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PRIMARY-PHYSICAL-EDUCATION PRACTICES IN PAKISTAN AND ENGLAND: HEALTH AND SAFETY PERSPECTIVES[¶]

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ABSTRACT

This paper initiates discussion and critique of teaching and curriculum relating to English and Pakistani primary-school-physical-education practices and their implications on school health. In most English primary schools, PE is co-educational. Students do athletics, dance, games, gymnastics and swimming. Majority has PE kit, but a significant minority has students undress to underwear. In Pakistan, most public sector schools have single-gender PE, which is not the case in private schools. Main activities include games and athletics. On PE days, students wear PE kit. They attend classes in the same outfit. We recommend gender-segregated PE starting from class one after clearing pre-participation-head-to-toe-physical examination. End-of-the-term evaluation should integrate unclothed-physical examination with fitness testing. Tests should evaluate health- as well as skill-related fitness. Developmentally appropriate curricula should consist of guarded-graduated training routines, enhancing body image. Students must wear activity-appropriate clothing and shoes. Gymnastics should be done barefoot with boys stripped-to-waist in briefs or figure hugging half-pants, covering knees; girls stripped-to-waist in panties (knickers) or leotard (with stockings, if desired). Exercises and diet-plans to increase height and reduce/gain weight are suggested. Health issues taken up are obesity due to inactivity, vitamin-D deficiency owing to reduced exposure of skin to sunshine and bone damage attributed to wet clothing worn. Remedial measures are proposed.

Keywords: Activity-appropriate clothing, safety, fitness, curriculum, gymnastics, pre-participation examination.

LIST OF ABBREVIATIONS

BMI: Body-mass index
NGDS: **N**ational **G**rowth and **D**evelopmental **S**tandards for the Pakistani Children
PE: Physical education
PPE: Primary-physical education
SF: Syed Firdous
SGPP: **S**ibling **G**rowth **P**ilot **P**roject — a subproject of the NGDS Pilot Project

INTRODUCTION

Social-cum-professional acceptability of a person, not only, depends on the academic, the intellectual and the communicational capabilities, but also, on the body image and the body language of an individual. In today's competitive world, students would be successful in the practical life if they possess a healthy body to go with a knowledgeable mind. An overweight candidate, walking awkwardly, may have lesser chance of getting a lucrative job as compared to a slim, a smart and a sharp individual.

This paper attempts to analyze the British and the Pakistani systems of physical education by describing salient features of both and looking into the shortcomings of each of these systems. In order to find practical solutions to some of these problems, a section on learning process is included, which compares and contrasts influences of teachers and peers on learning in the light of differences in growth trajectories and variations in the developmental-milestones achieved.

The purpose is to start a thinking process among academicians of both countries to develop solid guidelines, which could bring out changes in policies as well as teaching philosophies and methodologies both at home and in

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[¶]The italic superscripts [a], [b], [c], …, appearing in the text, represent endnotes listed before references.

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England. There are separate sections devoted to physical examinations and health statuses of children as well as clothing for gymnastics.

LITERATURE REVIEW

Synaptic connections of brain are, fully, developed by the age of ten. New connections are formed, while learning a motor skill. Hence, it becomes important to have an efficient and an effective physical-education (PE) curriculum covering health-related as well as skill-related fitness (Kamal and Khan, 2013). In fact, primary-physical education (PPE) is the foundation of lifelong physical, mental, emotional as well as social fitness (Davis *et al.*, 1999; Siedentop, 2003). Armstrong and Welsman (2000), strongly, believe that for people to have a positive experience and an appreciation of physical activity, the best vehicle for delivering it is during primary-physical education. Historically, PPE objectives listed by Bucher (1968) include encouragement of intellectual growth, development of basic skills, consideration as a total human being, creation of values, habits, appreciations and understandings leading to a constructive adult-life, discovering and nurturing special talents, fulfilling needs of all children, cultivating habits of rational thinking and problem-solving, fostering physical and mental health, establishing a setting with the aim of furthering social and aesthetic development, inculcating appreciation of hard work and stressing moral-spiritual values. Miller and Whitecomb (1969) have classified these objectives into three categories — physical, social-emotional and intellectual. Therefore, it is a matter of utmost importance to develop, test and implement a PPE curriculum.

Garrett and Wrench (2007) analyzed responses of 137 (102 female; 35 male) student teachers (19-35-year old) on the way participants drew on life experiences and discursive resources. Although, earlier experiences encouraged narrow definitions of being *sporty* (*non-sporty*), experience of competition provided diverse and contradictory meanings for individuals. This study provided support for arguments to expand beyond conventional forms of physical education to a wider range of movement practices, as proposed in this work.

Toriola (2010) studied children's perception of physical education and sport in Swaziland. The findings of this study indicated that the students attached more importance to subjects, in which they were examined, as the grades served major incentive to study such subjects, thoroughly.

One of the key health issues focused in this paper is maintaining optimal weight-for-height[a] through diet, exercise and lifestyle adjustment (Kamal *et al.*, 2013*h*; 2014*b*). There are indications that obesity-prevention programs, based on professional-facilitated interventions, are more effective as compared to those relying on self-help (Johnston *et al.*, 2013). However, in order to implement obesity interventions, which are intended to create sustained change, in real world, one requires flexibility in intervention design, timing and personnel (Jain and Langwith, 2013). In a US-based study, it was reported that adapted-intervention-mapping process led to environment and policy changes known to increase healthy eating and physical activity in primary-school children (Belansky *et al.*, 2013). High prevalence of overweight/obesity among primary-school students provides a rationale for BMI-screening retention at schools (Moreno *et al.*, 2013). However, in children, BMI interpretation requires use of BMI tables (Kamal *et al.*, 2013*h*). The concept of *Estimated-Adult BMI* (Kamal and Jamil, 2012) gives an estimated status of obesity, when the child is fully-grown adult (boys above 21 years and girls above 19 years). This index can be interpreted just like BMI for adults and may be used to spot trends of obesity in primary-school students.

SALIENT FEATURES OF THE BRITISH AND THE PAKISTANI SYSTEMS

In UK, most pupils are educated in state primary schools during the ages 4-11 years. Then, they move on to state secondary schools and stay there until the ages of 16 or 18 years. Almost, all primary schools are co-educational. However, a significant minority of secondary schools is single gender. In the independent (private) sector, prep schools admit students in the age group 4-13 years. Senior schools have a student population in the age group 13-16 years or sometimes 18 years. Most prep schools are co-educational, whereas most senior schools are gender segregated.

In English primary schools, PE lessons are co-educational. Activities in the public-sector schools consist of athletics, dance, games (which include football, cricket, tennis), gymnastics and swimming (the last two are compulsory). Majority of the prep schools do the same, but with more options. A large number of schools subscribe to a PE kit. However, many schools require the students to remove outer garments and participate in activities dressed only in their underwear.

Pakistani primary schools admit students in class one, when the child is at least 5 years and a half but not older than 6 years and a half. The students continue in the primary schools till class five (ages 10-11 years). At this point

they move on to secondary school in class six and continue till class ten (ages 15-16 years), at the end of which they appear for their *Secondary School Certificate (SSC) Examinations*, commonly known as *Matric*. Some schools have status of college (they are called higher secondary schools) and so the students can study there for another 2 years and write their *Higher Secondary Certificate (HSC) Examinations*, commonly known as *Intermediate*. A number of schools in urban area opt for British System by subscribing to *Cambridge (GCE)* and *London (EdExcel) University Examinations*, commonly known as *'O' Levels* and *'A' Levels*. Other schools have associated themselves with the Swiss System, *International Baccalaureate (IB)*. There is, also, a chain of Turkish Schools operating in this country.

