HYGIENE PRACTICES IN CHILDREN AND ADOLESCENTS TO PREVENT COVID-19 TRANSMISSION

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Socio-economic outcome of long-term SARS-CoV-2 pandemic poses a major health risk to children. A high number of neurological disturbances and nutrition-associated problems are reported. Hygiene is one of the most important measures to avoid the novel coronavirus infection. Children and adolescents commonly constitute a special population, as disease severity in this group significantly differs from that in middle-aged and senior groups. Lockdown and transition to remote learning result in numerous reasons for emotional stress such as a dramatically altered way of life and education, and an important reduction of physical activity. The basic hygienic measures for children and adolescents included lockdown and transition to remote learning. An altered way of life caused strong emotions and poor academic achievements. As time passes, based on numerous statistical data, we can conclude that the role of children in the infection transmission and spread is insignificant. In spite of doubtful effectiveness of transition to online learning and an abundance of negative consequences for children's mental health, some authors report that closure of schools resulted in a reduced number of those affected and decreased mortality rate. Hand hygiene is a very important way to prevent the spread of infections. Hygiene promotion aimed at children and adolescents is lacking during the pandemic, as explanatory talks are mainly given by parents.

Keywords: children and adolescents, hygiene, COVID-19, coronavirus, lockdown, epidemic control measures, remote learning.

Author contribution: in this article, we provide a framework for reviewing 150 global literature sources.

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САНИТАРНО-ГИГИЕНИЧЕСКИЕ МЕРОПРИЯТИЯ ДЛЯ ДЕТЕЙ И ПОДРОСТКОВ ПО ПРОФИЛАКТИКЕ COVID-19

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Главная опасность для здоровья детей от SARS-CoV-2 связана с социально-экономическими исходом длительной пандемии, имеется информация о повышении количества нервных расстройств и проблем с питанием детей. Санитарно-гигиенические мероприятия стали одними из наиважнейших мер по борьбе с новой коронавирусной инфекцией. Дети и подростки, как правило, составляют особенную группу пациентов, так как у них течение заболевания может ощутимо отличаться от средней и старшей возрастной группы. Карантин и переход на дистанционное обучение предполагает разнообразие причин эмоционального стресса, среди которых: сильная перемена образа жизни и обучения, а так же кардинальное уменьшение физической активности. Основными санитарно-гигиеническими мероприятиями в отношении детей и подростков стали переход на дистанционное обучение и разнообразные карантинные режимы. Перемена общепринятого образа жизни сопровождалось мощным эмоциональным стрессом и понижением плодотворности процесса обучения. По истечении определенного времени набралось много статистических данных, позволяющих сделать вывод о малосущественной роли детей в передаче и распространении инфекции. Вопреки спорной эффективности перехода к онлайн-обучению и множеству неблагоприятных последствий для психики детей, отдельные авторы сообщают, что закрытие школ содействовало уменьшению количества заболевших и снижению числа летальных исходов. Гигиена рук считается важным элементом инфекционного контроля. «Направленная» на детей и подростков популяризация гигиены во время пандемии отсутствует, и в основном разъяснительные разговоры ложатся на родителей.

Ключевые слова: дети и подростки, гигиена, коронавирусная инфекция, карантин, противоэпидемические мероприятия, дистанционное обучение.

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SARS-CoV-2, the novel virus belonging to the family of coronaviruses and causing a number of atypical respiratory diseases, was first identified in Wuhan of China's Hubei province [1]. Among the first 27 reported hospitalized cases, most were epidemiologically related to Huanan Seafood Wholesale Market. The main symptoms of viral infection were fever, cough and chest discomfort. In severe cases, dyspnea and bilateral pulmonary infiltration were developed. The acute respiratory syndrome associated with the novel viral infection is called SARS-CoV-2 (COVID-19). COVID-19 has rapidly spread around the globe. In March 2020, the WHO declared a coronavirus pandemic. By April 2020, 1,436,198 confirmed cases of COVID-19 have been reported worldwide with an almost 6% mortality rate [2].

The COVID-19 pandemic produced a significant influence on every human business area. First and foremost, the healthcare system was altered. Integrative strategies aimed to prevent a fast growth of those infected were developed in an urgent order [3].

Particular emphasis was given to sanitation and epidemic prevention measures, as etiotropic treatment was not possible due to a lack of sufficient data about pathogenesis and course of a novel disease. During the pandemic peak, the only possible way to reduce the infection mortality rate was re-profiling of already registered and used drugs, as it took time to create and release a qualitatively novel drug and/or vaccine [4]. Various measures were introduced such as lockdown, isolation, social distance, transition to distance learning and working. State strategies were aimed to avoid unnecessary social contacts in order to slow the disease spread.

