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Contact person: dr.sc. Senad Mehmedinović, e-mail: senad.mehmedinovic@untz.ba, tel.: +387 35 320 666

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P R E D G O V O R

Poštovani čitaoci, autori, saradnici,

Zadovoljstvo nam je predstaviti novo izdanje časopisa *Defektologija* sa izmjenjenim nazivom – Istraživanja u edukaciji i rehabilitaciji. Razvoj defektološke nauke, teorije i prakse, ali suštinska promjena društvenog viđenja invalidnosti, rezultirali su, pored ostalog, izmjenom naziva *defektologija* u naziv *edukacijsko-rehabilitacijska znanost*. Samim tim, javila se potreba da se časopis *Defektologija*, koji je u kontinuitetu izlazio pune 23 godine, terminološki uskladi sa nazivom znanosti čije teorijske i praktične rezultate istražuje, prikazuje i unapređuje. Nadamo se da ćete u časopisu naći korisne i interesantne teme iz područja edukacijsko rehabilitacijske znanosti, ali i iz srodnih disciplina, a naša misija je da stvorimo prostor za dinamičan i progresivan istraživački dijalog.

Zahvaljujemo se svima koji su nas pratili u dosadašnjem znanstvenom putovanju, ali i svima onima koji će nam se pridružiti u budućnosti.

Uredništvo

F O R E W O R D

Dear readers, authors, associates,

It is our pleasure to introduce you a new edition of the jornal Defectology with the changed name - Research in Education and Rehabilitation. The development of defectology as science, theory and practice, but also, a fundamental change in the social vision of disability, resulted in, among other things, the change of the name defectology into the name education and rehabilitation science. Consequently, the need for the jornal "Defectology", which has been continuing for 23 years to come, has been terminologically aligned with the name of science, whose theoretical and practical results are investigates, displays and promots. We hope that you will find useful and interesting reading from the wide field of education and rehabilitation science, but also from related disciplines, and our mission is to create a place for dynamic and progressive research dialogue.

We thank all those who have followed us in the current scientific journey, but also to all those who will join us in the future.

Editorial

Research in Education and Rehabilitation 2021; 4(1): 1-3. DOI 10.51558/2744-1555.2021.4.1.1

LIFE, ILLNESS, DEATH: THE RED FLOWERS OF OUR EXISTENCE

Renata Martinec[1]

[1]Faculty of Education and Rehabilitation University of Zagreb, Department for Motor Disturbances, Chronic Disease and Art-therapies, Borongajska cesta 83f, 10 000 Zagreb, Croatia

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„... There's no chance for us
It's all decided for us
This world has only one
Sweet moment set aside for us
Who wants to live forever?

... But touch my tears with your lips
Touch my world with your fingertips
And we can have forever
And we can love forever
Forever is our today..."

(May, B., 2011)

Elevator. I stood opposite my neighbor. Silence. Tears. "*He has a brain tumour*." Silence again. "He" is his son. We looked at each other. I could feel his fear. I felt his fear in my chest. In my whole body. I started to talk. Only nonsense. About some people that I know and who still have lived after the same diagnosis. About hope, miracles, fight. Only nonsense.

So many things have happened through human history. So many achievements in medicine, culture, arts and technology. But do we have more wisdom regarding illness and death in relation to our ancestor. Probably not. And also, we still do not know how to get out of the trap of giving weak comfort. However, nowadays we are looking for aging gene, the secret of eternal youth, immortality, diseaseless**,** etc. On the other hand, there is an elevator from the beginning of this text. With eternal questions associated with mortality and suffering. All of these are personal issues that cannot wait for the magic outcomes. In that moments everyone is seeking their own salvation with the help of medicaments, nature, spirituality, religion, philosophy, or transcendence.

[1] Correspondence to:
Renata Martinec, Faculty of Education and Rehabilitation University of Zagreb, Department for Motor Disturbances, Chronic Disease and Art-therapies
E-mail: renata.martinec@erf.unizg.hr

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Sometimes there is also a hope that, in the meantime, a revolutionary way of curing will be found that will save us. And set us free from pain, disability, decline and dying.

Fortunately, today we are witnessing great progress in various areas of human achievements, especially in the field of biomedicine and different kind of technology. Their current results are very promising. But, are they enough to us in our effort to understand the essence of life, illness and death? And also, to understand the mechanism of recovery. Of course that we need something more. We need the idea of renewal, emotions, communion, empathy, trust and dignity. So, can various scientific disciplines and spiritual orientations get start together to dance a tango? To help us to sustain a passion for life. Even when we are weak and helpless. Or we can paraphrase Sabina Bryan who pointed out that we can do anything as long as we have the passion, the drive, the focus, and the support (Bryan. 2021).

Among so many unanswered questions, there are still a few, maybe the oldest. What is the reason for illness and death? What is the reason for decay and disappearance? Why we have to suffer? There are plenty of theories and deliberations defined with the aim to clarify the causes of human suffering. According to them, possible causes could be attachments, expectations, dissipation, desire, lack of discipline, physical discomfort, unpredictability, life's injustices, ignorance, etc. (Kundu, 2021.). Or, as Buddha identified, it could be third type of suffering – "life's inherent unsatisfactoriness due to its intrinsic instability"[4]. We can conclude that there is no unique answer. And also, how all these deliberations can help person who is chronic or terminally ill? Sometimes, all these ancient and contemporary thoughts are inspiring, sometimes too demanding in their interpretations. Anyway, they are not universal for everyone. That means that every person should find own way of coping with illness. In that sense, Friedrich Nietzsche has nicely emphasized that living means suffering, surviving means finding meaning in suffering (Nietzsche, 2007).

Many religious, philosophical or spiritual concepts point out that different kind of human suffering should be understood as a sign or signal that we have to change something in our life. It could be lifestyle, worldview, priorities or value system. Illness may be our teacher who encourages us to learn something new about ourselves. Or about matters above us, like cosmic, universal or divine principles. Illness also teach us about hope, struggle and perseverance. Charles Dickens probably thought similarly when he wrote: "*Suffering has been stronger than all other teaching...I have been bent and broken, but – I hope – into a better shape."* (Dickens, 2018)

But ironically, although we have not came up the answers related to some important health and life issues we still have a dream of immortality, eternal youth and unconditional excellent health. However, we don't doubt too much whether it would be a damnation or an ultimate satisfaction. To know that something has no end can be frightening. How immortality may be frustrated tried to explain a famous imaginary character, Louis, in the book "*Interview with the Vampire*" when he said: "*Immortality holds as much sadness and loss - perhaps even more - than mortality.*" (Rice, 2007). Maybe, these days our effort should be directed to life extension and healthier lives (Tniman, 2012). In this concept, positive principles and achievements triggered by the idea of transhumanism can be helpful. On that way, development of biomedical, technical and technological sciences is *condition sine qua non*,

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but also we shouldn't forget human mind as well as transcendental and emotional dimension of our being.

Regarding contemplative state of mind Langer et al. cited that contemplative meditative experience can induce de-identification from the static self which can results with "*a greater degree of psychological flexibility and a more genuine way of seeing the world, leading to a new perception of the self that is connected to an experience of freedom, and contributes to one's own well-being, as well as to that of others and of the environment.* " (Langer at al. 2017).

Perhaps we should conclude that we must strive for scientific endeavors but also we have to strive for love, truth, beauty and goodness. In fact, we need to seek for everything that our life can make richer and more fulfilling. In that effort of understanding our transience we may discover the beauty of our life, its purpose, and the reasons why something is happening. And then - life, illness, and death would become the red flowers of our existence. In that beautiful garden where eternal and divine as well as mortal and human can meet each other. Together with anything else that is needed in that magnificent process of spinning and supporting the whole life cycle.

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FAMILY AND MOTHER LEISURE OF CHILDREN WITH DISABILITY

SLOBODNO VRIJEME MAJKI DJECE S TEŠKOĆAMA U RAZVOJU

Perić Bralo Magdalena[1]

Fakultet prirodoslovno-matematičkih i odgojnih znanosti Sveučilišta u Mostaru, Mostar, Bosna i Hercegovina

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ABSTRACT

Leisure is often associate with quality of life of an individual. Objective leisure definitions are used by economic, business and recreational researchers, and focused on behaviors that we can observe. Subjective definitions are more concerned with scientists who are focused on the microsphere of an individual. Modern families are under great stress and that through different family activities the reduction of stress can be achieved and also increase feel of family well-being. Family leisure is considered as very important component of family life. It often shows as idealized, constantly happy time in which everyone enjoys together, time that is pleasure for all family members as individuals and also for the whole family.During family leisure mothers usually have mixed roles of caring for children and caring for the household, thus disrupting their sense of freedom and enjoyment. Many roles that parents of children with disabilities need to take over creates a time pressure that does not occur to parents of children without disabilities. That time pressure is reflected on psychological and physical health of the parents, affecting simultaneously the lack of time for different activities such as going to work, leisure activities, personal care and social interactions. Research has shown that mothers of children with disabilities generally have much less time for themselves and family activities than when it comes to mothers of children without disabilities, no matter what type and level of disability is about.

Key words: leisure, family, mothers of children with disabilities

SAŽETAK

Pojam slobodnog vremena uglavnom vežemo uz kvalitetu života pojedinca. Objektivne definicije slobodnog vremena uglavnom koriste znanstvenici koji su usmjereni na ekonomiju i rekreaciju, a u fokusu su im ponašanja koja možemo opservirati. Subjektivnim definicijama slobodnog vremena više se bave znanstvenici koji su usmjereni na mikrosvijet pojedinca.

[1] **Correspondence to:**
Perić Bralo Magdalena, Fakultet prirodoslovno-matematičkih i odgojnih znanosti Sveučilišta u Mostaru
E-mail: pericmagda@gmail.com

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Današnje obitelji izložene su velikom stresu, a kroz različite obiteljske aktivnosti može se poboljšati kvaliteta života obitelji smanjujući utjecaj stresa. Slobodno vrijeme obitelji smatra se vrlo važnom komponentom obiteljskog života. Međutim, često se to vrijeme idealizira, prikazujući ga kao vrijeme u kojem svi uživaju i osjećaju se sretno, kao vrijeme koje je ugodno za sve članove obitelji. Tijekom obiteljskog slobodnog vremena majke uglavnom imaju još niz popratnih obaveza poput brige o djeci i kućanstvu, što narušava njihov osjećaj slobode i ugode. Roditelji djece s teškoćama u razvoju primorani su preuzeti životne uloge koje same po sebi stvaraju dodatni vremenski pritisak, a s kojim se ne susreću roditelji djece bez teškoća u razvoju. Sve to odražava se na psihičko i fizičko zdravlje roditelja, utječući istodobno i na manjak vremena za različite aktivnosti poput odlaska na posao, organizacije slobodnog vremena, brige o sebi i socijalne interakcije. Istraživanja su pokazala da majke djece s teškoćama u razvoju generalno imaju mnogo manje vremena za sebe i obiteljske aktivnosti u odnosu na majke djece bez teškoća u razvoju, bez obzira o kojoj vrsti i stupnju teškoće u razvoju je riječ.

Ključne riječi: slobodno vrijeme, obitelj, majke djece s teškoćama u razvoju

INTRODUCTION

A few decades ago, there was not so much thought about the impact of social support and family leisure in everyday parental functioning, their psychological well-being and stress level. Over time, they began to develop support programs like early intervention program. These programs were primary directed on child development, but indirectly they effect on wider context in which child is rising up. More preciously, they were affecting on expanding the network of family social support of child and increasing opportunities for including family in social and leisure activities. By conducting research it has been concluded that the effectiveness of social support and family leisure, depend of level of connection with family microsystem (relation parent-child). That mean if there is positive connection between social support and family leisure with parenting, parents are feeling pleasure, parental stress as also negatives parental feelings is reduce. As we can see theoretical premises and empirical research are connecting family functioning and family involvement in leisure activities (Roggman, Moe, Hart & Forthun, 1994).

