

A Students' Health Centre Design for Qatar

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Abstract

Introduction: School health services have the purpose of ensuring that all students are ready to learn by ascertaining that they are in good health. More than 2.3 billion school-aged children have been reported to spend a third of their days in the school environment¹. Such findings underscore the need to establish school health centers (SHCs) that exclusively promote students' physical, social, and psychological health of school children, yet currently non-existent in the State of Qatar.

Aim: The present paper aims to propose the establishment of SHCs in Qatar, and to envision the impact of these comprehensively and uniquely designed Student Health Care Centers (SHCs) for school children health and wellbeing in Qatar.

Student's Health Center Design: Qatar prioritizes student's health as part of its high-quality health care services. Qatar's student health will benefit from establishment of comprehensive school health center services.

Recommendation: This paper presents an SHC design that may be used in the State of Qatar. Identical SHC design may be applied in other countries also to improve the health, and quality of life among school children by creating a platform for rendering multidisciplinary health care services and health promotion to school children.

Keywords: School Health Program, School Health, Health Centers, Primary Health, Qatar

Introduction

The proposed School Health Centers (SHCs) are primary care facilities that mainly focus on providing comprehensive health care targeted to school children aged between 4 and 17 years old in Qatar [1]. The existing body of knowledge demonstrates a relationship between health status, quality of life, and academic performance among school children [2, 3]. School children with good health are more likely to fare better in their academic performance than school children with poor health [2]. The link that health status has with academic performance and quality of life among children provided unique insight towards the establishment of SHCs by the Primary Health Care Corporation (PHCC). This project aims to deliver the effective and efficient delivery of health services exclusively to school children. The new SHC design can be named as the Tolabi School Health Center (TSHC), where Tolabi refers to school children in Arabic language.

School health services have significant contributions towards achieving the common goal of education system and the healthcare system. In terms of the education system's goals, these school health services have a crucial role in managing school children's needs, especially those with chronic health problems [3]. The

services are also designed to help with easier access and referrals by linking students, health care providers, school staff, and the community to promote school children's health care in a safe and healthy learning environment [3]. The school health services aim to ensure all school children are healthy and ready to learn.

The SHCs evolved and developed following the public health nursing movement in the early 1900s [1]. School-based health services have been implemented in various countries, including the United States and Singapore [5]. Based on the current 2017 survey conducted by the National Assembly on School-Based Health Care census, approximately 2,000 SHCs are available in the United States. They operate nationwide, serving over 2 million preschool students through 12th grade [6]. In schools, SHCs improve access to care, enhance outcomes in terms of health and education, and increase levels of service satisfaction [7].

In 1954, School Health Services (SHS) were available to children through 15 units distributed throughout the State of Qatar under the Ministry of Education.

Law article of Cabinet Resolution No. 8 of 1971 provided the

guidelines for reorganizing administrative apparatus in the education sector. The decision to move SHSs from the MOE to MOPH was made based on the proposal brought forth by the MOPH and SHS was renamed as School Health Department (SHD). The authorization of the movement of the SHS was obtained through the final decision on 17/1/1990 by His Highness, the Amir of Qatar. Based on the above decision and authorization, a new article 2 was developed. Article 2 stated that as of 01/7/1990, the Primary Health Care Department (PHCD)'s affiliation with the SHS at the MOPH would perform all the tasks and responsibilities previously undertaken at the MOE through the SHD [8]. Development of the Emiri Resolutions No. 15 law which catalyzed the establishment of the Primary Health Care Corporation (PHCC) prompted the transfer of the PHCD to the PHCC [9].

The SHD had 61 staff members that included a family physician, pediatrician, ophthalmologist, optometrist, ENT, psychiatrist, clinical psychologist, psychologists, and Social workers. The department also consisted of dentists, dental assistants, nurses, a head nurse, nurse in-charge, a patient care attendant, pharmacist, pharmacist technician, lab technician, dermatologist, non-medical staff, and dietician. The staff members in the SHD were working in one building and provided services to the all schools in Qatar until it was rescinded.

