

Chronic Illnesses and Student Academic Performance

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Abstract:

Innovations in healthcare have improved survival in children with illnesses previously considered fatal. Chronic illnesses in school-age children are increasing significantly, and these children are at higher risk for school problems than their healthy peers. To review the state of research on the impact of chronic illnesses on student academic performance, we reviewed original studies that investigated the relationship of child development, cognitive abilities, and academic achievement with common chronic illnesses. Research reveals evidence that chronic illnesses have both direct (educational impacts) and indirect (social and psychological impacts) impacts on education. Specifically, epilepsy, asthma, diabetes mellitus, cancer, congenital heart diseases, and Human Immunodeficiency Virus infection affect student achievement and some specific areas of cognitive ability. Success at school for the chronically ill student requires the coordinated efforts of educators, parents, students, and medical professionals. This review also proposes ways to assess and assist children with chronic illnesses in different educational settings. Hospital schooling, homebound instruction, and school-based interventions are examined. The critical aspects of each educational service are discussed with recommendations for educators and healthcare practitioners.

Keywords: academic performance, chronic illness, identification, intervention

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Introduction

A number of childhood diseases that were previously fatal can now be successfully treated and cared as chronic illnesses.¹ Chronic illnesses are defined as physical conditions that affect an individual's ability to function for intervals longer than three months, or for a duration of hospitalization longer than one month.² Chronic illnesses include: asthma, cancer, diabetes, chronic renal impairment, epilepsy, congenital heart anomaly, obesity, and hematologic diseases. While survival have improved, a critical consideration of their impact upon school performance is required.

Approximately 15.0% of school-age children in the United States³ and Europe⁴ suffer from chronic illnesses, and 50.0% of these children experience some degree of school performance problems.⁵ A common pitfall in the management of these students is the assumption that the treatment outcomes of chronic illnesses are solely medical. Although educational problems in children with chronic illnesses may not be severe enough to catch the attention of teachers and parents, these children are usually falling behind when compared to their healthy peers and also children with other educational disabilities.⁵ This review considers both the current views regarding the impact of chronic illness and the recommended management strategies aimed at enhancing a child's school performance.

Common impacts across illnesses

The impacts of chronic illnesses can be divided into three major categories: social impacts, psychological impacts, and educational impacts; all of which influence a child's school performance in both direct and indirect ways.

Social impact

Children with chronic illness are at higher risk for developing social impairments compared to their peers

because of limitations associated with their chronic illness. They have fewer social opportunities to communicate with their healthy peers, restricted play physical activity capabilities, or feelings of alienation from peers.⁶ They are also at an increased risk of being bullied by peers because of their special care needs.⁷ Both children and their parents have reported deficits in social competence.⁶ Social skill interventions are necessary for some children with chronic illnesses who have severe problems. An assessment of social competence, including parent and child perspectives, should be provided to guide intervention decisions.⁷ The inclusion of children with chronic illnesses into a traditional school setting with consistent school attendance provides them with opportunities for developing peer relationships and contributions to a child's social competence.^{8,9}

Psychological impact

Approximately one-fifth of children with chronic illnesses have emotional or behavioral problems¹⁰ that are also likely to impact child's academic performance.¹¹ Although these problems are normal responses to their illnesses, early intervention and even prevention are needed when they impair a child's ability to function. Signs of anxiety or depression (e.g., loss of interest, poor appetite, and insomnia) are common in chronically ill children and usually overlooked or undertreated. Depressive symptoms can be found to be as high as 68.0% in children with severe chronic illness.¹⁰ Children with chronic illness with a history of repeated hospitalizations usually experience anxiety.¹² Research found that many factors can contribute to the developing of anxiety symptoms in chronically ill children such as genetic predisposition, illness-related pathogenesis. Psychotropic medications should be prescribed for children with depression and anxiety disorders in order to improve their overall functioning, including better school performance outcomes.^{10,11}

Educational impacts

Chronic illnesses early in a child's life adversely affect school performance in many aspects regardless of ethnicity, socioeconomic status, or grade level.^{13,14} Approximately half of children with chronic illness are absent from school for a significant amount of time comparing to their healthy peers. Absenteeism are commonly lead to the requirement of instructional adaptations, such as developing of individual education programs, placement in special education, or grade repetitions.¹⁵ They are absent from school for an average of 16 days a year compared to 3 days for healthy peers.⁶ Moreover, some chronic illnesses cause a more serious problems on school attendance. For example, childhood leukemia or other cancers absence approximately 40 days during the induction phase of treatment and have inconsistent attendance in the maintenance phase.⁶ However, the specific disease is not always the best predictor for absenteeism. Rather, the chronicity of the illness, parental responses to the illness, parental educational level, and ability of the child to participate in physical activities are better indicators.¹⁶

Besides poor school performance related to school absenteeism, illness severities and adverse effects of treatment regimens also contribute to cognitive impairment in children with chronic illnesses.¹⁷ For example, Childhood leukemia survivors face significant learning difficulties due to previous brain radiation and aggressive chemotherapy in treatment protocols which has an impact on memory, attention, and processing speed.⁶

Moreover, children with chronic illnesses may lack of leaning motivation for a number of reasons. Illness symptoms or the adverse effects of treatment regimens can cause fatigue, drowsiness, and irritability, which reduces their motivation to study.⁶ This places a significantly increased burden on teachers to accommodate these children as they attempt to maximize their academic performance.

