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THE EFFECT OF SCHOOL RETURN DURING THE COVID-19 PANDEMIC ON
CHILDREN'S PHYSICAL AND MENTAL HEALTH

A Capstone Experience/Thesis Project Presented in Partial Fulfillment
of the Requirements for the Degree of Bachelor of Science
with Mahurin Honors College Graduate Distinction
at Western Kentucky University

By

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ABSTRACT

Flashback to midnight on January 1st, 2020. It was New Year's Day, the beginning of a new decade. Many were filled with excitement and hope to make this year the best one yet. Little did they know that their entire world would be turned upside down a short two months later with a worldwide pandemic, the coronavirus. COVID-19 has affected people in many ways. Some lost their jobs, others struggled to maintain their education virtually, and unfortunately, too many lost their lives. As a nursing student, fear grew while imagining the role of becoming one of the frontline workers battling this invisible enemy.

One of the most challenging and divisive decisions during this pandemic has been what to do with schools. While no one knows for sure what the right choice is, through a nursing perspective and love for children, the investigator wonders how today's youth is facing this pandemic, and what impact social isolation and a sudden halt in their everyday routine and schooling has made on them. This thesis will examine the effect COVID-19 has had on the pediatric population, both physically and mentally, and how re-opening schools plays a factor.

I dedicate this thesis to my parents, Jenny and Brad, and my brothers, Cole and Clay, who have supported and inspired me throughout my education. Thank you for keeping a smile on my face during a challenging yet rewarding four years of college. I also dedicate this thesis to my late grandmother, Yvonne, my inspiration for becoming a nurse.

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INTRODUCTION

It is an understatement to say that the entire world has changed since the coronavirus disease-2019 (COVID-19) pandemic hit. It is caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) and originated in Wuhan, China. It did not take long to spread to countries across the globe, including here in the United States (U.S.). COVID-19 is causing many deaths, as well as burdens to families, long-term care facilities, hospitals, and even schools. During this unprecedented epidemic, it is hard to know what actions to take to keep our country safe, especially when there is still so much unknown about the virus. With only a few thousand confirmed cases, the U.S. took precautions quickly to avoid the further proliferation of the disease. The U.S. issued new guidelines to avoid social gatherings, restricted travel, closed bars, movie theatres and schools. Despite the advice from the government leaders and the Centers of Disease Control (CDC) the case numbers continued to rise. It is hard to say what could have happened if we did not take action as soon as we did.

One negative consequence of the COVID-19 pandemic is the downfall of the educational system. The coronavirus created a near total-shutdown of both public and private schools across the country, causing a historic event in kindergarten through 12th grade education. Additionally, many universities converted to a virtual format, closing college campuses throughout the U.S. Experts speculate that the coronavirus may permanently alter the mode of education. There is much discussion on whether schools

should be open or closed during this pandemic, and what effects this has on today's youth. It is important to keep U.S. citizens safe from this invisible enemy, but it is hard to interpret what effect a sudden halt in children's everyday routines has had on them.

While many of the effects of COVID-19 to our country, and the entire world, are able to be recognized, the detrimental long-term damage that is occurring due to school closures is yet to be determined. From a nursing perspective, it is important to discover how the coronavirus is affecting children physically, and what role this population plays in the transmission of the virus. Furthermore, is significant to recognize children experiencing mental health issues secondary to the pandemic. School leaders must weigh the risks versus the benefits of online learning and develop a safe plan to return to school.

SECTION ONE: THE CLINICAL MANIFESTATIONS AND TRANSMISSION RATES IN CHILDREN

To begin, it is important to understand what COVID-19 looks like physically in children. How sick does this infection make patients younger than 18, and what signs and symptoms do they display clinically? Are children playing a major role in the transmission and spread of the coronavirus?

