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REVIEW

Attention Deficit Hyperactivity Disorder and Role of Pediatric Nurse

Dikkat Eksikliği Hiperaktivite Bozukluğu ve Padiatri Hemşiresinin Rolü

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ABSTRACT

Attention deficit hyperactivity disorder (ADHD) is a health problem that begins in childhood and treated as a common psychiatric problem among children/adolescents. ADHD is a common health problem; however, there has been no definite consensus on its frequency and prevalence because of the different methods and diagnostic criteria used in its assessment. When we look at the studies conducted across the world, prevalence rates among school children are observed to vary from as low as 0.2%- 0.4% to as high as 23.4%-27%. The incidence of ADHD in Turkey is 5% and four times more common in boys than girls. Pediatric nurses play a key role in identifying the children/ adolescents with ADHD and in the continuity of the support to be given to. As a result, pediatric nurses should arrange trainings for early diagnosis and treatment of children/ adolescents with ADHD in schools, arrange screening work for ADHD, and provide expert advice to the child, their family, teachers and social environment.

Keywords: *attention deficit hyperactivity disorder, nurse, pediatry, symptom*

ÖZET

Dikkat eksikliği hiperaktivite bozukluğu (DEHB), çocuklukta başlayan bir sağlık sorunudur ve çocuk/ergenlerde ortak bir psikiyatrik problem olarak ele alınmaktadır. DEHB, sık görülen bir sağlık sorunu olmasına rağmen, kullanılan farklı yöntem ve tanı koyma ölçütleri nedeni ile sıklık ve yaygınlık konusunda kesin bir görüş birliği sağlanamamıştır. Dünyada yapılan çalışmalar incelendiğinde; okul çağı çocuklarında %0,2-%0,4 gibi çok düşük değerlerden %23,4-%27 gibi daha yüksek değerler arasında oldukça farklı prevalans oranları görülmektedir. DEHB'nin Türkiye'deki insidansı ise %5 olup, erkeklerde kızlara göre dört kat daha fazladır. DEHB'li çocuk/ergenleri erken dönemde belirleyerek onlara verilecek desteğin sürekliliğinde pediatri hemşireleri anahtar kişi rolündedir. Sonuç olarak pediatri hemşireleri, DEHB'li çocukların erken dönemde tanılanabilmesi ve tedaviye yönlendirilmesi için okullarda eğitimler düzenlemeli, bu konuya yönelik tarama çalışmaları yapmalı, çocuğun, ailesinin, öğretmenin ve sosyal çevresine danışmanlık sağlamalıdır.

Anahtar Kelimeler: *dikkat eksikliği hiperaktivite bozukluğu, hemşire, pediatri, semptom*

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INTRODUCTION

Attention deficit is the alterations in the central nervous system, characterized by developmentally inappropriate behaviors, and when it manifests itself with predominant hyperactivity, it is defined as attention deficit hyperactivity disorder (ADHD) [1]. ADHD is a health condition that starts during childhood and treated as a common psychiatric problem in children/adolescents [2].

Studies suggested that attention deficit and hyperactivity were the most commonly diagnosed psychiatric disorder in childhood/adolescence [2-4]. The term, ADHD, was first issued to describe a mental disorder in Diagnostic and Statistical Manual of Mental Disorders (DSM) III where the causes of the disorder were left unidentified [5, 6].

Attention deficit hyperactivity disorder is a common health condition, however, no unanimous consensus on its frequency and prevalence has been reached thanks to the different methods and diagnostic criteria used in its assessment. According to the studies across the world, it is observed that there are quite different prevalence rates among school children, from as low as 0.2%- 0.4% to as high as 23.4%-27% [7]. The discrepancy between prevalence rates are due to diagnostic criteria, source of information, requirement of impairment for the diagnosis and geographic location [8]. Besides, it is likely that environmental, psychosocial and hereditary factors lead to the discrepancies, but it is poorly understood how these factors trigger the disorder and the symptoms [9].