Disease-specific impacts

Epilepsy

Poor academic performance has been reported among children with epilepsy.^{18,19} Twenty to 30 percent of children with epilepsy have intellectual disabilities [intelligence quotient (IQ) <70] which lead to very poor learning outcome.²⁰⁻²² However, poor academic performance have been present even in some children with epilepsy who function at the average IQ.¹⁸ Previous studies showed other potential contributory factors to educational difficulties include specific cognitive deficits or behavioral problems.^{23,24} Epilepsy related to the impairment of mental processing, fine motor skills, and visual motor speed.²⁵ Not only visible seizures may interrupt learning, but also epileptiform discharges occurring in the brain between seizures may also disrupt learning processes and influence academic performance. Suppression of discharges is associated with a significant improvement in school function.^{26,27}

Diabetes mellitus

Diabetes mellitus (DM) is a metabolic disease that can cause complications in several organs, including the kidney, eyes, and brain.²⁷ Children with type 1 and 2 DM may present with cognitive dysfunctions. Previous studies have demonstrated an association between early onset diabetes, poorly-controlled diabetes, and frequent hypoglycemia and poor cognitive ability.²⁷ Both hyper- and hypo- glycemia are can cause cognitive impairment. However, the underlying mechanism is not well understood.²⁸ Despite the impact of poor glycemic control and impair academic performance, previous study showed the association between better control and the improvement of academic function.²⁸ It can be an incentive to all professionals to provide the multi-disciplinary support (e.g., public education system, school, health care providers) to children with DM, with close observation for signs of hypoglycemia, and rapid responses by parents or teachers trained to respond to children's hypoglycemic episodes.²⁹

Asthma

Among childhood chronic illnesses, asthma is the most frequent cause of school absenteeism. More than half of children with asthma missed school days due to asthma exacerbation or other related respiratory symptoms.³⁰ Previous studies showed that asthmatic symptom-related absenteeism was associated with poor school performance and with lower grade point in elementary school students but not in high school students.³⁰ However, earlier studies on college students have demonstrated that students with asthma miss 2.8 days on average of class due to asthma during a semester.³¹ They have lower cumulative grade point averages than students without asthma.³² However, inhaled corticosteroid use was the most important predicting factors for better academic performance in children with asthma.³⁰

Cancer

Childhood cancer survivors have increased psychosocial functioning which may be exacerbated by school absenteeism.³³ School absenteeism has led to poor academic performance. School absence was mostly due to physical health problems. Beyond school absenteeism, meta-analyses illustrated long-term cognitive impairment occurring after cancer treatment with and without cranial radiation.^{34,35} General intelligence was most affected. Compared with healthy peers, the IQ scores of children with acute lymphoblastic leukemia were 6 to 8 points lower. Working memory and processing speed were also affected.³⁶ Reading and spelling was within expectations, but mathematical achievement tended to remain inferior to reading and spelling scores.³⁴⁻³⁶

Congenital heart diseases

Children with congenital heart diseases showed deficits of intelligence, attention, executive function, and academic achievement.³⁷ Approximately one-quarter of

children with congenital heart diseases have other anomalies or identified genetic syndrome which related to cognitive impairment and school problems.^{38,39} In children with congenital heart diseases without underlying genetic syndromes, mean IQ scores fall within the normal range.³⁹ Children with cyanotic heart diseases (e.g., Tetralogy of Fallot, transposition of the great arteries) has shown greater impairments comparing to non-cyanotic heart diseases.³⁹ Heart/Lung transplantation has increased risks for lower academic performance associated with cardiopulmonary bypass during surgery.⁴⁰

Human Immunodeficiency Virus infection

Human Immunodeficiency Virus (HIV) infection itself does not likely to affect cognitive function.⁴¹ However, severe HIV disease significantly increases the risk for cognitive function impairment because HIV disease has progressed extensively, especially with CNS involvement.⁴² Resent studies show that children with perinatal HIV infection had poorer performances in visual recognition memory and verbal learning compared with uninfected children.⁴³

Assessment

Health care professionals often use a specific diagnosis of chronic illnesses to label children who require special educational support. However, the information on the child's abilities and the functional impairment of the illnesses may be a more practical way to deal with chronic illness-related school problems so that appropriate educational plans can be developed.⁴⁴ Health care professionals can play an important role in the assessments of the functional abilities of children with chronic illnesses by intentional history taking so that optimal goals for enhancing their development can be developed.⁴⁵

