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& Developmental Adolescent Health

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Contents

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Below the Greek summary are five keywords in Greek, for the thematic index.

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Figure 1. Diagrams describing the height of the participating adolescents, (a) boys, (b) girls

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Editorial

Dear colleagues,

the fifth issue of Volume 2 of the Journal Developmental and Adolescent Health (JDAH) presents a variety of valuable information concerning youth health and development.

A review article highlights current situation in Greece and worldwide concerning special learning difficulties. Another review article is focusing on nutrition and health implications of preterm children born to adolescent mothers. Additionally, limitations on physical activity in childhood cancer survivors and intervention programs are presented in a literature review, while a brief review is investigating the sexualization of adolescent girls via influencing on social media. Finnaly, an original research paper reveals important data about life satisfaction and early maladaptive schemas in children in residential care.

Have a great time exploring the present edition.

On behalf of the editorial team and content management of JDAH,

Artemis K. Tsitsika MD, PhD
As. Professor in Pediatrics-Adolescent Medicine
Head of the Adolescent Health Unit (A.H.U.)
Chair of "Str. Of Developmental & Adolescent Health" MSc
National and Kapodistrian University of Athens, Greece
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Special learning difficulties: The situation in Greece, compared to the European and international context

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ABSTRACT

The term "special learning difficulties" (SLDs) is used to describe intrinsic disorders that make the learning process difficult. These disorders may relate to a single cognitive or functional field, or more. Their early diagnosis by a team of experts is particularly important, as it can largely determine a person's learning path.

The aim is to participate in intervention programmes that teach students to manage their difficulties and develop alternative ways of learning according to their abilities.

We present an overview of the definitions, epidemiological data and classification of SLDs. We are referring to the evaluation process in Greece and present our conclusions from articles that study the symptoms, the possible causes, the ways of intervention as well as the comorbidity related to SLDs. Next, we present international approaches in the field of SLDs as well as new approaches that will lead to future planning.

Key Words: *specific learning difficulties , international approaches, Greece*

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Introduction

Learning Difficulties are divided into two major categories: Special Learning Difficulties and General (or Generalized) Learning Difficulties. In the category of Generalized Learning Difficulties students with mental and emotional difficulties are included. Specific learning difficulties are a developmental disorder associated with lower-than-age educational skills such as reading, writing and math skills (1).

Several studies have been carried out on the concept of dyslexia. Recent studies from the 21st century show that epidemiological data are equally widespread and affect 20% of the population, both boys and girls (2).

Specific Learning Disabilities according to DSM-V or Learning Disabilities according to ICD-11 (they have replaced the term 'dyslexia'): they refer to a separate category of learning difficulties and more specifically they refer to processing of written speech (3). SLDs affect students' school performance and can lead to problem behaviors (4).

Classification of developmental disorders of school skills(according to ICD and DSM) (5), (6):

- *Special reading disorder*
- *Special spelling disorder*
- *Special disorder of arithmetic skills*
- *There are also the remaining categories "not otherwise determined" and "with other specific learning impairment"*
- *Reading disorder is what we call in everyday speech 'dyslexia' and includes the other two, which are less common on their own.*

Classification Problems - Heterogeneity:

In contrast to DSM 5, many researchers classify children based on an evaluation vs. the presence of persistent difficulties. (7) In addition, the heterogeneity of the assessment tools creates problems in classification. (8) Heterogeneity is observed even in children who have already been classified in the same disorder (9).

Risk factors:

The risk factors for developing SLDs are primarily inherent, genetic and inherited. Family tensions and the quality of teaching significantly affect the intensity and frequency of symptoms.

Features of people with SLDs:

Children with SLDs have difficulty in recognizing the sound of letters and automating words. (10) Many children have speech delays and slow reading. (10). They show low self-image (12), they have anxiety and in severe cases they express depression.

Epidemiological data:

With reference to Greece and the population aged 6-18 years, the prevalence of dyslexia is 5-12% (14). The percentages of boys who present dyslexia and difficulty in reading are higher than girls (15).

According to researchers, about 5-15% of the school-age population in different countries and languages have SLDs. (5) Based on epidemiological data, it is supported that 4-9% of the school-age population have reading deficits and 3-7% have difficulty with mathematics. Data of 2009 referring to the case of USA reveal that 5% of school-age children have SLDs. This percentage is the 42% of all children who have some special educational needs and receive a form of special education (17).

A common criterion for diagnosing dyslexia is reading accuracy at 1.5 SD below the average age, having as a result a percentage of 7% of the population being diagnosed as dyslexic (18). Studies have shown that 44% of children under family risk of dyslexia may develop dyslexia. The prevalence of children with dyslexia in Hong Kong is about 9.7-1.6% according to a 2007 survey (19). More specifically, after an epidemiological study conducted in 2019 in Guangzhou, China, the prevalence rate was found to be 4.9 %.

Boys have OR = 4.17 to develop dyslexiacompared to girls (19). A percentage of 3% to 11% of students have difficulty with reading skills related to word recognition and text comprehension (20).

Law framework:

In Greece, learning disabilities and dyslexia (as a subcategory of SLDs), were considered a distinct disorder based on the ability-performance fluctuation approach, while the possibility of high intelligence was particularly emphasized. According to law 3699/2008 on special education and people with disabilities or special educational needs, students with learning disabilities can attend classes in the inclusive primary and secondary education (21).

Diagnostic criteria:

Regarding the diagnostic criteria, they refer to the school performance of the child when he or she does not reach the levels predicted according to the index of his or her mental ability, his or her chronological age and the education he or she has received. (4) The diagnosis of learning difficulties can take place at the end of the 2nd grade (14).

Diagnostic procedure:

The diagnosis of learning difficulties is carried out by scientific staff of KESY (educational and counseling support centers) and in the Medical-Pedagogical Centers certified by the Ministry of Education. Both Greece and countriesabroad have largewaiting lists (22), (23).

After the end of the evaluation process by KESY, the interdisciplinary team prepares an evaluation report - opinion and the appropriate educational framework for inclusive education is proposed (23).

The importance of interdisciplinarity:

Learning disabilities as a multifactorial phenomenon that needs to be evaluated by multiple scientific and expert perspectives. This leads to synergies, holistic approaches, analyzes, investigations and finally to compositions that emphasize the importance of interdisciplinarity (26). Proper assessment leads to diagnosis and is the basis for planning interventions, while it documents the rights arising from the law of rights (14). Early diagnosis of learning difficulties and the creation of an appropriate and effective intervention programme are key parameters for improving difficulties (14) (25).

There are numerous studies on SLDs that cover a large part of the phenomenon by investigating the causes, diagnosis, evaluation criteria, treatment methods, methods of intervention and prevention of Special Learning Difficulties. According to medical studies, anatomical differences are observed in areas of the brain in people with SLDs. Metabolic differences related to the middle frontal lobe are found in girls with dyslexia and reading difficulties compared to typical readers (27). Reduced ability to control emotional and perceptual disorders are found in children with reading difficulties compared to typical readers (27). Typical readers have better cognitive control, better reading and emotional abilities (28).

SLDs and behavioural problems:

A synchronous study on SLDs and behavioural problems was conducted in a sample of 200 students from the 1st to the 6th grade, 100 of which have SLDs and 100 don't have SLDs (the clinical and control group respectively). The students in the clinical group had more problems internally and externally compared to the control group. No statistically significant differences were found between boys and girls in the occurrence of the majority of behavioral problems. The findings of the study showed that many family factors are related to the occurrence or not of dyslexia (13).

Dyslexia underdiagnosis:

A synchronous study in 9 regions of Italy showed that there is a underdiagnosis of dyslexia (3). Successive levels of evaluation were given to students (questionnaires, weighted tools, informal tests). Two of three children in primary education (8-10 years old) had not previously been diagnosed with dyslexia. The prevalence before the study was 1.3% (1.1-1.5%) and after the studyit was found to be 3.5% (3.2-3.9%). There reveals an urgent need for adequate human and financial resources in both health care and education (29).

Dyslexia and dyscalculia:

By studying the relationship between dyslexia and dyscalculia , children with dyscalculia have 12.25 odds to experience dyslexiacompared to children who do not have dysnumeria (22)Co-morbidity is noted at 30-40% (30). Rehabilitation programmes should be carried out by therapists and educators with appropriate training. Co-morbidity with other psychiatric disorders should be taken into account (31). Intervention should start in the early years of school age (32).

SLDs and writing problems:

According to existing research, it has been concluded that children with special learning difficulties also face problems in writing – motor skills. These coexist because they rely on underlying related processes. (12) Science has conducted studies to analyze these difficulties and investigate whether there are strategies that could be followed to improve children's motor skills (33).

Phonological deficits in dyslexia and illiteracy:

Deficiencies in phonological awareness are one of the first features of dyslexia. (34) Many people with dyslexia also experience additional difficulties such as phonological representation (speed of processing and retrieval from vocabulary) and coding, storage and retrieval of representations (short-term and long-term memory). (35) According to a meta-analysis, the relationship between phonological awareness and reading is influenced by the spelling characteristics of each language.The exact nature of phonological deficits can be investigated through comparative linguistic studies taking into account the spelling and phonological characteristics of each language (36).

Dyslexia and Developmental Language Disorder (DLD):

A study of Greek-speaking children with dyslexia and children with DLD presented difficulties in semantic activities compared to their classmates. These difficulties were due to slow recall from the semantic dictionary rather than poor semantic vocabulary. (37) There is a comorbidity of dyslexia and developmental language disorder. (38) Studies in children with a family history of dyslexia show that they had severe language deficits in preschool age associated with an increased likelihood of developing dyslexia during the school years. (39).Children with dyslexia and / or DLD have difficulty in understanding text but show different symptoms, due to lack of coding in the case of dyslexia or lack of language skills in the case of DLD. Different forms of intervention are required on a case-by-case basis. (39)

Eye movement in children with dyslexia and dysgraphia:

In a study on eye movement in children with dysgraphia and dyslexia, 29 children participated: childrenwithout special learning disorders, children with dysgraphia and children with dyslexia. Significant effects were seen in the group of children with dysgraphia and special learning disorders: 1) in the time it takes for the eye to focus and 2) in the number of focusing that the eye makes. Children with dyslexia mentioned more time to focus on more points than normal children. The group of children with dyslexia differed from the other two groups in the possibility of internal reading in a condensed text (40)

SLDs and comorbidity:

Studies show that children with SLDs are more likely to have psychiatric disorders than children without SLDs. (41). Comorbidity often includes: Anxiety disorders (20% prevalence), depressive symptoms and ADHD (4 times more common in children with SLDs, prevalence 8-18%), behavioral disorders. (41)For social phobia there are indications that the risk is six times higher(42).

Study of cognitive and socioeconomic factors that affect children with dyslexia:

A study conducted in two schools in the United Kingdom evaluated the cognitive and socioeconomic factors that affect children with dyslexia. One school was in a run-down area and the other in a less disadvantaged area. A cross-sectional study was performed to examine whether visual sensitivity to genetic stimuli could predict reading performance. Taking into account age, gender, school and various phonological and cognitive abilities, the findings showed that visual sensitivity is a weak predictor of the development of specific learning disorders. The most important predictors are socio-economic and phonological awareness factors (43).

The role of visual-spatial abilities in dyslexia:

The aim of the study was to investigate the visual-spatial skills of children with developmental dyslexia, compared to typical children of the same age. The group included primary and secondary school- aged children. In order to verify whether the visual-spatial measurements could predict reading performance, regression analysis was performed on young and older children. (35). The results showed that younger children with developmental dyslexia performed significantly less in specific areas than children without developmental dyslexia. However, older children with developmental dyslexia have shown a general lack of visual perception. Current findings show that visual-spatial deficits in children with developmental dyslexia are age-dependent and the visual-spatial skills used in reading vary in relation to the different stages of academic education (35)

RADAR method:

RADAR method is a multimeter tool. It concerns a software of 25 parameters (custom algorithms), with texts on the computer (silent reading). The method evaluates dyslexia and reading difficulties. It draws objective and measurable conclusions about the level of concentration of the reader, the ability to decode and synthesize words as well as his or her reading ability. Due the accurate observation of eye movements the focus and saccadic movements in the visual processing of the text (silent reading) are determined.The reading path is recorded, which contains all the necessary information, from which we can draw useful conclusions (44).