Clinical Manifestations

Though pediatric research is still limited on this fairly new phenomenon, many pediatric journals have striven to fill the gap of knowledge and conduct studies to determine how COVID-19 presents in children. According to Ding et al.'s (2020) meta-analysis, fever (51.2%) and cough (37.0%) were the most common symptoms, and 17.4% of children were asymptomatic altogether. Additionally, out of 371 cases, five developed a critical illness that required intensive care, and two deaths resulted (Ding et al., 2020). Findings were similar in Hoang et al.'s (2020) systemic review of 7,780 pediatric patients, with fever (59.1%) and cough (55.9%) being the most frequent symptoms, and only seven deaths (0.09%). Bialek et al. (2020) suggest similar findings, stating that "56% of pediatric patients reported fever, 54% reported cough, and 13% reported shortness of breath, with 71%, 80%, and 43%, respectively" compared to adults ages 18 to 64 years. These findings continue to trend throughout more journals, including

“Prevalence, Clinical Characteristics, and Outcomes of Pediatric COVID-19: A Systematic Review and Meta-analysis.” Badal et al. (2021) also reported that the most prevalent manifestations in symptomatic pediatric patients were fever (55%) and cough (45%) of 1,810 pediatric patients.

Other less common symptoms reported include nasal congestion and rhinorrhea (28%) and digestive tract symptoms including nausea, vomiting, diarrhea, or abdominal pain (24%) (Ding et al., 2020). Fatigue (18.7%) and headache (67%) were other manifestations reported (Badal et al., 2021).

Laboratory and Imaging Findings

Regarding frequent abnormal laboratory findings among pediatrics, leukopenia/lymphopenia (28.9%) and elevated creatine kinase (20.1%) were most common (Ding et al., 2020). Leukopenia or lymphopenia are medical terms used to describe low white blood cell counts in the body. White blood cells play a major role in infection in the body, and as our bodies are exposed to a virus, such as COVID-19, white blood cells are used to help fight the toxin. Creatinine kinase is a type of protein found in skeletal muscles, the heart, and the brain. There are many reasons why this protein can be elevated, and infection is most likely the reason in this case. Other abnormal laboratory results include elevated ferritin (26%), procalcitonin (25%), and c-reactive protein (19%) (Badal et al, 2021). These levels also have many causes for elevation, but inflammation or infection, again, is most likely the reasoning.

A common imaging tool used in respiratory disease are chest x-rays, but most pediatric patients had normal results (Hoang et al., 2020). Children diagnosed with

pneumonia secondary to COVID-19, though, presented with “ground-glass opacification” in CT scans (36%) (Badal et al., 2021).

Transmission

The transmission of COVID-19 among children is an important concept to discuss, especially regarding the decision whether or not to send children to school. According to Rajmil (2020), a rapid scoping review determined that 75 to 100% of COVID-19 cases were the result of family transmission, and there is no overwhelming evidence to suggest that “children are transmitters to a greater extent than adults.” In addition, Lee & Raszka (2020) conducted a systemic literature review to discuss the extent to which children are responsible for the transmission of COVID-19. This systemic review includes the results of multiple studies. The authors cite a report from Geneva University Hospital from March to April 2020 in which 39 evaluable households found that only three (8%) children were the suspected index case (Lee & Raszka, 2020). These findings are consistent with other investigations, including Qingdao Women’s and Children’s Hospital from January to February 2020 in which only one COVID-19-related hospitalization resulted from a child to adult transmission. Lee & Raszka (2020) concluded that accumulating evidence argues that children, particularly school-aged, are far less important drivers of COVID-19 transmission than adults. A similar systematic review concluded that individuals age 20 and younger are “20 to 56% less likely to contract [COVID-19] from infected individuals than adults,” suggesting they play a less significant part in transmission (Sheikh et al., 2020).