In Pakistan, almost all of government-run primary schools are gender segregated as a matter of policy. As a result, PE in Pakistan is single gender in the public sector. Private schools, in general, do not adhere to this practice. Games (cricket, football, basketball, small-area games) and athletics are the main activities in the Pakistani schools. On PE days, private-school students are supposed to wear PE kit, when they arrive at school. They do not change after the activity and continue their classes in the same outfit.

SHORTCOMINGS

Clothing for gymnastics, both in Pakistan and England, is inappropriate on the basis of safety considerations. A complete section is devoted to analyses of PE outfits. Safe, practical and inexpensive PE kits for both boys and girls are suggested. In Pakistan, students keep on all day, sweat-soaked clothing worn during PE. Such unhygienic practices could lead to skin infections, which might be transmitted easily to other students during contact sport. The curriculum in this country is not consistent with the developmental milestones achieved by a child and lacks civic education. Further, there is insufficient time-allocation for essential topics, problem compounded by shortage of specialist teachers. The first one makes teaching of PE inefficient and the second one ineffective. In England, the practice of mixed-gender PE, at times, creates problems for students entering puberty.

There are, also, difficulties in setting the level of expectations, in both the British and the Pakistani Systems. Progress is necessary. However, the aim and the objective should be to bring out the maximum out of children, *i. e.*, a realistic estimation of their capabilities and developing their skills to the top of their capacity level, instead of producing prodigies. This is, sometimes, due to ill-defined aims and non-realistic objectives and at other times not exploring the full breadth of possibilities and pursuing narrowly, only, a single idea.

LEARNING FROM DIFFERENT RESOURCES

Students learn from fellow students as well as their teachers. Students copy each other and, sometimes, help each other, *e. g.*, in changing for physical activities. This experience is enhanced if a child joins a group, which has a common purpose, although they work as individuals, for example, walking heel-to-toe (motor coördination) or touching toes without flexing knees (flexibility). Some activities involve working in unison, without competition, *e. g.*, PT display. Still, other activities involve coördination and competition, *e. g.*, team sport. Although, peer learning is important, it is no substitute for learning from adults, which in school means learning from teachers. A teacher, having a wealth of knowledge and a multitude of personal skills, determines the general direction of lesson. In addition to movement-knowledge, the teacher is supposed to be aware of growth-standards and developmental-milestones of the children at a particular age, due to hereditary as well as environmental factors; the first one based on precedence graphs, whereas the second one on influence graphs (Kamal *et al.*, 2002*b*; *c*).

. Hence, the teacher has perspective, by being able to see the children as they are, in relation to what they were a few days, weeks or months ago as well as what they would be in the near future[*b*]. Every lesson, therefore, is an exercise in complexity science (Kamal *et al.*, 2002*a*), which may be tailored to accommodate the individual child's growth and developmental patterns (dependent, partly, upon inherited qualities and, partly, upon environment) as well as the child's own efforts leading the youngster to explore, to shape and to create new forms; or through recurrence, to establish techniques not known before.

PHYSICAL EXAMINATIONS AND HEALTH STATUSES OF CHILDREN

Pre-Participation Comprehensive Physical and Motor Examination should be focused on safety considerations of the students, their classmates, their teachers and the school staff. Its purpose should be to uncover conditions, which may cause serious injury and harm during exercise, *e. g.*, cardiac problems, epilepsy, hernia or hydro seal, as well as conditions, which may be corrected, *e. g.*, knees joining. Main emphasis should be on detection of communicable diseases, in particular, skin problems (important for contact sport and swimming), evaluation of sight and hearing (severe impairment may render the student vulnerable to accidents) as well as presence of malnutrition, fatigue and emotional disorders. Students must be barefoot, undressed to briefs/panties (knickers), stripped-to-waist,

in the beginning. Hair must be unbraided and separated for a thorough examination. Underpants should be removed for genital (signs of sexual abuse, venereal diseases), orthopedic (posture, gait, presence of trunk deformities, cerebral palsy and rickets), nutritional-status (vitamin-D deficiency, signs of neglect) and skin (signs of physical abuse, presence of skin cancers) examinations. Net mass (mass with zero clothing on) could, also, be recorded during this segment. These checks should be grouped together to minimize time for the student to remain completely undressed. Abnormalities detected should be communicated to class teachers, physical-education teachers and parents.

End-of-the-Term Evaluation should integrate unclothed-physical examination and fitness testing (Kamal and Khan, 2013) — students should be checked without shoes, socks or leggings, wearing short underpants, all clothing above the waist removed, hair unbraided and opened up for a detailed check-up and then tied up in the form of (hair) bun to leave neck-area exposed for fitness tests. It should be, mainly, based on performance considerations and improvements achieved compared to previous term as well as psychological disorders, *e. g.*, trends of anorexia and bulimia.

In both of the above health appraisals, there should be monitoring of height and weight according to laid-down protocols (Kamal, 2006; Kamal *et al.*, 2013*j*) by reproducible measurers (Kamal and Razzaq, 2014). Recorded heights and weights should be entered in the growth-and-obesity models put forward earlier (Kamal *et al.*, 2011*a*; Kamal and Jamil, 2012) to generate detailed growth-and-obesity profiles and roadmaps (Kamal *et al.*, 2013*i*) of students. Maintaining optimal-weight-for-height (Kamal *et al.*, 2013*h*) is of extreme importance for effective participation in physical activities as low levels of spontaneous activity are observed in many obese children (Siedentop, 2003). Tuckson (2013) suggests cost-effectively implementing evidence-based-weight-management program within the school setting. End-of-the-Term Evaluation should, also, include a thorough check of posture and gait**:** walking (normal — mainly, looking for arm-swing asymmetry, limp and spastic gait; on heels; on toes; heal-to-toe; with book on head) and running (Kamal, 1997*c*; Kamal *et al.*, 1996; 2013*d*), including meticulous examination of feet (Kamal *et al.*, 2011*b*). There should be emphasis on screening for skeletal deformities, in particular, scoliosis, preferably using moiré fringe topography (Akram and Kamal, 1991; Kamal, 1997*b*; Kamal *et al.*, 2013*e*) and rasterstereography (Kamal *et al.*, 2013*a*) during the later-childhood period. This becomes extremely important if the student under evaluation has a high *CSRW* (Kamal *et al.*, 2013*g*). *CSRW* stands for *Cumulative-Scoliosis-Risk Weightage*, which depends on history, posture and forward-bending checks (Kamal, 1997*a*), moiré fringe topography (Kamal *et al.* 2014*a*) and wasting combined with tallness ((Kamal *et al.*, 2014*b*). Any required treatment is the responsibility of family physician. If corrective work is needed, school doctor should refer the student to a specialist.

Boys and girls should be separated for the above-mentioned examinations. Genital and orthopedic examinations should not be conducted in the presence of other students.

Fitness testing should include tests for health-related fitness — body composition, cardiovascular endurance, flexibility, muscular endurance, strength — as well as skill-related fitness — agility, balance, coördination, power, reaction time, speed (Johnson and Nelson, 1986).