ADHD is found in all cultures with variation in the prevalence rate. According to the epidemiological studies, it generally ranges from 4% to 12% in the general population at age group of 6 to 12 years, with boys four times more commonly diagnosed than girls [10]. It was reported that ADHD symptoms and signs persist in adolescence in 60-85% of children with ADHD [11].

ADHD symptoms in children and adolescents are inattentiveness, hyperactivity, behavioral and cognitive impulsivity [12]. These children are known to have difficulty in sitting still, giving attention to or controlling impulsive behavior, which significantly affects their daily lives [13]. Srignanasoundari et al. stated that early diagnosis and treatment of ADHD may soothe the symptoms and might also be greater help in the treatment of comorbidities [14]. It is indicated that unless learning difficulties are addressed at earlier stages and appropriate management

strategies are accepted, it is likely that academic and social functionality of the child will deteriorate [15].

Since ADHD may significantly disrupt the child's academic success, affecting his/her social life and future education process, it is not only regarded as an individual concern but also seen as an issue that has an effect on health and education policies of countries. Accordingly, studies suggest that more attention be given to the children/ adolescents with ADHD and ADHD be identified and treated at early stages [14, 16, 17]. And, pediatric nurses have a key role in; identification of children/adolescents with ADHD and directing them to the right care centers, providing the necessary treatment and therapy, continuity of support for the children/adolescents adolescents and for the relationship between teachers, family and therapist. Considering ADHD prevalence among the children and adolescents, role of pediatric nurses in the early diagnosis of ADHD and the importance of the issue, in this paper, we aim to raise the awareness of pediatric nurses on above mentioned issues.

History

The diagnostic process of attention deficit/hyperactivity disorder has a long history. Diagnostics for the symptoms of the disorder have significantly changed over time [18].

Attention deficit/hyperactivity disorder was first described by the British pediatrician, George Still in 1902, who made reference to the presence of the children with attention deficit and behavioral problems. He reported that these children are fidgety, impulsive, and have mood disorder, physical defects and lack in sustained attention. He also established that these children have certain special learning difficulties in comparison to their peers [9].

In the early 20th century, hyperactive children were described to suffer from a disorder associated with the defect of moral control. In the 1930s, the concepts of minimal brain damage and minimal brain dysfunction were coined based on the observations of behavioral disorders seen in encephalitis pandemic or seen after a traumatic birthing in the 1920s. The term, ADHD, was first described as "hyperactive child syndrome" or "hyperkinetic reaction of childhood" before 1980, and referred as "attention deficit disorder" by DSM-III in 1980s [18]. Finally, a name that fits was released in DSM-IV [19] and DSM-V as "attention deficit hyperactivity disorder" [5]. Diagnosis of ADHD is made based on DSM-IV, however, it is treated according to DSM-V, the updated version of DSM-IV in 2013.

Etiology

The etiology of attention deficit hyperactivity disorder is not fully clear, but it was reported that genetic predisposition, neurobiological disorders and environmental factors play a role in ADHD [18]. Besides, child's prenatal and postnatal health state, premature birth, low APGAR score in birth, gender and exposition to certain toxins are described to be the ADHD risk increasing factors among children [14].

Genetic predisposition was indicated to play a major role in the manifestation of ADHD symptoms. The disorder is common to be seen in the first-degree relatives of the child diagnosed with ADHD. Correlatively, the fact that monozygotic twins suffer from co-occurring disorders more than dizygotic twins or siblings of hyperactive children are twice as potentially risky regarding ADHD suggests presence of genetic proofs [20]. In addition, it was reported that ADHD arises from the mutations of phenotype, the dopamine transporter gene and the mutations of dopamine D4 receptor genes and from the disorders in dopamine and noradrenalin metabolism and subcortical structure mediating neurotransmission in the prefrontal cortex [18].