These findings are comparable to the study conducted by Heavey et al. (2020) in which all pediatric cases of COVID-19 attending Irish schools identified “no cases of

onward transmission to other children or adults within the school and [a] variety of other settings.” Heavey et al. (2020) also found that the only documented transmission that occurred in the cohort was between adults working in an environment outside of school. Ludivigsson (2020) presents parallel findings, stating: “we identified 700 scientific papers and letters and 47 full texts were studied in detail...children accounted for a small fraction of COVID-19 cases and mostly had social contacts with peers or parents, rather than older people at risk of severe disease.” Children are arguably primarily interacting with individuals of the same age, for most of their time is spent in school or extracurricular sports and activities, rather than older people (Ludivigsson, 2020).

Of course, there is data suggesting the opposite, as well. Kelvin & Halperin (2020) argue that despite clear evidence that children do not develop notable disease, children can be facilitators of viral transmission because of the lack of symptoms. Bialek et al (2020) also suggest that because children are more likely to be asymptomatic or have a mild disease process, that they are “likely playing a role in transmission and spread of COVID-19 in the community.” Kim et al. (2020) found that a majority of those children that transmitted the disease were household members. These household members range in age and prevalence of co-existing diseases, so the child does have a chance of transmitting disease to population members with higher mortality rates. Hyde (2020) presents the same argument, stating that children do have the potential to play a role in community transmission. Citing public and private school systems across the globe, Hyde (2020) specifically states that after the U.S. closed schools in all 50 states in March, “a population-based time series analysis found school closure was temporarily associated with a marked decrease in COVID-19 incidence and mortality.” While school

closures are difficult for children and their families, one must weigh this against other potential harms to the community (Hyde, 2020).

Implication

To summarize the findings of clinical manifestations and transmission risk, children are likely to be asymptomatic or have minimal symptoms such as cough and fever. Pediatric patients are at very low risk of developing severe consequences, and death rates across literature are also very low. There are multiple laboratory and imaging diagnostics that are abnormal, but most of these levels are in response to inflammation and the body identifying and fighting infection. While transmission risk is arguable across various works, data shows that children are not the primary drivers of the infection, but there is always the chance that they could transmit the virus, especially with vague or no symptoms, to populations with higher risks. There is an urgent need for more data regarding specific transmission rates and vigorous contact tracing to determine more specifics of children transmission.

SECTION TWO: THE MENTAL HEALTH IMPACT ON CHILDREN

Another important consideration regarding children and the coronavirus pandemic is mental health. Are children being affected by quarantining together with family for months and leaving their normal lives and daily routines behind? Are children experiencing mental health issues due to the pandemic and the closure of schools?

Mental Health Related to the COVID-19 Pandemic

One major change that the world underwent during the pandemic is the appropriate guidelines to reduce the spread of COVID-19. This includes the “social distancing” phenomenon, in which all members of the community are responsible for keeping space between oneself and others to reduce the chance of contact with those who carry the illness. This also includes the recommendation of staying home and not gathering in large crowds. For the pediatric population, and adolescents in particular, this is a major change. According to Erik Erikson’s Stages of Development, a common theory used in nursing practice to consider the developmental stage a patient is in, school age children (6 to 11 years) must cope with social and academic demands at school to lead to a sense of competence. This stage is called the “industry vs inferiority” stage. Additionally, adolescents (12 to 18 years) are in the “identify vs role confusion” stage in which social relationships are most important. This age group needs to develop a sense of self and personal identity in order to develop (Perry et al., 2017). With the social

distancing guidelines, these stages are altered, effecting key factors in adequate development. From a nursing perspective, one may wonder if this sudden halt in going to school and being able to see peers is impacting the development and mental state of the pediatric population.

Considering this, Oosterhoff et al. (2020) conducted a cross-sectional quantitative study to examine adolescents' motivations for social distancing, their engagement in social distancing, and their mental and social health. The sample consisted of 683 adolescents residing in the U.S. between the ages of 13 and 18 years. This study was advertised on various social media platforms and participants self-selected to complete a 10-minute survey. Some of the questions included, "in the past 7 days, to what extent did you engage in social distancing?" and "in the past 7 days, I felt sad," in which the participants answered on a 5-point scale (Oosterhoff et al., 2020). Almost all respondents (98.1%) reported engaging in at least a little social distancing. In addition, across all models, the conductors of the survey did not find evidence of an association between degree of social distancing engagement and any indicator of mental or social health (Oosterhoff et al., 2020).