Compensatory reading therapy:

A meta-analysis of 4 studies shows that remunerative reading therapy has the potential to be reproduced offering good results (effect size G = 1.72). In the intervention, pseudo-words with letters in different positions were presented. There was a change in each reading error in the parameters of time and of the order of the letters. The readers gradually developed self-correction and reading strategies.In persons with reading disorder the following were observed: Insufficient stabilization time, large saccadic movements and reduced ability to simultaneously recognize a sequence of letters. (45) A meta-analysis of 49 studies was carried out on the effectiveness of intervention approaches for illiteracy. According to the results, the phonological exercises are the most effective.(46)

Oral language deficits in children with dyslexia :

In a meta-analysis of 95 studies, the results of studies showed that children with a family risk of reading disorders who continue to meet the criteria for dyslexia have more serious disorders in preschool than those who do not meet the criteria. The same is true for school-age children, where the family risk of dyslexia is associated with poor phonological awareness and cognitive skills. (47)

Dyslexia and ADHD:

There is a close relationship between dyslexia and ADHD, as there is coexistence of reading difficulties with attention deficit hyperactivity disorder (41). A percentage of 10% to 40% of children with ADHD have difficulty in reading, spelling, writing and / or math. (36), (41) Regarding gender and ADHD, findings showed that boys with reading difficulties had higher rates of attention deficit (60%) and hyperactivity (30%) than girls with reading difficulties who had mainly characteristics of carelessness (24%). (41) In a subsequent study, the association of reading difficulties with behavioral problems was studied.In conclusion, both boys and girls with reading difficulties showed ADHD and mainly hyperactivity (46).

The role of technologies in special education:

Many new technology tools are used successfully in the education of children with SLDs. (48) All research studies show that if students with LD use appropriate IT (information technologies), they will better cope in the areas of education (49).

Students with learning disabilities are facilitated by frequent repetition, by the multi-sensory approach to cognitive material, by providing patterns of desired behavior. The brains of these children have been shown to work better with technology (50).

International approaches in SLDs:

In an article which includes an overview of 10 countries for students with LD, differences are observed regarding the laws enacted, the policies pursued by governments, the definitions, the assessment process and the interventions / services provided. Most countries follow their own criteria for detecting SLDs. These discrepancies reflect cultural, economic and social parameters. In Botswana, for example, the definition given by the National Council LD is used(dysfunction with deficits in academic subjects that are not a result of mental retardation or other conditions).There exist special education classes in segregated schools. Other provisions involve a Central Resource Center for students with LD.(20)In Norway the difficulties relate to an ecological model. There is no specific and clear definition. There is counselling, support for teachers, family and help for finding a job (20).

New approaches – Planning for the future:

Policies should be adopted that facilitate early detection, evaluation and intervention. (52) In the USA and Canada there are effective detection and intervention models in early school age. (53) Sweden and the United Kingdom are comparatively less focused on early detection and intervention. Instead, they provide strong legislation to support higher education (52). Ontario provides significant educational funding for both diagnosis and intervention (53).

Conclusion

Central governments and the policies they pursue should promote intervention and support programs for people with SLDs and their parents. Early detection, early intervention, parent education, interaction between parents, therapists and the school setting are essential elements for the smooth running of people with SLDs.

The use of assistive technology and educational software seems particularly useful in intervention programs, however additional studies are required.

Adequate support at all levels, combined with proper management by qualified scientific staff, will alleviate the difficulties associated with education, future job rehabilitation and social inclusion of people with SLDs, by giving them the opportunities they are entitled to.

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Nutrition and health implications of preterm children born to adolescent mothers

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ABSTRACT

Preterm birth is one of the most important determinants of adverse infant outcomes, in terms of survival and quality of life. Adolescent pregnant is among the factors that are associated with an increased risk of preterm birth. However, despite its significant contribution, this age group has not received sufficient attention in efforts to prevent and reduce the burden of preterm births. The current efforts are generalized to all age groups and do not consider that adolescents have special age requirements even before becoming pregnant. This literature review summarizes some of the key nutrition and health challenges in pregnant adolescent that are linked to preterm birth as well as possible acute and chronic nutritional and health challenges to their preterm children. Electronic databases such as PubMed, Google Scholar, and MEDLINE were searched using keywords such as "adolescent", "health," "preterm", "Teen mothers", "nutrition" "preterm birth" and pertinent articles (N = 74) were retrieved and reviewed. Due to maternal young age, preterm children of adolescent mothers also have high risk of suffering from short and long adverse health and nutritional problems. Female adolescents should not only be viewed from one angle of growing girls but also as part of women of the reproductive age group. They should not receive any less of the benefits of this age group that include adequate education about reproductive health, pregnancy nutrition and use and choice of contraceptives.

Key Words: *Adolescent Health; Nutrition; Preterm birth; Teen mothers*

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Introduction

According to the World Health Organization (WHO) a preterm is defined as a baby born alive before 37 weeks of pregnancy are completed. Preterm babies are classified as extreme preterm (≤ 28 weeks), very preterm (28-31 weeks), moderate preterm (32-34 weeks) and late preterm (34-36 weeks). Every year 15 million babies are born preterm globally with over more than half of the births occurring in Africa and Asia (1). Preterm birth is among the most important determinant of adverse infant outcomes, in terms of survival and quality of life. Complications associated with preterm birth also, have been reported as the leading cause of mortalities among babies (2).The rate of mortalities associated with preterm birth is considerably higher in low and middle income countries compared to high income countries (1).

Preterm birth is a complex subject with multiple risk factors of which maternal age is among the high-risk one. Young maternal age of <19 years which covers adolescent group increases the risk of preterm birth. Studies report that pregnant adolescents are 3 times more likely to give birth to preterm babies compared to older women and have more incidents of extreme and very preterm births (3–6). Gynecological immaturity (short cervix [≤ 25 mm] and small uterine volume), malnutrition and susceptibility to subclinical infections are some of the reasons that put adolescent mothers at higher risk of preterm birth(7). Increased fertility and adolescent's pregnancies accelerate rise in the number and rate of preterm births(8).

One of the key measures to combat the problem of preterm birth is identification and prevention of its risk factors. This and other measures are normally directed towards one major group namely, women of reproductive age that fall between 15-49 years old. This is to say, women between 15-49 years old have the same need and contribution with respect to reproductive health. However, in the human development perspective this age group includes adults and adolescents. Pregnant women of different ages have shown to contribute differently to the burden of preterm birth and its subsequent complications. Greater burden and more and severe complications are evident in adolescents(5,9–11). Moreover, it should be noted that adolescents have special growth and nutritional needs of their own that by becoming pregnant may become interrupted and impact both maternal and child nutrition and health. This review highlights common nutritional challenges in pregnant adolescents that may lead to preterm birth. The burden of detrimental nutrition and health outcomes in preterm children of adolescent mothers is also discussed.

Discussion

Adolescents' contribution to new births

By 2010 adolescents made up to 18% of total global population. Female adolescents represent nearly a half of the total adolescent population and a quarter of all female individuals. Over 70% of the adolescents live in middle and low income countries (12). In addition, adolescents represent one fifth of women giving birth to their first live babies with the highest proportion residing in sub-Saharan Africa where the use of contraceptives is the lowest(12). Approximately 23 million and 18.5 million girls aged ≤19 years become pregnant and give birth respectively, in developing countries every year(13,14). The World Bank reported that, adolescent birth rate has declined from 66 births per 1000 girls in 1990 to 41 births per 1000 girls in 2020 globally (15). However, the population of adolescents continues to grow and it is predicted that the number of adolescent pregnancies will rise up especially in Africa (12). Adolescent pregnancies occur mostly in marginalized communities and are commonly driven by poverty, lack of reproductive health education, child marriage and lack of access to modern contraception (13,16). Other drivers include lack of parental adolescent communication and monitoring, being in a sexual relationship, alcohol use, peer pressure and involuntary and forced first sexual debut (17,18).

A link between adolescence, nutrition and pregnancy

Adolescence is the period of rapid growth and development that transitions a person from childhood to adulthood. The period of adolescence ranges between 10-19 years of age and is accompanied by biological, physical, neuro-developmental, psychological and social changes (19). To accommodate the changes and maintain a healthy body, nutritional needs increases. Pregnancy in a similar way is another case that brings in increased nutritional needs necessary for growth of a fetus. Therefore, being both an adolescent and pregnant makes the growing mother and the growing fetus compete for nutrients (20). However, adolescents are normally challenged by poor eating habits which may get worse if they become pregnant. Such habits in a way threaten the possibility of a pregnant adolescent to meet the mother and fetal nutritional requirements particularly vitamins and minerals that are vital for fetal growth and development. On the other hand, maternal nutritional

deficiencies during pregnancy have been reported to increase risk of preterm birth(21).

Adolescent nutritional problems associated with preterm delivery

Adolescence is the second window of opportunity for growth after the first 1000 days of life (22). It is a period of maturity in terms of physical, emotional, social and psychological aspects. Due to rapid growth during this period, there is an increased need of nutrients to compliment with the growth (23); (24). Also, starting menstruation for girls and attaining maximum bone growth increases the need for iron and calcium minerals respectively. Common nutritional problems found in this group are anemia, underweight and poor growth. Because of these nutritional compromises, giving birth during adolescence increases the risk of adverse pregnancy outcomes and has a negative impact on the future well-being of a mother and an infant (23). This section discusses some of the common and significant nutritional problems among pregnant adolescents that are associated with an increased risk of preterm birth.

Anemia

Anemia during pregnancy is a leading nutritional disorder with serious short and long-term consequences for both the mother and the fetus, preterm birth included (25,26). About 75% of pregnant adolescents have been reported to get anemia during their first pregnancy (27). Iron deficiency anemia which is the type of anemia caused by lack of iron to support normal red blood cell production is the most common type of anemia in pregnant women (28). Normally, as a pregnancy progresses to the second and third trimester exhaustion of iron stores occurs in most pregnant women and leads to more iron demand(28,29). On the other hand, elevated iron demand to accommodate the needed production of myoglobin in muscles and hemoglobin in blood during adolescence put adolescents at a high risk of becoming anemic(5,21,22). Apart from increased iron demand during adolescence and pregnancy, pregnancy anemia can be caused by low consumption of iron rich foods, poor up taking of iron and folate supplements and parasitic diseases such as malaria and hookworms (22,30). Adolescents rarely take iron supplements unless medically indicated due to health reasons (31). Therefore, being an adolescent and pregnant predisposes a girl to even higher risk of anemia which in turn increases the risk of preterm birth if pregnant.

Poor growth

In human life there are two stages of rapid growth i.e. from the time of pregnancy to infancy and teenage stage. These stages are accompanied with high nutritional demands to cater growth processes (22). Becoming pregnant may impair a female adolescent of adequate and proper nutrition she needs. This is because nutrients sufficient for the growth of an adolescent will be used to sustain growth of two beings and possibly become inadequate for both (32). On the other hand, the pregnancy itself can have effects on nutritional outcomes of the mother. Maternal failure to get adequate nutrition may affect an unborn baby in two ways. Firstly, the mother will not be able to supply through placenta enough nutrients to the baby for growth and development. Secondly, if a mother is malnourished she will not properly grow and acquire the physiological maturity and physical strength that a pregnant woman requires. Both insufficient supply of nutrients through placenta and immaturity of an adolescent mothers may cause inadequate weight gain during pregnancy, anemia and intrauterine growth retardation that may lead to preterm delivery (29)(5). Therefore, maximum growth is crucial for proper supply of nutrients to the fetus so as to improve birth outcome and lower the risk of preterm delivery.