LEISURE

Leisure is the term that is not so simple to explain and not easy to define also. We often associate it with quality of life of an individual. Kaplan (1961 toward Unger, Kernan, 1983) categorizes definitions of leisure on objective and subjective definitions. Objective leisure definitions are used by economic, business and recreational researchers, and focused on behaviors that we can observe. Subjective definitions are more concerned with scientists who are focused on the microsphere of an individual. To be precise, subjective definitions are directed to the state of mind and psychological experiences, the more we engage in the quality of life.

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Frequently, in the discussion leisure is comparing with concepts like free time, recreation and play (Miller and Robinson, 1963 toward Unger, Kernan, 1983), time and psychological state (Russel, 2004 toward Boyd Hegarty, 2009). Some author's states that leisure is the same as play but the term of leisure is used for adult age, while play is used for child´s age (Berlyne, 1969 toward Unger, Kernan, 1983; Roggman, Moe, Hart & Forthun, 1994). It is about non obligate activities, activities that reduce stress level and encourage personal development (Roggman, Moe, Hart & Forthun, 1994). Over time, researchers came to the conclusion that leisure has some components, and that these components include free choice, intrinsic motivation, enjoy, relaxation, role interactions, personal involvement and self-expression (Henderson, Bialeschki, Shaw & Freysinger, 1989 toward Henderson & Allen, 1991). Neulinger (1974 toward Esteve, San Martin, Lopez, 1999) states that the sense of freedom is crucial to the perception of certain activities as leisure activities.

FAMILY LEISURE

Family cohesion is an individual characteristic of every family. Research has shown that family cohesion is higher in two-parent families (only husband and wife) than in families with children. The reason for this is in fact that when child is born the family must adapt to new situations and challenges that distort the previously established family cohesion (Dansie, Brian Hill, 2014).

Family leisure often shows as idealized, constantly happy time in which everyone enjoys together, time that is pleasure for all family members as individuals and also for the whole family. All that has been accompanied by mass media and popular culture that promote positive family interactions and the common pursuit of leisure in which everyone enjoys (Shaw, 1992). Accordingly, various family leisure programs was developed in the community that encourage families to participate in activities such as going to picnics, running and cycling. The main idea was that modern families are under great stress and that through different family activities the reduction of stress can be achieved and also increase feel of family well-being (Harper, 1986 toward Shaw, 1992). Although it is undeniable that family leisure activities are enjoyable and family members have benefit from them, it is not all so unidimensional. As Shaw (1992) points out, we cannot work on family homogeneity, and ignore family members as individuals.

FAMILY LEISURE AND WOMAN

Depersonalization often happens to woman or to mothers in the family. One of the reasons for that is the gender role of the woman which is imposed to her by society. The role that woman is expected from others to care for (Miller, 1986 toward Henderson & Allen, 1991), and to be primarily a mother if there are children (Chodorow, 1978; Deem, 1986 toward Henderson & Allen, 1991). That is in some way affecting the freedom of choice which is one of the components of leisure. Wimbush and Talbot (1988 toward Henderson & Allen, 1991) state that the autonomy of women is limited when it is comes to enjoying personal leisure time due to the overall environment in which woman lives.

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Bella (1986; 1989 toward Henderson & Allen, 1991) agrees, stating that sometime it happens that the woman actually has no time for nonobligatory activities because of gender roles imposed to her. Therefore she does not have opportunity to satisfy her leisure needs.Family leisure is considered as very important component of family life (Holman & Epperson, 1984; Orthner & Mancini, 1990 toward Larson, Gillman & Richards, 1997). Despite the fact that different authors confirm that family leisure is very important for family and family cohesion, often family leisure equates with woman leisure (Bella 1987 toward Henderson & Allen, 1991). During family leisure mothers usually have mixed roles of caring for children and caring for the household, thus disrupting their sense of freedom and enjoyment (Henderson, 1990, 1991; Shaw, 1992 toward Larson, Gillman & Richards, 1997). As an example we can take a going to a vacation that does not necessarily have to be leisure for a woman because in those situations she cannot spend her time freely and stop caring about children (Bella 1987 toward Henderson & Allen, 1991).

Research has shown that mothers spend much more time in caring about family and doing housework compared to fathers (Pleck, 1985; Thompson & Walker, 1989 toward Larson, Gillman & Richards, 1997), and in addition, mothers are more likely to neglect their leisure interests and take on their role of mother (Freysinger, 1995; Shaw, 1992 toward Larson, Gillman & Richards, 1997). With time there is developed opinion about family leisure as an oxymoron for women (Hunter & Whitson, 1991 toward Larson, Gillman & Richards, 1997) because women are much less enjoying family leisure, neglecting their leisure needs.

The research carried out by Larson, Gillman & Richards (1997) confirms the fact that mothers are much less intrinsically motivated than the fathers when we are talking about family leisure. Fathers often have more negative experiences at work than mothers, so family leisure is for fathers usually a departure from hard work (Freysinger, 1995 toward Larson, Gillman & Richards, 1997). On the other hand, mothers does not experience family leisure so pleasant as fathers, because they cannot so easily move away from the role of the mother who is expecting to care for the family members and to lead the family (Freysinger & Flannery, 1992 toward Larson, Gillman & Richards, 1997). Mothers have shorter leisure periods than fathers, and if they want to have leisure in the true sense of the word (without interruption and without making compromise) they mostly have to be away from the family (Larson, Gillman & Richards, 1997).

Research by Bittman & Wajcman (2000 toward Crettender, 2008) confirms that the leisure time that parents have is reduced, especially when we talk about women. After the birth of a child, it was confirmed that women are likely to spend their leisure time much less quality in relation to husbands, and that a woman's leisure is focused on the family. In addition, their leisure time is also more likely to be interrupted in relation to fathers.

FAMILY LEISURE AND CHILDREN WITH DISABILITIES

It´s not necessary to emphasize in particular how important the role of parents is in raising a child, but when we are talking about child with disabilities, parents role becomes even greater.

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They are a constant in the child´s life and must be considered as partner and cooperator, but for successful co-operation it is important to have understanding for the parents. The life of parents that have child with disabilities is often accompanied by numerous uncertainties and concerns about the future of their child (Bujas Petković, Frey Škrinjar i sur., 2010). When we are talking about families of children with disabilities, it is clear that they are going through much greater stress and face more developmental challenges than those families without children with disabilities, and that the required level of parental care depends on the type and child´s disabilities degree (McCann et al., 2012).

Parents play an important role in all segments of professional work with their child and they must be part of the whole process of encouraging child development. However often it happens that the parents of child with disabilities turn into a professional and forget to be parents. The new situations, in which they are found, become very stressful and painful. Therefore, one of the tasks of professional is not only to stimulate the development of a child, but also to encourage the personal development of parents as individuals and as partners (Bujas Petković, Frey Škrinjar i sur., 2010).

Many roles that parents of children with disabilities need to take over creates a time pressure that does not occur to parents of children without disabilities. That time pressure is reflected on psychological and physical health of the parents, affecting simultaneously the lack of time for different activities such as going to work, leisure activities, personal care and social interactions (McCann, Bull & Winzenberg, 2012). This lack of time for all these different activities directly affects the sense of control over their own life (Brandon, 2007 toward McCann, Bull & Winzenberg, 2012).

The possibility to spend free time is very important for parents of children with disabilities because of the high level of stress they face every day (Baker-Ericzén et al., 2005). It is often the case that parents of children with disabilities are prevented from continuing their leisure activities after the birth of a child. The disability of the child can also affect the choice of leisure activities. The reason for this may be cognitive and physical skills that make the child unable to participate in activities that are pleasant to parents. This inability to participate in activities that are pleasant to parents can effect on physical and social activity of parents, which indirectly affect the level of satisfaction and happiness of parents (Myers & Diener, 1995).

Studies show that the need for child care decreases with the child´s age (Crowe and Michael, 2011). It has been shown that provision of basic care for the child with severe disabilities has a very significant impact on the everyday life of the parents of that child (Tadema and Vlaskamp, 2010), and greatly affects the quality of family life (Summers et al., 2005). The research conducted by Axelsson and Wilder (2014) confirmed that families of children with severe disabilities had much less free time than families of children without disabilities. Parents of children with disabilities allocate about 1 and a half hour less time for leisure activities than parents of children without disabilities. That is a big difference because that time they could spend in one of the leisure activities (Luijkx, van der Putten & Vlaskamp, 2017).

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According to researches, family leisure has own benefits for families of children with disabilities. Benefits are: being together, sharing child´s daily experiences and providing learning opportunities (Segal, 1999). In the research about quality of life, family of children with disabilities express dissatisfaction with the support from their family, friends and neighbors, and the dissatisfaction with the opportunities offered to them for spending leisure time as family (Summers et al., 2005).

By birth of a child with disabilities, the pressure on both parents increases, which can lead to changes in family structure (Cummins, 2001 toward Crettender, 2008). Parents have to start balancing between common family responsibilities with the new additional responsibilities that occur in the birth of children with disabilities. As mentioned earlier, all this leads to a rise in the level of family stress (Bruce & Schultz, 2001 toward Crettender, 2008), especially when it comes to mothers whose primary role in family is mainly caring for children and even for the child with disabilities (Cummins, 2001).

Research has shown that mothers of children with disabilities generally have much less time for themselves and family activities than when it comes to mothers of children without disabilities, no matter what type and level of disability is about (Lucca & Settles, 1981 toward Crettender, 2008). In addition to the mentioned mothers of children with disabilities spend much less time in free activities (Crowe & Florez, 2006). Johnson & Deitz (1985 toward Rassafiani et. al., 2012) compared the time it takes to care for child with disabilities and without disabilities. It was found that mothers of child with disabilities spend much more time for child care, and spend much less time with their child in out-home activities.

Many researches, including Breslau´s (1983 to Crowe, 1993) research confirms that mothers of children with disabilities spend much more time with their child in activities than mothers of children without disabilities. The same research has shown that mothers of children with disabilities spend much more time in household activities than mothers of children without disabilities, but no differences in the time they spend on child care have been established. However, when we are talking only about mothers of children with disabilities, differences have been observed with regard to the type and level of disabilities child has. Mothers of children with severe disabilities spend much more time in child care activities than mothers of children with mild disabilities, as well as in child-related activities. Another finding that has been made in this research is that there are no differences between mothers of children without disabilities and mothers of children with various disabilities when it is about time spent in recreational activities. But it has been shown that mothers of children without disabilities are more involved in socialization activities than mothers of children with disabilities. Regardless of the less time spent in socialization activities compared to mothers of children without disabilities, all mothers spend much more leisure time in socialization activities than in recreational activities as physical activities (cycling, running) (Crowe, 1993). Rassafiani et al. (2012) state that most mothers spend their leisure time in passive activities such as watching TV. The research carried out by Crowe & Florez (2006) included 30 mothers of children with various disabilities and 30 mothers of children without disabilities between the ages of 3 and 14. They also confirmed the differences in the time that mothers spend on child care and spend on leisure activities.

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This was confirmed by the research carried out by Rassafiani et al. (2012). They had included mothers of children with cerebral palsy and mothers of children without disabilities in the study. As expected mothers of children with cerebral palsy spend much less time on leisure activities, which is consistent with the results of research conducted by Sawyer et al. (2011). They noticed that mothers of children with cerebral palsy spend much more time on child care, and much less time on some other activities. That misbalance in everyday activities can lead to physical and emotional stress and affect the mental health of the mother of a child with cerebral palsy (Sawyer et al., 2011).

CONCLUSION

If we think about Bronfenbrenner´s ecological system theory, we are clear about how important is developmental environments of individual, whether it is about a child or an adult male or a woman.