In 2012, after SHD poly clinics were revoked, all students were referred to their respective health centers (HCs). The present article proposes the need to establish new health centers in Qatar under the Operation Directorate of the PHCC, targeting schoolchildren aged 4-17 years old.

A Students' Health Center Design.

The article discusses the health services delivered by a multidisciplinary team of service providers, including physicians, nurses, dentists, dental hygienists, dental assistants, pharmacists, laboratory technicians, social counselors, dietary counselors, researchers, and other professionals the field of health care. The health services that SHCs will provide include emergency, physical and dental screening for new and transferred school students, medical and dental treatment, immunizations, management of chronic diseases, primary medical care for injuries and illness, laboratory tests, referrals, and care coordination. Besides, school health services will include emergency, age-specific chronic illness management, immunizations, and primary medical care activities regarding handling illnesses and injuries. Moreover, to further enhance the comprehensive treatment, the students' health services will include laboratory tests and referrals in coordination with other health care facilities. Also unique to the designed SHC, are its research and wellness sections.

The SHCs seeks to improve the achievement of holistic health and wellbeing among school-aged children in Qatar. SHCs provides the opportunity to transform school children into healthy and well-informed adults with the ability to take care of themselves and their future children. The SHC seeks to improve the health and wellbeing of school children based on the following premises:

1. Providing child-centered care in a supportive environment.
2. Preventing the transmission of infection from adults to children.
3. Prioritized care with reduced waiting time for children.

4. Receiving all illness students and uncomplicated cases of emergencies directly from schools.
5. Significantly reducing the burden of existing PHCCs.
6. Enrichment center for Health Promotion and Disease Prevention Programs.
 - a. Mandatory Screening and Vaccination Services
 - b. Health Museum and Enrichment Center
 - c. Student Counseling Services
 - d. Skills Training Center
 - e. Wellness Center
 - f. Activity Oriented Health Laboratory
 - g. Conducting Health Fairs
 - h. Auditorium
7. Research Center for children.
8. Improvement in the academic performance of children due to reduced days of illness.

Provide Child-Centered Care in A Supportive Environment.

Children have distinct needs from adults in terms of medical and non-medical needs. Such needs are tailored to health services for children and adolescents. However, children's health care visits can be a challenging and stressful experience because they are unfamiliar with the health care environment and clinical procedures [10]. Such an experience can lead to anxiety and feelings of helplessness among children [11]. The most common negative response reported among children in health care visits is high anxiety levels that can affect their psychological health status. Besides, increased anxiety levels hinder children's efficacy to cope with treatment and lead to uncooperative behavior and negative attitudes towards their service providers [11]. The sense of helplessness, together with fear and pain, can also make children feel powerless in healthcare settings. Children's emotional responses during health care visits can contribute to aggressive behaviors, withdrawal, poor cooperation, and relapse [12]. Children also demonstrate a delay in clinical treatment and spend more time to complete medication. Feelings of helplessness also lead to reduced patient satisfaction. Hence children require more time and specially trained care providers who are compassionate [13].

Children are mainly disoriented in an undisclosed healthcare environment where they receive the necessary care with adults. The SHCs are exclusively developed for children because the healthcare facilities have significant impacts on a child's mind and body during their visit. The attractive medical environment, color scheme, child-friendly medical techniques, and reduced waiting time mitigate anxiety and stress levels among children during health care visits. Like adults, children are also affected by different types of diseases, and since SHCs emphasize children, the approach to address children's needs should differ from that used for adults. The health practitioner will apply their professional skills and competencies to ensure school children are comfortable with this. Using children-friendly equipment, administering drugs, and using effective and straightforward communication that complements children's understanding level will make school children feel comfortable and enjoy the experience of SHCs.

Infection Transmission from Adults to Children

Children are the most affected population by health-related infections. They are highly vulnerable to infections because of

developing immune systems and frequent visits to healthcare settings [14]. Social and human factors are among the risk factors for infection transmission among children. Factors, including children's closeness to adult patients in the healthcare facility, touching their mouths with infected hands, and their low immune responses, facilitates the transmission of infections [15].