Under nutrition

Under nutrition occurs when the body receives inadequate nutrients to support its normal functioning. Thinness (wasting) and underweight are among the signs of under nutrition affecting adolescent girls (5);(31). The two also increase the chance of preterm births among pregnant women (5). Under nutrition among adolescents is linked to poor eating habits and lifestyle factors such as cigarette smoking and alcohol consumption which impair adequate nutrients uptake and subsequent low weight gain. According to TDHS 2015/16 adolescents aged between 15-19 years are more likely to be thin than older women and the effect is higher in rural than urban areas. Preterm birth, both spontaneous and clinically indicated, have been associated to maternal under nutrition among other factors (33).

Health and nutritional care

Family support during pregnancy is needed to ensure both health and nutritional recommendations are well supported. Pregnant adolescents are more likely to not be married or living with a partners (34), hence might miss spouse support to care for the pregnancy (35). Moreover, most adolescents do not even plan to conceive and are still in lower levels of

education. Such shortcomings may affect their up taking and understanding of key health and nutrition information provided at prenatal clinics(5). It has been reported that pregnant adolescents go for prenatal care less often than older women (21). Fewer prenatal care visits prevent a pregnant woman from obtaining health and nutrition counseling according to pregnant stage thus increases the chance of having negative pregnancy outcomes that may include preterm birth.

Common nutrition problems of preterm children of adolescent mothers

Being born preterm is considered a nutrition emergence that requires proper nutritional care intervention to support the child's growth(36). The best and recommended source of nutrients for all newborns including preterm babies is breast milk (37). However, preterm babies are likely to have immature guts or other health complications that may delay initiation of breastfeeding as well as impair their ability to feed properly(38). For instance, in most clinical settings preterm babies are normally provided with intravenous dextrose for 2-3 days while receiving other necessary medical care (38). Dextrose contains only carbohydrates and lacks other important nutrients necessary for every newborn's growth. Micronutrients deficiency, low birth weight, severe acute malnutrition, stunting and poor growth are among the common nutrition problems in preterm babies. In this section, these problems are discussed in the light of preterm babies of adolescent mothers.

Low birth weight

Low birth weight (LBW, birth weight < 2,500 g) is among the common negative nutrition outcomes of preterm birth. Extreme LBW and extreme preterm birth are basically linked and the risk of occurrence is relatively high among pregnant adolescents. A retrospective study at Muhimbili National Hospital in Tanzania reported that adolescent mothers were more likely to deliver LBW babies compared to older mothers(39). LBW is also associated with increased mortality and morbidity in children (40). Since the incidence of LBW is more than twice as much among adolescent mothers when compared to adult mothers, babies born to adolescent mothers are in a higher risk of morbidities and mortalities during the first year of life (40). LBW babies among adolescent mothers may be as a result of biological immaturity of a mother, feto–maternal competition for nutrients and lack of adequate antenatal care(41).In a study that was conducted to evaluate whether adolescence pregnancy is a risk factor for LBW, it was found that about 1.5% of pregnant women do not receive antenatal care at all; and among them the proportion of pregnant adolescents was twice as much that of older women (40).

Micronutrients deficiency

Micronutrients are nutrients such as vitamins and minerals that are required by the body in trace amount. Despite their minimal requirement micronutrients are very important for child growth and development. Preterm babies have higher demand for micronutrients than term babies as they are born with low micronutrient stores. In a uterus a fetus receives nutrients from a mother through a placenta. This process occurs mostly in the third trimester. Extreme preterm babies, for instance, which are common among pregnant adolescents, have the highest risk of having micronutrient deficiencies and low nutrient stores as they are born within few weeks of the third trimester (36). Low micronutrient stores at the time of birth increases the risk of metabolic bone diseases(42).Moreover, babies born to adolescent mothers are even more prone to micronutrient deficiencies than those born to older mothers because adolescents are more likely to be undernourished compared to their older counterparts(14).

Poor growth and development

Malnutrition is often the main cause of poor growth among preterm babies. Reduced nutrient stores, insufficient nutrient absorption and immature organs are among the factors that make preterm babies susceptible to malnutrition. Growth assessment at birth provides an important benchmark for evaluating subsequent changes in nutritional status in preterm babies and determining goals for their discharge. Despite receiving adequate nutrition care, during hospital discharge most of these babies are still classified as postnatal or severe growth restricted (43,44).. It is also difficult to monitor growth pattern of preterm babies including how they reach to full term babies. Generally, preterm babies experience poor growth patterns that involve delays in achieving developmental milestones such as cognitive behaviors, movement, language and social aspects. Compared to adult mothers, adolescent mothers are less knowledgeable, less responsive, less skilled and more controlled in infant feeding, which interferes with infants' healthy growth (20). Infant feeding knowledge and child development skills among adolescent mothers are highly recommended to ensure proper growth of their children especially those born preterm.

Stunting

Stunting

Stunting or low height for age is the type of malnutrition caused by long-term insufficient nutrient intake and frequent infections. It occurs generally during the first 1000 days of the life of the baby starting from pregnancy period to two years of age. Past two years the effects of stunting are irreversible. Childhood stunting also has long-term effects that predisposes stunted children at risk of lower academic achievements. In retrospective study on the factors affecting stunting it was observed that, the risk of stunting at infancy stage was 3.7 times higher among preterm infants than the term infants (45). There are several causes of stunting ranging from poor maternal nutrition, poor breastfeeding and complementary feeding practices, lack of psychosocial stimulation as well as poor water and sanitation hygiene (WASH) practices that may cause frequent infections (45). These factors are common in children born to adolescent mothers as they are less likely to receive proper nutrition, health care, and cognitive and psychosocial stimulation. Studies conducted in urban Nigeria and South Africa reported higher prevalence of stunting in under-five children born by adolescent mothers when compared to older mothers (46,47). Higher rate of stunting children among adolescent mother can be explained by nutrients competition between the mother and the fetus and lack of prenatal and postal care visits among adolescent mothers.

Severe acute malnutrition

Severe acute malnutrition (SAM) is defined by a very low weight for height which can be seen as visible severe wasting or by the presence of nutritional edema. Low weight for height is a strong predictor of mortality among under-five children. It is usually the result of acute significant food shortage and/or diseases. It has been observed that preterm infants are at an increased risk for SAM, which is a very common case among hospitalized preterm babies(48). Nutrient deprivation predisposes preterm babies to significant metabolic maladaptation, growth failure, and long-term neurological injury that bring about SAM. A study conducted to adolescent mothers revealed that there is an increased risk of wasting that is associated with exclusive breastfeeding duration of less than 6 months (47). Children born to adolescent mothers experience poor nutrition status as the mothers are not yet well prepared to take the responsibility of childcare that includes feeding a child (47). Hence it is important to invest nutrition education and practices for school age children so as to reduce the chance of SAM to children born to adolescent mothers.

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Health implications associated with preterm children of adolescent mothers

Preterm babies are at a greater risk of health complications that not only compromise their health as infants and lead to high mortality rate but also predispose them to life-long disabilities. While some of complications are a direct effect of just being preterm and are more common and severe in extreme preterm infants, other complications are a result of the medical interventions they go through in order to save their lives. Generally, pregnant adolescents are more likely to give birth to preterm and low birth weight babies that will require harsher and prolonged clinical interventions that may sometimes come with costly health outcomes (49). Moreover, adolescent mothers are more likely not to receive proper pre and post-delivery care and education therefore, are less informed about what can be done to rescue the health of their children. Some immediate and lifelong complications associated with preterm children of adolescent mothers are discussed in this section.

High mortality rate

Prematurity is the leading and the second leading cause of death in neonates and children under five years of age respectively (2,50). Moreover, preterm babies born to adolescent mothers have minimal chances of surviving compared to babies of older women. High mortality rate may be explained by high prevalence of extreme and very preterm births among pregnant adolescents (51). The earlier the baby is born the lower the chance of survival particularly beyond the first month of life (neonatal period). In low income countries for instance, mortality rate in extreme preterm babies is as high as 90% (52). Babies with high degree of prematurity require specialized and intensive health care which is challenging in low income countries where most adolescent pregnancies occur. Pregnant adolescents are also at an increased risk of delivering LBW and small for gestational age babies. These conditions when are accompanied with prematurity elevates the risk of mortality even past the neonatal period(53,54).

Increased risk of mother to child HIV transmission

Adolescent mothers are at an increased risk of mother-to-child-transmission (MTCT) of Human Immunodeficiency Virus (HIV) and they contribute to more than 50% of all vertical transmissions of HIV infection (55). High rate of transmission is presumably due to inadequate use of prevention-of-mother-to-child-transmission (PMCTC) service.

HIV suppression and prevention of transmission can be achieved through the use and adherence to antiretroviral therapy (ART) (56). However, the proportion of HIV positive adolescents using and adhering to ART is hardly half the proportion of adults (Martelli et al., 2019). In a study conducted by Nachega et al., (2009) only 20.7% and 6.6% of HIV positive adolescents achieved 100% adherence to ART treatment within the first 6 and 24 months respectively, following initiation.

Additionally, PMCTC services that include HIV testing and initiation of ART for HIV positive pregnant women among many other services should be started as early as when a woman is planning to conceive to throughout pregnancy, labor and breastfeeding. Nevertheless, for most adolescent's pregnancy is an unplanned event and they have little tendency of testing for HIV. Majority of HIV positive pregnant adolescents become aware of their HIV status when they firstly book for antenatal care (ANC) (55). Unfortunately, pregnant adolescents book for ANC and initiate PMCTC services late during pregnancy particularly within the second trimester (Mustapha et al., 2018). It has been observed that, for HIV positive pregnant adolescents every single week delay in ANC booking increases the risk of MTCT by 10% (60). Time of initiation of ANC and number of ANC visits on the other hand influence pregnancy outcomes (61). Therefore, children born to HIV positive adolescents are at an increased risk of both being born preterm and infected with HIV through vertical transmission.

Mental health disorders

Studies conducted on mental health of preterm children points out to increased risk of mental health problems that are mainly evidenced by attention deficit/hyperactivity disorder (ADHD), emotional disorders and autism spectrum disorders (ASD) than in term children(62–64). The first two disorders are mainly characterized by inattention and anxiety disorders respectively. The risks increases with increasing level of prematurity at birth and is still significant even after active prenatal care for the children compared to the general population(65,66).Furthermore, ADHD and ASD have been linked to neuro-developmental disabilities that are mainly caused by brain injury and small brain volume (10,67). Brain injuries are among the common detrimental heath complications in preterm babies. Intraventricular hemorrhage (IVH) and white matter injury comprise the most common brain injuries in preterm babies (9,68,69). Small brain volume is also among the common outcome in preterm babies and has been shown to be influenced by both brain injury and gestational age independently of brain injury (9,67,68). Both brain injury and abnormal brain volume affect normal development of the brain and lead to developmental and cognitive disabilities that are characteristic in children with ASD.

On the other hand, emotional disorders are associated with social and medical factors (70). Maternal age at the time of birth, education, socioeconomic status and stress significantly impact child behavior and emotions (71). Medical practices for management of preterm babies such as long stay in the neonatal intensive care unit, artificial ventilation and postnatal corticosteroid exposure also may lead to similar effects (71,72). Studies show that young maternal age (>20 years) especially when associated with other socioeconomic and life style factors can have serious negative mental health implication to a child (11,73).

Non-communicable diseases

Early life events can seriously impact what happens later in life. Onset of non-communicable diseases such as cardiovascular diseases and type 2 diabetes is not only attributed to lifestyle behaviors in the mid adult age but also during fetal development, early infancy and childhood (74). Consumption of enhanced nutrition to prevent postnatal growth faltering (35–37) and conditions affecting intrauterine growth and development (69–75)(74)(73)(73)predisposes preterm babies to adult-hood chronic diseases(36,75). Also, preterm babies who experience accelerated growth early in life may have increased fat deposits and be at higher risk of metabolic and cardiovascular problems later in life (43). Therefore, when the babies reach term-corrected age they remain underweight but with proportionally more fat than fat-free mass compared with term babies (76). Having more fat than fat-free mass is linked to an increased risk of chronic diseases (77). The risk can be presented in later stages of life especially at the age of 30 to 40 years. In addition, unhealthy infant feeding practices among adolescent mothers such as a combination of formula feeding and early introduction of complimentary foods increases the chance of rapid or excessive weight gain in early infancy (20). This indicates that, preterm babies of adolescent mothers are at higher risk of overweight and non-communicable diseases than those born by older mothers. It should be noted that, proper nutrition education among adolescent mothers will increase knowledge and skills on infant feeding and consequently reduce the risk of overweight and non-communicable diseases.