While Oosterhoff et al. (2020) were not able to find significant evidence of an impact on mental health related to social distancing, Jiao et al. (2020) found that fear and anxiety were occurring in children. Jiao et al. (2020) used a cross sectional quantitative design to determine children's psychosocial needs during the epidemic. The sample consisted of 320 children and adolescents aged 3 to 18 years residing in China (Jiao et al., 2020). This study utilized a questionnaire which incorporated DSM-5 criteria. The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5 criteria) is

a diagnostic tool published by the American Psychiatric Association (APA) which serves as means to diagnosis mental health disorders. Some questions included topics such as poor sleep and fear of asking about the epidemic and the health of relatives. The findings suggest that the rates of fear and anxiety were higher in children residing in highly epidemic areas; however, the differences between areas identified by different levels of epidemic risk were not statistically significant (Jiao et al., 2020).

Imran et al. (2020) also argued that the COVID-19 pandemic has had a significant psychological impact. Imran et al. (2020) cited a recent study conducted in China that screened children and adolescents for behavioral and emotional distress due to the pandemic. “Clinginess, distraction, irritability, and fear that family members can contract the deadly disease were the most common behavioral problems identified” (Imran et al., 2020). Imran et al. (2020) also suggest that an increase in screen time, specifically the “excessive media coverage of the pandemic” can lead to “increased incidences of Post-Traumatic Stress Disorder (PTSD) and other mental health disorders.”

Saggioro de Gigueiredo et al. (2021) argue similar findings, suggesting that COVID-19 has a multifactorial impact on children and adolescent populations, and these populations can experience both short- and long-term consequences. Saggioro de Gigueiredo et al. (2021) state that immediate behavioral and social consequences include distress, hopelessness, irregular food intake, abuse, trauma, interpersonal and environmental restraint, and sensorial deprivation and neglect. These short-term effects can possibly lead to long-term consequences such as underdeveloped brain circuitry, obesity, substance abuse, lack of emotional processing, psychiatric disorders, and suicidal thoughts. Saggioro de Gigueiredo et al. (2021) specifically blame changes in daily routine

and uncontrolled reestablishment of daily activities, leading to frustration and the inability to cope. Saggiaro de Gigueiredo et al. (2021) urge for health policies and government involvement to treat the issue, as well as the need for more research, proper support, and treatment.

Mental Health Related Specifically to School Closures

While most evidence supports an impact on pediatrics' mental health related to the pandemic, one may ask if this impact is increased related to school closure. A systemic literature review conducted by Lee (2020) measures the global impact of educational disruption. This literature review sites a survey conducted by Young Minds, which included 2,111 participants up to 25 years of age with a mental illness history in the U.K. This study found that 83% of participants say the pandemic had made their conditions worse. The study concluded that this pandemic has been a challenging time for some young people, including quotes from students who are experiencing this: "Going to school had been a struggle for some... prior to the pandemic, but at least they had school routines to stick with..." "I have had a huge wave of fear that I might contract the virus and thus cannot make it to the exams." Lee (2020) also noted that there is a gap in research on how these large-scale disease outbreaks affect ordinary citizens, especially children. The author concluded that not much is known about the long-term mental health effects of large-scale outbreaks on children.

Similar findings present in Tang et al.'s (2021) cross-sectional online survey of 4,243 primary and secondary school students in China. According to Tang et al. (2021), the three most prevalent symptoms were, "anxiety (24.9%), depression (19.7%), and stress (15/2%). In addition, "senior grades were positively correlated with

psychopathological symptoms and negatively associated with life-satisfaction (Tang et al. 2021). With these negative effects, though, came resilience, and participants who had discussions with their parents about their fears regarding COVID-19 experienced less depression, anxiety, and stress. Because of this, Tang et al. (2021) concluded that parents have an important role of providing open communication with their children to help cope with mental health problems.