Waiting rooms are the most affected areas in the healthcare facility that present opportunities and facilitate infectious agents' transmission to patients. The increasing outbreaks of infectious diseases like measles, tuberculosis, respiratory tract infections, Rotavirus, Varicella zoster, Pertussis, and other infectious-related diseases among children have been traced to physicians' workstations, including their offices or clinics [16]. The most common infection transmission route among children includes direct contact or physical contact with infected persons and vulnerable patients. Children are also infected through indirect contact, such as through contaminated surfaces, including hands, bedrails, equipment, and materials [17]. Such infections are mainly viral since most viruses such as respiratory and gastrointestinal viruses are viable on physical objects and surfaces for a couple of hours [17].

Children also get airborne infections through their exposure to infectious environments or substances. Airborne transmission often occurs due to infectious particles and aerosols of small droplet nuclei or skin squama's suspended in the air and spread by air currents [18, 19]. Organisms that because airborne infections are mainly found in corners, corridors, and in and out of windows where children can easily touch [18]. This airborne transmission poses a threat to children's health status and reflects the need to establish a health care approach to combat further infections. The concern of infection transmission from adults to children can be addressed by having exclusive SHCs for children.

Children visiting similar healthcare settings with adult patients also encounter crowded waiting rooms, reception, share similar space with unfamiliar people, and are limited to move in the facility freely. These experiences increase stress, which in turn, initiates reciprocal immune response through the release of hormones by the autonomic nervous systems²⁰. Besides, high levels of stress that children develop due to encounters in the healthcare facility lead to increased cytokines, including interleukin-6 and serum cortisol, which impairs the immune response, inhibits wound healing and affects the wellbeing of children [20]. Reducing the challenges that children face in the healthcare facility may help improve their health status and wellbeing.

Prioritized Care with Reduced Waiting Time for Children

Long waiting hours are detrimental as it can lead to delayed diagnosis and treatment, increased mortality and patient greater dissatisfaction rates. It is an essential indicator of healthcare quality and reducing the amount of waiting time reduces anxiety and stress in parents and children [21]. The best interests of children are mainly served when they receive care at a possible time. Therefore, reducing the waiting time for children can be achieved by establishing or opening pediatric clinics around the school. Existing evidence illustrates that the establishment of school clinics is crucial for coordinating health care assessments, plan and execute individualized healthcare plans for each student

in a more efficient and timelier manner⁴.

Significantly Reducing the Burden of Existing PHCCS

In Qatar, Primary Health Care Corporation (PHCC) serves more than 90% of the entire population by providing primary care services. The PHCC works in partnership with Hamad Medical Corporation (HMC), with expanded inpatient beds by approximately 25%²². In terms of a national workforce that serves the country's population, it is evident that PHCCs have the highest percentage of 21.1% of the workforce while HMC has 12.1% [22, 23]. Based on the report by HMC, it is evident that every year, up to 5000 children visit HMCs and PHCCs for treatment and follow-up practices [22]. The increasing patient load compared to the number of nurses attending patients within the PHCCs can make patients dissatisfied due to their perceptions that healthcare professionals may not provide proper care due to paucity of time, lack of patient-physical communication, and the nature of the disease. The high number of patients may hinder the development of an interpersonal doctor-patient relationship and impede patients' ability to seek preventive care advice in the facility [24].

Consequently, directing school children for health care services at SHCs will undoubtedly help ease the burden of seeking care at the existing PHCCs. In terms of the number of children visiting pediatric emergency, a survey conducted in 2017 showed that the visits are high, with HMC and PHCCs recording 598,885 visits compared to 258,608 ambulatory visits or calls with 2,339 life flight activations [23]. Therefore, introducing SHCs will help reduce the number of pediatric visits by widening the scope of SHCs for minor illnesses, routine care and follow up, and utilization of wellness facilities. Reduced pediatric visits will prevent overutilization of existing limited PHCCs facilities in the pediatric emergency units for non-emergency illnesses.

Enrichment Center for Health Promotion and Disease Prevention Programs

Based on the need to achieve health promotion, prevention, early intervention, and reduction of health risks, SHCs would be essential to educate school children on healthy behaviors they should practice into their adulthood. The SHCs also seeks to foster treatment by seeking improving children's attitudes towards appropriate health services.