Like any other parent, parent of child with disabilities need systematic support from their environment to continue development as an individual and after the child´s birth. We must not allow parents of children with disabilities to lose their personality neglecting their needs. Special emphasis needs to be on mothers who often come to situations that put needs of other members of their family in front of their own personal needs. Women should certainly be free in choosing the way they want to spend their time and leisure.

We must not ignore either family leisure that contributes to family cohesion that is often disturbed in families of child with disabilities, but we must not equalize it with leisure time of mothers. However, we must not ignore fathers either. There is no enough findings about the leisure time of fathers of children with disabilities and that would be interesting to explore.

One of the tasks for professionals is that through early intervention programs emphasize not only the treatment of a child with disabilities, but to focus on parents self-awareness with the aim to prevent the development of burnout and lead them to the top of Maslow pyramid of needs – to self-realization. That process of support for parents should be constant as well as for their children, since we can never safely say what will happen to the new developmental phase in which a child with disabilities enters and whether it will effect on family cohesion and on self-realization of each of the parents.

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HAEMATOLOGICAL PARAMETERS AND C-REACTIVE PROTEIN IN PREDICTION OF DISEASE SEVERITY AND MORTALITY IN PATIENTS WITH SEPSIS

Sehveta Mustafić[1,2*], Selmira Brkić[2], Alma Mujić-Ibralić[2,3]

[1]Department of Laboratory Diagnostics, University Clinical Centre Tuzla, Tuzla, Bosnia and Herzegovina
[2]Faculty of Medicine, University in Tuzla, Tuzla, Bosnia and Herzegovina
[3]Department of Internal Medicine, Community Health Care Centre Zivinice, Zivinice, Bosnia and Herzegovina

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ABSTRACT

Sepsis is a life-threatening condition characterized by a systemic inflammatory response of the body caused by a severe infection. The aim of this study was to examine the importance of hematological parameters and c-reactive protein (CRP) in the diagnosis of sepsis, assessment of disease severity, and prediction of final outcome of these patients. The prospective study included 106 hospitalized patients with a clinical diagnosis of sepsis. Haematological parameters and CRP correlated with sepsis stage, and using ROC (Receiver operating characteristic) analysis were evaluated in the prediction of the final outcome of these patients. Among haematological parameters, patients with sepsis had a significantly higher proportion of total unsegmented neutrophil granulocytes, a lower percentage of lymphocytes, as well as a lower total platelet count ($p<0.05$ for all measurements). An excellent positive correlation was found between serum CRP concentration and disease stage ($r=0.77$). The best predictive value for the presence of sepsis was shown by CRP at the cut-off value of 165 mg/L (AUC 0.98), followed by the percentage of unsegmented neutrophil granulocytes for the cut-off value of 15.5 (AUC 0.67), and the percentage of lymphocytes less than 9.9 (AUC 0.66), platelets lower than $118x10^9$/L (AUC 0.63). At the CRP cut-off value of 294.7 mg/L (AUC 0.84; 95% CI 0.74-0.93), death could be predicted in 80.95% of patients with sepsis, with the sensitivity of 43.75% and the specificity of 89.71% ($p<0.0001$).

[1] **Correspondence to:**
Sehveta Mustafić , Department of Laboratory Diagnostics, University Clinical Centre Tuzla
E-mail: sehveta.mustafic@ukctuzla.ba

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By monitoring changes in haematological parameters and CRP concentration in combination with other clinical and laboratory indicators, disease severity and final outcome in patients with sepsis can be predicted.

Key words: CRP, lymphocytes, platelets, SIRS, sepsis,

INTRODUCTION

Sepsis is a life-threatening condition characterized by a systemic inflammatory response of the organism caused by a severe infection (Levy et al., 2003). It is associated with clinical and laboratory signs of disease such as fever, tachycardia, rapid breathing, changes in mental status, changes in the number of leukocytes, platelets, and many others. However, these parameters very often do not provide enough information for the differential diagnosis between non-bacterial and bacterial infections, infectious and non-infectious inflammatory conditions, as well as the severity of the disease itself. On the other hand, shortening the time required for diagnosis has been shown to be the most important component in reducing the risk of individual organ damage during sepsis and mortality associated with it (Jones et al., 2010). After a microbial infection or microbial intoxication, the immune system triggers a complex series of events that cause an immune response. The acute response of the organism in sepsis begins with the activation of the first line cells of defense of the immune system against pathogens-polymorphonuclear neutrophils, which make up 50-60% of all circulating leukocytes. With any type of microbial trigger, the immune response is amplified over time and develops into an "excessive" immune response - systemic inflammatory response (SIRS), characteristic of sepsis, due to increased production of proinflammatory cytokines that include TNF (tumor necrosis factor), interleukin-1, interleukin-12, interferon gamma and interleukin-6. Total number of leukocytes is routinely recommended as the first screening marker for the presence of infection. Numerous studies have shown that increased number of leukocytes and absolute number of neutrophilic granulocytes, as well as a left shift are associated with sepsis (Wile et al., 2001). Also, numerous cytokines primarily TNF, IL-1β and IL-6 mediate the initial response of the innate immune system to trauma or infection. TNF, IL-1β activate endothelial cells by attracting circulating polymorphonuclear leukocytes-neutrophils (PMN) to the site of inflammation. They also penetrate the circulation causing fever and other systemic symptoms. IL-6 stimulates the liver to produce reactants of the acute phase of inflammation including CRP, and also leads to bone marrow stimulation and increased production of PMN. Depending on the degree of inflammation, this stimulation can cause PMN precursors to leave the bone marrow and enter the circulation even before they are fully mature. Increased release of total PMN, as well as an increase in the percentage of immature forms of PMN are one of the criteria for SIRS. As a consequence of the activation of circulating immune cells, the bone marrow in response to systemic infection releases immature granulocytes into the peripheral blood, which increases the ratio of immature/total granulocytes whose degree correlates well with the stage and severity of sepsis (Bender et al., 2008).

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Early diagnosis and adequate treatment of sepsis is a daily problem faced by doctors, especially in emergency rooms and intensive care units. Although there are numerous strategies for accessing and treating patients with sepsis, in order to improve survival rates, rapid and adequate diagnosis has proved to be the most important.

The aim of this study was to examine the importance of haematological parameters and CRP in the diagnosis of sepsis, assessment of disease severity and prediction of final outcome in these patients.

MATERIAL AND METHODS
PARTICIPANTS

The prospective study included 106 patients hospitalized at the University Clinical Center Tuzla, with a clinical diagnosis of sepsis, with positive 2 or more criteria for SIRS. Based on the collected evidence of infection, 82 (77.36%) patients were classified in the clinical group of patients with proven infection - patients with sepsis, while 24 (22.64%) patients were a control group of patients without sepsis because no evidence of infection was found. Out of a total of 82 patients with sepsis, 52 of them (63.41%) had a positive blood culture, and 30 (36.59%) had a negative blood culture result. According to the ACCP / SCCM (American College of Chest Physicians / Society of Critical Care Medicine) (Anonymous, 1992) criteria for disease severity, 24 (25.44%) patients had two or more positive signs of a systemic inflammatory response without clear evidence of infection and they were in the zero (0) stage of sepsis marked as SIRS. 43 (45.58%) patients met the criteria for the first (I) stage of sepsis (SIRS + evidence of infection) marked as sepsis. In 31 (32.86%) patients with SIRS and evidence of the presence of infection, organic damage was present and they were in the second (II) stage of sepsis-severe sepsis, while in 8 (8.06%) patients, with sepsis and organic damage there was constant hypotension with perfusion disorder, and they were in a state of septic shock-stage III (III). Patients with proven malignancy, haematological patients on cytostatic therapy, as well as transplant patients were not included in the study.

DESIGN AND PROCEDURES

The clinical diagnosis of sepsis, according to ACCP / SCCM criteria (Anonymous, 1992) and clinical guidelines for sepsis (Dellinger et al., 2013), was made based on 2 or more positive indicators (signs) for SIRS. Patients diagnosed with suspected sepsis by the attending physician had undergone venepuncture for blood sample for blood culture directly on two different substrates for aerobic and anaerobic microorganisms and sent to the Department of Microbiology of the Polyclinic for Laboratory Diagnostics of the University Clinical Center Tuzla for analysis. At the same time, venous blood samples were taken from patients for haematological and biochemical tests and sent to the Department of Biochemistry of the Polyclinic for Laboratory Diagnostics of the University Clinical Center Tuzla.

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MEASURES

Haematological parameters: total leukocyte count, differential blood count and platelet count were determined on an haematological automatic counter Cell-Dyn Rubby (Abbot Diagnostic), after which microscopic specimens were made from the same blood sample, stained by the Gimza method and on which the proportion of non-segmented neutrophils and the percentages of all white blood cell parameters were determined microscopically under a magnification of 100. The CRP concentration was measured on a Dimension RxL (Siemens) biochemical analyzer. The obtained values were compared between patients with a clinical diagnosis of sepsis - SIRS and patients with a confirmed diagnosis of sepsis, as well as between patients with a positive blood culture and an isolated bacterial agent; and correlated with the stage (severity) of sepsis and evaluated in the prediction of the final outcome of these patients.

STATISTICAL ANALYSIS

Standard methods of descriptive statistics (range, median, arithmetic mean, standard deviation) were used in statistical data processing. The distribution of the variables was determined by the D'Agostino test, the Pearson omnibus test, and the Kolmogor-Smirnov normality test. Mean values are shown as mean ± standard deviation in the case of a normal distribution, and in the case of a nonparametric distribution these values are shown as medians. Parametric and nonparametric tests (Student's t-test, Mann-Whitney test, Fisher's test and $\chi 2$ test with double and single orientation) were used to test the statistical significance of the difference between the samples; and the ANOVA test was used to calculate the relative difference in the variance distribution between the variables. Assessment of the diagnostic validity of the examined laboratory indicators in the diagnosis of sepsis in patients with the present systemic inflammatory response of the organism was made using the Receiver Operating Characteristic Curve (ROC curve) (Hanley and McNeil method). For the obtained ROC curves, the value of the area under curve (AUC) was calculated to determine the diagnostic accuracy of the examined clinical and laboratory indicators. The validity of the examined parameters is marked with the largest area under the curve, which implies the best sensitivity and specificity for a certain cut-off value. Univariate and multivariate logistic regression analysis was used to determine the predictive value of the examined variables for the presence or absence of sepsis, the presence / absence of positive blood culture, and mortality rate in these patients. The difference between the samples was considered significant when the result is $p<0.05$. All data were analyzed using the statistical program GraphPad Prism, version 7 (San Diego, California, USA) and SPSS version 10 for Windows

RESULTS

Out of the total number of patients, 47 (49.82%) were hospitalized at the Clinic for Resuscitation and Anesthesia, 30 (31.8%) patients at the Clinic for Internal Medicine, 22 (23.32%) patients were hospitalized at the Clinic for Infectious Diseases, while 7 (7.42%)

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were placed in other hospital departments of the University Clinical Center Tuzla. The frequency of patients with sepsis was equally distributed between individual clinics ($p>0.05$), and no significant difference was found in the positivity of blood culture in individual departments ($p>0.05$). Both sexes were equally represented, 52 (49%) male and 54 (51%) female patients. Patients with sepsis were slightly older (57.84±1.65 years) compared to patients without sepsis (49.54±4.2 years) ($p<0.05$). Organic damage was present in 47.56% (39) versus 52.44% (43) of patients in whom no damage to any of the organ systems was found. Fatal outcome occurred in 15% of all patients with SIRS, in 19.51% of patients with sepsis, and in 28% of patients with positive blood culture. When it comes to the haematological parameters, patients with sepsis had a significantly higher proportion of total non-segmented neutrophils granulocytes, a lower percentage of lymphocytes, as well as a lower total platelet count ($p<0.05$ for all measurements) compared to patients without sepsis. Values of other monitored haematological parameters had an equal distribution between both groups ($p>0.05$ for all measurements). Lower total lymphocyte counts and lower platelet counts ($p<0.05$, $p<0.01$, respectively) were found in patients with positive blood culture compared to patients with negative blood culture. The values of other monitored haematological parameters had an equal distribution between patients with positive and negative blood culture ($p>0.05$ for all measurements) (Table 1).

