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An Alternative and Complementary Medicine Method in Vulnerable Pediatric Cancer Patients: Yoga

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***Abstract*—**Pediatric cancer patients experience multiple distressing, challenges, physical symptom such as fatigue, pain, sleep disturbance, and balance impairment that continue years after treatment completion. In recent years, yoga is often used in children with cancer to cope with these symptoms. Yoga practice is defined as a unique physical activity that combines physical practice, breath work and mindfulness/meditation. Yoga is an increasingly popular mind-body practice also characterized as a mindfulness mode of exercise. This study aimed to evaluate the impact of yoga intervention of children with cancer. This article planned searching the literature in this field. It has been determined that individualized yoga is feasible and provides benefits for inpatient children, improves health-related quality of life, physical activity levels, physical fitness. After yoga program, children anxiety score decreases significantly. Additionally, individualized yoga is feasible for inpatient children receiving intensive chemotherapy. As a result, yoga is an alternative and complementary medicine that can be safely used in children with cancer.

***Keywords*—**Cancer treatment, children, nursing, yoga.

I. Introduction

IT is a fact that the children who receive cancer treatment are obliged to cope with several problems in comparison with healthy children. Especially high level of depression and anxiety, poor well-being and life quality on deteriorated health are the problems that children are obliged to face with during and after the cancer treatment. Besides, sleep problem, appetite, stomach, anxiety and behavior problems can be seen in patients in the preschool period. There can be observed problems with autonomy and cognitive functions in children who are between 6 and 7 years. Moreover, there are also seen problems such as pain, sleep disorders, nausea/vomiting, prostration, anxiety and muscle weakness [1]-[6].

Alternative and complementary medicine usage rates vary during and after pediatric cancer treatment. It is mentioned in 20 studies that were entirely conducted with 2871 participants that usage prevalence of any alternative and complementary medicine (as from diagnosis of cancer) varies between 6% and 91% [7]. Another survey determined this ratio as between 31% and 84% [8]. One of the types of alternative and complementary medicine methods that children who receive cancer treatments use to manage the negative experiences is yoga.

Yoga is a body-mind approach that comes from Indian philosophy and includes physical stance (asana), breathing techniques (pranayama) and meditation applications (dhyana). Yoga is adapted to use in integrative and alternative medicine and also classified as a type of integrative and alternative medicine by National Health Institute [9]-[12].

Literature has studies that show several benefits of yoga. It is seen when looking at studies about pediatric population that yoga has been performed with students and different variables are analyzed. Dariotis et al. actualized focus group discussion with 22 middle-school students who come from poor urban communities after 16 weeks of yoga intervention. With reference to their results, students provided better impulse and emotional regulation following the intervention [13]. Bhardwaj & Telles analyzed students who join the yoga group and do not join the same group. According to their research findings, self-respect level of students who joined the group increased. Moreover, 50% of the students are motivated to do yoga at leisure [14]. Rathod & Jiwtode mentioned that students display higher self-fulfillment performance after 10 days yoga interference. In addition to this, it is revealed that yoga practice accelerates and improves the fine motor coordination,visual-motor integration, visual perception, planning skills, cognitive performance, self-sufficiency, and processing [15]. Frank et al. organized an activity aiming to create a transformational lifestyle for 3-4 days in the first semester of the school. According to their results, yoga has a grand potential as a global method to encourage the positive school behavior and schooling [16]. Shivakumar et al. put students through yoga practices during 6 weeks. With reference to their results, the physiological variables (lung capacity, cardiovascular endurance) improved among the middle-school students [17]. Butzer et al. applied 32 sessions of the yoga interference for students at 7th grade instead of gym class. Afterward, they were observed for 6 months and 1 year. It is revealed that yoga interference has beneficial effects for women to improve emotional self-control and also yoga increases smoking cessation wish [18]. In a systematic compilation of yoga research in pediatric population, Galantino et al.reviewed 24 surveys that focused on healthy children. It is confirmed that yoga has a positive effect on motor performance, concentration skill, cardiopulmonary function and musculoskeletal functions [19]. There are studies on children who stay in the hospital. Yoga caused a decrement in pain score in children who stay in the hospital because of sickle cell anemia and veno-occlusive

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crisis (VOC). Moreover, there was seen a decrement in anxiety scores, healing in arthralgia, the increment in emotion sub-scale and breathing sub-scale of children with cystic fibrosis. It is seen in another study that was conducted with children with autism that yoga decreases the level of symptoms. There have been informed an improvement in constant attention and discrimination skill in attention-deficit-disordered children [20]-[22].