Research Center for School Children

Establishing this will be crucial in ensuring a suitable environment for research and development on school children's health issues. Researcher involving disease epidemiology, knowledge, attitudes, behaviors, and practices of children, utilization of services, patient satisfaction, and quality improvement projects. Besides, the SHCs will provide a suitable environment to study the impacts of interventional programs, including training of schoolteachers and peer education programs.

Academic Performance Improvement Among Children Due to Reduced Days of Illness

The concept of SHCs originates from the assumption that health status, education and health are linked, and unmet clinical, emotional, and social needs impede student's learning. Students with good health status are more likely to show improved academic performance while poor physical and mental health poses adverse

effects on academic performance among children.

Services Offered by SHCs

School Health Centers will allow school children to find more comfortable access to comprehensive medical services provided by the multidisciplinary team of physicians, nurses, dentists, dental hygienists, dental assistants, pharmacists, laboratory technicians, social counselors, dietary counselors, researchers, and other professionals. The SHCs can be established in three geographical locations, which entail North, Central, and Western of Qatar. The SHC will aim to cater to school children's needs of several public and private schools in each area. Following the introduction or establishment of SHCs, parents may consent for their children to be assessed and treated during school hours. Parents may



Figure 1: Design for the students' health center 1st floor

School Students' Emergency Services

An emergency section for school students receives all the acute cases that come either from schools at the morning school duty for urgent treatment, and transfer a patient if urgently to the emergency department in a hospital if needed, or receive other cases that may pass during the day or night.

General Medical, Dental, and New Students Screening.

General medical services will include timely first aid, different health services for common health diseases, including sore throat, fever, gastroenteritis, and skin infections. Other general services that SHCs will provide are continuous patient monitoring, care coordination, and management with telemedicine and follow up for chronic diseases, such as diabetes, epilepsy, obesity, and asthma.

Also, age-specific medical services will be delivered in the SHCs. School children will receive treatment for acute diseases like flu, dental pain, age-appropriate asthma management, and diabetes management. Other medical services available in the SHCs will be primary medical care for injuries, immunizations, and emergency cases. These general medical services will be coupled with well-equipped medical laboratories and pharmacies. Referrals and coordination may also be required, and this will be provided with

also book an appointment with the SHCs and accompany their children. Besides, the school health center will allow students and parents more comfortable access to a safe and appropriate healthcare environment, allowing for proper assessment of children's health. Early assessment of students' health status and early treatment provision will reduce the suffering and improve children's school attendance and academic performance. The primary services offered by SHC include emergency services, general medical, dental, and new students screening, vaccination, health museum and enrichment center, health education, student counseling services, skill training, wellness, activity-oriented health laboratory services, and Health Fair (HF). A creative design for the students' health center has shown in Figures 1, 2.



Figure 2: Design for the students' health center 2nd floor

other service providers, including PHCC, HCs, HMC, and private clinics. General medical services will be provided together with dental screening procedures.

The impacts of oral health problems on school time are an essential part of school-based programs because most students miss approximately 52 million hours of school time annually [25]. Since most dental problems can be prevented, improving preventive care services for school children is essential. The school-based health centers in an era of health care reform will provide general services ranging from oral health education to preventative oral health treatment, emergency treatment, cavity treatment, malocclusion, and treatment of other dental diseases. The medical and dental screening will be performed on all enrolled school children.

Mandatory Screening and Vaccination Services

Screening and vaccination are also the mandatory services offered by SHCs. Following the establishment of SHCs, school children get mandatory routine screening, health care assessment and developmental processes, assessment of their nutritional habits, scoliosis, oral health, vision, hearing, and mental health status. School children can also receive mandatory annual flu vaccinations and tetanus vaccination, especially for adolescents.

Student Counseling Services.