Table 1. Values of haematological parameters in sepsis

Parameter	With sepsis	Without sepsis		Hem (+)	Hem (-)	
	X±SD	X±SD	p	X±SD	X±SD	p
Leukocytes (x 10^9/L)	26.64 ± 13.4	13,57±1,21	0,1492	33.81 ± 21.1	16,04±1,29	0,3585
Neutrophils (x10^9/L)	15.57 ± 0.97	11.01 ± 1.05	0,2637	15.30 ± 1.34	14.02 ± 1.12	0,2415
Neutrophils (%)	82.31 ± 1.09	79,61±1,28	0,1028	82.67 ± 1.48	81,69±1,53	0,3341
Lymphocytes (x10^9/L)	1.33 ± 0.11	1,36±0,13	0,4467	1,11±0,09'	1,71±0,26	0,0172*
Lymphocytes (%)	10.02 ± 0.92	13,13±2,15	0,0079*	8,85±0,85	12,07±2,02	0,0748
Monocytes (x10^9/L)	0.92 ± 0.05	0,95±0,09	0,3793	0.88 ± 0.07	0.98 ± 0.09	0,1830
Monocytes (%)	7.58 ± 0.95	7,69±0,72	0,4744	8.32 ± 1.46	6.28 ± 0.58	0,1546
Eosinophils (x10^9/L)	0.145 ± 0.02	0,18±0,05	0,2763	0.11 ± 0.03	0.20 ± 0.06	0,0680
Eosinophils (%)	1.08 ± 0.21	1,19±0,32	0,3938	1.03 ± 0.25	1.18 ± 0.35	0,3660
Basophils (x10^9/L)	0.084 ± 0.01	0,07±0,02	0,3208	0.52 ± 0.06	0.50 ± 0.08	0,4443
Basophils (%)	0.52 ± 0.05	0,46±0,06	0,2665	0.08 ± 0.01	0.09 ± 0.02	0,2766
Erythrocytes (x10^{12}/L)	3.52 ± 0.08	3,66±0,13	0,1964	3.54 ± 0.11	3.52 ± 0.11	0,4755
Hemoglobin value (g/L)	106.2 ± 2.45	110,3±3,38	0,2014	105.7 ± 3.19	107.0 ± 3.86	0,4006
Hematocrit value (L/L)	0.316 ± 0.01	0,321±0,01	0,3746	0.315 ± 0.01	0.32 ± 0.01	0,4812
Platelets (x10^9/L)	233.2 ± 14.4	258,6±20,68	0,0436*	203.8±15.8	284.2 ± 25.9	0,0064*
MPV (fL)	7.65 ± 0.22	7,00±0,345	0,0711	7.63 ± 0.25	7.69 ± 0.40	0,4470

* -difference statistically significant

When it comes to the haematological parameters of white blood cell obtained by making a microscopic specimen and staining by the Gimza method, patients with sepsis had a

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significantly higher proportion of total non-segmented neutrophil granulocytes 22.13±1.51 versus 16.75±2.96 in patients without sepsis ($p<0.05$), while other white blood cell parameters were equally distributed ($p>0.05$ for all measurements). Patients with sepsis also had a significantly higher serum CRP concentration of 240.65 mg/L (102.7-500.7), compared to patients without sepsis 104.55 mg/L (13.6-167.9) ($p<0.0001$).

Also patients with sepsis and positive blood culture had a significantly higher concentration of CRP 269.2 mg/L (120.7-500.7) compared to patients with negative blood culture 213 mg/L (102.7-328.9) ($p<0.0061$). The concentration of CRP increased in each higher clinical stage compared to lower stages of the disease ($p<0.001$ for all measurements), with the exception of the second and third stage, where there was no difference in the concentration of this parameter in these two stages ($p>0.05$) (Figure 1). An excellent positive correlation was found between serum CRP concentration and disease stage (Spearman correlation coefficient 0.77; 95% CI: 0.6725 to 0.8376; $p<0.0001$).

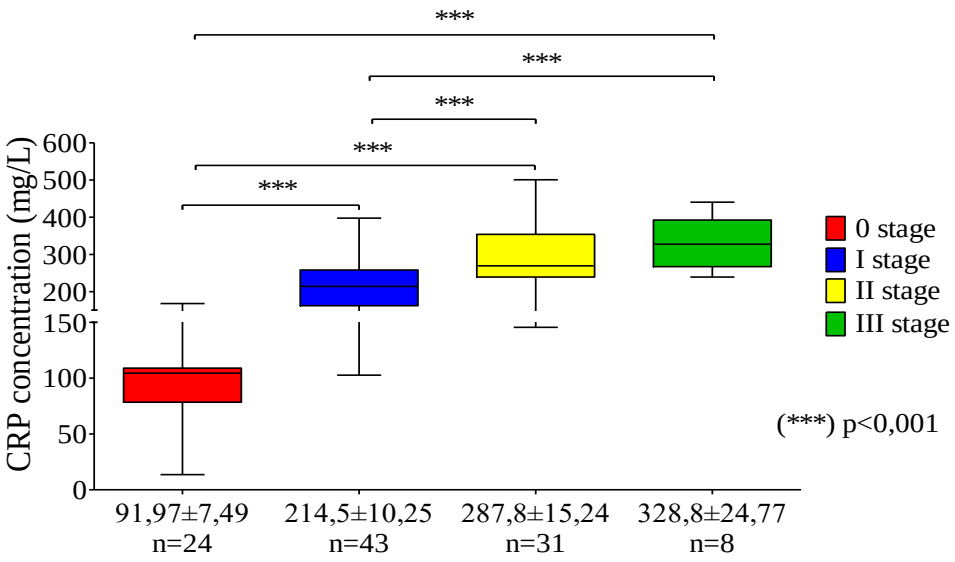

Figure 1. Values of CRP concentration in different stages of sepsis

Significantly higher CRP values were recorded in patients with a fatal outcome of 269.5 mg/L (168-500.7) compared to patients without a fatal outcome of 164.95 (13.6-433) ($p<0.0001$). Using ROC analysis ,the limit values of the predictive score of the presence of sepsis of those haematological parameters for which there was a difference between patients with present and absent sepsis (total unsegmented neutrophil granulocytes-microscopy, lymphocytes-differential blood count and platelets), as well as for CRP were determined.

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Table 2. Haematological parameters and c-reactive protein in prediction of sepsis

	Presence of sepsis			
	NNG*(%)	**Lymphocytes (DKS %)****	**Platelets (x10^9/L)**	**CRP (mg/L)**
Cut-off value	15.57	9.9	118.0	165.0
area under the curve	0.67±0.07	0.66±0.06	0.63±0.06	0.98±0.01
p value	<0.01	<0.05	<0.05	<0.0001
95% CI	0.53 do 0.82	0.55 do 0.77	0.52 do 0.7	0.96 do 0.1
Sensitivity	58.33%	60.0%	24.39%	84.15%
Specificity	36.64%	66.67%	95.83%	95.83%
PPV***	84.38%	85.71%	95.24%	85.7%
NPV****	35.0%	33.33%	27.06%	63.89%
Test accuracy	65.38%	61.54%	40.57%	86.79%

*NNG-unsegmented neutrophilic granulocytes-microscopy, ** DKS-differential blood count, ***PPV- positive predictive value, ****NPV- negative predictive value

ROC analysis was also used to determine the limit values of the predictive score of the presence of positive blood culture of those hematological parameters, for which there was a difference between patients with positive and negative blood culture (lymphocytes-absolute number and platelets). A lymphocyte cut-off value (absolute number) below 0.81 x10^9/L with the area under the AUC curve of 0.65 (95% CI:0.5180 to 0.7741; p<0.05) was obtained in patients with positive blood culture, with the sensitivity of 31.37% (95% CI:19.11% to 45.89%) and the specificity of 79.31% (95% CI:60.28% to 92.01%). The positive predictive value was 72.73% (95% CI: 49.78% to 89.20%), and the negative predictive value was 39.66% (95% CI: 27.05% to 53.36%). Using ROC analysis, a platelet limit value below 125.5 x10^9/L with an area under the AUC curve of 0.68 (95% CI:0.5558 to 0.7948; p<0.01) was obtained in patients with a positive blood culture, with the sensitivity of 30.77% (95% CI:18.72% to 45.10%) and the specificity of 90.0% (95% CI:73.47% to 97.89%). The positive predictive value was 84.21% (95% CI:60.40% to 96.43%), and the negative predictive value was 42.86% (95% CI:30.46% to 55.95%). Using ROC analysis, the cut-off value of C-reactive protein above 239.7 mg/L with the area under the AUC curve of 0.76 (95% CI:0.6519 to 0.8602; p<0.0001) was obtained in patients with positive blood culture. The sensitivity was 67.31% (95% CI:52.90% to 79.67%) and the specificity was 76.67% (95% CI:57.72% to 90.07%). The positive predictive value was 83.33% (95% CI:68.63% to 93.00), and the negative predictive value was 57.5% (95% CI:40.89% to 72.95). At the CRP cut-off of 294.7 mg/L (AUC 0.84; 95% CI 0.74 - 0.93), death could be predicted in 80.95% of patients with sepsis, with the sensitivity of 43.75% and the specificity of 89.71% (PPV 50.0%; NPV 87.14%) (p<0.0001).

DISCUSSION

Despite advances in diagnosis in better disease recognition, patients with sepsis are a very heterogeneous group of patients and the condition is very often difficult to recognize, especially in the early stages of the disease. The definition of sepsis, which includes SIRS+evidence or suspected infection, can be very broad and includes a large number of patients who do not have to develop sepsis.

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On the other hand, the transition from SIRS and sepsis to severe sepsis develops over time in different ways in different patients, so that even the development of severe sepsis may remain unrecognized until it is too late. Timely diagnosis of sepsis and early initiation of adequate therapy have been shown to lead to a better outcome in patients and a reduction in mortality caused by sepsis (Levy et al., 2010).

The results of our study, as in most cases of other authors, did not show a significant difference in the total number of leukocytes, however, patients with sepsis had a significantly higher proportion of total unsegmented neutrophil granulocytes compared to patients without sepsis ($p<0.05$), while this difference was not found in relation to a positive blood culture in patients with sepsis. In the study by Veeresh et al. (2012) no statistically significant difference was found in the total number of WBC and neutrophils between patients with sepsis with positive and negative blood cultures: WBC median $10.1x10^9$/L (8.0-17.2) versus $11.06x10^9$/L (6.75-13.28); neutrophil count $8.7x10^9$/L (5.7-13.5) versus $8.51x10^9$/L (4.55-10.85). Also, Longxiang et al. (2012) in the early diagnosis of sepsis versus SIRS found no difference in the total number of WBCs ($13.32x10^9$/L versus $12.54x10^9$/L; $p=0.373$), nor did Robriquet et al. (2013) between SIRS uninfected patients and patients with intrahospital proven infection WBC $12.68x10^9$/L (8.8-13.5) versus $10.5x10^9$/L (7.1-13.5) ($p> 0.05$). In contrast, Huang et al. (2013) had a significant difference in PON values (neutrophil percentage) and did not find a significant difference in the total number of WBCs between patients with positive and negative blood cultures. PON to Hem (+) 0.86 (0.80-0.917) vs. Hem (-) 0.82 (0.733-0.829); and WBC Hem (+) $9.87x10^9$/L (5.9-15.72) versus Hem (-) $9.71x10^9$/L (6.27-14.07). Similar to our study, Yan et al (2013) found no significant difference in either total leukocyte count or percentage of immature neutrophils between patients with negative and positive blood cultures: WBC Hem (+) $11.1\pm8.9x10^9$/L vs. Hem (-) $10.6\pm7.9x10^9$/L ($p=0.789$); the percentage of granulocytes 84.6 ± 28.2 versus 85.1 ± 19.3 ($p=0.792$), and these parameters did not prove to be good predictors for a positive blood culture outcome: WBC AUC 0.42 ($p=0.130$) percentage of granulocytes AUC 0.508 ($p=0.871$). In our study, using ROC analysis, the limit value of total non-segmented neutrophilic granulocytes-microscopy above 15.57% (AUC 0.67) in the diagnosis of sepsis was obtained, with a test accuracy of 65.38%, while they did not prove to be a significant predictor of positive blood culture findings. During bacterial infection, there is also a significant interaction between antigen presenting cells (ACPs) and lymphocytes, which are key effector cells in the body's acquired immune response. After a primary microbial infection, T cells do not have to receive an adequate stimulus from the ACP in terms of responding adequately to secondary infections (Murphey et al., 2004). The potential mechanism of loss of this T cell function during sepsis arises because the signal by the ACP is disrupted by inducing anergy, apoptosis, and a decrease in lymphocyte count. Although lymphocytopenia has been recognized as a marker of bacteremia, it has not been widely used as a marker for infection. The mechanism by which lymphocytopenia occurs in sepsis and septic shock involves the margination and redistribution of lymphocytes by the lymphatic system and is characterized by accelerated apoptosis. In patients with septic shock, lymphocyte apoptosis is greatly accelerated leading to constant lymphocytopenia associated with a poorer prognosis of the final outcome in these patients (Le Tulzo, 2002).