TABLE I
YOGA STUDIES WITH CHILDREN IN THE LITERATURE

Author, Year	Research Type	Research Place	Number of Sample	Age Range	Sample Characteristics	Result
Moody et al., (2017) [20]	Randomized Controlled /Experimental	USA	73	5-21	Children who stay in hospital because of sickle cell anemia and VOC	Mean pain score ↓ Anxiety, duration of stay or opioid use →
Sotoodeh et al., (2017) [28]	Randomized Controlled /Experimental	Iran	29	5-15	Children with high function autism (HFA)	The severity of symptoms in children with autism ↓
Dariotis et al., (2016) [13]	Experimental/ Qualitative	USA	22	10-13	Middl-school students in urban area who are characterized by high-rate crime, violence and poverty	Young people reported better impulse control and emotional regulation following intervention
McNamara et al., (2016) [22]	Intervention	USA	20	7-20	Children with cystic fibrosis	Sudden anxiety score ↓ arthralgia score improved Emotion sub-scale ↑ Respiratory sub-scale ↑
Bhardwaj & Telles (2017) [14]	Retrospective	India	26	11-12	Student	Total self respect ↑
Chou & Huang (2017) [29]	Intervention	Taiwan	49	8-12	Children with attention deficit hyperactivity disorder	Constant attention ↑ Discrimination ability ↑
Das et al., (2016) [30]	Intervention	India	210	11-16	Student	Fine motor coordination ↑ Visual-motor integration ↑ Visual Perception ↑ Planning Skills ↑ Cognitive Performance ↑ Self-efficacy ↑ Processing Speed ↑
Rathod & Jiwtode (2016) [15]	Prospective case-control study	India	30	12-15	Student	Skeletal muscle strengthening ↑
Frank at al., (2017) [16]	Intervention	USA	159		Student	Delay to school ↓ School absenteeism ↓ Emotion Regulation in response to the stress, Positive thinking and Cognitive restructuring ↑
Shivakumar et al., (2016) [17]	Intervention	India	30	12-16	Students	Lung Capacity ↑ Cardiovascular endurance ↑
Butzer et al., (2017) [18]	Intervention	USA	211	7. sınıf	Students	Willingness to smoke ↓

Literature has limited number of studies that evaluate the effectiveness of yoga during and after the pediatric cancer treatment. Those studies mention several benefits of yoga. Tygeson et al., applied yoga practices for 11 children (between 6-12 years), 5 adults (between 13 and 18 years) and 33 parents. There are observed significant decrements in anxiety scores of adults and parents [23]. According to Geyer et al., there are improvements in motor functions of children after 5 sessions of yoga interference for 2 months for 6 children who stay in the hospital because of cancer [24]. The effectiveness of yoga on fatigue, anxiety, balance, and sleeping was evaluated in a study that was conducted with 13 people (between 10-17 years old) who survived cancer. It is determined after 6 weeks yoga interference that while sleeping and anxiety score is similar to healthy age groups, fatigue, and balance scores are found as under the norms in comparison with healthy age groups [25]. There was performed a study with 11 patients (between 7-18 years old) who receive chemotherapy and hematopoietic stem cell transplantation. Those patients practiced yoga three times a week. At the end of the study, Pediatric Quality of Life Inventory was applied. General fatigue score average was specified as 55.6 ± 15.5. In the same survey, individualized yoga program was offered for in-patient children who receive intensive chemotherapy [26].

II. CONCLUSION

Studies toward yoga use in children have been conducted on different sample sizes and groups. Yoga has positive effects on health and patient children. Birdee et al., (2009) mentioned in their systematical compilation that the general run of the surveys is positive. There is not talked about any side effects as well [27]. In the same study, the clinical fields where the yoga was practiced in are the physical fitness, cardiorespiratory effects, motor skills/strength, mental health and psychological

disorders, behavior and development, prenatal-postnatal.

There is the need for developed methodology and reports of yoga practices in children. Many of the studies have explained randomization technique. There was small sample size in the general run of the studies. The surveys with bigger samples and randomization should be performed. Especially there is the need for studies that evaluate the effectiveness of yoga during and after pediatric cancer treatments. However, there is no yoga research that was performed with children in Turkey. Entirely 2 doctoral theses whose one of them is in schizophrenic patients and other one is in pregnancy were written in 2016. Also, nursing field has no study on this issue. Therefore, the studies about the effectiveness of yoga are required in Turkey.

TABLE II
YOGA STUDIES WITH CHILDREN WHO HAVE CANCER TREATMENT IN THE LITERATURE

Author, Year	Research Type	Research Place	Number of Sample	Age Range	Sample Characteristics	Result
Thygeson et al., (2010) [31]	Intervention	USA	16 children and 33 parents	6-18	Patients in hematology / oncology unit	Anxiety score ↓
Geyer et al., (2011) [24]	Intervention	USA	6	6-10	Cancer patients who stay in hospital	In motor functions ↑
Hooke et al., (2016) [25]	Intervention	USA	13	10-17	Children and adolescents who have completed cancer treatment	It is determined while sleeping and anxiety score are similar with healthy age groups, fatigue and balance scores are found as under the norms in comparison with healthy age groups
Diorio et al., (2015) [26]	Intervention	Canada	11	7-18	Patients who receive intensive chemotherapy or hematopoietic stem cell transplantation	Pediatric Quality of Life Inventory general fatigue score average ± standard deviation 55.6 ± 15.5

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