should be trained to recognize hidden conditions — skin cancer (footnote of Table 6), cardiac problems (cyanosis and clubbing), hernia (blueness of scrotum) and hydrocele (scrotum reduces in size when the child is in the supine position, with an irritation or solid mass that is not rough and does not cause pain; the size increases when the child is playing). Further, the parents should be provided necessary training to handle emergencies, which may include accidents, cut and falls. A-E of handling a young trauma patient include inspection of [A]irway, [B]reathing, [C]irculation, [D]isability and [E]xposure, with the patient totally undressed except short underpants. For children on medicines, their parents should be aware of allergies to medicines, currently used or used in the past. Expiry date of medicines should be transcribed clearly in markers on box and pill-wrapping foil (re-checked there). Also, parents should check power and recommended dosage before administering medicines. Initiatives need to be taken by prospective mothers even before birth to prevent overweight and obesity in their offspring (Grobler *et al.*, 2019). Chen *et al.* (2019) emphasize the role of optimal parenting style in helping offspring maintain healthy weight into mid-life.

CONCLUSION

Lieutenant Colonel (Retd.) Amy McGrath of US Marine Corps, who flew F-18 planes, remarked in Christian Amanpour Show (CNN, June 1, 2018) that handling a toddler is more taxing than flying a fighter jet. In this paper, we have addressed the importance of proper diet and exercise to maintain a healthy lifestyle for parents and their young children. Upbringing of youngsters, who are emotionally, mentally and physically healthy, should in turn produce a dynamic working force for the society.

Parents should adopt a balanced style of child rearing for their sons and daughters, which makes them independent at the same time respectful to others, self reliant at the same time obedient, curious at the same time good-mannered and, finally, considerate at the same time well-behaved. The children should be guided to be able to spot potential dangers during the lifespan in order to protect self and immediate family. They should be trained to accept ethnic and linguistic diversity, to respect differing points-of-view, to exhibit religious tolerance and to love nature. Family activities should include handling pets, maintaining home garden and, if possible, developing a forest garden. A weekly walk in the forest by the entire family is the best way to get away from day-to-day grind of the city life and to resolve family disputes. Inspired by the Japanese practice of *Shinrin-yoku*, which means getting absorbed in the atmosphere of the forest, ‘forest bathing’ means immersing oneself within the soothing properties of plants and trees – the colors, the forms, the scents, the sounds as well as the general vibe of nature. The children groomed in this manner should grow up into young adults, who have the potential to efficiently and effectively contribute to the community by taking lesser days off due to illness as well as reducing the cost of medications and treatments. This is the dream of STRONG PAKISTAN.

KEY POINTS

- Plans for lifestyle adjustment, balanced diet and exercise are given for young children and their parents to achieve targets given by Growth-and-Obesity Roadmaps 2.1.
- In order to make young children receive recommended doses of vitamin D, a chart is prepared for safe and intermittent sun-exposure durations for the entire year valid for the city of Karachi.
- Hairstyle, footwear and clothing recommendations are put forward for gymnastics, jogging/running/cycling and walking/small-area games/table tennis/badminton/tennis at home as well as gender-segregated training sessions in school/sport club.
- Younger children should get 8 *hours* (range 6-10 *hours*) of sound and uninterrupted sleep during night in a dimly lit-room away from electronic devices, dressed in fire-resistant pajama shorts, stripped-to-waist; their parents should get 7 *hours* (range 5-9 *hours*) sleep.
- Children's active play should be channelized into structured activities through family-centered exercise routines.

Informed Consent

Informed consent was obtained from parents of Z. Z., whose profile is included in Table-3c.

Conflict of Interest

The authors declare no conflict of interest. This work contains no libelous or unlawful statements and does not infringe or violate the publicity or the privacy rights of any third party.

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Dedication

This paper is dedicated to the affectionate remembrance of Ex-Test Cricketer Abdul Qadir Khan (*born*: September 15, 1955; *died*: September 6, 2019; both in Lahore, Pakistan), who was regarded as the best leg spinner of the 1970s and the 1980s. A commentator as well as a Chief Selector of the Pakistan Cricket Board, Abdul Qadir played 104 ODI (One Day International) as well as 67 Test matches. The cricketer's most notable accomplishment in Test cricket was in 1987 against UK, taking 30 (9) wickets for 437 (56) runs, in a series (for an inning).