Children, adolescents and elderly normally form a special population. The course of their disease can significantly differ from that in middle aged and senior groups. According to numerous sources, children usually have mild symptoms of COVID-19 and have little to do with the spread of the coronavirus [5]. Thus, it is interesting to review sanitation and epidemic prevention measures for children and adolescents accepted during the pandemic and estimate their effectiveness.

PATIENTS AND METHODS

The study method included a literature review of 75 articles concerning the course of the novel coronavirus infection in children and adolescents, prevention of and measures preventing the spread of COVID-19. Every article describes sanitation and epidemic prevention measures, used in different countries of Europe, Asia, Africa, North and South America during COVID-19 pandemic.

STUDY RESULTS

COVID-19 is a viral disease accompanied by a severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Though SARS-CoV-2 typically presents with respiratory symptoms, it is also capable of influencing the cardiovascular system, gastro-intestinal tract, liver, kidneys and pancreas, and causing central and peripheral neurological impairment [6].

COVID-19 is a highly contagious disease transmitted from human-to-human by droplets or aerosols. According to statistical data, children make up 1–5% of all reported cases of COVID-19. Children normally have milder symptoms as compared to adults. In 90% of cases, no symptoms, mild symptoms or moderate symptoms are diagnosed. However, severe cases can be observed in up to 6.7% of cases. Severe cases normally occur in infants under 1 year of age and in children with underlying conditions [2]. There is no evidence for mother-to-child virus transmission. However, the neonates who have a close contact with an infected person can catch the disease as well [7].

Although medical literature shows that children are minimally susceptible to COVID-19, they mostly suffer from the psychosocial impact of the pandemic. Lockdown and home schooling can contribute to a greater emotional stress as compared to physical sufferings caused by the virus [8].

Closure of schools due to COVID-19 affected 87% of the world's students. For the majority of them, the educational regimen was qualitatively new. The sociological survey, hold in March among Shanghai pupils of primary (4) and secondary (342) schools, showed that the most common mental illnesses were anxiety (24.9%), depression (19.7%) and neurotic disorders (15.2%). However, about 21.4% of those surveyed were satisfied with the novel educational mode and school closure [9]. By the middle of April, schools were closed in 192 countries and about 90% of schoolchildren and students (about 1.6 billion people) shifted to remote learning (RL) [10].

Italy was the first COVID-19-hit country in Europe. In Italy, 16% of residents are children and adolescents. Many state schools were deprived of technological support necessary for remote learning. By the end of March, only 67% of schools shifted to learning from home covering 6.7 million children out of 8.4 million available [11]. Supporting children with limited learning disabilities was a great challenge.

In March 2020, it took 10 days to close nursery schools, day care centers, and almost all schools and colleges in the USA. The lockdown measures were unprecedented: 21 million children in kindergartens, 57 million schoolchildren and 20 million students in colleges and universities were shifted to remote learning [10].

In developing countries, children from low-income families have a limited access to online learning and depend on free school meal. The first lockdown made the South African Pediatric Association plead for coming back to schools. It recommended to implement an educational practice with minimal risk of contamination and material support for schools located in areas with poor resources [12]. Schools of Brazil also report an increased number of emotional disorders (anxiety, depression, sleep disturbance, posttraumatic stress disorder) and nutrition-related problems. Moreover, local schools were closed for more than 200 days, or much longer as compared with schools in the majority of developed countries such as Denmark, France and Germany [13].

In spite of a very low morbidity and incidence of COVID-19 among children, it was established that school closures reduced a number of those exposed per week and improved mortality rate [14]. The French Pediatric Society published clinical guidelines stating that children under 10 years old don't contribute significantly to the epidemic. In children, the risk of secondary infection is very low, whereas outbreaks are rare [15]. School opening in South Korea was postponed several times, face-to-face learning consisted of 4 stages for different classes and lasted from May 20 to June 8. School opening here wasn't accompanied by a sharp increase in the number of affected children; children with COVID-19 represented 7% of the total COVID virus detection rate in the country [16]. Israel reported a large outbreak of coronavirus, which occurred in May 2020, or 10 days after reopening of schools. 153 children and 25 staff members with COVID-19 were revealed within a short period of time [17].