Within the age group 4-7 years, children are susceptible to infectious diseases, *e. g.*, from simple common colds to respiratory ailments (in winter and spring) or alimentary-tract maladies (in summer and fall). Within the age group 7-9 years, children may fall prey to stomachache and nausea. Wet clothing, not direct exposure of skin to cold air, is the most probable cause of catching cold in children. In rainy weather, students sometimes arrive in school drenched in rainwater and soaked clothes. They should be required to remove wet clothes, dry themselves with a clean and a dry towel and change into spare kits or spare clothing, which has been provided by their parents, beforehand. Under no condition they should be allowed to take classes in wet clothing, where cool air from fans would do damage to their bones. Same goes with sand and water play. It should be mandatory for the school physician to conduct a complete, unclothed examination of any student reporting for even a minor cut or bruise for the following reasons:

i) Safety of the student to rule out damages and abrasions on other parts of the body and, more importantly, internal injuries
ii) Legal protection of school authorities

There should be proper documentation and parental notification of any such unexpected and undesirable event occurring as well as any treatment offered or medicines given, on the school premises. New admissions and those reporting after sick leave, have to go through head-to-toe, stripped physical by school doctor, before allowed to mix with other students.

There should be two mandatory daily inspections by the custodial parent, with the child stripped-to-waist, wearing only underpants, the first one just before sending the child to school, to make sure that the incumbent has not come up with any communicable disease, which may spread to other students in the class and the school staff,

e. g., chicken pox, and the second one upon arriving back at home to look for any abrasions, cuts, broken bones, signs of bullying or corporal punishment by teachers. Any unusual findings, *e. g.*, birth marks, bruises, cane marks, moles (benign or malignant) or rashes must be recorded in the school diary to protect the parent.

A mirror exercise is to be done by the school authorities to protect themselves by comparing parental notes with the school-health-team observations, where two segregated-stripped inspections are done, the first one upon arrival in school and the second one just before departing for home, in the presence of class teacher. A systematic and a scientific implementation of these routines would prevent abuse/bullying and would serve as frontline effort to spot neglect, malnutrition, anorexia and bulimia. Computerized records will help these exercises.

SAFETY IN SCHOOL SETTING

Accidents, most frequently, occur during the primary-school period, which are the leading cause of mortality and morbidity. The active and the aggressive nature of boys render them more vulnerable to misadventures as compared to girls. Therefore, there is a need of safety instruction as well as clear-cut policies on how to handle minor and major mishaps.

School inspection is supposed to discover, not only, health-and-hygiene issues, but also, meant to guard against bringing in by students any controlled substances (drugs, sharp objects and weapons). Canine teams and observers may help achieve this goal. Mandatory hand searching of school bags and clothing of children and then sending their carryon baggage through X-ray machine is recommended. However, the authors do not recommend X raying students' shoes, clothes and other personal items carried close to body (in particular, clothing worn next to skin) as there seem to be indications that such items become secondary sources of radiation, after being subject to primary doses of radiation.

In pervious discourses, the first author did not recommend any *active-scanning devices*, walk-through (metal-detecting, full-body-scanning) gates, electronic-hand-held devices or such other sensors on growing children, as they may effect brain, heart and spinal column as well as increase risk of cancer as children have fragile bone marrow (Kamal, 2010; 2013*a*, *b*; 2014*a*). Further, any wound or infection could, also, get worse from radiation dose. Exposure of children's bodies to strong electric and magnetic fields as well as X-ray and millimeter-wave radiation should be avoided at all costs — one may appreciate that magnetic field of the human brain (a child's brain is, still, developing and reaches its maximum capacity by about the age of ten years) is of the order of one part in 10^{13} Tesla (Kamal, 1993). Faculty scanning devices, made in the third-world countries, could, also, burn eyes, cause thyroid cancer and infertility, as gonads are not shielded in such screening procedures (Kamal, 2010). Some of these devices generate three-dimensional-unclothed pictures, with complete anatomical details of the body, recorded and stored for later analysis of data to spot any irregularities. Such practices step into the boundaries of *child pornography* (PRESCIENT. 2011).

Safety is the primary concern for examining and analyzing clothing choices for gymnastics, which are described in the next section.

CLOTHING FOR GYMNASTICS

Gymnastics are defined as *exercises developing the muscles* — the grammar or the anatomy of movement. In gymnastics, movement is considered as the mobility of joints and the tone of muscles. Combining anatomy with physiology, gymnastics are concerned with complete physiological functioning of the human body, with the basic purpose of an all-round harmonious development. The first author has been fascinated by gymnastics since his twenties by watching the score-10 (out of 10) performances of the Romanian gymnast Nadia Elena Comăneci (born on November 12, 1961) in the 1976 Summer-Olympic competitions in Montréal at the tender age of 14 years. Later, he had a chance to develop 3-D static (Kamal, 1996*a*) and dynamic (Kamal, 1996*b*) models of the human spinal column, which made him ever more passionate to visualize gymnastics as the overall comprehensive activity developing not only, muscles, but also, bones as well as strengthening skeleton. In 2008, he suggested use of moiré fringe topography in teaching gymnastic activities — studying movements in the sagittal plane (Kamal, 2008). In fact, the narrow conception of gymnastics, given in the beginning of this section, was the product of the industrial age. In the primary school, it is, usually, referred to as PT (physical-training). However, PT lesson has, traditionally, included a wider range of activities than would, usually, be found in a lesson of gymnastics, including movements, which have a compensatory or a remedial purpose — maintaining or restoring full physiological function as well as providing opportunities for agility on all sorts of apparatus. In order to derive full benefit from gymnastic-activities, students should be attired, properly, based on performance and safety considerations.

Table 1. Hairstyle, clothing and footwear for gymnastics

Description	*Boys*	*Girls*
	HAIRSTYLE	
Long hair	Tie in the form of (hair) bun[∈]	Tie in the form of (hair) bun[∈]
	CLOTHING	
Younger students	Briefs only[$]	Panties (Knickers) only[$]
		Asymmetric leotard[#]
		Regular leotard
Older students	Figure hugging half-pants[@]	Regular leotard, with stockings
	FOOTWEAR	
Indoors	Barefoot	Barefoot
Outdoors	Sneakers (Plimsolls) + pure-cotton socks[&]	Sneakers (Plimsolls) + pure-cotton socks[&]

[∈]exposing the upper-neck area
[$]no clothing above the waist
[#]baring dominant arm and neck area, *i. e.*, left arm for left-handed students and vice versa
[@]terminating just below knees, stripped-to-waist
[&]where barefoot is not possible