Counseling services will include confidential, personalized, and tailored programs organized by liaising with parents, school staff, psychologists, counselors, and social workers to help in the early assessment, treatment, and referral of children with emotional and behavioral health issues. The close association between teachers and students for most of the day will help identify any behavior changes quickly. Due to developmental stage and particular problems, adolescents are considered a select group that requires a specific counseling service. Counseling is necessary to address adolescent health issues. The teenage stage is a process of emotional stress and strain, and children at this stage are often jostling in the pursuit of their independence and the need to seek guidance. Adolescents have the potential to make decisions than adults without taking into consideration the associated consequences. Therefore, the provision of timely support and counseling makes adolescents more equipped to cope with the anxiety of school examinations, depress prion, family-related stress, addiction to digital media usage, bullying, substance abuse, peer pressure, and other related behavioral issues.

Wellness

Wellness-based therapies will be integrated into the SHCs to provide physiotherapy, gym, sauna, swimming sessions, hydrotherapy, and aqua fitness for school children. The wellness-based therapies will facilitate lifestyle modifications and the establishment and maintenance of good health. The services will be accessed before, during, and after school hours to achieve productive health goals.

Research Center

The State of Qatar, in its research and policy agenda, prioritizes the health and wellbeing of children. In the last decade, substantial progress has been obtained from numerous researches globally. However, there are many problems in children's healthcare that remain unaddressed. A multi-dimensional approach would help understand illnesses that affect children and identify the most optimal treatment for them. Similarly, the various risk of illnesses related to environmental, social, biological, and psychological factors need to be investigated.

Various fields may be targeted during the conducting of dedicated research on children's healthcare. The fields include research into asthma, obesity, weight, exercise, substance abuse, addiction, mental and dental health. Moreover, performing risk behavior assessment and incorporating the research from targeted fields may enhance the steps towards improving children's health and wellness. At SHC, school-going children's quality of life will enhance by focusing on developing and implementing policies and programs suitable for the health care sector.

The inception of Dental Stem Cell Bank at SHCs

Stem cells refer to those cells that have extensive renewal capacity. They also possess daughter-cell generation ability, which is then set for differentiation. Stem cell therapy in regenerative medicine is slowly becoming prevalent [27]. To ensure that stem cell therapies and their future applications are harnessed during research into dental illnesses and wellbeing among children, researchers will need to establish a Dental Stem Cell Banking at the SHC.

Current Stem Cell Applications

Various stem cell applications are already in use in the health care sector. The illnesses where stem cell therapy has been used in treatment include leukemia and lymphoma cancers, Alzheimer's, Parkinson's disease, Multiple Sclerosis, Cardiovascular diseases, failure syndromes, Spinal cord injury, gum disease, failure syndromes, and cartilage repair.

Emerging Applications

Emerging stem cell therapy applications are in Crohn's disease, kidney disease, heart attack and defects, muscular atrophy, tooth loss, cerebral palsy, type 1 diabetes, stroke, and brain injury. Also, stem cell applications are being developed for tooth loss, facial reconstructions, and jawbone regeneration.

In the future, it is indubitable that dental stem cells will lead to enhanced health outcomes in children. The potential of stem cells may make dental stem cells preferred compared to hematopoietic stem cells. Hematopoietic stem cells are harvested from the umbilical cord and can only differentiate in the immune and blood-related cells. In contrast, dental stem cells' potential is unlimited because of their pluripotency. Pluripotency refers to a cell's ability to differentiate into several types of cells.

The harvesting of the dental stem cells may be removed from deciduous and permanent teeth. The human exfoliated deciduous teeth are used in stem cell extractions. When dental stem cells are obtained from permanent teeth, they are extracted from the supernumerary and impacted teeth, and those that are explicitly removed for orthodontic purposes.

Stem cell viability is relatively high, regardless of when the sample was obtained. New sample stem cells have been proven to have similar viability to those extracted twenty years earlier. By initiating Dental Stem Cell Banking at SHCs, the children's possibility of getting access to quality and effective degenerative disorder management will improve. Management of degenerative disorder management through the initiative will be enhanced by adopting regenerative therapies and their future advancements.

Activity-Oriented Health Laboratory Services.