Conclusion

Young maternal age contributes substantially to the burden of preterm birth and serious nutrition and health complications to both mother and child. Female adolescents should not only be viewed from one angle of growing girls but also as part of women of the reproductive age group. They should not receive any less of the benefits of this age group that include adequate education about reproductive health, pregnancy nutrition and use and choice of contraceptives. Countries should make policies that allow adolescents to have access to contraceptives and ensure the policies are well known by the adolescents as well as all key practitioners. Adequate and user-friendly antenatal, childbirth and postnatal cares to adolescent mothers are also essential in promoting good pregnancy outcomes and lower the risk of preterm births. Additionally, the WHO recommendations on antenatal care pointing to prevention of preterm births have to be followed. Some of the key recommendations include counseling on healthy eating and nutrient supplementation, HIV testing and a minimum of 8 antenatal care contacts throughout pregnancy to monitor pregnancy health and identify and manage indicators of negative pregnancy outcomes (78). Lastly, strategies for preventing preterm birth should not be generalized but rather varied depending on main issues across the reproductive life span to ensure positive pregnancy outcome for every woman.

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Review

Limitations on Physical Activity in Childhood Cancer Survivors and Intervention Programs: A Review of Literature

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ABSTRACT

Purpose: Pediatric cancer survivors have been increased through the last decades, while scientists conduct studies in order to discover new treatments and ameliorate survivors' quality of life. Physical activity consists an important factor with multiple benefits for the overall health of Childhood Cancer Survivors (CCSs). However, CCSs are not following the suggested guidelines and they are defined by low physical performance. The aim of this review was to highlight the reasons survivors neglect exercise and how intervention programs benefit them.

Methods: Search was conducted for studies published between 2002 to 2021 in four databases (PubMed, Goggle Scholar, Cochrane Library and Research Gate). All studies were in English language. All articles were either descriptive or intervention research and provided results according to survivors' physical activity and specifically related to the barriers, preferences and benefits.

Results: Results showed that survivors face mostly physical and psychological barriers that discourage them from exercise. Intervention programs showed significant improvement in several aspects of CCSs' physical and mental health and social life. While some survivors are not particularly active, they reported willingness to improve not only the level of physical performance but also several unhealthy habits.

Conclusion: Appropriate guidance and specialized framing by professionals are crucial not only for CCSs but also their families. Further research is necessary in order to reassess and ameliorate beneficial policies and promote Public Health for CCSs.

Key Words: *Childhood Cancer Survivors (CCSs), Psychosocial Barriers, Physiological Barriers, Public Health, Physical Activity*

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Introduction

In 2020, the worldwide incidents of childhood cancer were 206,362 between the ages of 0 and14 years. The most common diagnoses at these ages were leukemia, brain and central nervous system (CNS), non – Hodgkin lymphoma, kidney cancer and Hodgkin lymphoma (1). According to the World Health Organization, cancer is a leading cause of mortality in children and adolescents (2). Specifically, the American Cancer Society reports cancer as the second cause of death in this population, after accidents (3).

Regardless the type of cancer, 80,104 cases of death were reported in 2020 internationally. Particularly, 25,080 (31.3%) cases were due to leukemia and 11,889 (14.8%) due to CNS tumors. Although it is estimated that by 2025 the percentage of mortality in Africa will be increased by 9.2%, a decrease of 1.3%, 2.2% and 2.7% in mortality is expected in America, Europe and South-East Asia respectively (1).

The scientific community has developed different types of childhood cancer treatment. Most common treatments are chemotherapy, radiation therapy, surgery, immunotherapy and stem cell transplant, separately or in combination. The eligibility of a treatment depends on the type and the stage of cancer (4). Despite the received treatment, some people may develop second cancers either as a long-term effect of the initial malignancy or due to the treatment. The second cancer as a new and completely different cancer may not be associated with the first one and its completely different from the cancer recurrence which means that the original cancer reoccurs (5).

According to National Cancer Institute someone who has been diagnosed with cancer, is known as survivor from that moment until the end of life (6). In order to improve the general health and quality of life (QoL) of cancer survivors, several guidelines are recommended. The most important among them is to be active and to participate in physical activity gradually (3).

Objective of the present review is to investigate the level of physical activity in childhood cancer survivors (CCSs) and its contributing factors. Furthermore, the intervention programs aimed to improve and motivate CCSs to be physically active were reviewed.

Methods

A literature search was conducted for studies published any time since 2002, in four databases: PubMed, Google Scholar, Cochrane Library and Research Gate. The studies in this review had to meet three inclusion criteria: 1) reference in CCSs of any age, 2) any type of cancer, 3) written in English language. No restrictions were considered regarding geographical origin or whether survivors were on/off therapy.

Results

Study Designs and Samples

In this review two meta – analyses (7,8), two systematic reviews (9,10), one systematic review and meta – analysis (11), six randomized controlled trials (12–17), one pilot clinical trial (18), one quasi – experimental study (19), five cohort studies (20–24), seven case–control studies (25–31), eight cross–sectional studies (32–39), one cross–sectional cohort study (40) and four qualitative studies (41–44) were included.

Out of the 38 studies, 15 were conducted in the USA, 11 in Europe (Sweden, Spain, Italy, France, Germany, UK, The Netherlands, Greece), six in Asia (China, Turkey), three in Canada and three in Australia. Four studies were based on data from participants in the Childhood Cancer Survivor Study (CCSS) (22,24,30,35), two based on data from Swiss Childhood Cancer Survivor Study (SCCSS) (29,33)and two from St. Jude's Lifetime Cohort Study (14,20).

According to sex, the majority of participants were male. The most common diagnoses were hematological malignancies and CNS tumors. The types of treatment were chemotherapy, radiation therapy, surgery, bone/cell marrow transplant or mixed methods.

Data from the final 38 studies are presented in Table 1, including: authors/year and country, study design, sample characteristics, type of cancer and outcome measures.

Level of physical activity in CCS

Several studies included in the present review demonstrated a reduced physical activity of CCSs (8,10,24,25,27,31). Especially malnourished survivors had a significantly lower physical performance than well-nourished CCSs (P=0.01) (27). As Gülnerman et al. reported, even after a long time since completion of therapy, the physical capacity of CCSs was significantly lower as compared to their healthy siblings (25). Furthermore, Ness et al. showed that survivors, when compared with their healthy siblings, were almost twice more likely to have performance limitations (RR, 1.8; 95% CI, 1.7-2.0) (24). Apart from limitations in physical activity and performance, survivors were 4.7 times more vulnerable to restrictions in personal care and daily activities (RR, 4.7; 95% CI, 3.6-6.2) (24).

The level of physical activity was associated with CCSs age and sex (17,22,28,29,39). One study revealed the physical inactivity, among other factors, as a behavioral risk factor (17). Older CCSs had higher behavioral risk factor index scores. Furthermore, one study showed that limitations in sports were more frequent in CCSs aged ≥40 years (OR 2.7, 95% CI, 1.02-7.16) (29). In the study of Paxton et al. differences were identified between adolescents and adults CCSs (39). Specifically, leisure time physical activity (LTPA) was significantly correlated only to improved physical function in adult CCSs (P<0.01), whereas in adolescent CCSs, LTPA was associated with improved overall health related QoL, social and cognitive function and cancer worry (all P<0.01). Another study, examined the relationship between sex and level of exercise capacity as measured by the related VO2max (ml/kg/min) (28). Vo2max refers to the maximum volume of oxygen that the body can use during exercise. The survey showed that female survivors had lower mean VO2max than their healthy siblings (P=0.03) (28).

Frequency, intensity and duration of exercise had a significant impact on the level of physical activity in CCSs. Lanfranconi et al. showed that exercise over time is very important, even if the intensity is low to moderate, such as a 6-min of walking (21). Similar results were demonstrated in the work by Scott et al.,where a 6-MET-h/wk (metabolic equivalent tasks) increase in vigorous exercise was associated with a 13% reduction in the rate of death from any cause (22). The same researchers highlighted the benefits of continuous exercise, while increased exercise over 8 years was related to an adjusted 40% reduction in the rate of death from any cause (RR, 0.6; 95% CI, 0.44-0.82) (22). Other two studies revealed the importance of frequency, intensity and duration of physical activity in cognitive, psychological and physical function of CCSs (35,38). Badr et al. observed that CCSs who had better physical function scores exercised more often (P=0.01), while those who expressed more general fatigue (P=0.04) and cognitive fatigue (P=0.01) exercised less often (38). Additionally, Tonorezos et al. found association between vigorous exercise and a lower prevalence of depression (Ptrend=0.003) and somatization (Ptrend=0.005) (35).

Limitations on physical activity

Despite the aforementioned studies, other studies focused on the reasons why CCSs report low physical activity levels (17,20,23,24,26,29,30,32–34,36,37,41,42,44). All of them referred to physiological limitations.

Specifically, a self-reported survey highlighted that among 20 participants, 11 did not exercise and 3 invocated current health conditions (42). Another study showed that severe headaches discouraged CCSs from working out (44). Four studies correlated limited physical performance with the occurrence of neurological and musculoskeletal impairments (24,29,33,44). Moreover, in the survey of Ness et al., CCSs with musculoskeletal impairments (RR, 1.9; 95% CI, 1.7-2.0) and CCSs with neurologic impairments (RR, 2.0; 95% CI, 1.9-2.2) had the highest risk for developing a performance limitation as compared to CCSs without similar comorbidities (24). Five self-reported studies demonstrated the crucial impact of pain, fatigue and decreased physical strength on physical activity status (29,32,34,36,44). However, in the work by Nayiager et al. CCSs who had a fracture during the treatment for acute lymphoblastic leukemia reported more active hours (mean 8.8 vs. 6.9, F=6.14, P<0.01) on a typical weekend day (40).

One study examined the impact of cardiac impairments in physical activity of CCSs; especially those who had cardiac problems had a twice as high risk to present performance limitations, when compared with their healthy siblings (RR, 2.0; 95% CI, 1.8-2.2) (24). Another study investigated the exercise tolerance by measuring peak oxygen uptake and reported that tolerance was significantly better among survivors without cardiac autonomic dysfunction (CAD) (24.4±8.1 vs. 21.2±10.1 mL/kg/min, P<0.001) as compared to survivors with CAD (20).

Regarding the percentage of oxygen volume (VO2peak), two studies associated it with physical activity level (20,26). Papalia et al., found that VO2peak was significantly higher in the control group than in brain tumor CCSs (43.3±11.9 and 32.4±10.2 mL/kg/min, respectively, P=0.04) (26). Furthermore, survivors had decreased exercise tolerance, as measured by peak oxygen uptake (24.2±6.1 vs. 27.7±8.0 mL/kg/min, P<0.001) when compared with controls (20).

Another study found statistically significant differences between participant z scores and the normative sample on balance (P<0.001; 95% CI, -1.66 to -0.97) and running speed/agility (P=0.005; 95% CI, -1.04 to -0.20) (37).

Despite the physiological barriers, physical inactivity was detected in CCSs due to psychological problems (29). Moreover, depressive symptoms, coexisting with conflicts with the parents, constituted a risk factor for physical inactivity (β=0.005, P<0.05) (17). Krull et al., reported correlations between social withdrawal (OR 1.7, 95% CI, 1.2-2.5, P=0.01) and use of anti-depressants (OR 3.2, 95% CI, 1.1-1.7, P=0.02) with physical inactivity in adulthood (30).