Gymnastic-clothing, for both boys and girls, should not be loose enough to get caught into apparatus or furniture. Loose clothing may fall over faces of students obstructing vision and causing serious accidents. It should not have loose strings or straps, also, for safety reasons (leotards with fancy strings, T-shirts or vests are not recommended for these reasons). Such items can get tangled into vault or asymmetric bars and may cause injury. Gymnastic-clothing should not have zippers, which may damage apparatus. Same reasoning is applied for dis-allowing watches and jewelry (bracelets, brooches, chains, rings, *etc.*) during an activity. On the other hand, clothing should not be too tight (at the waist and around thighs) prohibiting free movement as well as causing heating and irritation of genital areas (that is one of the reasons for not allowing primary-school students to wear thongs). Moreover, primary-school students get heated, quickly. Thirty-two years ago, American Academy of Pediatrics — Committee on Sports Medicine (1982), proposed "clothing of exercising child should be lightweight, limited to one layer of absorbent material in order to facilitate evaporation of sweat and *expose as much skin as possible*." Hence, it is recommended that younger students should be dressed in the barest minimum (*cf.* Table 1). The following additional benefits may be derived from this practice**:**

a) It should alert teachers to obese and wasted students.
b) The student would try to maintain a better posture, a balanced gait and an improved body image.
c) Air and sun exposure may give students adequate doses of vitamin D, which prevent *rickets* and *tuberculosis* (during early childhood), *scoliosis*, *kyphosis* and *lordosis* (during later childhood and adolescence), *osteomalacia* (during adulthood) and *osteoporosis* (during old age) — a guarded-graduated (*guarded* means strict surveillance of overexposure and possible harmful effects; *graduated* means a systematic increase of exposure so that the body may condition itself to increased doses) approach would build up sun-exposure tolerance and resistance to common colds (*cf.* argument *j*, entered below) and produce a layer of melanin on skin, which protects the pupil from acquiring skin cancer. Such practice would acclimatize child to the effects of heat (American Academy of Pediatrics — Committee on Sports Medicine, 1982). During initial contact with sunrays, it is recommended that the exposed body-parts of students should be covered by sunscreen of an appropriate SPF (Sun-Protection Formula) value (Kamal *et al.*, 2013*b*).
d) It would provide opportunity to observe unconscious posture as well as free movement.
e) Primary-school-age students grow rapidly. Fitting PE kit bought becomes too tight, quickly. Such clothing is bad for circulation and restricts movement. Too loose clothing, besides being unsafe for apparatus activities, looks shabby on the student.
f) Younger students get sweaty much earlier than older ones. Sweat-soaked PE kit worn during the entire exercise period (and, sometimes, in classes, afterwards — *cf.* Pakistani-school practices mentioned in section "Salient Features of the British and the Pakistani Systems") may cause skin infections, irritations and tan lines on arms and shoulders.

g) Upper part of PE kit gets dirty during free play, sand, mud and water activities. The last two may render the upper garment damp and wet, which could make the student catch cold or chest infection — this seems to be, probably, the prime reason of practice of many families throughout the world to let their kids remain un-dressed from the waist up inside their homes, according to Internet polls.

h) Undressing to undergarments instead of changing to PE kit may save money, allocated to purchase these garments, for economically-weak parents. The saved money could be diverted to purchase healthy foods, pay sport-activity fees and enjoy vacations.

i) Japanese consider that the students reared this way are stronger (capable of taking the pressures of school life in childhood and adolescence, *e. g.*, bullying, which may lead to schizophrenia and even suicide, and job-related pressures in teen years and adulthood) and more disciplined. They show lesser tendencies of resorting to violence. Hikari Kindergarten in Tokyo encourages stripping students to waist in the school and inside home. Communities, in the past, like Greece and Sparta adhered to similar practices.

j) Nikitin children in the suburb of Moscow, brought up in this fashion (these children are dressed minimally even in the coldest of winters), have shown very high IQ. One of the Nikitin kids completed a university degree, just, when he was 13-year old. Many schools in Russia now subscribe to this practice.

k) Whether it be Buddhists, Hindus or Muslims, spiritual maturity is achieved, when a male worshipper is required to strip-to-waist and cover the upper part of body using a loose sheet.

l) Increased tactile stimulation (touching) to back, arms, legs, may help kids learn better. In fact, our bodies are programmed in such a way as to respond, positively, to touch, which reduces our stress response, increases our level of oxytocin (a natural peptide responsible for promoting bonding), activates orbital-frontal cortex (area acknowledging pleasure, when one is exposed to pleasant smells) and enhances communication (Signy, 2012). Difficult concepts/words may be taught better, if figures are drawn and words are written on palms (Helen Keller sensed the words written on her palm), arms, feet soles, legs, back, neck, *etc*. Atkinson *et al.* (1981) show a figure in which image of a telephone, converted into a pattern of dots, is projected on the bare back of a blind woman, in the form of hundreds of tiny cones, which vibrate against her back, allowing her to feel the dot pattern and perceive the phone image.

Burton (1977) observes, "If children wear clothing that permits an unlimited rage of motion and allows for considerable tactile stimulation, movement experience is enhanced". Conduct of PE in underpants is most *efficient* (least time spent in changing, the saved time could be utilized in teaching and learning) and highly *effective* (allows teacher to observe body form, shape and spinal outline, making possible quality teaching) option for lower primary. According to Internet surveys, parents from all over the world expressed satisfaction if their primary-school children exercised in underwear. This had been the standard practice in England (Ministry of Education and Central Office of Information, 1952; 1953; Russell, 1975; Davies, 1954; Miller, 1955), Germany (Vendien and Nixon, 1968) and other European countries in the last century. Davies (1951) mentioned that in suitable weather or when working indoors in forties and fifties, English primary-school children wore trunks or knickers (panties) only. Kirchner (1970) has described adoption of strip-to-underwear procedure in the American setting, after taking into confidence the parents, "When they 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". This procedure reduced changing time from 12 to 4 minutes.

Further, it is not practical for primary-school students to change for PE and shower for the following reasons**:**

i) A private space, where students can change completely for PE would be difficult to arrange in primary schools — in Pakistani culture, it is considered inappropriate to disrobe completely, even, in the presence of same gender.

ii) Private shower cubicles would be difficult to arrange in most primary schools — communal showers are not acceptable in the Pakistani society.

iii) Younger students might need supervision while handling hot water, in particular — may be difficult to arrange in all schools.

iv) Time constraints in the primary-teaching schedule might not allow showers to be arranged for students.

At the end of a PE session, the students should rub their bodies with a towel (towel should not be shared by other students) to wipe off sweat before putting the school uniform back on.

Boys and girls should participate in gymnastics barefoot indoors and wear sneakers (plimsolls) and socks outdoors, where barefoot is not possible. Pure clean cotton socks should be used in order to avoid feet infections — disinfectant powder should be applied before putting on socks (Kamal *et al.*, 2011*b*). Long hair should be tied in the form of (hair) bun leaving the upper-neck area exposed so that teacher may see minutest deviations from the correct posture. Also, untied hair may get jumbled up in apparatus or furniture. Gym clothing should be white or light colored, so that it reflects off most of the heat rays. As mentioned above, it should neither be too tight (to cause

irritation of genitals) nor loose enough (to get caught in the apparatus), made of absorbent material and elastic bands at the waistline and around the thighs, good enough to hold the garment in place and not allow exposure of private parts.

Boys should do gymnastics stripped-to-waist, younger ones dressed in briefs only, whereas older students may put on figure hugging half-pants, reaching just below knees.

Suitable attire for gymnastic-activity of younger girls is panties (knickers) only, stripped-to-waist. Older girls may put on asymmetric leotard (with dominant arm and neck area bare, *i. e.*, right arm for right-handed students and vice versa), or regular leotard, the last one with stockings, if desired. Asymmetric leotard, although offering freedom of movement to dominant arm, may be more expensive. Younger girls may find leotard difficult to manipulate — a possible solution of this problem is adapting school uniform for girls, so that it consists of leotard, skirt, socks and shoes; for PE, these girls just remove shoes, socks and skirts to participate in movement activities. This may work well for countries with colder climate, *e. g.*, England, but would fail completely in Pakistan, where whether is hot and humid for nine to ten months.