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We found a significantly lower percentage and absolute lymphocyte count in patients with sepsis compared to patients with noninfectious SIRS. With the lymphocyte proportion less than 9.9% in the differential blood count, the diagnosis of sepsis could be accurately predicted in 61.54% of SIRS cases (AUC 0.66), while a positive blood culture finding based on an absolute lymphocyte count of less than $0.81x10^9$/L (AUC0.65) could be predicted in 72.73% of patients with sepsis. Initially, lymphocytopenia was described as a case report of toxic shock syndrome (Galus and Stern, 1998). Later, Zohorec (2001), in a prospective longitudinal study, demonstrated an association between disease severity and lymphocytopenia in oncology patients with severe sepsis and septic shock treated in the intensive care unit. Hawkins et al (2006) described the presence of T and B lymphocytopenia in Gram (+) and Gram (-) bacteremia, while Wyllie et al. (2004, 2005) confirmed the clinically useful application of lymphocytopenia in the prediction of bacteremia in two separate studies. By analyzing the hemogram, Juan et al (2013) proved a significant increase in the total number of leukocytes on account of neutrophils, with a statistically significant decrease in the number of lymphocytes and eosinophils in patients with sepsis. Cornelis et al. (2010) in their study compared the values of CRP, WBC, lymphocytes and neutrophil / lymphocyte ratios in patients with proven bacteremia. In their study, patients with a positive blood culture had lower lymphocyte values compared to patients with a negative blood culture ($0.8\pm0.5\times10^9$/L versus $1.2\pm0.7\times10^9$/L; $p < 0.0001$); lymphocyte count also proved to be a good predictor of a positive blood culture outcome (AUC 0.73) for a cut-off value below 1.0×10^9/L with the sensitivity of 73.9% and the specificity of 57.6% (PPV 63.6%, NPV 68.8%). Significantly better predictive value for lymphocytes compared to total leukocyte count or neutrophil count, as it has been shown in our study results, was also found by Wyllie et al (2004) in the prediction of bacteremia. In a study by Liu et al. (2014), the number of lymphocytes in patients with sepsis correlated well with the severity of the disease, which makes them a good indicator for monitoring the condition of patients and the success of the applied therapy. In patients with non-infectious SIRS, sepsis and severe sepsis, they found a relative tendency to decrease the number, as well as the percentage of lymphocytes in the differential blood count: total lymphocyte count $1.53x10^9$/L (0.89-1.88), $0.90x10^9$/L (0.65-1.42), and $0.80x10^9$/L (0.50-1.12); percentage of lymphocytes (0.225 ± 0.122; 0.138 ± 0.097; and 0.106 ± 0.070). Also, the number of lymphocytes, as in our study, was significantly lower in patients with a fatal outcome versus survivors: total lymphocyte count $0.90x10^9$/L (0.50-1.29) versus $1.05x10^9$/L (0.70-1.54); percentage of lymphocytes 0.123 ± 0.098 versus 0.143 ± 0.097.

Other white blood cells, with the help of various laboratory techniques and possibilities, can be used as special indicators of changes in the body during sepsis. Monocytes and macrophages, except in response to the innate immune system, are also involved in infection - induced anemia due to iron retention resulting in a sharp decrease in hemoglobin synthesis and hemoglobin content in reticulocytes, which may serve as an early indicator of monocyte - macrophage activation (Franck et al., 2004). However, in our study, no significant difference was found in hemoglobin concentration and other red blood cell parameters between patients with sepsis and without sepsis, nor between patients with positive and negative blood cultures.

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This can be explained by the fact that patients were not previously specifically stratified and that the study included a large number of patients after surgical treatment, as well as a certain number of patients who receive dialysis, and in whom other possible causes of decreased hemoglobin were not excluded. Disseminated intravascular coagulation (DIC) is very common in patients with severe sepsis. Consumption of coagulation factors and platelets, together with inhibition of the fibrinolytic system, results in microvascular fibrin deposition. This compromises blood flow and participates in organ dysfunction characteristic of severe sepsis. Thrombocytopenia often occurs during severe sepsis and septic shock as a consequence of platelet consumption, splenic sequestration and microcirculation, peripheral destruction, and due to decreased production during hemophagocytosis (Thiolliere et al., 2013). The results of our study showed that patients with sepsis had a lower total platelet count compared to patients without sepsis as well as patients with a positive blood culture compared to patients with a negative blood culture. Decreased platelet counts can be used as an indicator of prediction of sepsis in patients with SIRS (AUC 0.63±0.06) and they can be used to predict a positive blood culture finding in patients with confirmed sepsis (AUC of 0.68±0.06).

Numerous experimental studies on animal models as well as human research have clearly shown that a sufficient number of platelets is an important determinant of the host immune response to infection. Platelets interact with bacteria through a large number of different molecular and cellular mechanisms. In the initial stage of uncomplicated sepsis, there is a decrease in platelet count as a result of increased concentrations of fibrinopeptide-A, aPAMP and quinocidin PF4 in the serum of these patients which then cause platelet degranulation (Michael, 2010). Recently, thrombocytopenia has been recognized as a significant, independent factor associated with infection and its mortality rate. Even in the absence of neutropenia, in elderly patients, thrombocytopenia was positively correlated with the frequency and severity of the disease in the case of bacterial pneumonia (Feldman et al., 1991). Similarly, Chang et al. (2000) demonstrated that thrombocytopenia is an independent predictor of infection severity and fatal outcome in liver transplant patients. Thrombocytopenia, in a study by Santoly et al. (2002), was shown to be an independent risk factor for bacterial infections with the sensitivity of 92% and the specificity of 76% (PPV 82%, NPV 90%) at the cut-off value $<50x10^9$/L, while Yoshida et al. (2005) demonstrated by multivariate analysis that decreased platelet count is an independent predictor of severe bacteremia. The better predictive value obtained in these studies compared to the results of our study is due to the use of a much lower cut-off value for platelets in these studies compared to ours (50 versus 118).

CRP is an acute phase protein member of the pentraxin protein family whose synthesis takes place in the liver induced by cytokines that are released during inflammation regardless of whether there is an infection or not. CRP plays an important role in the innate immune response to infection. It activates the complement system in the classical way through direct interaction with complement proteins. CRP can also activate phagocytic cells through interaction with the surface receptors of these cells.

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It is also involved in the removal of apoptotic cells from the body, the process of atherosclerosis, and it has been identified as a mediator of organic damage during myocardial infarction (Abij and Meinders, 2002). In our study, significant differences were found in CRP values in patients with sepsis compared to SIRS-positive patients but without confirmed sepsis as well as between patients with positive and negative blood culture p <0.0001). CRP was also shown to be a significant predictor in the diagnosis of sepsis (AUC 0.98) at the cut-off value above 165.0 mg/L, while a positive blood culture outcome could be predicted in 70.73% of sepsis patients (cut-off value 239.7 AUC 0.76). Robriquet et al. (2013) also found a statistically significant difference between SIRS of uninfected patients and patients with intrahospitally proven infection in CRP values of 173 mg/L (126-188) versus 57 mg/L (31-105), and similar results were obtained by Longxiang et al. (2012) in a clinical study conducted to establish an early diagnosis of sepsis (CRP in sepsis 114 mg/L versus 83 mg/L in patients with SIRS, p <0.001). A large number of studies, in addition to the statistically significant difference of this parameter in distinguishing SIRS from sepsis, also confirmed the significant predictive value of CRP in the early diagnosis of sepsis, as well as the prediction of a positive blood culture outcome. In the study by Jaimes et al. (2013), based on CRP values, SIRS 45.0 mg/L (10-99) could be distinguished from sepsis 131 mg/L (54-229), and at a slightly lower CRP cut-off value of 78 mg/L (AUC 0.71) they had the sensitivity of 66.6% and the specificity of 66.1%. In a study by A-Jin Lia and Sang-Gyung Kim (2013) for the CRP cut-off value of 69.95 mg/L, the sensitivity was 83.3% and the specificity was 52.5%. The better predictive value of CRP obtained in our study can be explained by the fact of a higher cut-off value for CRP (165.0 mg/L) which resulted in higher sensitivity (84.15%) and specificity (95.83%) of this parameter in the diagnosis of sepsis. Slightly weaker, as in our study, but still a significant predictive value of CRP was found in the prediction of positive blood culture findings in studies by Veeresh et al. (2012) who compared CRP values between patients with sepsis with the positive blood culture of 212 mg/L (115 -263) and the negative blood culture of 134 mg/L (68-238) where CRP at the cut-off value of 150 mg/L had the sensitivity of 69.6%, and the specificity of 52.9% (AUC 0.64). Similar results were obtained by Huang et al. (2013); CRP in Hem (+) 110 mg/L (60.4-146.0) versus Hem (-) 74.0 mg/L (34.0-120.0), where CRP at the same cut-off value of 150 mg/L had a sensitivity of 82%, and a specificity of 35 % (AUC 0.613) in the prediction of a positive blood culture finding. The concentration of CRP was increasing at each higher clinical stage compared to the lower stages of the disease, which allows assessing the severity of the disease based on this parameter, and distinguishing milder stages of sepsis from severe sepsis and septic shock associated with high mortality rates. Similar results were obtained by Canovic et al. (2006) for CRP values as the "gold standard" in the diagnosis of sepsis, for SIRS it was 119±89 mg/L, for sepsis 159±51 mg/L, for severe sepsis 254±181 mg/L and for septic shock 228±119 mg/L. Significantly higher CRP values of 269.5 mg/L (168-500.7) were also recorded in patients with a fatal outcome compared to patients without a fatal outcome where CRP was 164.95 mg/L (13.6-433)(p <0.0001), and cut-off positive correlation of the height of the serum concentration of CRP with the fatal outcome (r=0.46). In our study, at the obtained CRP cut-off value of 294.7 mg/L and AUC 0.84, a fatal outcome could have been predicted in 80.95% of patients with sepsis.

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Mortality in our study was 19.51% compared to mortality of SIRS-positive patients in ICU of 35.7% in the study by Rocker et al. (2004), mortality of 34,3 % found by Mhamed et al. (2004), and mortality of 22 % in the study by Vincent et al. (1998). These differences in our results can be explained by the fact that our study included a number of patients who met the inclusion criteria for the study but who due to better general condition were not placed in ICU but in other hospital units, where mortality rate is generally lower.