Phelps & Sperry (2020) also address children's mental health needs as a national public health issue. Children with a history of trauma, living in lower socioeconomic households, and having lost a loved one to COVID-19 have a particularly increased risk of experiencing mental health effects. Phelps & Sperry (2020) also bring to the forefront that some children do not have access to behavioral health services, and some count on schools to help deal with traumatic stress and other mental health needs. The authors point out that there is limited discussion about behavioral and mental health issues among schools since the pandemic, and there is a need for coping skills and other services (Phelps & Sperry, 2020).

Implication

Throughout all research journals, it is undeniable that the pandemic has been challenging for students worldwide. Some studies do not find any significant correlation between school closures and a decline in students' mental health, but across findings it was clear that the pandemic has increased fear and anxiety in many children. Regardless, consensus of all authors is that there is a gap in research in this area, and that not much is known about the long-term mental health effects of large-scale outbreaks on children.

SECTION THREE: SCHOOL CLOSURE RECOMMENDATIONS FROM A NURSING PERSPECTIVE

Considering the physical and mental impacts that the coronavirus has made on the pediatric population, now one must decide if schools should reopen or stay closed. The investigator also considers this decision from a nursing perspective, and the guidance that nurses should provide to parents and children regarding this choice.

Consequences of School Closures

Despite the obvious increased risk for spread of the virus, there are still many positives for children to return to school. According to Betz's (2020) literature review, there are consequences that may arise from staying home and disrupting daily activities and friendships. Betz (2020) points to the data reported worldwide that indicates lower rates of infection in the pediatric population; in Iceland, no children under 10 years of age were reported positive, and only 0.8% of those 10 years of age and older were infected. In Italy, "children younger than 18 years of age accounted for 1% of the total population infected with COVID-19...none of these children died...[and] in the United States, as of August 6, 2020, 380,174 children have been infected representing 9.1% of the COVID-19 population" (Betz, 2020). Betz (2020) goes on to say that children are being exposed to new family stressors because of school closures, including uncertain financial situations and family member outcomes. Of particular concern are children in poverty, for children

in that population depend on schools for food and academic resources and, often times, have limited access to internet or computers required for an online educational format.

Sheikh et al. (2020) present similar consequences. Not only are children missing out on their educational experience, causing lifelong implications, but “children from deprived backgrounds are at increased risk of hunger from missing free school meals, domestic violence, and the poverty that ensues from parents being unable to work because of daytime caring responsibilities” (Sheikh et al., 2020). Again, children that are members of vulnerable populations in society depend on school for food. Additionally, young children are unable to stay home alone, depending on parents or guardians to stay home. This can cause a significant decrease in a family’s income, especially when jobs are not as lenient in childcare. This could further decrease the availability of children’s basic needs, such as food and shelter, and cause additional stress. Esposito & Principi (2020) discuss this further in their piece “School Closure During the Coronavirus Disease 2019 (COVID-19) Pandemic,” also arguing that school closure’s negative effects can lead to even greater medical, economic, and social problems. Regarding childcare, Esposito & Principi (2020) state that “to take care of the youngest children when daycares and schools are closed, parents must remain at home, with inevitable economic consequences.” Furthermore, if these parents happen to be health care workers, it could also cause medical effects. In the U.S., “it has been calculated that the absence from work of 15% of health care workers may be associated with a significant increase in COVID-19 mortality” (Esposito & Principi, 2020).