Furthermore, some studies included in this review referred to the type of diagnosed cancer and the type of received treatment as factors that affect the exercising status of CCSs. Rueegg et al., showed that CCSs are more likely to report restrictions in sports if they had been diagnosed with a CNS tumor (OR 7.1; 95% CI, 3.7-13.8), a retinoblastoma (OR 5.6; 95% CI, 1.7-18.7), a bone tumor (OR 12.3; 95% CI, 5.4-28.2) and a soft tissue sarcoma (OR 3.5; 95% CI, 1.4-8.9) (29). Similar research findings arose from the study by Ness et al., CCSs of bone cancer were 2.9 times (95% CI, 2.6-3.3 times), CCSs of brain cancer 2.5 times (95% CI, 2.2-2.8 times) and CCSs of Hodgkin lymphoma 1.8 times (95% CI, 1.6-2.0 times) more likely to report a physical performance limitation as compared to their healthy siblings (24). One study showed that children with a cancer relapse had lower levels of physical activity (OR 0.5; 95% CI 0.4-1.0, P=0.030) (33).

According to the type of the received treatment, CCSs who received radiotherapy or chemotherapy reported decreased physical performance (24,29,37,42). Specifically, limitations in physical activity were more frequent in CCSs who received radiation, than in CCSs who underwent only surgery (RR, 1.4; 95% CI, 1.1-1.7) (24). However, Nayiager et al., found no statistically significant difference in physical activity between children who received cranial irradiation and those who did not (40).

Additional factors that contribute in physical inactivity of CCSs are associated with daily routine. Some CCSs reported complains about the screening time, the lack of time and scheduling conflicts (23,32,42). The lack of time was also highlighted as a burden by the parents of CCSs in the study by Cheung et al. (41).They reported that family responsibilities limited the time that could be expended in physical activity with their children (41). About half of the children and adolescents cancer survivors expressed that they had limited time for physical activity due to demanding academic responsibilities (36,41). Similar results were found in the survey by Cheung et al., where more than the half of the parents stated that their children were spending a lot of time on homework and had limited time for physical exercise (41). According to Mizrahi et al., another limiting factor could be the insufficient guidelines for the type, intensity and duration of the exercise (32). Furthermore, in the study by Bertorello et al., participants reported that they were physical inactive due to laziness (19%) or because they were not interested in exercising (27%) (23).

Enablers of CCSs and preferences in physical activity

In the present review, two studies concerning the enablers which CCSs found that could motivate them to participate in physical activity, were included (32,42). CCSs noted the importance of physical activity in health and its improvement, as well as in the strengthening of muscles (32,42). In addition to the benefits in physical health, a positive effect in their mental health was reported, even if some participants found physical activity just satisfying and (32,42). CCSs also mentioned that motivation from family or friends was important (32,42).

The preferences for physical activity, as mentioned by CCSs, were demonstrated in three self-reported studies (23,38,42). The cost of the exercise was crucial, while the choice between individual or group training was not important (42). In the same survey, the majority of CCSs showed preference for afternoon or evening training, three days per week, 60 min at each exercise session, on a private gym (42). They also stated that they preferred combining both aerobic and resistance training (42). Furthermore, in the study by Bertorello et al., male participants reported as the most frequent physical activities, soccer and swimming (23). Respectively, the most frequent activities among females were dancing and swimming (23). CCSs also reported that they prefer competitive sports (23). Finally, as shown by Badr et al. , 87% of the participants were disposed to “get in shape”, 84% to be informed about a nutritious diet plan and 75% were “very” or “extremely” interested in joining weight control programs (38).

Physical activity intervention programs

The intervention programs included in the present review aimed to give prominence to the impact of physical activity in general, mental health and QoL. The term QoL refers to cardiorespiratory system, muscles and flexibility (11).

A 16-week randomized controlled trial with gradually increasing intensity training showed that in the intervention group there was a significant positive change in the measurement of VO2peak (12). However, 9 out of 19 articles included in meta–analysis of Morales et al., showed no significant difference in VO2peak (P=0.065, 95% CI,0.12–4.06) (7). Three studies detected a significant improvement in physical functioning in CCSs (14,18,19). The first one, included a 10-week pilot program in Cologne, Germany in which the intervention was the indoor wall climbing (18). Improvement was detected in ankle DF-ROM (dorsiflexion – range of motion) and ankle DF strength (18). Secondly, a quasi - experimental study which investigated the impact of Stoplight Program (SLP), a physical therapy intervention, showed that the intervention group had higher scores in motor proficiency and physical activity (19). Thirdly, a randomized controlled trial examined a web – delivered

physical activity intervention (14). Motivation for activity was represented by an avatar, unique for each participant, which gathered points as a reward for physical training (14). Results showed a significant improvement in fitness measures (handgrip strength, number of sit-ups and pushups) (P<0.01) (14).

Physical activity also contributes to the decrease of cancer-related fatigue in CCSs (13,15). According to an adventure - based clinical trial, after a 12–month period follow up, there was a substantial change in cancer-related fatigue (P<0.001) (15). The self-reported questioners in the randomized controlled trial by Lokkart et al., provided similar results in comparisons between CCSs and healthy population (13). Interestingly, there was a significant difference regarding fatigue in children aged between 7-12 years during a 12-month follow-up (13). Apart from the self-reports of CCSs, parents were also asked about cancer-related fatigue in their children (13). A prominent difference in cancer-related fatigue was described for adolescents aged between 13-18 years, after a 12-month follow-up (13).

Some studies report that the physical activity also contributes in mental health and QoL. Däggelmann et al. highlighted the enhancement in emotional functioning; specifically, participants reported that felt stronger and more self-confident (18). Similar data were derived from the clinical trial by Li et al., where CCSs felt greater self-efficacy, improved QoL and physical activity (15). Two studies in the systematic review and meta-analysis of Mizrahi et al. and the randomized controlled trial of Howell et al. showed that distance-delivered intervention programs contribute to the improvement of psychosocial and physical function, and QoL (11,14). However, the level of physical activity were not significantly increased (11,14).

A qualitative study conducted in greek CCSs showed similar results. CCSs were described as happier, stronger and more active (43). An improvement in physical, psychological functioning and easiest socialization was observed (43).

Physical function of CCSs and psychological function of both CCSs and their families may also be enhanced by the participation in summer camps. A systematic review of 19 observational articles highlighted the decrease of sedentary life and the increase of physical activity, self-efficacy, self-confidence and socialization (9). Moreover, this study revealed the view of the parents of CCSs, who reported that felt more accepted by other families as they had similar experiences due to cancer diagnosis and treatment (9). Three studies from this systematic review showed the positive impact of camps in families' reconnection without distractions of everyday life, such as television (9). In two studies, parents reported that camps were a "safe place" where they can escape from daily life (9).

Another pilot study developed a summer camp in the gym of a pediatric hospital in USA for five months during summer (16). The intervention group participated in several physical activities and the control group just received monthly newsletters with suggestions about physical activity. The findings from the monitor that measured the hours of physical activity showed that the intervention group increased the exercising hours (except from 2 participants). On the contrary, the control group decreased the hours of physical activity (except from 1). A medium effect size (r=0.55) between moderate-to-vigorous physical activity and total self-efficacy scores was also detected, as well as a medium effect size (r=0.62) about subscale for adequacy (19).

Discussion

This paper summarizes the literature of limitations that discourage CCSs from exercising, as well as related intervention programs. This field of study is of particular importance for the enhancement of QoL of CCSs. QoL is also important for the public health as it means "the ability to perform everyday activities which reflect physical, psychological, and social well-being" and "patient's satisfaction with levels of functioning and the control of disease and/or treatment – related symptoms" (45).

The present review showed that CCSs have decreased physical performance due to several barriers. However, it is encouraging that several studies indicated the willingness of CCSs to participate in physical activities and to overall improve physical and mental health (23,38,42). In order to accomplish that, framing by qualified health professionals is considered crucial. Specifically, apart from medical experts, collaboration with nutritionists seems to be beneficial, as Alford et al. (27), Rokitka et al. (42) and Badr et al. (38) highlighted. Physiotherapists also, provide services targeting to the improvement of motor and physical mobility (19). Cooperation with mental health professionals could be profitable for the management of psychological and social barriers.

The intervention programs included in this review, showed that physical activity level can be increased and health, especially mental, can be improved. As Kelada et al. mentioned, except from CCSs, families can be also positively influenced (9). Further research on enablers and preferences of CCSs could pave the way to intervention programs that focus on the needs of CCSs and their families.

Limitations should be considered when interpreting the results of this review. Firstly, the sample of some studies was small and only studies in English were included. Secondly, among all studies, eight were cross–sectional and four quantitative and some of them had not statistical data.

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Original Research

Life satisfaction and Early Maladaptive Schemas in children in residential care

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ABSTRACT

Life satisfaction is the degree to which a person positively evaluates the overall quality of life. The aim of the present study is to illustrate the levels of life satisfaction both in total and per domain and to investigate the relationship of EMS and EMS domains with life satisfaction in children living in residential care. Sixty six children (51,5% were girls) with mean age 12.9 ±2,4 participated in our study. Participants of our study were children and adolescents that were referred to the Day Center "The house of the Child" and lived in caring homes of " the Smile of the Child". The Greek version of the Brief Multidimensional Students' Life Satisfaction Scale and the Greek version of the Schema Questionnaire for Children were administered to children. Highest scores of life satisfaction were presented by satisfaction with friends and lowest by satisfaction with family contact. Life satisfaction was inversely predicted by EMS: a) Emotional Inhibition, b) Enmeshment, c) Vulnerability to Harm and d) Abandonment and by domains of EMS: a) Disconnection/Rejection and b) Overvigilance/Inhibition. Regarding life satisfaction, it was observed negative correlation with age and no gender differences were observed for life satisfaction and EMS. We suggest the extension of the study to broader samples including evaluations regarding psychopathology. Through the knowledge on cognitive processes and dysfunctional patterns, it is possible that the dynamic process of their consolidation will be better understood and more appropriate and developmentally oriented intervention will be created.

Key Words: *Life satisfaction, Early Maladaptive Schemas, child protection services, residential care*

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INTRODUCTION

The study of life satisfaction focuses on the evaluations that individuals make regarding their own lives, both as regards individual and general domains. In our study, we focus on the life satisfaction of children in residential care in relation to Early Maladaptive Schemas. Cognitive schemas appear to be central to the development or maintenance of psychological difficulties in adulthood [1]. While there is an increase in studies on life satisfaction, there are still few studies available that investigate the issue in children and even fewer in children in residential care [2].

Child protection homes and residential care in Greece

Residential child care involves a large network of residential resources for out-of-home care, usually for the most severely affected children and adolescents requiring attention that cannot be provided in a family context, such as kinship care or family foster care [3]. According to Andreopoulou et al. [4] in Greece there are 85 children institutions nationwide that host 2,825 children from all over the country as well as immigrant children, according to latest reports. Only 28 of these institutions are public, while 57 are privately funded by Non-Government Organizations, churches and other associations/ institutions. Our study is focused on a sample of children that live in residential care homes of the association "The Smile of the Child" and they were referred to the "House of the Child". The association is in charge of 11 Homes nationwide in order to protect children that are victims of any form of violence and provide them with a safe living environment where they can enjoy everything necessary for their healthy physical, mental, emotional and social development. "The House of the Child" is a Mental Health Unit for the pro¬vision of individualized Mental Health Services to children and adolescents victims of abuse, neglect, domestic violence, victimized minors, children involved in bullying incidents and generally children who have recently or in the past been exposed to severe psycho-traumatic experiences and suffering, resulting to mental health, adaptation or behavioral problems. The domes¬tic child protection civil society Association "The Smile of the Child" is the administrator of the "The House of the Child" [5]. According to González-García et al. [3], Therapeutic Residential Care organizes living environments that are constructed in such a way to offer a multi-dimensional setting that improves treatment, education, communication and socialization possibilities, support and protection of children and adolescents that present behavioural and mental health needs in collaboration with families and the community, through formal and informal funding as well as other resources.