When neurobiological factors as to attention deficit hyperactivity disorders are examined, one of the most remarkable results from neuroimaging studies is the foundation of low glucose use in the frontal region in ADHD. In neuroanatomical studies, it was determined that normal anatomic brain asymmetry did not exist in these children, but differences in various regions of the brain such as corpus callosum, nucleus caudatus, globuspallidus and putamen were observed. For instance, it was found that some regions of corpus callosum is smaller than normal and that no normal asymmetry exists in nucleus caudatus and its metabolism slows down with blood flow to it. Globus pallidus volume was again found smaller in cases with ADHD [21]. According to neurobiological imaging by Castellanos et al. brain regions of the persons with ADHD were found to be smaller than those of control group based on the volumetric measurement of all the regions of the brain and this discrepancy was reported to be more salient in the cases who did not previously get stimulation therapy [22].

Environmental factors were considered to be likely to cause ADHD, but this was not proven for sure. Environmental factors including Maternal stress, smoking during pregnancy, perinatal complications, premature birth, traumatic brain damage were stated to play role in ADHD etiology [18]. Besides, ADHD was also reported to be caused by intake of short-term breast milk in the post-natal period, lead, a variety of food additives, toxins and lack of vitamins [1]. And, the role of food additives and preservatives in causing ADHD in children has been considered as a controversial issue [18].

Diagnosis Criteria

Children with attention deficit hyperactivity disorder have difficult in focusing on a certain point; that is, they are inattentive. Their easy distraction by external stimuli, having difficulty in managing their routines, losing their stuff and toys frequently, forgetting the responsibilities and tasks they are given also suggest attention problems. Attention difficulty for these children particularly comes out in boring situations in which they, as reported, cannot pay attention to, have difficulty in keeping up, cannot become organized or lose their important objects [23]. Attention levels of the children with ADHD decreases in the situations like heavy loads of homework, but families report that they do not face

such a problem when kids watch television or play computer game.

Another problem with the children with ADHD is excessive mobility. In healthy children, mobility is accepted to be a natural developmental behavior; however, level of excessive mobility is observed to be remarkably higher in the children with ADHD in comparison to their peers. When it comes to excessive mobility which poses problems for friends, family, or teachers at the time of play, kindergarten and school- when it affects the functioning of the child, it is considered as behaviors that can be easily perceived by parents and teachers [24].

Besides, the problem of impulsivity is also confronted in children with ADHD. Impulsiveness is defined as behaviors such as difficulty in waiting for his/her turn, delaying gratification, responding before the question finishes, hastiness, interrupting people around them. These behaviors signal that the child's daily life is negatively affected and that the child has impulsivity problems [25].

In order to be able to diagnose attention deficit hyperactivity disorder, a list of 18 items in the DSM-IV diagnostic guideline has been identified that specifies inattention, hyperactivity and impulsivity [24].

ADHD Diagnostic Criteria by DSM-IV-TR

To possibly warrant a diagnosis of ADHD, at least six or more of the following inattentiveness and/or hyperactivity/impulsiveness symptoms must be present for at least six months to a degree that is considered to be inconsistent with the child's developmental level.

Inattentiveness;

a) often fails to give close attention to details or homework, or makes mistakes during other activities.
b) often has difficulty in sustaining focus in tasks or play activities.
c) often fails to follow instruction properly or to complete homework, chores or duties in the workplace (not because of lack of understanding the instructions or oppositional defiant disorder).
d) often does not seem to listen when spoken directly.
e) often has difficult in organizing tasks and activities.
f) often avoids, dislikes and is reluctant to engage in tasks requiring sustained focus.
g) often loses the things necessary for tasks or activities (e.g., toys, homework, pencils, books or tools).
h) often loses focus and gets distracted by external stimuli.
i) is oftenforgetful in dailyactivities.
Hyperactivity or Impulsiveness;
a) is often "on the move" and acts as if "driven by a motor".
b) often leaves their seat when remaining seated is expected.
c) often runs about or climbs in situations where it is inappropriate (which may be limited to feeling restless in adolescents or adults).
d) mostly talks too much.
e) is often fidgety, taps feet or squirms in their seat.
f) often has difficulty in participating recreational activities or playing games.
g) often gives an answer before a question is completed.
h) often interrupts conversations or intrudes others.
i) often has difficulty awaiting their turn

To diagnose;

- Some hyperactive-impulsive and inattentive symptoms that cause functional impairment should be present before age 7.
- Functional impairment caused by the symptoms should be observed in two or more settings (eg. at home, school).
- Clinically clear evidence that symptoms impair academic, social or occupational functions should be present. Symptoms do not occur during common developmental disorders, the course of schizophrenia or another psychotic disorder, and are not better explained by another mental disorder -e.g. mood disorder, anxiety disorder [5, 19, 24].