In colder weather, while working outdoors, the students may be allowed to discard extra clothing at the start of an activity, provided care is exercised in ensuring that the students are kept warm during the entire activity period and mandated to put on extra coats, immediately, at the conclusion of the activity (Davies, 1951).

The rationale for gymnastic-clothing may be extended to a wider range of physical activities, without compromising comfort, safety and hygiene considerations. Adoption of such clothing becomes essential for rhythmic gymnastics and circus (which contains routines of gymnastic-performances). Tree climbing and maneuvering are the most primitive of gymnastic-activities. It should be interesting to note that *Tarzan* in nature movies, strictly, comp-lied with the dress code suggested in this paper. Due to safety concerns, girls wearing *shalwar*/*kameez* (common dress in the Indian subcontinent)[c], dresses, sundresses, skirts or miniskirts should not be allowed into play areas located in amusement parks, fast food places, *etc.* — garment getting caught up in equipment. Boys wearing *shalwar*/*kameez* or *lungi*[d] would pose the same problem.

Safety, performance and decency are the main reasons for not allowing students to enter swimming pool, unless they are attired in, proper, bathing costumes. The same considerations must be applied to activities involving any type of gymnastic apparatus located in any setting.

RECOMMENDATIONS

Physical education should not be limited to learning and teaching about human body, but a holistic approach encompassing physical fitness, character building, scholarship and emotional stability. "Leadership, morale, training and equipment" are the four core factors, which differentiate between a winning team and a losing team. The playing fields in the primary school are the breeding grounds of leaders of tomorrow. Hence, there is a dire need to elevate status of physical education from a pure-recreational subject to a core subject incorporating both health and physical education, which should be taught, jointly, by the school doctor and the physical-education teacher, under the supervision of a primary-physical-education specialist. The authors, very strongly, support the notion of training and hiring such specialists to inject new blood into the routine practices existing in primary-physical education, both at home and in England (Kirk, 2012).

According to Naqvi (2012), childhood seems to be the best time to incorporate health and healthy lifestyles, necessary to engage in healthy behaviors, in particular, during formal school education. Anita Ghulam Ali, educationist and CEO of Sindh Education Foundation is of the opinion, "What is taught at school regarding health has a direct impact on the community." The authors of this paper are of the opinion that there should be a close, two-way communication between school health team and parents. Parent education and support of PE activities through activity-describing worksheets and detailed fitness reports, combined with health channel on cable TV and websites related to activities, would bring out the desired results.

In order to have a homogeneous learning environment, it is recommended to create PE-learning subgroups in a particular physical-education class. Each of these subgroups should consist of students, with similar scores on motor-coördination quotient in *the Early-Childhood-Integrated-Developmental Examination*, just like academic-subgroups in a class, which should be made according to mental-ability quotient in the above developmental examination (Kamal, 2002). A physical-education teacher of the third millennium should act as a facilitator not as a commander (who works with the students, not makes the students follow orders, given out without consultation), focusing thinking and energies of students to appreciate movement experiences and accomplish complex feats.

End-of-the-Term Evaluation should consist of a short written examination (regarding healthy habits, in particular, nutritious foods) combined with performance as well as physical (clinical) examination. This examination should be graded, with the grades included in the cumulative grades of the students. Those students, who do not

Table 2. Exercise plans for primary-school students

Exercise Name	*Description*
Setting-up exercises (start of school day)	Stretching hands (palms together) to front and top of head (stretching body by standing on toes), reaching to toes such that knees are not flexed, exercising to relax neck muscles (chin up, chin down, neck turned to left and right at an angle of 90 degrees)
End-of-class exercises (for 5 minutes)	Stretching, bending sideways, bending to touch toes with knees extended, moving head up and down, rotating neck on both sides so that the respective chin is aligned with shoulder
Exercises to increase height (for stunted[ə] students)	Light-stretching exercises (bar hanging, mild stretching, summersault, cartwheel) Diet plan[©] should include calcium-, protein- and fiber-rich diet.
Exercises to gain weight (for wasted[∀] students)	Heavy exercises performed for shorter duration, consistently Diet plan[©] should include milk, potato items and protein-rich diet (meat, fish).
Exercises to lose weight (for obese[∃] students)	Light exercises performed for longer duration, consistently Diet plan[©] should include salad and yogurt.

[ə]Lesser height-for-age (below 50th percentile of height; our group defines stunting as height lesser than current-age-mid-parental height)

[∀]Lesser weight-for-height (percentile of mass lesser than percentile of height)

[∃]Excess weight-for-height (percentile of mass greater than percentile of height)

[©]All diet-based interventions would be ineffective if the student is suffering from vitamin-D deficiency (*cf.* Boxes 1 and 2)

who do not posses optimal weight-for-height (Kamal *et al.*, 2011*a*; 2013*f*) or proper height-for-age (Kamal *et al.*, 2013*c*) should be put on a diet-cum-exercise plan (*cf.* Table 2) under the supervision of a team consisting of dieticians and physical-education teachers (Kamal and Khan, 2013), combined with education about nutritious foods.

To gain weight, wasted student's exercise routine should consist of heavy exercises, performed consistently, for shorter duration during a typical day (Kamal *et al.*, 2013*h*), accompanied with milk, potato items and protein-rich diet, *e. g.*, meat, fish (Mozaffarain *et al.*, 2011) at the same time avoiding fiber-rich food. Obese student's exercise routine should consist of light exercises, performed consistently, for longer duration during a typical day ((Kamal *et al.*, 2013*h*), accompanied with weight-reducing food-items, *e. g.*, salad and yogurt. Stunted students should perform light-stretching exercises, *e. g.*, hanging from bar, mild stretching, summersault, cartwheel, accompanied by food consumption, which is high in calcium and protein as well as fiber, *e. g.*, bread (Kamal *et al.*, 2013*c*).

Incentives to maintain proper weight-for-height by recognizing healthy children through awards, gifts, scholarships and honor rolls may encourage students to alter their daily routine so that they can achieve these objectives.

The importance of a healthy breakfast cannot be underestimated. Parents and teachers have to join hands in persuading students to eat properly, before they arrive in school. There should be a column in diary of students, where parents can enter breakfast items taken in the morning. Those students, who arrive in school without proper breakfast, may be asked to first have breakfast and then join classes.

Students should arrive in school after a minimum of eight-hour-sound sleep. There are indications that sleep disorders contribute to obesity, depression, stroke and heart problems. In children, this, also, deters them from concentrating to acquire academic or motor skills. Developing pre-sleep rituals, like meditating, praying, stretching and performing yoga, eases transition from wakefulness to sleep (Hales, 2000). A long nap in the afternoon would, also, prevent sound sleep during the night. The recommended pre-sleep routine may include the following tasks (Kamal *et al.*, 2013*c*)**:** (*a*) performing light exercises after undressing to exercise-friendly clothing, (*b*) relaxed game of table tennis or working on jigsaw puzzle, (*c*) massaging with olive oil (to strengthen bones and skeleton), (*d*) consuming a glass of milk, (*e*) brushing teeth, (*f*) taking bath with lukewarm water — in the absence of bathing

Table 3. Morning inspection**:** Safety, hygiene and health (physical and mental)[Σ]

Inspection Component	*Description*
Safety	Blocking import of controlled substances: drugs, sharp objects and weapons (canine teams, observers, mandatory hand searching of school bags and clothing, sending carryon baggage through X-ray machine — shoes, clothes and other personal items carried close to body should not be X rayed)
Hygiene	General appearance, tidiness, hair (unbraided and separated) for presence of lice, nails, uniform, socks, vest, underwear, shoes (polished or not) as well as thorough inspection of feet
Physical health	Absence of communicable diseases (*e. g.*, infections, skin problems), physical abuse, bullying (investigate unexplained cuts or bruises[Ξ])
Mental health	Verbal abuse, peer pressure, neglect, signs and symptoms of destructive behavior, depression or schizophrenia (remote video-monitoring by educational psychologists)

[Σ]The students, who show slightest deviation from normal health statuses should be examined head-to-toe by school doctor before being allowed to mix with other students.