Another vulnerable population one must think about are those with chronic disease or special needs. Dooley et al. (2020) states that in the US, 14% of public-school

students receive special education, and “these populations are heavily reliant on schools for services to help them learn and develop in a healthy manner.” Hamilton (2020) is a pediatric nurse and a mother of a child with cystic fibrosis, and she uses her experience to explain the losses of children not attending school, “including the physical aspects of safety, food and shelter, as well as the emotional-social aspects of an in person of the home-based education.” Hamilton (2020) explains that this population experience higher rates of mental health issues, and “this potential increase in mental health issues may result in even more difficulties with home-based learning.” Children with special needs often depend on the school setting for particular educational tools, such as speech-language services, counseling, and physical or occupational therapy. These assistances are likely limited without in-person school, as providing these services are challenging using a virtual format.

Considering the alternative to in-person schools, an online format has been instituted by many school systems. While this is a great substitute for some students, one must consider the entire student population. Esposito & Principi (2020) look to a 2015 National Institute of Statistics study in Italy in which of those living in the poorest areas of the country, 41% did not have access to a personal computer or tablet. In addition, of households in poverty with at least one child, “only 14.3% could guarantee distance learning (Esposito & Principi, 2020). This issue exists in the U.S. as well. One must also bear in mind access to adequate, high-speed internet. Even households that can provide tools such as computers and tablets still may not meet internet requirements, especially those living in rural areas. These considerations contribute to a “diminution of educational opportunities” (Larcher & Brierley, 2020). Some households may be limited

in their capability of providing home-based learning. Hamilton (2020) emphasizes the “many factors that can limit a family's ability to deliver effective age-appropriate home-based learning,” including, “parental work schedules, parental education, parental mental or physical health issues, as well as technology availability.”

Diving further into the issues that arise from online schooling, Dooley et al. (2020) refer to a study highlighting considerations of Black, Hispanic, and Native American students. Research during the pandemic shows that this student population had “less access to electronic devices, internet connectivity, and quality virtual learning programs” (Dooley et al., 2020). Because of which, these students may experience additional learning loss compared to other student populations. Dooley et al. (2020) also bring to the forefront the “disproportionate burden of disease and death due to COVID-19 that this population experiences,” as well as the effect of employment type, with “just 19% of those whose jobs were not flexible planned to...keep their children home.”

Benefits to School Closure

While it is clear that there are many advantages to children returning to school, for many of the consequences mentioned previously would be eliminated, one must consider the other side. What may happen, especially if done poorly, if schools reopen? Of course, there would likely be an increase in COVID-19 cases, as the risk of exposure increases. Betz (2020) reports a spike of 179,990 children with COVID-19 from July 9 to August 6, “demonstrating the ever-changing nature of this pandemic.” Sheikh et al. (2020) refers to a recent systematic review on school closures that concluded 2 to 4% of coronavirus-related deaths could be prevented from closing schools.

Because some children acquire an asymptomatic disease process, and others present with vague symptoms such as cough, fever, and fatigue, it can be unclear if children at school are transmitting the virus. Vermund & Pitzer (2020) argue this point in “Asymptomatic Transmission and the Infection Fatality Risk for COVID-19: Implications for School Reopening,” stating that the average child “comes into contact with more people than the rest of the population.” Additionally, the pediatric population arguably does not adhere to hand hygiene practices, increasing the risk of spread. Vermund & Pitzer (2020) also suggest that children do not follow social distancing or mask wearing, either, though modeling by parents and teachers may better encourage these practices. University students, as well, who reside in dormitories, which are crowded, high-risk environments, have an increased risk of spreading COVID-19.

Keeling et al. (2020) compare eight strategies for reopening primary and secondary schools in England summer 2020 and found that reopening schools in any format “results in more mixing between children...hence transmission of the disease.” Keeling et al. (2020) also found that the scope of that surge is dependent on the age groups and behaviors of the pediatric population. As we discussed before, the adolescent population relies heavily on social relationships to achieve adequate development. Therefore, older children are more than likely to have a larger number of social acquaintances and a greater risk for transmission.