References

- Alam, M. R., Reza, S., Kabir, M. A., *et al.* (2019). Prevalence and association of different lifestyle factors associated with overweight and obesity among the children of selected private English medium schools from Dhaka city. *World Journal of Nutrition and Health*, **7** (2): 42-47; full text: <https://www.ngds-ku.org/Papers/J58/Alam.pdf>
- Angeles-Agdeppa, I. & Arias, F. P. S. (2020). Individual and environmental factors are important predictors of overweight and obesity among 0- to 60-month-old children in the Philippines: 2013 NNS data. *Journal of Food and Nutrition Research*, **8** (1): 1-14. <https://doi.org/10.12691/jfnr-8-1-1>
- American Academy of Pediatrics — Committee on Sports Medicine. (1982). Climatic heat stress and the exercising child. *Pediatrics*, **89** (6): 808, 809. <https://doi.org/10.1542/peds.69.6.808>
- American Academy of Pediatrics — Committee on Sports Medicine and Fitness. (2000). Climatic heat stress and the exercising child and adolescent. *Pediatrics*, **106** (1): 158, 159. <https://doi.org/10.1542/peds.106.1.158>
- Atkinson, R. L., Atkinson, R. C. & Hilgard, E. R. (1981). *Introduction to Psychology*, p. 128 — chapter 4: Sensory Processes (skin senses), 8th Ed. San Diego, California, United States: Harcourt Brace Jovanovich
- Bartelink, N. H. M., van Assema, P., Kremers, S. P. J., *et al.* (2019). Can the healthy primary school of the future offer perspective in the ongoing obesity epidemic in young children? A Dutch quasi-experimental study. *BMJ Open*, **9**: e030676. <https://doi.org/10.1136/bmjopen-2019-030676>
- Bates, C. R., Bohnert, A. M., Buscemi, J., Vandell, D. L., Lee, K. T. H. & Bryant, F. B. (2019). Family entropy: understanding the organization of the family home environment and impact on child health behaviors and weight. *Translational Behavioral Medicine*, **9** (3): 413-421. <https://doi.org/10.1093/tbm/ibz042>
- Brady, M. (1958). *Children's Health and Happiness*. 2nd ed. Health for All: London, UK, p. 86 — treat the sun with respect, p. 99; plate
- Burton (1977). *The New Physical Education for Elementary School Children*, chapter 4, Boston, Massachusetts, United States: Houghton Mufflin
- Chen, Y., Kawachi, I., Berkman, L. F., Trudel-Fitzgerald, C. & Kubzansky, L. D. (2019). Does optimal parenting style help offspring maintain healthy weight into mid-life? *Preventive Medicine*, **123**: 84-90. <https://doi.org/10.1016/j.ypmed.2019.03.001>
- Committee on Nutrition and the Council on Sports Medicine and Fitness (2011). Clinical report — sports drinks and energy drinks for children and adolescents: are they appropriate? *Pediatrics*, **127** (6): 1182-1189. <https://doi.org/10.1542/peds.2011-0965>
- Côté, J. (1999). The influence of family in the development of talent in sport. *The Sport Psychologist*, **13** (4): 395-417. <https://doi.org/10.1123/tsp.13.4.395>
- Davies, M. B. (1951). *Physical Training, Games and Athletics in Schools — A Text Book for Training College Students*. 8th ed. George Allen and Unwin: London, UK, 151, 152 — clothing, plates 12, 13 facing page 96
- Davies, M. B. (1954). *Hygiene and Health Education for Training Colleges*. 6th ed. Longman Green and Company: London, UK, plate facing title page
- Day, R. E., Krishnarao, R., Sahota, P. & Christian, M. S. (2019). We still don't know that our children need vitamin D daily: a study of parents' understanding of vitamin-D requirements in children aged 0-2 years. *BMC Public Health*, **19** (1): 1119. <https://doi.org/10.1186/s12889-019-7340-x>