CONCLUSION

Sepsis, severe sepsis, and septic shock are urgent medical conditions that require prompt treatment and patient care. This is a severe clinical condition very often accompanied by complications, in the form of failure of certain organs/organ systems, and often, especially severe sepsis and septic shock, result in death. During sepsis, a numerous of clinical and laboratory indicators change, which can be used for rapid identification of the disease and application of timely and adequate treatment, which proved to be decisive for the final outcome of these patients. By monitoring changes in hematological parameters and CRP concentration in combination with other clinical and laboratory indicators, disease severity and final outcome in patients with sepsis can be predicted.

CONFIRMATION

All authors confirm that there is no conflict of interest.

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PERCEPTIVE-MOTOR SKILLS IN CHILDREN WITH DEVELOPMENTAL DISABILITIES

PERCEPTIVNO-MOTORIČKE SPOSOBNOSTI KOD DJECE SA TEŠKOĆAMA U RAZVOJU

Adelisa Salkić[1], Milena Nikolić[2]

[1]Center for Early Intervention "Little World", Bistarac Donji bb, 75 300 Lukavac, Bosnia and Herzegovina

[2] Faculty of Education and Rehabilitation, University of Tuzla, Univerzitetska 1, 75 000 Tuzla, Bosnia and Herzegovina

Review Article

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ABSTRACT

Perceptual-motor skills (PMS) are very important for the functioning of children in general, including children with developmental disabilities, and enable a person to, based on the stimulus through movement it acts on the space that is surrounded. This paper aims to review the research of enriched knowledge of PMS of children with disabilities, which emphasized the importance of performing activities of everyday life and the acquisition of academic skills. The papers collected a search of electronic databases using the keywords: PMS, children with disabilities, visual perception, gross and fine motor skills, visual-motor coordination, visual-motor integration. Criteria for the selection of papers have been published in full and in the last 10 years. A total of 12 works met the criteria. The results of the research review showed that children with disabilities have a limitation in PMS, and showed that PMS differ separately from the type and degree of difficulty, but differences also exist within the same category of children with disabilities. Implementation of education and rehabilitation programs improves PMS. The results showed that there is a correlation between PMS and activities of everyday life and a correlation between visual perceptions and the acquisition of reading skills. It is important to point out that PMS can be practiced and it is important to implement incentive programs for children with disabilities, but also children at risk for some difficulty, to prevent possible difficulties that children may have in performing daily life activities and in acquiring academic skills. The results of the presented research should be considered concerning the limitations of the presented research, but also to the limitations of this research.

Keywords: visual-motor integration, fine and gross motor skills, developmental difficulties

[2]**Correspondence to:**
Milena Nikolić, Faculty for Special Education and Rehabilitation, University of Tuzla
E-mail: milena.nikolic@untz.ba

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SAŽETAK

Perceptivno-motoričke sposobnosti (PMS) su vrlo bitne za funkcioniranje djece općenito pa tako i djece s teškoćama u razvoju, a omogućavaju osobi da na osnovu podražaja koje primi i obradi iz okoline putem pokreta djeluje u prostoru koji je okružuje. Cilj rada je da se pregledom istraživanja obogate spoznaje o PMS djece sa teškoćama u razvoju te istakne značaj istih za obavljanje aktivnosti svakodnevnog života i usvajanje akademskih vještina. Radovi su prikupleni pretragom elektroničkih baza podataka uz korištenje ključnih riječi: PMS, djeca sa teškoćama, vizuelna percepcija, gruba i fina motorika, vizuo-motorička koordinacija, vizuo-motorička integracija. Kriteriji za odabir radova bili su da su radovi objavljeni u cjelosti i u posljednjih 10 godina. Ukupno 12 radova je zadovoljilo postavljenje kriterije. Rezultati pregleda istraživanja su pokazali da djeca sa teškoćama imaju ograničenja u PMS te da se PMS razlikuju ovisno od vrste i stepena teškoće, ali razlike postoje i unutar iste kategorije djece sa teškoćama. Provođenje edukacijsko-rehabilitacijskih programa utiče na poboljšanje PMS. Rezultati su pokazali da postoji povezanost između PMS i aktivnosti svakodnevnog života, te povezanost vizuelne percepcije i usvajanja vještine čitanja. Bitno je istaknuti da se PMS mogu uvježbavati te je važno provoditi programe poticanja kod djece sa teškoćama, ali i djece sa rizikom za neku teškoću, kako bi prevenirale eventualne teškoće koje djeca mogu imati u obavljanju svakodnevnim životnim aktivnostima kao i u usvajanju akademskih vještina. Rezultate prezentiranih istraživanja treba sagledati u odnosu na ograničenja prezentiranih istraživanja, ali i u odnosu na ograničenja ovog istraživanja.

Ključne riječi: vizuo-motorna integracija, fina i gruba motorika, razvojne teškoće

INTRODUCTION

Developmental disabilities are a group of conditions caused by physical impairment, learning, language, or behavior. These conditions begin during the developmental period and can affect daily functioning and usually last throughout life (Center for Disease Control and Prevention - CDC, 2016; according to Nikolić, 2018). Children with developmental difficulties are a very heterogeneous group within which there are numerous differences concerning the type and degree of difficulties (Žic Ralić and Ljubas, 2013). According to Zrilić (2011; according to Zagorec, 2018), children with disabilities are children with reduced intellectual abilities, speech, voice, and language disorders, autism spectrum disorders, blind and visually impaired children and children with motor disorders and chronic diseases, behavioral disorders, with attention deficit disorders and children with specific learning difficulties.

When it comes to perceptual-motor development in the literature, the authors emphasize its importance for various aspects of human functioning. To better understand the significance of these abilities, it is necessary to define them. Bogović (2017) states that perception is a process in which the brain organizes data obtained through the senses and formulates them as a meaningful whole. As a complex activity of the organism, perception consists of its components of organizing, integrating, and interpreting sensory information that enable knowledge and recognition of the surrounding world.

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Motor abilities are defined as latent motor structures that are responsible for an infinite number of manifest motor reactions and can be measured and described (Findak, 2001; according to Bavčević, 2020). Kiš-Glavaš, Teodorović, and Levandovski (1997) point out that the development of motor skills assumes a certain degree of development of motor skills (e.g. walking is possible only when the ability to maintain balance is developed, or catching a ball is possible only when the ability to react is developed). Motor skills are essential for most activities in a child's life. A child who has well-developed motor skills has more success when engaging in play with peers and thus makes better use of time in kindergarten or at home (Vučinić, 2001; according to Nikodem, 2019). When it comes to motor skills in the literature, there is a division between gross and fine motor skills. Bavčević (2020) states that when large muscle groups are involved in the performance of movements, and precision is not essential, we speak of gross motor skills, while skills characterized by precise movements and the use of smaller and finer muscle structures are called fine motor skills.

Observing the above definitions, we can say that perceptual-motor abilities enable a person to act in the space that surrounds him based on the stimulus he receives and processes from the environment through movement. Levandovski, Teodorović, and Pintarić (1992) point out that perceptual-motor abilities are one of the important preconditions for successfully mastering educational content. Perception difficulties that are present in children with learning difficulties are particularly pronounced in the acquisition of teaching materials at early school age. The authors state that limitations in the process of perception can occur in one or more sensory areas, in the reception of information, their processing, and appropriate motor reactions. Igrić, Levandovski, and Kiš-Glavaš (1992) state that successful mastering of teaching contents requires, in addition to a certain level of intellectual and sensory functions, the ability to direct attention, motivation, speech potential, and a certain degree of development of perceptual-motor abilities. Nourbakhsh (2006; according to Dizdarević, 2014) states that research has confirmed a positive correlation between motor skills and academic achievement, which is why schools need to improve and influence physical activity programs to improve the perceptual-motor abilities of these children. Grubišić and Pinjatela (2019) point out that an indispensable part of the development of motor and perceptual abilities is visual perception. As part of visual-perceptual development, visual-motor integration stands out, whose role is to unite visual information from the environment with the motor performance of the hand. The brain processes visual information based on which we plan and perform coordinated motor action. The authors state that the connection of visual-motor integration with precise hand movements is a key factor in activities such as writing, drawing, and many manipulative activities. Golubović et al. (2005; according to Nikolić and Vantić-Tanjić, 2015) state that people with developmental disabilities most often show difficulties in the field of visual and auditory perception. Perceptual-motor skills improve with exercise, and the fastest progress is achieved during the early period of a child's development (Singh et al., 2010; according to Ljutić, Gros Popović, and Šikman Ljutić, 2014). The maturation of perceptual functions and perceptual-motor integration is closely related to the maturation of higher cognitive functions (Munakata, Casey & Diamond, 2004; according to Gligorović, 2013), academic and adaptive skills (Serrien, Ivry & Swinnen, 2007; according to Gligorović, 2013).

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Kiš-Glavaš, Teodorović, and Levandovski (1997) believe that it seems justified to start the rehabilitation of persons with greater developmental disabilities by stimulating the development of perceptual-motor abilities that would indirectly affect the development of cognitive abilities, communication, emotional and social development.

This paper aims to review the available literature and present research on perceptual-motor abilities of children with disabilities with special reference to the skills of visual perception and visual-motor integration and fine motor skills and graphomotor skills. The aim is also to enrich the knowledge about perceptual-motor abilities and emphasize their importance for the activities of everyday life and the acquisition of academic skills.

METHODS OF WORK

The search was conducted by searching electronic databases: Google Scholar, Hrčak, SCIndeks, Pub Med, ResearchGate, National Repository of Final and Graduate Papers ZIR (National and University Library in Zagreb). The following keywords were used in the search: PMS, children with disabilities, visual perception, gross and fine motor skills, visual-motor coordination, visual-motor integration. The paper analyzes 12 studies that are in line with the objectives of the paper. The selection criteria of the presented research were the time of publication (research published in the last 10 years) and the publication in full.

RESULTS

To facilitate the analysis, the research was divided into two groups: research of visual-motor integration (5 papers) and research of motor abilities (7 papers). Table 1. gives a summary of papers related to visual-motor integration.

Table 1. Overview of research related to visual-motor integration

The authors of the research, year, state	Research objectives	Research methods	
		Measuring instruments	Sample of respondents
Bijonda (2017) Republic of Croatia	Identify differences in the visual-motor integration of children with motor disorders and children of typical development. To determine the effect of the educational-rehabilitation program on visual-motor integration in children with motor disorders of school age.	Beery-Buktenica test of visual-motor integration, GMFCS (Gross Motor Function Classification System), MACS (Manual Ability Classification System), and CFCS (Communication Function Classification System).	The sample included 8 students with motor disorders and 4 students with typical development.

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Torres-Carrión et al., (2019) Spain	In this paper, the authors have focused on visual-motor abilities to encourage better learning. The proposal relies on the stimulation of cognitive, visual-motor skills of people with Down syndrome (DS) using exercises with a gestural interaction platform based on the Kinect sensor called TANGO H.	Illinois test of psycholinguistic abilities (ITPA) and various stimulation exercises using TANGO: H. Qualitative methods: observations and interviews, recordings and analyzed diaries of the platform as well as videos of all sessions. The study was conducted with the approval of the Down Tenerife Ethics Committee. The sample was selected from the population of the Down Tenerife Association, which has 56 students from the DS. Before conducting research written consent was taken to participate in the research.	The sample (N = 6, two girls and four boys) was divided into the experimental group (EG, N = 3, one girl and two boys) and the control group (CG, N = 3, one girl and two boys). EG was stimulated using TANGO: H with gestural interaction, while CG worked daily in the classroom without the use of gestural stimulation.
Cho, Kim, & Yang (2015) Korea	To determine the effects of a visually perceptive intervention on visual-motor integration and activities of daily living in children with cerebral palsy.	Visual observation intervention was conducted for 8 weeks, 3 times a week for 30 minutes per session, for a total of 24 sessions. All children were assessed using VMI and WeeFIM to assess visual and motor integration and daily life activity, immediately before and after 8 weeks of intervention.	The study included 56 children with cerebral palsy.
Elbasan, Atasavun, & Düger (2011) Turkey	To examine the effect of visual perception and motor functioning in daily activities of children with disabilities.	The Functional Independence Scale was used to assess daily life activities (WeeFIM); Visual perception was assessed using visual perception tests (MVPT3); GMFM was used to assess motor function.	The study included 35 children with mild intellectual disabilities.
Baluoti, Bayat, & Alimoradi (2012) Iran	Establishing a link between visual perception and	Marriane Frostig developmental test of visual perception and	The sample included 50 students (30 boys and 20 girls) who

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	reading difficulties of students attending the Learning Disability Center and the Counseling and Psychological Service Center of the educational organization in the city of Ahwaz.	standardized collection of Fallah Chai tests.	attended these centers.