Ziauddeen et al. (2020) found similar results, though urging a return to school to avoid “further disadvantaging education and social development.” Mandatory face coverings may be hard to enforce, especially in younger children, and social distancing measures may be hard to follow. Additionally, Ziauddeen et al. (2020) suggest that the

use of personal protective equipment (PPE) is limited in instances where it was previously used, and face masks may limit the “visual cues and engagement with the teachers that children may have experienced in the past, making for a less pleasant experience.” Without these measures used effectively, transmission rates may also increase. Vermund & Pitzer (2020) also consider the costs for PPE, such as masks, shields, and gloves for cleaning.

Another consideration to keep in mind are children with underlying chronic disease. As discussed previously, this population suffers from consequences related to school closures, such as limited access to services and increased risk for mental health issues. Despite this, Abrams et al. (2020) explain the risk of school return for students with underlying disease such as asthma. While this population has a high risk of missing out on educational opportunities when schools reopen, they have an increased risk of complications if they contract COVID-19. Medication adherence and strict disease control are recommended to manage disease and decrease risk of serious complications if contraction of COVID-19 occurs. In regard to asthma, which is a common disease in this population, children may require ongoing review of inhaler technique and adherence to a personalized asthma action plan (Abrams et al., 2020). Additionally, Abrams et al. (2020) explain that respiratory symptoms that occur with asthma can be similar to those of COVID-19, increasing risk of being sent home. Suggestion of rapid testing services may need to be put in place to reduce this.

School Return Strategies and Guidance from the Nurse

It is apparent there are both consequences and benefits to school closures. If and when particular school systems decide to open their doors again, it is important to

develop strategies and implement safe practices to decrease the chance of COVID-19 transmission as much as possible. Strategies include guidance from the CDC that the public has received, including mask-wearing, social distancing, and staying home if and when presentation of symptoms occur.

Sheikh et al. (2020) describe four formats for schools to choose from, all in which with the same goal of enabling the “safe return of as many learners and staff as possible whilst maintaining physical distancing.” The first strategy proposes school closures be maintained until a vaccine can be administered at sufficient levels to achieve herd immunity or until proper treatment is found (Sheikh et al., 2020). While this is a safe option, differing opinions exist regarding what a sufficient number of vaccines means. Additionally, it is difficult to determine when treatments will be approved and agreed upon. A second approach involves the complete reopening of schools once the effective reproduction number, or the number of people that a person will infect with COVID-19, is well below one (Sheikh et al., 2020). Without thorough contact tracing, this may be hard to determine, and this does not consider future peaks or waves of the virus. The third strategy suggest a partial reopening of schools so there are fewer number of students at school at any one point (Sheikh et al., 2020). This seems to be a popular choice, as many reopened schools in the US have utilized this suggestion. This makes the social distancing guideline easier to implement, as well. A fourth plan is a hybrid approach in which “in-person classes are live-streamed to those who for example need to be shielded because of underlying chronic disease or have the capacity to study from home” (Sheikh et al., 2020). This is another popular choice seen in the U.S. and would reduce many of

the consequences discussed earlier. However, this strategy depends on virtual students having access to high-speed internet and devices such as a personal computer or laptop.

Regardless of the strategy that a school chooses, it needs to be accompanied by contact tracing capability so that any student or faculty member that acquires the virus can be traced and isolated, and so other students and faculty that were in contact with that person can be notified. Rapid tests would also be beneficial to screen children and faculty or to eliminate COVID-19 as the cause of symptom presentation. Additionally, temperature and symptom screening should be implemented to decrease chance of transmission. Regular, thorough cleaning of schools as well as instruction on proper handwashing are other methods to decrease the chance of transmission. Esposito & Principi (2020) propose similar strategies as opposed to total school closure, including a reduction in class size, social distancing, and the encouragement of proper hand hygiene.