Life satisfaction

From the mid 90s' until today, there is an increasing interest on the part of the academic society from psychopathology to positive psychology with the aim of interpreting in which way and under which circumstances people experience positive feelings, such as happiness, in their life [6]. Positive psychology emphasizes on different aspects of happiness as well as takes interest in the quality of adaption in various circumstances and conditions, which is being expressed through positive behavioural, psychological and physical indices [7]. Positive psychology is based on and attempts to give prominence to individual strengths, positive elements and success without emphasizing on aspects that refer to individual deficits. Through this perspective, positive psychology tries to "heal" [8].

It is very often the case that studies which examine the development of children put emphasis on "psychopathological paradigms" [6]. The more we emphasize on the pathology of children that experience behavioural problems the more possible is that they will remain an important problem to their parents, teachers and peers [9]. Consequently, there is a need to shift our interest from mere diagnostic issues, that stem from the diagnostic criteria of disorders, to the relationships that these children foster and to the way they can be restored. Positive psychology has managed to shift the focus from "pathology" to a developmental perspective of "normality". Furthermore, the focus at the present time lies on early intervention and settings that offers a variety of motives and stimuli for children.

According to Diener [10], "subjective well-being" is defined as "the way a person experiences the positive characteristics of hir/her life". According to Diener, there are three dimensions as regards the expression of subjective well-being: the positive feeling (including feeling of joy and content), the negative feeling (such as stress and despair) and satisfaction from life. The satisfaction from life constitutes a dimension of vital importance as regards the drawing and retrieval of personal strength and eagerness for development in order for children and adolescents to be mentally and psychologically resilient. Nevertheless, studies are limited but increase in number as far as subjective well-being and children's life satisfaction is concerned [6,11].

Life satisfaction is defined as the subjective, spherical evaluation of positive aspects of life not only as a whole but also in specific domains of life (e.g. family and school life) [12]. This index presents relevancy to risk taking behaviours of children such as alcohol and psychoactive substances consumption, aggressive and cruel behavior, sexually-related activities, psychopathological symptoms (depresstion, stress, loneliness) and physical health (e.g. eating patterns and training) [13]. Huebner's theoretical model includes five specific domains of life satisfaction as regards children and adolescents (family, friends, school, living environment, self) from which a spherical index of life satisfaction can be extracted [13-14].

Life satisfaction of children and youth in residential care

As suggested by Monserrat et al. [2], research on life satisfaction of children in the care system is still in its infancy. The value of studying life satisfaction in this population will help us understand their evaluations and perceptions about their livesand especially on topics, such as satisfaction about the residential home where they are accommodated, their family of origin, school and their self among other aspects. Furthermore, the study of life satisfaction allows us to identify which factors or conditions of the protection system help in the process of increasing children's life satisfaction in care [2], e.g. stability, the prioritization of school [15], and in which type of placement children are most likely to find themselves. There are extremely few studies that have investigated the life satisfaction of children in residential care and previous studies indicate that they report significantly inferior life satisfaction than their peers in kinship and non-kinship foster care [16-17]. Research in children and youth in residential care supports that higher levels of life satisfaction are associated with lower levels of violence, fewer suicide attempts, and fewer risk-taking behaviors, including substance abuse and sexual risk taking behavior [18]. As suggested by Wood and Selwyn [19], factors such as abuse, care placements, "having to be continuously in contact with professionals, along with the uncertainty of the surrounding leaving care, impact on the life satisfaction of children in care".

Early Maladaptive Schemas

A schema is conceived of as a structure used for screening, coding, and evaluating impinging stimuli [20]. They constitute cognitive structures which are shaped by former experience and/or knowledge a person has and are used in evaluation of events and conditions as well as in the shaping of future aspirations and plans. The experiences a person has lead them to the shaping of schemas about themselves, the others and the environment. The schemas are found in a latent form, however, they tend to be activated under specific circumstances [21]. According to Young [1], the psychopathology of adults stems from maladaptive Schemas that have been developed during childhood.

The early maladaptive schemas, according to Young et al. [22] are developed when particular vital needs of the childhood are not satisfied · they constitute wide and stable patterns · they comprise memories, feelings and knowledge · they refer to the relationship of a person with the others and one's self · they are developed during childhood and puberty and continue to develop throughout one's life.

According to Schema Theory [22], schemas are grouped into five broad categories of unmet emotional needs the "schema domains": a) Disconnection and Rejection, b) Impaired Autonomy and Performance, c) Impaired Limits, d) Other-Directedness and e) Overvigilance and Inhibition.

Disconnection and Rejection domain relates to the assumption that the following needs such as security, safety, stability, nurturance, empathy, sharing of feelings, acceptance, and respect are not going to be satisfied in a way that could be predicted. Impaired Autonomy and Performance relates to the assumption that elements of the self and the environment interfere with one's assumed ability to separate, survive, function independently, or perform successfully. Impaired limits relate to problems with internal limits, responsibility to others, or long-term goal orientation. Other-Directedness relates to a constant emphasis on the desires, feelings, and responses of others, at the expense of one's own wishes and desires so as to gain love and approval, maintain one's sense of connection, or avoid retaliation. Usually involves suppression and lack of awareness regarding one's own weak elements and emotional bursts and natural inclinations. Overvigilance and Inhibition relates to excessive focus on not expressing one's spontaneous feelings, impulses, and choices or on abiding by strict, internalized rules and expectations about performance and moral behavior, often at the expense of happiness, self-expression, relaxation, close relationships, or health [22]. Furthermore, as Young et al. [22] suggested one more taxonomy of schema which is based on unconditional and conditional schemas. The schemas that are developed the earliest and are the most at the core; are unconditional beliefs about the self and the others (e.g. Mistrust/Abuse), whereas the schemas that are

developed later are conditional (e.g. Self-Sacrifice).

Nevertheless, according to Reinecke et al. [23] few research studies have focused on the topic of schema development while there are very few empirical data on the issue. Moreover, there has been no systematic research until today as regards the degree to which schemas in adulthood relate to the schemas and their functions during childhood and adolescence. The identification and the recognition of the importance of critical periods for the development of schemas during childhood could not only assist the early intervention during the development of dysfunctioned schemas but also the creation and consolidation of more adaptive schemas as regards the reference frame.

Through the knowledge on cognitive processes and dysfunctional patterns, it is possible that the dynamic process of their consolidation will be better understood and more appropriate and developmentally oriented intervention will be created. The aforementioned aims at the reduction of vulnerability and the boosting of life satisfaction during adulthood.

The present study

The aim of the present study is to illustrate the levels of life satisfaction both in total and per domain as regards children in residential care. To our knowledge, this is the first study in Greece that used advanced psychometric methods (Confirmatory Factor Analysis) to investigate the psychometric properties of the BMSLSS.

The present study is the first that aspires to investigate the predictive capacity of EMS as well as the domains of EMS in life satisfaction of children in residential care. The innovation of the present study is that it tries to investigate the EMS not as a factor connected to psychopathology but as a factor that relates to the subjective well-being and the positive aspects of psychology. As it is depicted in the study of Ford et al. [24], at least 60% of the children in residential care present difficulties on psychological level and 72% of the children bound to live in residential care have been diagnosed with at least one mental disorder. Therefore, through the present study, we aspire to investigate the notion of life satisfaction as an opposing notion to the burden that children with these characteristics experience, in accordance with Early Maladaptive Schemas that are linked to the potential appearance of psychopathology during adulthood.

As regards life satisfaction, we believe that children will present satisfaction connected to friends.

As far as the EMS are concerned, we believe that the participants will present higher rates in the Mistrust/Abuse and Vulnerability to harm domain. We also believe that EMS will have a reverse correlation to life satisfaction. Regarding the relationship of domains of EMS with life satisfaction strong negative correlations are expected for Disconnection/Rejection and Overvigilance and Inhibition. Finally, it is expected that life satisfaction will be reduced from mid school age children until adulthood.

Method

Participants

In the present study, children and adolescents that were referred to the Day Center "The house of the Child" of " the Smile of the Child" for diagnostic evaluation and search for therapeutical support participated. The participants were children that lived in sheltering frameworks of "The Smile of the Child". More specifically, from the 66 children that participated, 32 (48,5%) were boys and 34 (51,5%) were girls. The age span was between 9 and 18 years old, mean age 12.9 years old (SD = 2,4). As regards the age that children were placed in residential care, the youngest age span was between 0 until 16 years old, mean age 7.1 (SD=3.9) years old.

Measurements

Brief Multidimensional Students' Life Satisfaction Scale (BMSLSS).

The BMSLSS [25] contains five items on children's and adolescents' satisfaction with five important specific life domains: satisfaction with communication with family, satisfaction with friendships, satisfaction with school experience, satisfaction with oneself, and satisfaction with the living environment. These five items are rated on a 5-point Likert-type scale, ranging from 1 (not satisfied at all) to 5 (very satisfied). The BMSLSS has demonstrated acceptable internal consistency reliability in prior study [25]. From the scale, an overall score of life satisfaction is extracted from the average scores of the dimensions. The scale was adapted to Greek from the original English versions by two bilingual researchers following back translation procedures.

Schema Questionnaire for Children (SQC)

The SQC was developed by Stallard and Rayner [26], has been administered to community and clinical

samples [27] and aims at investigating and evaluating the EMS.

The SQC, translated in Greek language by Zafiropoulou, et al. [28], assesses 15 early maladaptive schemas (Abandonment, Mistrust, Emotional deprivation, Defectiveness, Social isolation, Dependence, Vulnerability, Enmeshment, Failure, Entitlement, Insufficient self-control, Subjugation, Self-sacrifice, Emotional inhibition and Unrelenting standards) as proposed by Young. In our study we also used mean scores for schema domains: a) Disoconnection and Rejection (Emotional Deprivation, Abandonment, Mistrust/Abuse, Social Isolation and Defectiveness), b) Impaired Autonomy and Performance (Failure, Dependence/Incompetence, Vulnerability to harm, Enmeshment), c) Impaired limits (Entitlement, Insufficient self-control), d) Other Directedness (Subjugation, Self-sacrifice) and e) Overvigilance and Inhibition (Emotional inhibition and Unrelenting standards). The original scale has been tested for validity and psychometric properties [26,29] and has been administered to community and clinical samples [27].

Procedure

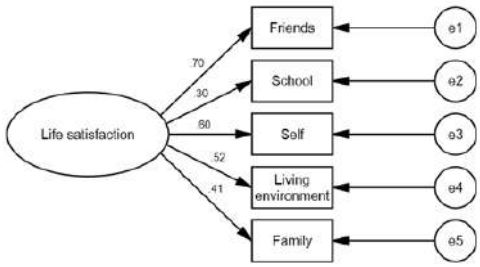
The questionnaires completed by the children and the caregivers were part of the diagnostic assessment process that took place at the Day Center "The House of the Child" and were completed during the diagnostic evaluation phase. This is a retrospective study as it was conducted on already available data that were collected as part of routine diagnostic evaluation. Written informed consent was obtained by the person who had the legal custody of the minor at the point of the assessment process (before the minor was assessed). Recognising the need for ethical clearance for such a retrospective analysis, the researchers were concerned with whether there was more than minimal risk of harm to the participants. No risk was identified and the authors/ researchers decided to obtain approval from the President of the “Smile of the Child” who has the legal custody for all/ the majority of the participants. Moreover, researchers ensured privacy and confidentiality, which were maintained at all times by using unlinkable anonymized data, by storing the data in an anonymised or a de-identified database and extracting them securely.

Results

Confirmatory Factor Analysis

A Confirmatory Factor Analysis was conducted in the BMSLSS to ensure the statistical appropriateness of the measurement model. The analysis showed acceptable goodness of fit indices in the determination of the underlying structure of the scales ($\chi2$ = 5.09, df = 5, p = .405, $\chi2$/df = 1.02, TLI = .99, CFI = 1.00, RMSEA = .02, SRMR = .06 (see Figure 1).

Figure 1. Confirmatory factor analysis for BMSLSS



Descriptive statistics

Life satisfaction. As regards life satisfaction indices, the highest mean score was presented by satisfaction with friends followed by satisfaction with oneself, school, living environment and communication with family (see Table 1).