Updated in 2013, DSM-V, a modified version of DSM-IV, made some changes about the diagnosis of ADHD [5, 19, 26].

According to these changes;

- Onset of symptoms was changed from "prior to age 6" to "prior to age 12"
- "Evidence of impairment in two or more settings" was changed to "Evidence of symptoms in two or more settings".
- New descriptions were added to show what symptoms might look like at later stages and
- For adolescents and adults 17 and above, 5 symptoms are needed rather than 6 for young children.

Subtypes of ADHD

Subtypes of ADHD differ significantly based on age and sex. It is stated that understanding these differences will make remarkable contributions to the diagnosis and treatment of the disorder [27]. These types are; Combined Presentation, Predominantly Inattentive Presentation and Predominantly Hyperactive-Impulsive Presentation.

1. Combined Presentation; Inattentivenessandhyperactivity/impulsivityarebothpresentfor at least 6 months.
2. Predominantly Inattentive Presentation; For at least 6 months, inattentiveness is present but not hyperactivity/impulsivity.
3. Predominantly Hyperactive-Impulsive Presentation; For at least 6 months, hyperactivity/impulsivitysymptomsarepresent but not those of inattentiveness

Symptoms may change over time and presentations may do so accordingly [26].

Other Psychiatric Problems

Psychiatric co-morbidities are likely to be often seen in patients with ADHD. Oppositional Defiant Disorder affecting 60% of and behavioral disorders affecting 25% of children/adolescents adolescents are among the most frequent co-morbidities which are reported to have a high incidence of co-morbidity [9, 18]. Similarly, ADHD is accompanied by learning disorders, anxiety, depression and tic disorders in these children [18].

According to the study by Xia et al. in which depression and anxiety levels of the children and adolescents were examined, it was reported that comorbid depression and anxiety disorders are frequent in ADHD cases and that depression and anxiety scores in this group are significantly higher than the control group [28]. According to the study by Herguner and Herguner who studied accompanying psychiatric disorders in the children and adolescents with ADHD, it was reported that certain psychiatric disorders with a high rate are present in the children/adolescents diagnosed with ADHD and that the most frequent accompanying disorders are destructive behavioral and anxiety disorders. Moreover, the study reported that substance abuse, conduct and mood disorders are more frequent in adolescents thanchildren [29].

Treatment

ADHD, a serious health problem persisting from preschool period into school age, may influence the child's social and academic life negatively unless it is treated early enough [16]. Since ADHD affects a child's functionality in various respects, its treatment should be comprehensive. The purpose of the treatment is to solve the problems occurring in behavioral, mental, cognitive, social and familial areas. A comprehensive treatment of ADHD involves medication, psychotherapy, and psychosocial interventions. Which treatment will be administered and how to apply it is determined based on the person's age and the condition's severity [30].

Pharmacotherapy

The notion that pharmacotherapy including stimulants plays an important role in the treatment of ADHD has been accepted since the 1950s. Stimulants have been used over a short- or long-term in drug treatment as an effective way [31]. For certain reasons, non-stimulant treatment options are needed. This is because it was reported that stimulants proved to be effective in 70-80% of ADHD cases but not effective enough in 20-30% of ADHD cases or treatment cannot be continued due to side effects of the stimulants. In addition, families of children with ADHD may be prejudiced against the use of this drug, since the drug can only be taken with a red prescription. Again, some children with ADHD comorbided with alcohol-substance use disorder, anxiety or tic disorder may need to use non-stimulant drugs [20].