[Ξ]School physician must conduct a complete, unclothed examination of any student reporting for even a minor cut or bruise to rule out damages and abrasions to other parts of body as well as internal injuries.

facilities, washing of hands and feet, (*g*) proper drying of body, in particular, hands, feet (between fingers, finger and thumb, finger and toe) and inside of ears, (*h*) changing into fire-resistant pajama-shorts — most deaths in children occur, when their bed clothing and sleepwear catches fire, the main difference between exercise-underpants and pajama-shorts is that the former are form-fitting and made of absorbent material, whereas the later are loose-fitting and made of fire-resistant material — sleepwear may, preferably, be made in briefs/knickers (panties) style, elastic bands around the waist and the thighs offering proper protection; the practices of sleeping in day clothes or underwear should be discouraged, (*i*) getting into bed on time (regular hours for sleep should be maintained even on weekends) in a quiet sleeping room (distractions produced by opening and closing of doors with bright lights from adjoining rooms causing so much discomfort to, an already, tired student) with subdued-night lights (artificial lights, *e. g.*, computer-screen and smart-phone lights are more harmful as compared to electric bulbs and tube lights), so that the children rise up in the morning early enough to complete wake-up routine and have a proper breakfast — both parents should ask about good and bad things during the day (looking for early-warning signs of internal frustrations leading to destructive behavior) followed by storytelling or poem-reading. Avoid TV watching, Internet surfing or strenuous exercise just before bedtime — the first two tire brain and eye muscles and the last body muscles. Wherever possible, separate sleeping quarters should be arranged for boys and girls, so that they can enjoy their bedtime in a relaxed mode, wearing minimal clothing. If students are sleeping in air-conditioned room, they should cover themselves with a thick sheet or blanket to avoid catching cold. A simple back rub facilitates better night's sleep, according to *Journal of Holistic Nursing* — a three-minute, slow-stroke back massage improved quality as well as quantity (by about 36 minutes) of night-time sleep in patients suffering from dementia (Health Smart, 2013*a*).

There should be a morning (health, cleanliness and safety) inspection, covering physical and mental health as well as hygiene (*cf.* Table 3). The first one should focus on absence of communicable diseases (for example, infections, skin problems), whereas the second one is conducted for the purpose of uncovering any form of abuse (verbal, physical, sexual), peer pressure/bullying (any unexplained bruises or cuts should be investigated), neglect and tendencies to destructive/suicidal behavior (Kamal, 2011) as well as spotting signs and symptoms of depression (Wednesday, October 10, 2012 was observed as the World Mental Health Day — *Depression: A Global Crisis* was the theme chosen last year by the World Federation for Mental Health) or schizophrenia (Kamal and Jamil, 2012) supplemented by remote video-monitoring of behavior by educational psychologists. The hygiene portion of inspection should be devoted to looking for cleanliness related to hair, mainly checking for lice, nails, uniform, shoes, vest, underwear and socks as well as a thorough inspection of feet (Kamal *et al.*, 2011*b*). Boys and girls, stripped-to-underwear, should be checked in separate areas — hair must be unbraided and separated. Those presenting with the slightest deviations from normal health statuses (class teacher should compare current-day heath-status with the last seven entries to spot unusual findings) should be sent to school doctor for a complete

examination (with the student undressed), before allowed mixing with other students. Unclothed-morning-inspection practices are well known in Russian crèches. According to non-formal-information exchange, there are indications that selected schools in Asia, Europe and North America have adopted these practices. Visits to doctor shall be reduced if drills are arranged to reinforce practice of hand washing after activity programs, before and after eating and after responding to call of nature.

It would be best if the first period consists of light gymnastic-exercises, so that the morning inspection could be carried out more thoroughly as the students would be undressed for these activities. There should a logbook/register to note down the times of arrival and departure of each student as well as anything found in the morning inspection (to, legally, protect school authorities). Any unusual findings should be entered in student's diary and explanation sought from parents. Parents should be required to enter similar timings in the diary, so that any extra time spent by students during traveling is monitored. In case of an unauthorized absence, school authorities should call parents to rule out the possibility that a child left for school but did not reach there. Effective surveillance is the key to spotting internal injuries, possible abuse and may prevent student abductions en route to school or while going back home.

Setting-up exercises should be introduced in the school assembly — the first activity of a typical school day. These exercises should consist of holding hands (palms together) to front and on top of head (standing on toes), touching toes with knees extended and exercising neck muscles (up, down, sideways). At the end of every class, the students should be mandated to exercise for 5 minutes — stretching, bending on sides, touching toes without flexing knees, nodding head up and down as well as turning neck to left and right all the way so that their ears are aligned with the shoulders, focusing eyes to infinity and moving eyeballs to relax muscles of eye, moving fingers and wrists to increase circulation after computer work or writing. This should make the students active and pay more attention to the next lecture and the associated activity, whereas the teacher, who is taking more than one period, continuously, could use this time to relax and catch breath. There are indications that such vestibular rehabilitation reduces dizziness, as the moves teach the brain to adapt to movement (Health Smart 2013*b*). In case, the teacher observes signs of fatigue in some students, they should be provided rest and relaxation periods. There may be a provision of spare beds in health room, where such students can lie down and relax after removing their shoes, socks, sweaters, jackets and ties.

Clothing and shoes, appropriate for a given activity, must be mandatory to optimize safety and performance of students. Suggested clothing for gymnastics (based on technical and practical considerations) would find acceptability among conservative parents if physical-education classes were gender-segregated. Many of the problems regarding gymnastic- and sport-clothing, body image and preteen embarrassment would be avoided by adhering to this practice. The different physiques (of boys and girls), the different activity-styles, the different rates of growth and development as well as the different management-styles all suggest need for different curricula of physical education for boys and girls, which could be implemented efficiently and effectively, only in separate classes for boys and girls. This point would be illustrated by the following examples. If one observes boys and girls of the same age climbing a wall, boys would tend to outperform the girls. However, when it comes to cartwheels, girls can, easily, be recognized by the better shape of their cartwheels. Similarly, in a mixed group of boys and girls skipping, boys look like to be in difficulties, whereas girls look awkward, when it comes to throwing. "Yet, boys learn to skip and girls to throw" (Ministry of Education and Central Office of Information, 1952). Girls tend to excel in fields, where momentum matters. Boys are ahead of girls in feats, where a direct and a vigorous application of strength is required. Separate physical-education classes for boys and girls would, also, provide opportunities for the students to discuss, freely, issues related to gender-specific anatomy and physiology with the school doctor during their health-education classes.