EMS. As regards Early Maladaptive Schemas, the highest rates were presented by Vulnerability to Harm and Unrelenting Standards while the lowest rates by Failure and Emotional Deprivation (see table 1)

Domains of EMS. As regards the domains of EMS, the highest rates were observed in Overvigilance/Inhibition whereas the lowest were presented by Disconnection/ Rejection (see table 1).

Table 1
Descriptive statistics regarding life satisfaction, EMS and domains of EMS

BMSLSS	*M*	*SD*
Friends	4.48	0.77
Self	4.06	1.28
School	3.87	1.27
Living environment	3.82	1.42
Contact with family	3.41	1.65
Life satisfaction	3.93	0.81
EMS		
Vulnerability to Harm	6.03	3.38
Unrelenting Standards	4.29	3.57
Dependence/Incompetence	4.02	3.46
Emotional Inhibition	4.00	3.46
Self Sacrifice	3.84	3.20
Social Isolation	3.70	3.05
Subjugation	3.59	2.93
Enmeshment	3.36	2.83
Entitlement	3.27	3.33
Mistrust/Abuse	3.14	2.92
Insufficient self-control	2.88	2.89
Defectiveness/Shame	2.76	2.46
Abandonment	2.26	2.70
Failure	1.94	2.18
Emotional Deprivation	1.91	1.93
Domains of EMS		
Overvigilance/Inhibition	4.14	2.83
Impaired Autonomy/Performance	3.84	1.80
Other Directedness	3.71	2.24
Impaired Limits	3.08	2.66
Disconnection/Rejection	2.75	1.79

Sociodemographic factors, life satisfaction and EMS

Gender. Following the control of differences through a t-test for independent samples, statistically significant differences concerning the gender were not observed as regards the means of the factors of life satisfaction, the EMS and the domains of EMS (see Table 2).

Current age and age of entrance to the institution

Pearson r correlation was used to evaluate the relationship of age and the age when participants were placed in residential care with life satisfaction and EMS. Regarding age, it was correlated inversely to satisfaction with friends, school, contact with family and total life satisfaction. Adolescents presented statistically significantly lower life satisfaction indices. Statistically significant correlations among age, EMS and domains of EMS (see Table 3) were not observed. Regarding the age of entering the institution, older children reported statistically significant lower satisfaction with contact with the family. A statistically significant correlation with the age of entrance to the institution and the Defectiveness/Shame was also observed (see Table 3).

Statistical prediction of life satisfaction by EMS and domains of EMS.

Two multiple regression analyses (stepwise method) were performed to predict life satisfaction by a) EMS and b) domains of EMS. Life satisfaction was predicted (R2=0.41 , F2 = 0.69) by a) Emotional Inhibition (β = –0.38, t = –3.53, p = .001, ΔR2 = 0.20) b) Enmeshment (β = 0.33, t = 3.30, p = .002, ΔR2 = 0.10) c) Vulnerability to Harm (β = –0.28, t = –2.69, p = .009, ΔR2 = 0.06), d) Abandonment (β = –0.23, t = –2.26, p = .028, ΔR2 = 0.05) (see table 4). As regards the domains of EMS, life satisfaction was predicted by (R2=0.27 , F2 = 0.37) by a) Disconnection/Rejection (β = –0.32, t = –2.67, p = .010, ΔR2 = 0.20) and b) Overvigilance/ Inhibition (β = –0.30, t = –2.51, p = .015, ΔR2 = 0.07) (see Tables 4 and 5).

Table 2
Gender differences on life satisfaction, EMS and domains of EMS

	Boys		Girls		
	M	*SD*	*M*	*SD*	*t*
Friends	4.47	0.76	4.50	0.79	−0.16
School	3.66	1.43	4.07	1.09	−1.32
Self	4.28	1.11	3.85	1.40	1.57
Living environment	3.84	1.46	3.79	1.41	0.14
Contact with family	3.78	1.56	2.06	1.69	1.80
Life satisfaction	4.01	0.73	3.86	0.88	0.75
Unrelenting Standards	4.50	3.77	4.00	3.41	0.47
Social Isolation	4.00	3.34	3.41	2.78	0.78
Mistrust/Abuse	3.66	3.18	2.65	2.60	1.41
Abandonment	2.00	2.53	2.50	2.86	−0.75
Dependence/Incompetence	4.31	3.69	3.74	3.25	0.57
Vulnerability to Harm	5.91	3.27	6.15	3.53	−0.29
Emotional Deprivation	1.88	2.17	1.93	1.70	−0.13
Subjugation	3.53	3.21	3.64	2.69	−0.15
Defectiveness/Shame	3.09	2.63	2.44	2.19	1.08
Entitlement	3.81	3.84	2.76	2.72	1.27
Self Sacrifice	3.25	3.19	4.39	3.15	−1.46
Emotional Inhibition	3.88	3.61	4.12	3.36	−0.28
Enmeshment	3.84	3.18	2.91	2.42	1.34
Insufficient self-control	3.28	3.31	2.50	2.40	1.10
Failure	2.22	2.76	1.68	1.43	0.99
Disconnection/Rejection	2.03	1.81	2.50	1.80	0.76
Impaired Autonomy/Performance	4.07	1.89	3.62	1.70	1.02
Impaired Limits	3.55	3.06	2.63	2.18	1.39
Other Directedness	3.39	2.31	4.01	2.16	−1.13
Overvigilance/Inhibition	4.19	2.96	4.10	2.75	0.12

Table 3
Pearson r correlation among age, age of children when they were placed in the institution, life satisfaction, EMS and domains of EMS

Pearson r	Age	Age in institutional care
Friends	**−.32****	.06
School	**−.25***	.12
Self	−.13	−.05
Living environment	−.19	.24
Contact with family	**−.26***	**−.33****
Life_satisfaction	**−.36****	−.02
Unrelenting Standards	−.04	.04
Social Isolation	−.07	.00
Mistrust/Abuse	−.01	−.10
Abandonment	−.08	.23
Dependence/Incompetence	−.11	−.14
Vulnerability to Harm	.24	.02
Emotional Deprivation	−.11	.04
Subjugation	−.23	−.13
Defectiveness/Shame	.09	**.33****
Entitlement	−.12	.01
Self Sacrifice	.17	−.07
Emotional Inhibition	−.08	−.15
Enmeshment	−.21	−.02
Insufficient self-control	−.06	−.02
Failure	−.06	.00
Disconnection/Rejection	−.05	.14
Impaired Autonomy/Performance	−.04	−.07
Impaired Limits	−.11	.00
Other Directedness	−.03	−.13
Overvigilance/Inhibition	−.07	−.07

Note * p < .05, ** p < .01, *** p < .001

Table 4

Multiple regression analysis (method stepwise) for the prediction of life satisfaction by EMS

		Life satisfaction			
	Step (ΔR^2)	*B*	*SE*	*b*	*t*
Unrelenting Standards					
Social Isolation					
Mistrust/Abuse					
Abandonment	4(0.05)	−0.07	0.03	−0.23	**−2.26***
Dependence/Incompetence					
Vulnerability to Harm	3(0.06)	−0.07	0.02	−0.28	**−2.69****
Emotional Deprivation					
Subjugation					
Defectiveness/Shame					
Entitlement					
Self Sacrifice					
Emotional Inhibition	1(0.20)	−0.09	0.02	−0.38	**−3.53*****
Enmeshment	2(0.10)	0.09	0.03	0.33	**3.30****
Insufficient self-control					
Failure					
R^2			0.41		
F^2			0.69		

Note * p < .05, ** p < .01, *** p < .001

Discussion

Through this study, we tried to investigate the correlation between life satisfaction and Early Maladaptive Schemas of children living in resident care. The present study constitutes the first study to investigate the relation between the aforementioned variables as regards residential care.

With respect to the rates of life satisfaction, the highest indices were presented by satisfaction with friends while the lowest indices were presented by satisfaction with

friends while the lowest indices were presented by satisfaction with family contact and satisfaction with the place of accommodation. Our findings are compatible with the fact that the majority of participants were adolescents, a developmental period when satisfaction stemming from friends is of utmost importance to identity formation. Equivalent findings on satisfaction with relationships of children in residential care are also found not only in the corresponding literature [2,3] but also in community sample [6]. As for the low level of satisfaction with the place where one lives (referring to the neighbourhood) and low satisfaction with contact with family, this finding is also in consistency with previous studies in children in residential care [2,3]. Low satisfaction with contact with family is consistent with the fact that the children, participating in the present study, have experienced either abandonment or neglect from their biological parents or have been abruptly removed from abusing or negligent environment. In some cases, contact with biological parents has been excluded by the authorities on behalf of the child's protection.

The hypothesis as regards high indices in Vulnerability to Harm was confirmed. In the study of Stallard [26], involving a clinical sample of children, consistent findings were presented. The schema of Vulnerability to Harm has been linked to depression [22] during adulthood. Consequently, further investigation of the schema Vulnerability to Harm in this population could help the prevention and the appropriate treatment aiming at the development of more functional schemas for the children belonging to this population.

Strong predictive factors as regards life satisfaction were Emotional Inhibition (the excessive inhibition of spontaneous action, feeling, or communication, usually to avoid disapproval by others, feelings of shame or losing control of one's impulses), Enmeshment (excessive emotional involvement and closeness with one or more significant others at the expense of full individuation or normal social development), Vulnerability to Harm (exaggerated fear that imminent catastrophe will strike at any time and that one will be unable to prevent it), Abandonment (the perceived instability or unreliability of those available for support and connection). Our hypothesis that EMS would be negatively related to life satisfaction was partially confirmed.

Table 5
Multiple regression analysis (method stepwise) for the prediction of life satisfaction by domains of EMS

	Life satisfaction				
	Step (ΔR^2)	*B*	*SE*	*b*	*t*
Disconnection/Rejection	1(0.20)	−0.14	0.05	−0.32	−2.67**
Impaired Autonomy/Performance					
Impaired Limits					
Other Directedness					
Overvigilance/Inhibition	2(0.07)	−0.09	0.03	−0.30	−2.51*
R^2			0.27		
F^2			0.37		

Note * p < .05, ** p < .01, *** p < .001

Relevant findings can be found in studies with sample of adults from general population. [30-31]. It is worth pointing out that the strongest predictor of life satisfaction (Emotional Inhibition) is a conditional EMS. However, Enmeshment was positively related to life satisfaction. As suggested by Young et al. [22], the schema of Enmeshment relates to the excessive emotional proximity with one or more significant others which often stands as a burden to the claiming of total independence or to normal social development. The aforementioned might also be linked to an adaptive strategy as regards care residency, however being malapdaptive during adulthood. Consequently, a frequent challenge for childhood care residency is the confrontation with problems that refer to the promotion of theautonomy and self-differentiation of children that have experienced a complex and developmental trauma. Nevertheless, future studies will need to investigate the positive connection between life satisfaction and Enmeshment schema. As it is also suggested by Zafiropoulou et al. [27], through a developmental approach, thoughout the creation and the development of developmental schemas during childhood and adolescence, some schemas are not considered maladaptive by definition but constitute part of an ongoing developmental procedure.

As regards the domains of EMS, our hypotheses for the inverse correlation between life satisfaction and the domains of EMS a) Disconnection/Rejection and b) Overvigilance/Inhibition were confirmed. According to the theory of schemas, the lack of stability and security (Disconnection/Rejection) as well as the emotional withdrawal against happiness, relaxation and close relationships (Overvigilance/Inhibition) were supposed to be reversely correlated to life satisfaction. The present study is the first to verify this relation with a sample of children and adolescents.

It is very important that we emphasize on the fact that the schema model explained about 41% while EMS domains 27% life satisfcation's variance. From the aforementioned, it can be seen that the model has a greater predictive power when we used the EMSs separately than in domains.

As regards the negative correlation between age and life satisfaction, our findings are compatible with the findings of previous studies on community samples [6, 32-33] and according to Goldbeck et al. [33], the observed decrease in life satisfaction constitutes a developmental pattern during the developmental phase of adolescence.