It is stated that in the treatment of attention deficit hyperactivity disorder, the most commonly used drugs approved by US Food and Drug Administration are amphetamine and methylphenidate as psychostimulants, and the non-stimulant drug is atomoxetine.

Psychosocial Approach and Non-pharmacological Treatments

Psychosocial approach in the treatment of attention deficit hyperactivity disorder involves family, school and the child. The diagnosis of ADHD has an effect on both the children and their families. Because the prognosis of the disorder is a matter of concern to the family, the treatment should be planned with the family and the child [24].

One of the therapeutic interventions in ADHD is behavior change, which has been used to cure psychosocial disorders as a treatment method since the early 1990s. With this method, any undesired behavior of the child is aimed to be modified. To this end, social and psychical settings are tailored accordingly [32]. In addition, this program has an average of 1 to 2 hours of 10 to 20 training sessions for each family. In the sessions, families are informed about the disorder and trained about how to approach carefully to the child's misbehaviors [11].

Multidisciplinary Approach

This approach involves the examination of ADHD in three steps. In the first step where a medical treatment takes place, the subtype of ADHD is identified. In the second step, behavioral techniques are integrated into ADHD treatment. The third step aims to develop insight in terms of education. The children with ADHD and their families and teachers are informed. The aim here is to increase the efficacy and success of the treatment [16].

Role of The Pediatric Nurses

Signs and findings of attention deficit hyperactivity disorder can be confused with other health problems and the chance of misdiagnosis is high. Thus, a comprehensive evaluation is needed for early diagnosis and treatment [33]. Identifying the children with ADHD and providing early diagnosis and treatment are among the main roles of pediatric nurses. In fact, pediatric nurses are first and foremost professional to offer health services that can easily observe the behaviors of the children and adolescents and their responses to the treatment [34].

Pediatric nurses should identify the children under the risk of ADHD, offer early diagnosis and treatment, observe the child's growth and development, follow behavioral changes and make sure of the cooperation between the child's family, teachers and members of healthcare team during the treatment of the condition [35].

To this end, pediatric nurses;

- Should understand the effects of ADHD on children and their families.
- Should be careful collecting detailed history and direct observation of the child, because hyperactivity signs can also be seen in other behavioral disorders [36].
- Should offer care for the children with ADHD hospitalized for other diagnostic reasons like special health care need or a health problem as well as those who live in the environment where the children/adolescents adolescents with ADHD live, play and work [37].
- Should make sure of the communication between the school, family and the child.
- Should evaluate the children's domestic lives from the perspective of a parent by conducting family interviews and their actions in the classroom from a teacher perspective, and should conduct face-to-face interviews with the children.
- Should catch up with up-to-date studies to evaluate the children and use certain evaluation scales.
- Should consider cultural diversity among the individuals with ADHD and provide community-based trainings and information about ADHD [34,37].
- Should Facilitate social skills through role playing, small group games and setting model since establishing fiduciary relationship with the children with ADHD is important. For this, when children behave positively, they should be provided with positive feedback and they should be rewarded when they sit at the expected time and when they take their medication on time and help the procedures.
- Should offer consultations to the family about reducing the length of watching TV in children aged between 1-3.
- Should minimize the distractive environmental factors when a child with ADHD is hospitalized. For this, the child's room must be a maximum of two persons, the light of the room must be turned off at sleep time, and the sound, if there is any, should be minimised.
- Should recognize the reactions to the behavioral management program and accompanying signs as well as the evaluation and the diagnosis, and follow up the risky behaviors and complications of the drugs they use [36].

CONCLUSION

The fact that pediatric nurses give consultation to the children with ADHD, their families, teachers and social circles is conceived to increase the children's adaptation and success. Thus, with regular observations and consultation services that pediatric nurses offer, potential problems of the children with ADHD are to be diminished and prevented. Additionally, in order to diagnose the children with ADHD at an earlier stage and provide the necessary treatment, pediatric nurses should provide the school teacher with sufficient knowledge and awareness of ADHD and conduct screening for ADHD by collaborating with the teachers and other healthcare disciplines.

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