With both clear benefits and risks to reopening schools, parents or caregivers of pediatrics may seek advice and support from health care workers, including nurses. Due to scientific uncertainty and conflicting opinions, there is no perfect choice whether or not to send children back to school. As a nurse, one should offer families with evidence-based guidance and resources in order to make their own, informed decision. As Hamilton (2020) says, pediatric nurses are “uniquely posed to advocate for children, especially those with chronic disease and special needs within our clinical areas and communities.” From a nursing perspective, the investigator empathizes with individual circumstances, and while school return is ideal, some families may decide that an alternate virtual format is better suited in their situations.

CONCLUSION

To conclude, it is undeniable that the pandemic has been challenging for children and adolescents worldwide. Clinically, the pediatric population has a lower risk of developing a critical enough COVID-19 illness that requires intensive care. Some present with no symptoms, while the most common manifestation consists of cough and fever. Other common symptoms include fatigue, headache, nasal drainage, shortness of breath, and gastrointestinal effects such as nausea, vomiting, and diarrhea. Some laboratory changes may also occur, the most common being a decreased white blood cell count and creatinine kinase. Others include elevated ferritin, procalcitonin, and c-reactive protein. These changes are likely a response to inflammation and infection to the body, and typically do not cause long-term consequences. Additionally, imaging diagnostics present normally unless the pediatric patient acquired pneumonia as a complication, presenting as ground-glass opacification in CT scans. Transmission rates have conflicting evidence, though the consensus over most literature describes a lower transmission rate than adults, signifying that the pediatric population is not a primary driver in the spread of COVID-19. Nevertheless, the potential for spread is always possible, as the transmission rate to household members is high and can cause detrimental consequences to those of older age and coexisting health conditions.

Regarding a mental health impact, both from the pandemic itself, and specifically resulting from school closures, conflicting evidence also presents. Some studies do not

find a correlation between school closures and a decline in students' mental health, while others found a clear increase in fear and anxiety. Many children with mental health effects were residing in highly infected areas or had family members or friends that had passed away due to COVID-19. There was also an increased risk of mental health effects on those with a history of mental health illnesses, as well as children in lower socioeconomic households that no longer had access to counseling services and time with peers. Other factors include excessive media exposure and stress related to families' financial state and the changing format of school. The underlying theme across research, though, is the urgent need for more research, and the need for parental and school involvement to provide resources and open communication.

Whether schools should open or close also brings about conflicting opinions and uncertainty. There are evident consequences of long-term school closures and undeniable costs of a total disruption in daily activities and friendships. Results include a lack of access to food, shelter, and tools required for virtual learning, such as internet, computers, and tablets. Those in lower socioeconomic groups and with chronic disease or special needs in particular are negatively impacted. However, there is risk of increased COVID-19 cases if and when schools choose to reopen. The pediatric population does not typically comply as well to hand hygiene, social distancing, and the proper use of PPE. In addition, because children typically present with vague symptoms or no symptoms at all, it is also hard to determine how extensive the spread is. There are multiple strategies for schools to implement to ensure safety when opening again. Regardless of the plan, it is clear that schools should implement thorough contact tracing, symptom screenings, and teaching of effective hand hygiene, proper mask wearing, and social distancing.

Furthermore, there is still much unknown regarding the long-term mental health effects of a pandemic on children, and a gap in research that needs to be addressed.

Despite much research, the investigator still believes that the choice of returning to school versus continuing a virtual format at home should be up to the individual parent and caregiver. While research shows that children are not as susceptible to the virus as adults, nor transmit the virus as easily as adults, this is an unprecedented time. Based on this review of current research, nurses should provide education to parents on both the benefits and risks of going back to school. Additionally, nurses should provide children and adolescents with resources to help with their mental health and fears surrounding this pandemic. Nurses should teach both children and their parents on methods to prevent the spread of COVID-19, such as hand hygiene, wearing a mask, and social distancing. Additionally, this information should be taught to teachers who are returning to in-person school. While this has been a challenging time for all people alike, the investigator believes that children are resilient, and with the right guidance and support, the pediatric population will be successful.

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