In the study, no gender differences on life satisfaction and EMS were observed. As far as life satisfaction is concerned, equivalent findings were observed in literature on children in care residency [2] and in community [34]. However, there are some studies [35-37], where girls have reported lower subjective well-being scores than boys. Regarding the EMS, equivalent findings were observed in the study of Stallard [27]. The fact that EMS did not seem to to be linked to the age the children were placed in care residency, with the exception of Defectiveness/Shame, is of great interest. It is possible that the children who were placed in an older age in the institution had developed bonds with people from the previous contexts in which they lived, and displayed, in relation to this, higher values in Defectiveness/Shame and less satisfaction with contact with the (dysfunctional) family. However, further research on situational factors related to hospitality contexts is needed in order for more secure conclusions to be drawn.

Limitations/Suggestions for future study

The present study presents some limitations. It must be highlighted that the sample does not meet the criteria of random sampling. Furthermore, the data was collected through self-reference questionnaires, with all the limitations that this entails. Furthermore, limitations of the present study refer to the nature of the cross-sectional design (which does not permit a causal relationship to be established between the variables). The prediction of life satisfaction is a multidimensional process which cannot be described only through the few variables that can be studied in empirical studies. The results of the present study could assist to the development of appropriate educational and preventive programs with the aim of preventing the consolidation of early maladaptive schemas in children in residential care.

The results of the present study could contribute to the development of appropriate intervention programs, so that the establishment of dysfunctional patterns and behaviors in children living in residential care are prevented. Further studies need to be carried out in order to validate the findings using larger samples. In order to better understand the complex association between childhood adversities and life satisfaction, further research is required to include measurements related to exposure to adverse childhood experiences (ACE).

Despite the limitations of this study, some implications for policy and practice can be suggested based on its results. Residential care should be encouraged as the best way to promote factors that increase children's life satisfaction, such as stability. Residential care should be improved regarding the promotion of fostering stable and healthy relationships with peers outside the residential centre. Caregivers in residential care should be stable and respected reference persons since they are extremely important to children's lives and must adopt an individualized perspective to fit children's and adolescents' particular socio-emotional needs more appropriately.

We suggest the extension of the study to broader samples with the inclusion of evaluations regarding psychopathology. It is suggested that a comparative study as regards life satisfaction of children in residential care, adopted children and children who live with their biological parents as well as further research on life satisfaction and EMS on children through longitudinal studies should be conducted.

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Brief Review

The Sexualization of Adolescent Girls Via Influencing on Social Media: Literature Review

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ABSTRACT

Teenagers spend a significant portion of their day on social media, where they are always "connected" to read and be informed about their friends' latest projects and those of other celebrities. The so-called "influencers," who are the newest trend in online marketing and hold the power to influence their followers, now dominate social networking sites.

Young people try to rediscover themselves during adolescence through the various changes they go through. They thus frequently assess their own social status by comparing it to that of others. Adolescent girls are pushed to adopt an objectified view of themselves by the images and beauty standards displayed on social media and by social stereotypes surrounding women. Additionally, the phenomenon of sexualization is observed, where children are told that in order to be liked by their peers, they must emphasize their sexual attractiveness. The literature review led to the conclusion that there is a strong connection between the sexualization of adolescent girls and the sexualized role models that are promoted on social media. Additionally, it has been demonstrated that these can result in low self-esteem, depression, eating disorders, and early sexual activity. These results show how serious this phenomenon is on a large scale and can be a valuable tool for experts, who can use them to make the right interventions, so that to manage and prevent the occurrence of these behaviors.

Key Words: *adolesence, sexualization, self-objectification, social media influencers*

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INTRODUCTION

Social media has gained an important role in the daily life of teenagers. Systematic use seems to be increasing (1). With the development of media, social networking presented a new phenomenon called micro-celebrities Influencers. These persons create a reputation around their name, derive their lifestyle, while advertising products and services (2).

Teenagers are fascinated by the life that Influencers display on their profiles, many times without filtering what is presented to them, and as a result of it, they are significantly influenced by their publications and suggestions. Research has shown that the behavior of teenagers is significantly influenced through social identification with Influencers (3,4). The continuous monitoring of their activity increases the risk of occurrence of FoMO (Fear Of Missing Out), while feelings of inferiority, jealousy and negative body image are observed (5,6,7).

The prevailing social norms for women's bodies are related to provocation and are presented as sexual objects in the media mass media (8). This results in the new girls being more focused in their appearance and trying to look sexy to be accepted (9,10). Thus young children are driven to self-objectification, and they believe that their value depends mainly on their external appearance, considering the characteristics of their personality to be of secondary importance (9). The above phenomenon also related to sexualization, whereby individuals find themselves attractive only when they are sexy and their value comes from looking sexual and being sexual (8).

The consequences of these phenomena have significant effects on the lives of adolescents. Increased risk of developing eating disorders, depressed mood, low self-confidence and dissatisfaction with their body image, are a few examples. Also, exposal to online space by publishing provocative material, can lead to online bullying, seduction, harassment (8,10,11). Physical and psychological changes affect teenagers and create a sense of insecurity about their image and their identity (12).

MATERIALS AND METHODS

The literature search was done from online databases such as PubMed, Research gate, Google Scholar, as well as printed material. The keywords that were used to for studies were “adolescents”, “adolescence”, “sexualization”, “objectification”, “adolescence”, “adolescents”, “girls “adolescents” “teenagers”, “sexualization”, “self-objectification”, “social media”, "influencers". Then, with the "snowball" method, the relevant ones were investigated through bibliographical references. The selected surveys were taken from 2012 onwards, so that the used data to be up-to-date and reflect the characteristics of the current decade. The main inclusion criteria were: a) age group: adolescent girls, b) no geographical restrictions, c) language: English. Also, the examined studies investigated the role of parents because their importance is considered decisive during adolescence.

RESULTS

Objectification

According to research, there is a significant correlation between objectified standards in the media with the self-objectification of teenagers. Self-objectification correlates with girls' self-sexualization (13). Girls are more vulnerable to such phenomena, as female socialites representations mostly present women as attractive, beautiful, groomed to be acceptable and liked (14). Meier and Gray (2014) showed that the use of FB associated with increased exposure to photographic material promoting the value of external appearance, correlates positively with self-objectification among adolescent girls (15).

Video games or social media, compared to television, are significantly correlated with self-objectification. Results are likely explained by the high levels of interactivity and immediacy that characterize engagement with video games and online media (16). In an adolescent population from Austria, Belgium, Spain and South Korea, it was shown that the use of women's magazines and social media are related to these sexualized behaviors. In all countries, these attitudes were more associated with girls, as was ideal internalization of outward appearance (17).

Internalized Display Standards

Exposure to sexualized images on Instagram appeared to be indirectly linked with the girls' self-observation through the internalized standard of the impossible female body. They give more value to their external appearance instead of their abilities (18). These images result in internalization standards of beauty, causing teenagers to observe their bodies in order to rate their appearance. Also, internalized

concern about body image is linked to the eating habits adopted by both adolescent girls and boys (19).

Internalized Sexualization

Internalized sexualization is associated with early sexual initiation activity. A 2014 survey of teenagers showed that increased interest in external appearance is related to the initiation of sexual desire he kiss. Moreover, focusing on the external appearance was associated with the initiation of sex contact at age 12-18 (20). According to the literature, sexualization affects the attitude of girls towards relationships and knowledge of safe sex practices (21,22). An important consequence of the sexualization of adolescents is the sexual health of both girls and boys, as there is reduced condom use. Also, unrealistic standards of sexual performance and sexual activity that are perceived as attractive, create unrealistic expectations for sexual experiences (8).

Influencing

Most social media users are inspired by influencers for various issues that concern them. Some of them are healthy habits (fitspiration) and the effort to maintain an ideal, thin, shapely body (thinspiration). It seems that social media content related to healthy habits, is of interest, mostly to teenage girls (23). In 2015 a study by Carrotte, Vella and Lim showed that about 50% of people who were viewing fitspiration posts were teenage girls (24). Prolonged use of social media can affect teenage girls' mood and cause negative emotions such as melancholy, low self-esteem, as well as negatively affecting their view of themselves and of those around them. (36,26,27). As teenage girls are in a process of personal formation identity, they get the message.

that they must perfectly match all the roles in their lives to succeed, which in reality is not possible. This social pressure leads to burnout, from taking on multiple roles (28).

According to Bandura's social learning theory, people adopt more often behaviors that are positively reinforced. Therefore, the more the likes displayed on social media, the more important the roleshares are considered, and worthy of imitation (28).

Discussion

Adolescence is the transitional stage from childhood to adulthood. During this period, children undergo developmental changes, some of which can be observed, while others can not. Hormones increase, thus leading to appearance of primary and secondary sex characteristics (12,29). The body changes, muscle and fat tissue increase. The relationship between adolescents and their parents also changes. From the absolute dependence, they are now marching towards their gradual independence, the peers now have a primary role in their lives. Conflicts are created equally between their inner world and outside (12,30).

The goal of this multi-changing period is to create personal identity, i.e. for teenagers to build a system of values and beliefs that will characterize and express them. According to Marcia, the type of identity that someone will form, affects her/his self-esteem, his autonomy, his level of self-awareness, as well as the manner facing the people around him. Some of the main factors that affect the formation of the identity type are the ties that prevail in family and the societies that raise individuals (29,30,31). Friends also contribute to identity formation. The teenagers that they tend to focus more on friends, the develop the feeling that they are part of a group and being accepted, and this feeling boosts their confidence. Important for them is equality, reciprocity of feelings, trust and loyalty among their friends (29,32).

Nowadays, social media have also entered the daily life of teenagers through which they communicate with their peers, they have the possibility to present themselves as they wish and also to satisfy their need for acceptance (33,34). But the sexualized norms that dominate these platforms are affecting the self-image of teenagers, the way they evaluate themselves. Through research it has been shown that girls' engagement with social media is greater compared to boys (15, 35). That was the reason, why in the present study, the population group of teenager girls was chosen to be investigated. As mentioned above, adolescence is a sensitive period in which every stimulus that teenagers receive, can affect them in terms of formation of their identity and most probably of their behavior (31).

Studies have shown that internalizing a sexually objectified image self-esteem is associated with increased body surveillance and body dissatisfaction (19,23,35). Furthermore, there is the risk of developing eating disorders, melancholy, low self-esteem and negative self-image (26,27,36). Skowronski's study has shown that the sexualized social networks, while they do not necessarily appear to display short-term effects on adolescent self-objectification, in the long-term of time they present such effects (18,19).

In recent years the trend "Instagram vs Reality" has appeared on the Instagram platform, by which users are trying to take down the model of the perfect and fully harmonious life projected on social media networking. So it's a kind of online activism where women post-edited and unedited photos of themselves, with makeup and completely natural,, as well as images with "perfectly staged" and spontaneous moments from their daily life. Followers see the difference between reality and what is displayed on Instagram on purpose, demystifying, thus, the flawless standard they believed that existed. The studies that have investigated so far this new trend, show that this helps to reduce any comparison in relation to the external appearance and body dissatisfaction (37,38).

A new trend is "body positivity". In this, the users post photos of their bodies showing how different they look according to the various levels of lighting and the way they pose for the camera. They are not afraid to show their imperfections, because the goal is to accept the body exactly like this is. They dispel the myth of the perfect and flawless role model. Studies have shown that this practice leads to body acceptance and appreciation, and by extension to the persons's self (39,40). There aren't many studies investigating the consequences of these new trends, therefore in the long term it is deemed necessary to proceed to further investigation to highlight their contribution.

Conclusion

In summary, the holistic approach to prevention and investigation of the adolescent's individual elements that make them susceptible to the influence of standards is important. To prevent or address the effects of sexualization and self-objectification of both adolescent girls and boys, participation in intra-school or extra-curricular activities is helpful, eg the educational programs at school and sex education (8,41). More research is needed to further understand individual differences, such as how trans people use social media and the challenges that face compared to heterosexual youth (42).

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