The results of a study conducted by Bijonda (2017) show that there is a statistically significant difference between the experimental group of students with motor disorders and the control group of students without difficulties in the initial results on the variables visual-motor integration and visual perception, where students without disabilities had significantly better results. After the initial assessment, students with motor disorders were included in the educational-rehabilitation program to encourage visual-motor integration. The program was implemented as part of an extended professional procedure two times a week for 45-60 minutes and spent a total of 3 months. At the final assessment, after the implementation of the educational-rehabilitation program for students with motor disorders, students without difficulties had statistically significantly better results on the variables of visual-motor integration and motor coordination. On the variable visual perception, in the final assessment, students from the experimental group had better results than students without difficulties, but this difference was not statistically significant.

Cho, Kim, & Yang (2015) in their study examined the impact of visual-perceptual training on visual-motor integration and daily life activities in children with cerebral palsy. Visual-perceptual training was conducted for a total of 8 weeks, 3 times a week for 30 minutes per session, a total of 24 sessions. The results showed improvement and a positive effect of training on visual-motor integration and daily life activities for all 56 children with cerebral palsy who participated in the study, and the improvements were statistically significant.

Elbasan, Atasavun, & Düger (2011) examined the effect of visual perception and motor functioning in activities of daily living in children with mild intellectual disabilities, and the results showed that there is a positive correlation between GMFM results and the overall score of the Functional Independence Scale, including self-help, mobility, and locomotion. Visual memory and visual closure and overall visual perception test scores were significantly related to the overall score of the Functional Independence Scale, while visual discrimination was significantly related to self-care on the Functional Independence Rating Scale.

In addition to the influence of visual perception on the performance of everyday life activities, it is also important in the acquisition of academic skills. Baluoti, Bayat, & Alimoradi (2012) examined the relationship between visual perception and reading, and the results showed that there is a significant negative relationship between visual perception and reading difficulties of students with dyslexia, if visual perception skills decrease reading difficulties in children increase.

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Torres-Carrión et al., (2019) focused on encouraging visual-motor integration skills in people with Down syndrome. To stimulate learning, visual cognitive stimulations were used in the experimental group, and the results of the study did not show statistically significant differences between these two groups, while the results of qualitative methods showed an improvement in visual-motor cognitive skills.

An overview of the papers included in the review related to motor skills (fine motor skills and graphomotor skills) is given in Table 2.

Table 2. Overview of research related to motor skills (fine motor skills and graphomotor skills)

The authors of the research, year, state	Research objectives	Research methods	
		Measuring instruments	Sample of respondents
Nobusako et al., (2018) Japan	Investigate the factors that affect poor manual dexterity, provide useful behavioral markers for understanding the neural mechanism of developmental coordination disorder and promote the development of new neurorehabilitation techniques to improve poorer manual dexterity.	Manual Dexterity Test - Battery for Assessing Movement for Children (Second Edition), Experimental Tasks 1 and 2, and the Depression Self-Assessment Scale for Children (DSRS-C).	The sample was divided into two subsamples: children who were thought to have a developmental coordination disorder and children of typical development. The first group consisted of 29 children with poorer manual dexterity, while the second group consisted of 42 children with normal manual dexterity.
Miller, Chukoskie, Zinni, Townsend, & Traune (2014) San Diego, California	To examine the relationship of specific basic motor function, including eye movement, with ideational dyspraxia (sequences of skillful movements), as well as the possible role of visual-motor integration in dyspraxia.	Praxis and Basic Motor Tests. Visual-motor integration assessment test (Beery VMI) Gap / Null / Overlap Paradigm.	The sample included 20 children with autism spectrum disorders aged 8-15 years (17 boys and 3 girls) and 20 children of typical development (16 boys and 4 girls).
Park (2015) Korea	Comparison of differences in motor and processing skills in children with developmental disabilities.	Motor and process skills assessment test, AMPS.	The sample included 39 children with disabilities who attended the N hospital in South Korea, 25 boys (64.1%) and 14 girls (35.9%), with an average age of 7.5 years (SD = 2.6). This study was approved by the institutional review board of Korea University (KU-IRB-11-09-P-1).

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Skowroński, Winnicki, Bednarczuk, Rutkowska & Rekowski (2018) Poland	Analyze the relationship between physical fitness, gross and fine motor skills, and levels of functioning in schoolchildren with intellectual disabilities (IT).	Motor difficulties, as well as gross and fine motor skills, were measured by BOT-2, TGMD-2, and Eurofit Special tests. The level of functioning in society was assessed by a specially designed questionnaire based on the ICF.	The study involved 62 respondents aged 9 to 24 years. Due to the size and homogeneity of the group, the results of 26 respondents were taken into account in the analysis: 12 girls and 14 boys with moderate IT.
Marić (2017) Republic of Croatia	Determine if there is a relationship between the degree of development of stereopsis and dexterity in fine and gross motor skills of children with intellectual disabilities.	Stereo test (random point sharpness test 2 with Lea Symbols®). Likert scale for assessing fine and gross motor skills.	The sample included 27 children with IT without motor problems. The mean age of the examined children was 11 years.
Šešerko (2019), Republic of Croatia	To examine the impact of an individual educational-rehabilitation program on the development of motor and perceptual-cognitive activity in a child with cerebral palsy.	For this research, a measuring instrument was created based on the existing standardized variables from the Guide for assessment and creation of individual development programs for children from third to sixth year (Pištoljević and Majušević, 2015), ACADIA test of developmental abilities, and Frostig developmental test of visual perception. The assessment also used tasks from the test for the assessment of manipulative dexterity of the hands (LaFaye), the test of differentiation of finger motility (Rey), and the questionnaire for the assessment of knowledge of body parts (Stevanović, Bojanin, 1979).	The study involved a boy with cerebral palsy, a bilateral spastic type at the age of 6 years.
Matijević-Mikelić, Košiček, Crnković, Trifunović-Maček i Grazio (2011) Republic of Croatia	The aim was to determine the frequency of graphomotor difficulties in children with perinatal damage to the central nervous system and premature babies.	Retrospective research by reviewing the archive in the period from April to September 2010 for children up to 3 years of age who were hospitalized at the Clinic for Rheumatology, Physical Medicine and	The study included 50 children aged 12 to 36 months.

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		Rehabilitation of the Clinical Hospital "Sisters of Charity" Children who were hospitalized in the Department were subjected to a team assessment, which included a developmental educational and rehabilitation assessment using Munich's functional developmental diagnostic tools, as well as the BeeryBuktenica developmental test of visual-motor integration (VMI).	

Nobusako et al., (2018) concluded in their study that children who were thought to have a developmental coordination disorder have deficits in visual-motor temporal integration and the function of automatic imitation compared to children of typical development. This study investigated whether these two groups of children differ when it comes to the characteristics of autism spectrum disorders (ASD), attention deficit and hyperactivity disorder (ADHD) characteristics, and depressive symptoms, because these characteristics often occur associated with developmental coordination disorders. Through the introductory part of the study, the authors explain that developmental coordination disorder is often diagnosed as ADHD and that children with developmental coordination disorder often develop symptoms of depression. Multiple regression analysis revealed that the delay-detection threshold, which indicated visuomotor temporal integration, was the greatest predictor of poor manual dexterity. The results showed that children who were thought to have a developmental coordination disorder had more symptoms of depression compared to children of typical development. The results of the SCQ test (battery for assessing the social cognitive functions associated with ASD) were significantly higher in the group of children considered to have developmental coordination disorder than the group of children of typical development. These results show that children considered to have developmental coordination disorders have the characteristics of autism spectrum disorders and that the severity of ASD traits is associated with a deterioration in manual dexterity. Also, the results showed that there is a significant association between ADHD traits and poorer manual dexterity in children with suspected developmental coordination disorder compared to children of typical development.
The results of a study conducted by Miller, Chukoskie, Zinni, Townsend & Traune (2014) showed that children with autism compared to the control group of children of typical development show a significantly higher level of dyspraxia, have a poor effect on tasks assessing basic motor function, overall worse eye movement performance (saccades or rapid simultaneous movements of both eyes started more slowly in children with autism and it took more saccades to achieve the goal than in children of typical development). Standard results from the Beery VMI showed poorer performance in children with autism compared to typical children in the visual-motor integration test and the supplementary motor coordination test.

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However, on the supplementary visual perception test, there were no significant differences between the groups. As there are significant group differences in the dependent measures, correlations were calculated within the group. Neither in children with autism nor children of typical development was there an association between ideational dyspraxia and a simple motor control index. However, in children with autism, higher ideational dyspraxia was significantly associated with poorer performance on standardized tests of visual-motor integration and motor coordination. These measures were not associated with children with typical development. Also, in children with autism, greater ideational dyspraxia was associated with more pronounced traits of autism and with increased repetition of behaviors and limited interests.

Park (2015) compared the motor and processing skills of participants between three different disabilities: pervasive developmental disorder, cerebral palsy, and intellectual disabilities. Data were analyzed using descriptive statistics and one-way ANOVA. The results showed that there are significant differences in motor skills between diagnoses. The group in which the subjects had cerebral palsy showed poorer motor skills than pervasive developmental disorder and intellectual disabilities.

When it comes to the gender of children with intellectual disabilities and motor skills, the results of a study conducted by Skowroński, Winnicki, Bednarczuk, Rutkowska, & Rekowski (2018) showed that girls have better motor skills than boys, ie they showed a higher level of functioning. The boys, despite better physical fitness, were classified at a lower level of functioning.

Marić (2017) in her study found that there is a statistically significant association between the degree of development of stereopsis (the highest level of binocular vision) and dexterity in fine and gross motor skills in children with intellectual disabilities.

When it comes to graphomotor abilities Matijević-Mikelić, Košiček, Crnković, Trifunović-Maček, and Grazio (2011) examined the frequency of difficulties in graphomotor abilities in neurorisk children, and the results showed that in the examined children in 72% of cases the drawing was within expected for age, in 13 children the graphic abilities were below those expected for age, while one child did not show functional pen use. The results of this study suggest that despite good initial compensation in the early development of graphomotor skills, it is necessary to monitor this population of children to prevent possible later difficulties in the development of graphomotor skills and writing.

The impact of educational-rehabilitation programs for the improvement of motor and perceptual-cognitive abilities in a child with cerebral palsy was investigated by Šišerko (2017) in her case study, and the results showed that in no area of assessment - gross motor skills, fine motor skills, graphomotor skills, and perceptual-cognitive area) not all variables resulted in improvement. However, the results point to progress in most of the variables from each of the mentioned areas. The biggest shift is visible in the field of graphomotor skills. The child never held a pen in his hand before beginning the program. Consequently, his graphomotor skills were very poor or rather did not exist at all, while the final assessment indicates great progress in the field of graphomotor skills. The child's drawing of a man on the final measurement contains more than five elements and successfully redraws the basic shapes and lines. The grip is correct most of the time during the final assessment, only the elbow is still raised off the ground. Great progress can be seen in some tasks in the field of fine motor skills and visual perception.