- Deniz, S. & Oguzöncül, A. F. (2019). The prevalence of obesity and related factors among primary and secondary school students. *Nigerian Journal of Clinical Practice*, **22** (12): 1685-1692. https://doi.org/10.4103/njcp.njcp_173_19
- Draper, C. E., Tomaz, S. A., Biersteker, L., et al. (2019). The South African 24-Hour Movement Guidelines for birth to 5 years: an integration of physical activity, sitting behavior, screen time and sleep. *Journal of Physical Activity and Health*, **17** (1): 109-119. <https://doi.org/10.1123/jpah.2019-0187>
- Elsori, D. H. & Hammoud, M. S. (2018). Vitamin-D deficiency in mothers, neonates and children. *The Journal of Steroid Biochemistry and Molecular Biology*, **175** (1): 195-199. <https://doi.org/10.1016/j.jsbmb.2017.01.023>
- Frumkin, H., Bratman, G. N., Breslow, S. J., et al. (2017). Nature contact and human health: a research agenda. *Environmental Health Perspectives*, **125** (7): 1-18. <https://doi.org/10.1289/EHP1663>
- Ghanghro, A. W. (2019). Daily intake of buffalo's milk and its contribution in the RDA values of some essential materials required for 1-12 years children. *Scientific Journal of Food Science and Nutrition*, **5** (1): 16-19; full text: <https://www.ngds-ku.org/Papers/J58/Ghanghro.pdf>
- Grobler, L., Visser, M. & Siegfried, N. (2019). Healthy Life Trajectories Initiative: summary of the evidence base for pregnancy-related interventions to prevent overweight and obesity in children. *Obesity Reviews*, **20** (S1): 18-30. <https://doi.org/10.1111/obr.12767>
- Hartmann, C., Dohle, S. & Siegrist, M. (2013). Importance of cooking skills for balanced food choices. *Appetite*, **65**: 125-131. <https://doi.org/10.1016/j.appet.2013.01.016>
- Health Smart (2013, January). The three-minute sleep fix, *Reader's Digest (Asia)*, **100** (599): 11
- Hodgkinson, A., Abbott, J., Hurley, M. A., Lowe, N. & Qualter, P. (2019). An educational intervention to prevent overweight in pre-school years: a cluster randomized trial with a focus on disadvantaged families. *BMC Public Health*, **19**: 1430. <https://doi.org/10.1186/s12889-019-7595-2>
- Houser, N. E., Roach, L., Stone, M. R., Turner, J. & Kirk, S. F. L. (2016). Let the children play: scoping review on the implementation and use of loose parts for promoting physical activity participation. *AIMS Public Health*, **3** (4): 781-799. <https://doi.org/10.3934/publichealth.2016.4.781>
- Kamal, S. A. (2011, March 28-30). The fourth law of thermodynamics. *Proceedings of the Pakistan Institute of Physics Conference 2011 (PIPC 2011)*, ed. M. Z. Butt, M. K. Rahman & D. Ali, Lahore, Pakistan: University of Engineering and Technology, pp. 183-187, paper#PIPC-11-25 — 'steady state' and 'non-equilibrium', pp. 1, 2; full text: <https://www.ngds-ku.org/Papers/C83.pdf>
- Kamal, S. A. (2016, April 7). *Manual for Anthropometric Measurements*, version 9.11. The NGDS-Pilot-Project-e-Publication, Karachi, Pakistan: University of Karachi; full text: https://www.ngds-ku.org/ngds_folder/M02.pdf
- Kamal, S. A. (2017a). Integration of BMI-based-optimal mass and height-percentile-based-optimal mass to propose the sixth-generation solution of childhood obesity. *International Journal of Biology and Biotechnology*, **14** (4): 485-502; full text: <https://www.ngds-ku.org/Papers/J49.pdf>
Additional File 2 — Height (Stature), Mass (Weight) and MUAC (Mid-Upper-Arm Circumference) Measurement (step-by-step procedures illustrated through labeled photographs): https://www.ngds-ku.org/Papers/J49/Additional_File_2.pdf
- Kamal, S. A. (2017b, October 15). A series of 5 videos on 'Anthropometry of Children'
First Video — Introduction to Anthropometry of Children: <https://youtu.be/sXGGaM73S3E>
Second Video — Preliminaries: <https://youtu.be/GxnEowK0AcE>
Third Video — Measurement of Height of Children: <https://youtu.be/l1xs-xkhiBk>
Fourth Video — Measurement of Mass of Children: <https://youtu.be/q916pgYCiC8>
Fifth Video — Measurement of MUAC of Children: https://youtu.be/O6pr7wfgA_0