Helping school children engage in health and hygiene-based activities and exercises at SHCs is an essential way of improving their ability to learn about health using an entertaining approach. The most common activity-based health activities that school children should engage in and that make learning a fun activity are building the food pyramid, fishing for healthy food, meditation of food digestion, heart functioning, kidneys and lung functions, tooth brushing, hand hygiene, and traffic safety.

Conducting health fairs

When schools participate in Health Fairs at the SHC, students stand to benefit in various ways such as:

1. Providing opportunities for them to explore the community's and other students' interests in healthcare.
2. Enhancing health awareness among the students.
3. The fairs will equip the students with knowledge that they may use to educate others on health-related illnesses and disorders and the various health behaviors that may lower a person's risk of getting poor health outcomes [26-28].

Skill training service.

Training plays a crucial role in equipping school children with the necessary and invaluable life skills. Training also aids in developing and improving communication skills, self-confidence, and teamwork among students. School administration must establish special training sessions for school children to deliver age-specific training based on the age groups. In the training program, first aid, nutrition, hand hygiene, oral hygiene, menstrual hygiene management for adolescent girls will also be incorporated to train school children on self-care behaviors. Having fun and adding scenarios to act as one of the medical or dental professionals will attract students to enroll in medical or dental fields.

Auditorium & Health Museum

This section outlines the educational tour, health education, and Enrichment Services.

Educational tour.

An educational tour is a prearranged school visit. Children visit a health museum to gain a rich immersing experience in an informal setting. In SHCs, the Health museum has a crucial role in improving school children's awareness and educate them on health, the human body, fun facts, and games.

During the Health Museum, students will learn about various medical and dental specialties through posters and films. Also, an introduction to the first Qatari medical and dental professionals in Qatar, the history of the development of medicine, the different medical and dental tools used in the past and present. Children will also receive health information pamphlets and leaflets for use in reinforcement after the visit. Health museums will also be available for school staff to increase their knowledge of various health fields and encourage students to join the medical field later. This museum will stimulate high school students to think about entering any of the medical specialties, and it will also show the State of Qatar's needs for different medical fields.

Health education.

The SHCs will provide an auditorium where national health and dental events will occur. That will facilitate outside learning and give educators enough space to teach school children versatile, age-specific health-related topics, including nutrition, healthy snacking, eating disorders, body hygiene, and oral health. School children will also receive education on adolescent health, lifestyle education to prevent non-communicable diseases, digital addiction and screen time, and cyber safety. This health education aims to improve the health literacy of children. The educational sessions will also include posing children questions on health care, painting, games, and other fun activities to enhance students' interest and attention as they learn. Health information literature on different health topics will be made available. Besides, Schools can participate in various health activities by arranging in advance to present it to other schools that will attend the educational theater at the time allotted for it.

How will the Services be delivered?

The operations of SHCs will be under the PHCC in collaboration with Hamad Medical Corporation (HMC) and Ministry of Education for both public and private schools. To ensure that all schools are adequately served, the SHCs' locations will be

distributed based on geographical ranges and boundaries. The number of SHCs in a geographical range or boundary will depend on the students, workers, and schools in the area. The auditorium and museum theater can be in one of SHCs and not in all.

Facilities within SHCs

The SHCs facility will consist of emergency services, patient reception, the triage room, general physician clinics, optometrist clinics, ENT clinics, and dental clinics. The SHCs will also have Radiographic imaging rooms, medical laboratory rooms, pharmacy, student counseling office, research center, administration offices, health museum, wellness center, activities-oriented health laboratory, and the auditorium.

SHCs Staff

The SHCs staff will involve family physicians, pediatricians, ENT specialists, Ophthalmologists, psychologists/ student counselors, and general nurses. In addition, it will involve dentist, pedodontist, dental hygienists, dental assistant, optometrist, social workers, dietary counselors, pharmacists, physiotherapists, and lab technicians. Other staff members of SHCs are radiologic technologists, researchers, lifestyle coaches, receptionists, and administration staff.

Recommendation

This paper presents an SCH design that can be used in the State of Qatar. Due to its efficacy, the SHC design may be applied in other countries to improve the health and quality of life by creating a platform for lowering infection rates and risk factors.

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