Beyond the routine non-structural assessment, the Children with Special Health Care Needs Screener and

the Questionnaire for Identifying Children with Chronic Conditions–Revised have been empirically accepted structural tools that were used to assess school-age children with chronic illnesses.⁴⁶ These questionnaires identify parental perceptions, differences in symptoms, and severity.⁴⁷

Management

Children with difference chronic illnesses have unique specific needs. However, all children share in the need for education.⁴⁸ A supporting system should be developed in order to minimize the academic problems of chronically-illed children chronically early recognition and interventions.⁴⁹ Healthcare professional can delivery of educational services to children with chronic illnesses in a three major approaches, as discussed below:

School-based intervention

Regular attending school is related to a sense of normal functioning in children with chronic illness.⁵⁰ To maximize attendance and enhance academic performance, it is required coordinated school interventions.⁵¹ Teacher should design individual programs that integrate their health, psychological, and educational needs for children with chronic illness.¹⁴ Teacher and healthcare professionals should establish open discussions in both the medical and school settings. Training for teachers regarding the care of children who are chronically ill is required because teachers may feel less confident because of a lack of information about the child's medical problems.^{28,52}

Intentional planning should be developed to resolve the current impromptu tendencies of teacher. Rynard et al.⁵³ recommended the school support programs for children with chronic illnesses. They described keys for effective school interventions as the followings; (1) helping children deal with absenteeism by providing home school

or tutoring programs; (2) providing psychosocial support for children and their parents; (3) encouraging children to cope with medical fears; (4) assisting children and their parents to deal with the side effects of treatment; (5) developing emergency medical plans or disease-specific intervention for the classroom; (6) collaborating among parents, teachers, and the health care professionals; (7) collaborating in the development of educational plans and care plan to improve adherence to treatment, self-care, or school behaviors; (8) providing assessment and intervention to improve academic performance; and, (9) facilitating their coping with emotional and behavioral problems.

Home-based intervention

For some children with chronic illnesses, being discharged from a hospital does not mean being ready to attend school. Several chronic illnesses require home isolation.¹⁴ Home-based intervention can be provided either by the children's school teachers, or by a hospital teacher.¹⁴

The American Academy of Pediatrics, Committee on Children with School Health^{54,55} recommends 4 important features for home-based intervention: (1) teaching in a home-based program mirrors the content in the classroom; (2) monitoring the child's condition before returning to their school; (3) supervising parents during all home-based activities; and, (4) considering the health status of the children during the hours of home-based intervention.

Most home-based intervention is generally limited to 1 hour per day, and may not go into effect until an absence has exceeded 15 days.⁶ The limited intervention time provided through home-based intervention is clearly problematic. Although home-based intervention is not the ideal method for education, with good planning home-based intervention can be an effective narrow-gap way of uninterrupted schooling and it can provide to the normality of the lives of children.⁵⁶

Hospital schooling

Education can be provided in a medical setting by hospital teachers in cases of long-term illness. Hospital schooling is usually run by the hospitals or the local public school system and are based on the same curriculum and method of evaluation.⁵⁷ Hospital teachers have to ensure continuity of education and communicate with the children's own school. The limitation of this approach is that hospital teachers must provide instruction for many grade levels. Moreover, enrollment of hospital schools is very low when compared to traditional one. Despite the limitations, there have been a number of hospital school programs in many counties that show some benefits on closing the educational gaps of children with chronic illnesses.⁵⁵

Discussion

Previous research shows that educational disabilities (i.e. dyslexia, dyscalculia, intellectual disabilities) received significant educational support and had better academic performance when compared to children with chronic health conditions, but without a clear educational disability.⁵ This review showed the association among chronic illnesses and child's academic performance. As expected, children with chronic illnesses were at an increased risk of academic difficulty in both general performance and specific domains of education. The association between chronic illnesses and academic performance is not disease-specific.^{58,59} Although there are some differences across illnesses, most research in this review show a commonality in terms of the educational, psychological, and social impacts. A non-categorical impact of chronic illnesses will inform the development of evaluation and management system applied to children with chronic illness, broadly, that could be more relevant to a wider range of children and their families than a disease-specific approach.

Early identification and interventions in children with a chronic illness are associated with better academic outcomes. Coordination between healthcare and educational services includes informal and/or structural screening to identify learning problems in children with chronic health conditions, which may prevent later behavior and psychiatric disorders and further improve the child's opportunities for academic success.

Although school reentry and school-based interventions seem to be the best management strategies for these children, alternative modes of educational services (homebound instruction and hospital schooling) are also important components for providing education to children who would otherwise not have adequate access to a general school setting.

Conclusion

Our review has potential implications for educational identification and intervention efforts for children with chronic illness. Healthcare professionals should change the focus from the diagnosis-based inclusion model for intervention for children with chronic illness.⁶⁰ Inclusion for providing intervention should be based on the children's functioning rather than specific diagnosis because the impact of chronic illness is not disease-specific, and is pervasive across educational domains. As such, multi-disciplinary team approach is critical in managing to the educational needs of children with chronic illness.⁶¹

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