- Kamal, S. A., Ansari, M. J., Ansari, S. A. & Naz, A. A. (2020). Two parameter (height and mass) problem solved by fitting parabolic curve to construct Growth-and-Obesity Vector-Roadmap 3.0 — the eighth-generation solution of childhood obesity. *International Journal of Biology and Biotechnology*, **17** (1): 23-57 — height-gain-target-achievement and mass-management-target-achievement indices, Figure-10; ‘steady state’ and ‘non-equilibrium’, Table-2; full text: <https://www.ngds-ku.org/Papers/J54.pdf>
- Kamal, S. A., Ansari, S. A., Sarwar, M. & Naz, A. A. (2017a). Medical criteria for induction into the Armed Forces of Pakistan: cut-off heights for still-growing youth. *International Journal of Biology and Biotechnology*, **14** (3): 319-333; full text: <https://www.ngds-ku.org/Papers/J47.pdf>
- Kamal, S. A., Azeemi, H. I. & Khan, S. R. (2017b). Psychological testing, physical examination and fitness testing of primary-school students for participation in gymnastic activities. *Pumukkale Journal of Sport Sciences*, **8** (2): 15-40; full text: <https://www.ngds-ku.org/Papers/J48.pdf>
- Kamal, S. A., Jamil, N. & Ansari, S. A. (2018). Validation of concept of optimal mass in children and adults — the seventh-generation solution of childhood obesity. *International Journal of Biology and Biotechnology*, **15** (4): 613-638; full text: <https://www.ngds-ku.org/Papers/J52.pdf>
- Kamal, S. A., Jamil, N. & Khan, S. A. (2011). Growth-and-Obesity Profiles of children of Karachi using box-interpolation method. *International Journal of Biology and Biotechnology*, **8** (1): 87-96; full text: <https://www.ngds-ku.org/Papers/J29.pdf>
- Kamal, S. A. & Jamil, S. S. (2014). KJ-regression model to evaluate optimal masses of extreme cases. *International Journal of Biology and Biotechnology*, **11** (4): 623-648; full text: <https://www.ngds-ku.org/Papers/J34.pdf>
Additional File 3 — Extended Growth Tables and Extended Growth Charts: https://www.ngds-ku.org/Papers/J34/Additional_File_3.pdf
- Kamal, S. A., Jamil, S. S. & Razzaq, U. A. (2014). Stunting induced by wasting — wasting induced by stunting: a case study. *International Journal of Biology and Biotechnology*, **11** (1): 147-153; full text: <https://www.ngds-ku.org/Papers/J32.pdf>
- Kamal, S. A. & Khan, S. A. (2013, September 4, 5). Fitness for primary-school children. *The First Conference on Anthromathematics in the Memory of Syed Firdous (ANTHROMATHEMATICS 2013)*, p. 24, Karachi, Pakistan: Department of Mathematics, University of Karachi and Hyderabad, Pakistan: Government College; abstract#Anthro13-18: <https://www.ngds-ku.org/Presentations/Fitness.pdf>
- Kamal, S. A. & Khan, S. A. (2014). Primary-physical-education practices in Pakistan and England: health and safety perspectives. *International Journal of Biology and Biotechnology*, **11** (2&3): 401-419 — putting forward case for separate physical-education classes for boys and girls, p. 411; full text: <https://www.ngds-ku.org/Papers/J33.pdf>
- Kamal, S. A. & Khan, S. A. (2015). Hairstyle, footwear and clothing for gymnastic activities in the primary-school setting. *Pumukkale Journal of Sport Sciences*, **6** (3): 46-64; full text: <https://www.ngds-ku.org/Papers/J37.pdf>
- Kamal, S. A. & Khan, S. A. (2018). Overcoming vitamin-D deficiency in male gymnasts during pre-teen years. *The Sky (International Journal of Physical Education, Health, Sports and Allied Sciences)*, **2**: 60-75; full text: <https://www.ngds-ku.org/Papers/J50.pdf>
- Kamal, S. A., Rajput, M. K. & Ansari, S. A. (2016). Gait analysis of 7-10-year-old children of Karachi from nutritional-status perspective. *International Journal of Biology and Biotechnology*, **13** (1): 13-25; full text: <https://www.ngds-ku.org/Papers/J41.pdf>
- Kamal, S. A., Sarwar, M. & Razzaq, U. A. (2015). Effective decision making for the presence of scoliosis. *International Journal of Biology and Biotechnology*, **12** (2): 317-328; full text: <https://www.ngds-ku.org/Papers/J36.pdf>