Return to in-person learning will prevent disruption in the lives of children and adolescents. Another important reason was that online distance learning resulted in a poor performance. Intervals in in-person learning were linked with poor academic achievements, especially in primary school. Using a model analysis, Bao et al. predicted that reading skills in children from kindergartens would be worsened by 66% as compared to in-person learning, leading to a reduced growth of reading skills (by 31%) from January 1, 2020 to September 1, 2020 [18]. Primary school teachers insist that in-person learning is necessary, whereas high school teachers prefer a combined learning (when in-person and distant learning are used together) [19].

Measures of social distancing are introduced for a long time (more than several months). One of the most important state strategies is to minimize isolation-related economic and social disturbances [20].

Thus, the Coronavirus Act issued in England on March 23, 2020 during the first outbreak, announced a strict lockdown with a wide strategy of epidemic surveillance to monitor COVID-19 in children. Among children, the first cases were reported on February 29, 2020. A number of COVID-19 cases initiated its growth in the second week of March, reached the peak on April 11, 2020, and slowly decreased afterwards. The tendency corresponded to that one in adults [21].

According to Roche et al., isolation of all groups, which is practiced in many countries (including Russia), can be significantly less effective than targeted isolation of young and middle-aged people [20]. Experience of many countries shows that only over 1% of children were affected even during the peak of the epidemic [21]. There is also a low risk of COVID-19 spread in schools. Case studies in Guangzhou, Italy, Australia and Netherlands showed almost no virus transmission from children to adults [22]. Public health education and healthy lifestyle promotion are always considered as important components of disease prevention measures. However, their role becomes crucial during outbreaks of diseases and healthcare emergencies [23]. The WHO recommends to use respiration devices, masks and gloves due to a long-term incubation period and symptomless course of COVID-19 in some patients [24]. The drug-free modalities form a barrier restricting droplet and airborne transmission, enabling to control epidemic in its early stage and protect vulnerable groups of population [25]. There are currently no messages aimed specifically at children. The need can be replenished by video-/cartoon-based entertainment and educational activities, which are of most importance to promoting good hygiene habits on a long-term basis and preventing recurrent infections [23].

In its application, the South African Pediatric Association provides the following comments on safety measures: masking is not recommended for children under the age of 2 due to risks of suffocation. Children over 4 years old should wear masks, especially when they return to schools [12].

Hand hygiene is a very important way to prevent the spread of infections. Proper hand washing can stop the virus spread and reduce the risk of contamination among schoolchildren from 6% to 44% [26]. In their study, Chen et al. examined hand-washing behavior of schoolchildren. Handwashing survey was conducted among 8.569 children aged 6–13 years old. 80% of those surveyed had been in Wuhan with 51.95% of them being there right before the lockdown. Only 42.05% of primary school children showed excellent knowledge and conscious handwashing behavior. Researchers expected to obtain better results [25].

Smith et al. conducted a large-scale hand hygiene study among adolescents of 12–15 years old in 80 countries. It was interesting that in upper-middle-income countries they never or seldom washed their hands before eating. There was a less probability that people with a low socio-economic status performed proper hand hygiene [27].

DISCUSSION OF RESULTS

It was the first study of global epidemic control measures during the COVID-19 pandemic. Cumulative world's experience devoted to management of sanitary and epidemiologic measures preventing the spread of COVID-19 shows that children commonly suffer from milder symptoms of COVID-19 as compared to adults. It was supposed that transmission without symptoms can contribute to the spread of infection. However, numerous sources report that the role of children and adolescents in COVID-19 spread is insignificant. SARS-CoV-2-related health threat is rather associated with socio-economic consequences of long pandemic than with COVID-19 itself. An increased number of mental disturbances (anxiety, depression, sleep disturbances, posttraumatic stress disturbance) and nutrition-related problems are reported. Hygienic measures relate to the best precautions against the novel coronavirus.

CONSLUSIONS

Hygienic measures are widely used precautions against coronavirus. During the outbreak, no data were available on the possible etiothropic treatment of the novel disease and effective re-profiling of already registered drugs. The main state strategy included social distance and healthy lifestyle promotion used to slow down the infection spread and reduce COVID-19-related morbidity.

The basic hygienic measures concerning children and adolescents embraced transition to distant learning and numerous lockdown modes. An altered way of life was accompanied by a strong emotional stress and decreased effectiveness of education. As time passes, based on numerous statistical data, we can conclude that the role of children in the infection transmission and spread is insignificant. In spite of doubtful effectiveness of transition to online learning and an abundance of negative consequences for children's mental health, some authors report that closure of schools resulted in a reduced number of those affected and decreased mortality rate. Hygiene promotion aimed at children and adolescents is lacking during the pandemic, as explanatory talks are mainly given by parents.

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