Physical activities in the primary classes should consist of locomotor (based on translational movement of body center-of-mass, *e. g.*, running, sliding, walking — body center-of-mass shifts its position during translational movement) and non-locomotor (involving movement about body center-of-mass, *e. g.*, bending, stretching, twisting — movement about body center-of-mass is, mainly, a combination of rotations) movement activities (Miller and Whitecomb, 1969). Examples of such activities are athletics, gymnastics, swimming, table tennis and small-area games.

Games provide the students with opportunities to develop motor (coördination and balance) as well as social (coöperation and sharing) skills (Davis *et al.*, 1999). There is a need to have daily physical-education session at least for 60 minutes, out of which 30 minutes should be devoted to structured activities, which should include vigorous activity, diagnosis and learning of neuromuscular skills, educating about physical activity and fitness as well as enjoying the use of skills and knowledge. Recess ought not to be used as a substitute for organized physical-education instruction (Flinders and Thornton, 2009). All activities should have warm-up and cool-down sessions.

There should be age-appropriate competitions, *e. g.*, under 7, under 9, under 11 (some of them, specifically, focused on improving posture and gait). These competitions, organized during *Health and Sport Week*, would become

Box 1. Adverse effects of vitamin-D deficiency

Alzheimer's disease
Autoimmune diseases
Backache
Cancer
Chronic fatigue
Chronic flu$^{\subset}$
Delayed teething$^{\subset}$
Infectious diseases
Kidney stones
Kyphosis
Lordosis$^{\Leftarrow}$
Muscular and joint pain
Nullification of calcium-rich diet-plans
Osteomalacia$^{\Leftrightarrow}$
Osteoporosis$^{\subseteq}$
Progressively weakening eyesight
Rickets$^{\Rightarrow}$
Scoliosis
Skull-bone hardening$^{\subset}$
Tuberculosis$^{\Rightarrow}$

$^{\subset}$in very young children
$^{\Rightarrow}$during early childhood
$^{\Leftarrow}$during later childhood and adolescence
$^{\Leftrightarrow}$during adulthood
$^{\subseteq}$during old age

sources of talent hunt. Those exhibiting exceptional potential could be groomed in sport-specific clubs and schools, where the focus should be on developing sport skills, for example, batting, catching, climbing, dribbling, kicking, throwing, vaulting and volleying (Miller and Whitecomb, 1969). There is a tendency for club-organized activities to attract more children as compared to school-organized activities (Davis *et al.*, 1999). A special health week could be organized, when an epidemic strikes, such as *dengue* or *swine flu*.

A guarded-graduated-training routine would ensure health- as well as skill-related fitness (performance considerations) at the same time preventing exercise-related injuries (safety considerations). *Guarded* brings out the concept that, during various exercise phases, different body ligaments are in stable equilibrium, locally, whereas *graduated* implies that infinitesimal transformations relate sequential exercise phases (Kamal and Khan, 2013). As per advice of the American Academy of Pediatrics, approved by the Council on Child and Adolescent Health, an adjustment period of 10-14 days should be provided to implement a strenuous exercise program (American Academy of Pediatrics — Committee on Sports Medicine, 1982). This becomes, even, more important when the student travels to a warmer climate. Such a practice should make the child get used to the effects of heat. In addition, the intensity of activities lasting more than half-an-hour must be reduced, whenever relative humidity and air temperature exceed critical levels and the child should be fully hydrated prior to prolonged physical activity.

The importance of skin exposure to the morning (for the morning-shift schools) or the later-afternoon (for theb afternoon-shift schools) sun, as mentioned in the section on "Clothing for Gymnastics" (argument *c*), cannot be overemphasised (*cf.* Box 1). Such exposure is necessary to produce a critical level of vitamin D, a problem that is surfacing at a colossal level in the Asian countries, in particular, Pakistan — 600 IU daily dose is recommended according to the Consensus Report of the Institute of Medicine (November 30, 2010). Zahoor (2012) mentioned a UK study; in which 13 out of 14 found cases of vitamin-D deficiency were in the Asian children. Symptoms include backache, chronic fatigue, muscular and joint pain as well as progressively weakening eyesight. In very young children, it may contribute to chronic flu, delayed teething and hardening of the skull-bone. Untreated deficiency may cause Alzheimer's disease, autoimmune diseases, cancer, infectious diseases and kidney stones. Supplementation via intra-muscular injection, tablets or syrups, sometimes, fails to absorb and causes severe vitamin-D toxicity. Experts suggest that the most natural, the cheapest and the safest way is to expose students' skins to sunshine, at those times when sun rays are inclined and coming from a denser layer of atmosphere, so that intensity is reduced and harmful rays are cut down by absorption or removal from the main beam (Rybicki and Lightman, 1979). Initially, starting with a 10-minute exposure, gradually, increasing to 20 and later to 30 minutes, accompanied with 2-3-hour, fresh-air exposure in the shade (as there are no risks reported with this practice, the duration may be increased), with the students minimally dressed, exposing hair (unbraided and separated, spread along their backs), hands, arms, shoulders, backbone and back skin from external auditory meatus to waistline, legs from mid-thighs to feet. During this period, students may be engaged in light floor activities, involving drawing, singing, scribbling, playing jigsaw puzzles or board games (*e. g.*, ludo), *etc.* A structured activity may be story reading by the teacher. The teacher should sit facing the sun and the students must have their backs towards the sun to protect their eyes. In addition to direct exposure, indirect exposure from sun-soaked air and eating *sunshine foods* (fresh, ripe fruits, raw vegetables), also, contribute towards developing healthy bodies. The sun should, however, be treated with respect. Too much playing about in the sun may prove overtiring for a child (Brady, 1958). It is, extremely, important that vitamin-D deficiency be overcome, through natural sun-exposure, as soon as possible, because this condition shall prevent calcium to be, properly, absorbed and contribute towards strengthening the bones. This would, also, nullify all attempts to introduce calcium-rich-diet items (Kamal *et al.*, 2013*b*).

Younger students may be encouraged to undress from the waist up and wear shorts/ miniskirts to expose legs from thighs to shin, even during activities other than gymnastics. This would, automatically, reduce incidences of skin infections. The classrooms should be well lighted and ventilated. The practice of stripping -to-waist may be carried out in winter if the classrooms are properly heated. The authors suggest open-air-classroom instruction during pleasant weather, where the students, attired in a minimum of clothing, study outside exposing their bodies to fresh air and sunshine (*cf.* Box 2). This practice should strengthen, not only, their skeletons, but also, their eye-sights (studying in natural light instead of an artificial substitute), at the same time making them emotionally stable and effective team player, the concept extending from sport to personal (family, friends) and professional interactions. Desks and chairs should be of adjustable heights, so that students can maintain a proper sitting posture and avoid developing kyphosis. One may realize that every student would have a different sitting height, and so a standard size, averaged over students of a certain age group, would not fit anyone. It is important that correct body mechanics and posture are explained and taught to students. They should practice these learnt ideas (to maintain proper posture), when writing, reading, playing or, even, relaxing. Those, who are not able to maintain a reasonable posture during computer/Internet activity, may be required to use computer/surf the net, while standing, and indulge in light physical activity, while watching television. A new threat to the health of younger students has been identified by the American Academy of Paediatrics — inactivity (Hales, 2000). A proper balance of diet and lifestyle adjustment is needed by the primary-school students in addition to a guarded-graduated-exercise routine to achieve optimal fitness (Kamal *et al.* 2011*b*).