- Kia, A. A., Goodrazi, S., Asadi, H., Khosravi, A. & Rezapour, A. (2019). A decomposition analysis of inequality in malnutrition among under five children in Iran: findings from multiple indicator demographic and health survey, 2010. *Iran Journal of Public Health*, **48** (4): 748-757. <https://doi.org/10.18502/ijph.v48i4.1009>
- Kim, J., Kim, G., Park, J., Wang, Y. & Lim, H. (2019). Effectiveness of teacher-led nutritional lessons in altering dietary habits and nutritional status in preschool children: adoption of a NASA mission X-based program. *Nutrients*, **11** (7): 1590. <https://doi.org/10.3390/nu11071590>
- Kirchner, G. (1970). *Physical Education for Elementary School Children*, 2nd Ed. Dubuque, Iowa, United States: William C. Brown
- Lanigan, J., Bailey, R., Jackson, A. M. T. & Shea, V. (2019). Child-centered nutrition phrases plus repeated exposure increase preschoolers' consumption of healthful foods, but not liking or willingness to try. *Journal of Nutrition Education and Behavior*, **51** (5): 519-527. <https://doi.org/10.1016/j.jneb.2019.02.011>
- Mandlik, R., Kajale, N., Ekbote, V., et al. (2018). Determinants of vitamin-D status in Indian school-children. *Indian Journal of Endocrinology and Metabolism*, **22** (2): 244-248. https://doi.org/10.4103/ijem.IJEM_622_17
- Mendes, A. A., Lopes, W. A., Locateli, J. C. et al. (2018). Prevalência de Active Play em crianças e adolescentes brasileiros: uma revisão sistemática (The prevalence of active play in Brazilian children and adolescents: a systematic review). *Revista Brasileira de Cineantropometria & Desempenho Humano*, **20** (4): 395-405; full text: <https://www.ngds-ku.org/Papers/J58/Mendes.pdf>
- Miller E. (1955). *Education through Experience in the Infant School Years*. Basil Blackwell: Oxford, UK, plate 8b (facing page 44), plates 16a, c (facing page 112), plate 17b (facing page 113)
- Ministry of Education and Central Office of Information. (1952). *Physical Education in the Primary School: Part One — Moving and Growing*, plates 2-4, London, UK: Her Majesty's Stationery Office
- Ministry of Education and Central Office of Information. (1953). *Physical Education in the Primary School: Part Two — Planning the Programme*, London, UK: Her Majesty's Stationery Office
- Penagini, F., Dillillo, D., Meneghlin, F., Mameli, C., Fabiano, V. & Zuccotti, G. V. (2013). Gluten-free diet in children: an approach to a nutritionally adequate and balanced diet. *Nutrients*, **5** (11): 4553-4565. <https://doi.org/10.3390/nu5114553>
- Ricotti, L. (2011). Static and dynamic balance in young athletes. *Journal of Human Sport and Exercise*, **6** (4): 616-628. <https://doi.org/10.4100/jhse.2011.64.05>
- Roach, L. & Keats, M. (2018). Skill-based and planned active play versus free-play effects on fundamental movement skills in preschoolers. *Perceptual and Motor Skills*, **125** (4): 651-668. <https://doi.org/10.1177/0031512518773281>
- Rodrigues, D., Muc, M., Rodrigues, P. R. M., Pinto, A. M. & Padez, C. (2016). Dietary Patterns and their socioeconomic and behavioral determinants in 6- to 8-year-old Portuguese children. *Ecology of Food and Nutrition*, **55** (5): 428-441. <https://doi.org/10.1080/03670244.2016.1200038>
- Rodrigues, D., Padez, C. & Machado-Rodrigues, A. M. (2018). Active parents, active children: the importance of parental organized physical activity in children's extracurricular sport participation. *Journal of Child Health Care*, **22** (1): 159-170. <https://doi.org/10.1177/1367493517741686>
- Russell, J. (1975). *Creative Movement and Dance for Children*, pp. 28-32, plates 8-16, Boston, Massachusetts, United States: Plays

- Rybicki, G. B. & Lightman, A. P. (1979). *Radiative Processes in Astrophysics*. John Wiley: New York, United States, 36
 - Sealy, Y. M. (2010). Parents' perceptions of food availability: implications for childhood obesity. *Social Work in Health Care*, **49** (6): 565-580. <https://doi.org/10.1080/00981381003635353>
 - Siedentop, D. (2003). *Introduction to Physical Education, Fitness, and Sport*. 5th ed. McGraw-Hill: Boston, Massachusetts, United States, 5-7 — lifespan-physical activity during early-childhood years
 - Silvea, D. A. S., Chaput, J. P., Katzmarzyk, P. T., et al. (2018). Physical education classes, physical activity and sedentary behavior in children. *Medicine and Science in Sports and Exercise*, **50** (5): 995-1004. <https://doi.org/10.1249/mss.0000000000001524>
 - Spruyt, K., Herbillon, V., Putois, B., Franco, P. & Lachaux, J.-P. (2019). Mind-wandering, or the allocation of attentional resources, is sleep-driven across childhood. *Scientific Reports*, **9**: 1269. <https://doi.org/10.1038/s41598-018-37434-5>
 - Tandon, P. S., Tovar, A., Jayasuriya, A. T., et al. (2016). The relationship between physical activity and diet and young children's cognitive development: a systematic review. *Preventive Medicine Reports*, **3**: 379-390. <https://doi.org/10.1016/j.pmedr.2016.04.003>
 - Tandon, P. S., Zhou, C., Sallis, J. F., Cain, K. L., Frank, L. D. & Saelens, B. E. (2012). Home environment relationships with children's physical activity, sedentary time and screen time by socioeconomic status. *International Journal of Behavioral Nutrition and Physical Activity*, **9** (1): 88. <https://doi.org/10.1186/1479-5868-9-88>
 - Tirloni, A. S. & Moro, A. R. (2010). Interferência do vestuário no desempenho, na amplitude de movimento e no conforto na ginástica laboral (Clothing interference in performance, articular range of motion and comfort in labor gymnastics). *Revista Brasileira de Cineantropometria e Desempenho Humano (Brazilian Journal of Kinanthropometry and Human Performance)*, **12** (6): 443-450. <https://doi.org/10.5007/1980-0037.2010v12n6p443>
 - Tracy, B. & Strutzel, D. (2018). *The Science of Motivation*, Ahmedabad, India: Jaico Publishing House, page 7
 - Trost, S. G. & Loprinzi, P. D. (2011). Parental influences on physical activity behavior in children and adolescents: a brief review. *American College of Lifestyle Medicine*, **5** (2): 171-181. <https://doi.org/10.1177/1559827610387236>
 - Vendien, C. L. & Nixon, J. E. (1968). *The World Today in Health, Physical Education and Recreation*, p. 144; plate — third grade group work in gymnastics, Englewood Cliffs, New Jersey, United States: Prentice-Hall
 - Westphal, R. J. & Woodward, K. R. (2010). Family fitness. *Military Medicine*, **175** (S8): 97-102. <https://doi.org/10.7205/MILMED-D-10-00238>
- Web address of this document (first author's homepage): <https://www.ngds-ku.org/Papers/J58.pdf>

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Dr. Maria Shiraz, Kinnaird College, Jail Road, Lahore, Pakistan and Dr. Quratulain Ershad, Kinnaird College, Jail Road, Lahore, Pakistan was jointly written titled "Effects of Athletics on Academic Performance of Pakistani Female Students at Graduate Level"

Sumera Sattar, Lecturer Physical Education, Lahore College for Women University, Lahore, Syed Asim Hussain, Assistant Professor, Center for Physical Education, Health and Sports Sciences, University of Sindh, Jamshoro and Syed Ihtisham Ahmed Principal, Al-Razi Institute Lahore was jointly written article titled "Impact of Coaching Behavior on the Performance of Female Athletes: A Correlational Study"



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