Box 2. Vitamin-D deficiency: Some facts and remedial measures

Recommended daily dose is 600 IU — *Consensus Report of the Institute of Medicine* (November 30, 2010).

13 out of 14 found cases were in Asian children — *UK Study*

Supplementation via intra-muscular injection, tablets or syrups fails to absorb at times — causes severe *vitamin-D toxicity*.

The cheapest, the most natural and the safest way is *exposure of children's skin to sunshine*, when sun rays are inclined and coming from denser atmosphere.

Start with a 10-minute exposure, gradually increase to 20 or 30 minutes + 2 to 3 hour fresh-air exposure.

During initial contact with sunrays, cover the exposed body-parts of students with an appropriate SPF sunscreen.

Students should be minimally dressed, exposing hair (unbraided and separated, spread along their backs), hands, arms, shoulders, backbone and back skin from external auditory meatus to waistline, legs from mid-thighs to feet.

Students must have their backs towards the sun to protect their eyes.

According to Tuckson (2013), "There is an urgent need and (an) increasing demand for creative physical education engagements to supplement the traditional physical education programs." The innovative ideas, presented in this work, should be tested in terms of efficiency, effectiveness, practicability and cultural acceptability (some of the most unconventional ideas are accepted in various cultures if presented, gradually, by applying techniques of social psychology), by first implanting as pilot projects in model institutions and laboratory schools so that the policy makers may be able to discover accurate and precise methods of appraising and assessing different types of educational processes (Sharma, 2005). Xiang *et al.* (2004) used achievement-goal theory to assess an elementary-physical-education-running program. A similar approach might be helpful to evaluate the approaches proposed in this work.

The above recommendations would be successful if the curricula consisted of developmentally appropriate practices. There is a need to extend *the Early-Childhood-Integrated-Developmental Examination* to age 10 or even higher age, so that we have a baseline, which could be used to check developmental (motor coördination) milestones (Kamal, 2002). Knowledge of the developmental milestones achieved during each phase (early childhood, later childhood and adolescence) would help interface primary-physical-education curriculum with the secondary-physical-education curriculum. Pickup and Price (2007) argue, "Primary physical education *is different* from secondary physical education and should, therefore, be treated as a special case within initiatives, policies and strategies." The most enriching experience is that the primary-physical-education teacher sees children in the early childhood as well as later childhood, which include prepubertal, peripubertal (prepubertal children, who are approaching puberty, indicated by a marked reduction in growth velocity) and pubertal children. Special exercises should be designed to cater for energy-channelization problems, *e. g*., tallness accompanied with wasting and obesity accompanied with stunting (Kamal *et al.*, 2014*b*), in particular, puberty-induced energy-channelization

(Kamal, 2014*b*). Additional file of this reference contains numerical examples of the above-mentioned and other phenomena, drawn up from data collected in a local school.

CONCLUSION

Comparing and contrasting Pakistani and English practices would serve a dual purpose. The territories, which constitute today's Pakistan, were part of British Empire during 1857-1947. Hence, our educational, cultural and value systems are, largely, influenced by British history and culture, which needs to be studied by physical-education policy-makers of this country (Trevelyan, 1978). The elite schooling in this country is dominated by examinations conducted under the British system. Further, there is a constant migration of families (back and forth) between Pakistan and England, which calls for a closer review of strengths and deficiencies of systems in both countries. It is hoped that such a discourse would open up a dialogue between the two countries on government and civil-society levels, resulting in policy changes (Carlson *et al.*, 2013) dealing with outdated practices and bringing out pragmatic, culturally-acceptable solutions conforming with findings of the latest scientific research, mainly from modern curricula of countries, whose cultural roots come from the English civilization, like Australia (Eshuys *et al.*, 1996).

The salient features of philosophy of physical education are development of body image and body language, sportsmanship, civic education, relationship building, networking, teamwork, developing concentration, conflict management and maintaining balance in life. Pre-participation physical examinations should improve safety and end-of-term examinations should enhance performance. Stripped inspections, performed on a daily basis, are supposed to contribute towards hygiene and prevent spread of communicable diseases. Physical activities should be preceded by proper warm up and end with cool down, accompanied by proper milk/water intake with the students properly attired, based on safety, hygiene and ease-of-changing considerations. The teaching of physical education would become effective if basic concepts regarding the meaning of physical fitness should be communicated to students at their level of understanding (Bucher, 1968). Student participation in interactive activities, *e. g.*, demonstrations, educational boards, models and posters, would encourage them to do research and share health-related information with classmates (Naqvi, 2012). Anita Ghulam Ali suggests that students form health committees (which should include community doctors, nurses and health workers) so that they could participate in health-awareness campaigns. It is, also, important that teachers, administrators and support staff of the primary schools understand the root causes of some of the major health issues, *e. g.*, obesity, facing the pre-adolescent (Odum *et al.*, 2013). Of course, nothing can change unless there is a support from home and parents change their beliefs and attitudes. This can be achieved by increasing parental awareness about child obesity (Aslam *et al.*, 2013), which, according to Casazza *et al.* (2013), must be based on facts instead of myths (persisting beliefs despite contradicting evidence) or presumptions (sticking with convictions in the absence of supporting scientific evidence). The First Lady of US, *Michelle Obama* has shown the vision to declare childhood obesity as national epidemic for her country. Kamal *et al.* (2013*i*) have attempted to provide quantitative recommendations to reduce weight in the next 6 months and provided guidelines for optimal-weight management (Kamal *et al.*, 2013*h*). Third-millennium goal of strong physical-education programs in primary schools should ensure a healthy workforce followed by a healthy old age, which would, in turn, contribute to a strong nation and a strong economy.

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lover, who passed away on February 4, 2013 — a memorial lecture in his honor was delivered on September 4, 2013 (Kamal *et al.*, 2013*f*). No potential conflict of interest is identified for this work.

ENDNOTES

[a]The concept of *optimal mass (weight)* was introduced by the first author in 2011 as the mass (weight), whose percentile matches with the percentile of current height (Kamal *et al.*, 2011*a*).

[b]The NGDS Pilot Project (http://ngds.uok.edu.pk) was initiated in 1998, which aims to establish a longitudinal-study database of heights and masses of students of primary schools in civilian and military schools, to establish National Growth and Developmental Standards for the Pakistani Children, based on Opt-in Policy. The *Informed Consent Form* is uploaded at**:** http://www.ngds-ku.org/ngds_folder/Protocols/NGDS_form.pdf[ce]

[c]*Shalwar* (resembling athletic trousers) is an article of clothing worn covering the area from waist to shin; *kameez* (resembling a long shirt) is put on the upper portion of body. These garments are common in the Indian subcontinent, the Middle East and the Far East.

[d]A plain cloth wrapped around waist covering the body from waist to mid shin

[e]SF-Growth-and-Imaging Laboratory serves the local community in the field of family-health care — our growth-monitoring program registers families with children, who have growth-related problems. A subproject of the NGDS Pilot Project, this program is, officially, recognized as SGPP (Sibling Growth Pilot Project). Families can participate by filling out and signing *the SGPP Participation Form* (http://www.ngds-ku.org/SGPP/SGPP_form.pdf), which explains SGPP protocols (http://www.ngds-ku.org/ngds_URL/subprojects.htm#SGPP) and provides links to reading material and procedure-photographs.

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