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The author points out that the educational-rehabilitation program was conducted once or twice a week, in the period from October 2017 to June 2018. During that time, the therapy was not conducted for two months due to the unplanned absence of the child. Nevertheless, a total of 30 hours of therapy was performed. Each therapy lasted 60 minutes, with several shorter breaks. As children with developmental disabilities differ from each other in the type and degree of impairment, so they also differ in perceptual-motor abilities, they differ from each other, but also in comparison with children of typical development. The results of the study (Miller, Chukoskie, Zinni, Townsend & Traune, 2014) show that children with autism compared to children of typical development show a significantly higher level of dyspraxia, have a poor effect on tasks assessing basic motor function, and poorer performance on the test of visual-motor integration and a supplementary motor coordination test. The authors point out that although the sample size was small to examine the association between the measures, strong correlations were observed in the group of children with autism in the measures of visual-motor integration and motor coordination with practice.

DISCUSSION

Analyzed research shows that children with developmental disabilities differ in PMS concerning peers of typical development (Bijonda, 2017), as well as to the type and degree of developmental difficulties (Park, 2015). Given the differences between children and the fact that two children with the same diagnosis do not have the same level of functioning and the same success in certain skills, this indicates the need for each child to be seen as an individual and that each child should create an incentive program based on his abilities. There is no program to encourage perceptual-motor abilities that are constructed based on the child's age, gender, or diagnosis. Research indicates differences among children with different diagnoses, and children with cerebral palsy show poorer motor skills than children with pervasive developmental disorder and children with intellectual disabilities (Park, 2015). It is important to emphasize that children differ not only when it comes to diagnoses but also within the same category of children, that is children with the same diagnosis have differences. The results of the research show that girls with intellectual disabilities have better motor skills than boys with intellectual disabilities (Skowroński, Winnicki, Bednarczuk, Rutkowska & Rekowski, 2018), but also that there is a connection between stereopsis (highest level of binocular vision) and dexterity in fine and gross motor skills in children with intellectual disabilities (Marić, 2017). Given that research shows differences between children with cerebral palsy and children with pervasive developmental disorders and intellectual disabilities, the question arises: Is there a difference in perceptual-motor abilities between children who have difficulties that are not based on motor disorders (children with disabilities, children with autistic spectrum disorders, children with hearing impairment, visual impairment), and whether and to what extent the distinguish children with difficulties in perceptual-motor abilities concerning involvement in early treatment and encouragement of these abilities?

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The results of studies presented in the paper aimed at examining the impact of the educational-rehabilitation program on perceptual-motor abilities (Bijonda, 2017; Šešerko, 2019) showed progress in some of the perceptual-motor abilities, although in some areas the progress was not statistically significant, but existed, which suggests that educational-rehabilitation treatment can improve perceptual-motor skills in children with developmental disabilities. Incentive programs conducted within these studies lasted 3 months: treatment twice a week for 45-60 minutes, a total of 24 treatments (Bijonda, 2017), and 6 months: once to twice a week, a total of 30 treatments each treatment 60 minutes (Šešerko, 2019). Observing the above, we see that programs to encourage perceptual-motor abilities for 30 treatments can improve perceptual-motor abilities in children with disabilities. This leads us to analyze the importance of long-term implementation of educational-rehabilitation programs to stimulate perceptual-motor abilities and measure progress. To encourage learning in people with Down syndrome, Torres-Carrión et al., (2019) used visual-cognitive stimulation in their study, although no statistically significant differences were found. The results of qualitative methods showed that there is still progress in perceptual-motor cognitive abilities. The authors cite the study's limitations as being limited to objective assessment from ITPA test subtests that include visual-motor cognitive abilities before and after stimulation through the TANGO: H gestural interaction platform and exercises specifically prepared for this study. They point out that the study sample was limited to six individuals (CG = 3, EG = 3). The authors state that the aim of this study is not to extend these results to the entire population of people with Down syndrome but to contribute to improving the quality of life of people with Down syndrome by scientifically evaluating the technological platform for gestural stimulation.

Given that perceptual-motor abilities affect everyday life activities, research shows that the implementation of visual-perceptual training programs has a positive effect on visual-motor integration and daily life activities and leads to improved functions in children with cerebral palsy (Cho, Kim, & Yang 2015), and subparameters of visual perception are an important factor for independence in the activities of everyday life of children with mild intellectual disabilities (Elbasan, Atasavun, & Düger, 2011). As limitations in their study Elbasan, Atasavun & Düger (2011) point out the absence of a control group consisting of healthy children for comparison. The authors state that they did not investigate the connection between mental status and activities of everyday life. Given the above, the possibility of further studies and analyzes opens, that is to analyze the impact of stimulation of perceptual-motor abilities in people with varying degrees of intellectual disabilities on functioning in the activities of everyday life?

Perceptual-motor abilities are also important for learning and acquiring academic skills (reading and writing). Research shows that there is an association between visual perception and reading difficulties in children with dyslexia, and the worse the visual perception, the greater the reading difficulties (Baluoti, Bayat, & Alimoradi 2012). This indicates the importance of encouraging perceptual-motor skills in the preschool period so that the child is ready to go to school and acquire academic skills.

Tükel (2013 to Bijonda, 2017) points out that in children with neurodevelopmental disabilities, because of the difficulty of visual-motor integration, development, and acquisition of graphomotor skills is much more difficult.

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According to the same author, no matter what kind of neurological damage, the problem is most often seen in graphomotor abilities. Neurological symptoms that affect visual-motor integration can be in motor control, visual system, and mechanisms of attention and memory. In developmental disorders, difficulties in visual-motor integration occur mostly in preschool or school age and are reflected as difficulties in drawing and/or writing that can monitor motor difficulties and learning disabilities. Nobusako et al., (2018) believe that developmental coordination disorder has a neurological basis, and it represents deficits in the internal model and the mirror-neuron system (MNS) in the parietal lobe and cerebellum. The results of a study conducted by these authors show that developmental coordination disorder is the biggest predictor of poor manual dexterity, but point out that the limitations of this study were children included in the sample, that is children considered to have developmental coordination disorder did not fully meet diagnostic criteria A DSM-5 manuals. Therefore, current results are limited to the results of children with disabilities in manual dexterity. The authors state that further research is needed on a sample of participants who fully meet diagnostic criteria A through D of the DSM-5 for developmental coordination disorder.

When it comes to children with neurodevelopmental risk, research shows that this population of children should be monitored, and the rapid detection of difficulties in the development of graphomotor skills and the use of appropriate therapeutic procedures can prevent the development of greater difficulties in writing later (Matijevic-Mikelic, Kosicek, Crnkovic, Trifunovic-Macek and Grazio 2011). Skowroński, Winnicki, Bednarczuk, Rutkowska, & Rekowski (2018) point out that the literature indicates frequent learning difficulties, attention, and fine motor skills in preschool and especially in school-age in children born with neurodevelopmental risk.

Since fine motor skills are a prerequisite for performing daily life activities (dressing, feeding, combing, etc.), limitations in fine motor activities will lead to limitations in these activities. Since the perceptual-motor skills are also the very important question arises whether the parents and educators of children with disabilities aware of the importance of perceptual-motor skills at an early age?

Limitations in this research were: a small number of available research following the objectives of the work, insufficient number of research conducted in our country, inability to access certain electronic databases and/or papers, inability to access complete papers (availability of abstracts only), time frame of the research taken in review and analysis of research covering all types of developmental difficulties. Due to these limitations, the results of the research should be accepted with reservations, and therefore there is a need for further analysis of the research perceptual-motor abilities of children with disabilities. In future review papers, it would be good to focus on the analysis of research concerning a particular type of developmental difficulty.

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CONCLUSION

Based on the review of research about perceptual-motor abilities in children with developmental disabilities, can be concluded the next:

- Perceptual-motor abilities of children with developmental disabilities differ in comparison with children of typical development, as well as concerning the type and degree of developmental difficulties;
- Children with cerebral palsy show poorer motor skills than children with a pervasive developmental disorder and intellectual disabilities;
- Differences in perceptual-motor abilities exist within the same category of children, so girls with intellectual disabilities have better motor skills than boys;
- Educational-rehabilitation treatment can improve the perceptual-motor abilities of children with developmental disabilities;
- When it comes to children with intellectual disabilities, it has been shown that there is a correlation between stereopsis (the highest level of binocular vision) and dexterity in fine and gross motor skills, that visual perception is an important factor for independence in everyday life of children with mild intellectual disabilities;
- Visual-cognitive stimulation may affect progress in the perceptual-motor cognitive abilities of children with Down syndrome;
- Implementation of visual-perceptual training programs improves visual-motor integration and activities of everyday life of children with cerebral palsy;
- There is a correlation between visual perception and reading difficulties in children with dyslexia, the worse the visual perception, the greater the reading difficulties;
- Children with neurodevelopmental risk have more frequent difficulties in graphomotor abilities, learning difficulties, attention, and fine motor skills.

Children with developmental difficulties have difficulties in perceptual-motor abilities, most difficulties in visual-motor integration, fine motor skills, and manual dexterity, and graphomotor abilities. Limitations in perceptual-motor abilities lead to limitations in everyday life activities and the acquisition of academic skills. Also, children with disabilities differ from each other when it comes to perceptual-motor abilities and children with motor disorders have greater limitations in perceptual-motor abilities than children with disabilities whose basis is not a motor disorder, but also within the same category of children, there are differences in perceptual-motor abilities. Given that perceptual-motor abilities improve if educational-rehabilitation programs are implemented to encourage these abilities, it is necessary to include children with disabilities in the system of early intervention and rehabilitation through which work will be done to encourage these abilities in children with disabilities and encourage the overall development of children, exploiting their potential and improving the functioning of the child in everyday life activities. The presented conclusions should be considered concerning the limitations of the research, and the need for further analysis of research on perceptual-motor abilities to only one type of difficulty is indicated. Research on children's perceptual-motor abilities needs to continue to be conducted concerning the research questions that have opened up through the discussion in this paper.

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OBSTACLES TO THE EMPLOYMENT OF THE PERSONS WITH DISABILITIES FROM THE EMPLOYER'S PERSPECTIVE

PREPREKE PRI ZAPOŠLJAVANJU OSOBA SA INVALIDITETOM IZ PERSPEKTIVE POSLODAVCA

Paušić Vesna[1], Krstić Tatjana[2], Vidojević Jelena[3]
[1]Faculty of Medicine Novi Sad, University of Novi Sad
Hajduk Veljkova 3, 21000 Novi Sad, Serbia
[2] Faculty of Medicine Novi Sad, University of Novi Sad
[3]JPU "Dječiji vrtić" Gacko, 89240 Gacko, BiH

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ABSTRACT

The role of employers in obtaining a job for people with disabilities can be crucial. The law on "Professional rehabilitation and employment of people with disabilities" was supposed to be a key factor in improving the position of this population in the labor market, but in practice this has not been confirmed. One of the major obstacles to the employment of persons with disabilities is the lack of a register of persons with disabilities where employers colud find potential candidates with appropriate skills and competencies. This research was conducted with the aim of identifying potential barriers to employment of persons with disabilities perceived from the perspective of employers. The sample consisted of 50 employers of both state and private companies in the city of Novi Sad. Employers were surveyed with a questionnaire created for the purposes of this research, modeled on the Employers' Motivation Questionnaire for Employment of Persons with Disabilities with the prior consent of the author. The results schow that the adaptation of the workplace and access to means of transport are the biggest obstacle when we are talking about employing people with disabilities. In order to gain a deeper insight into the perspective of employers regarding the employment of people with disabilities, it is important to take into account their direct experiences as well as what worries them and what they feel insufficiently competent when it comes to employing this population.

Key words: people with disabilities, employers, barriers.

[1]**Correspondence to**:
Paušić Vesna, Faculty of Medicine Novi Sad, University of Novi Sad
E-mail: vesnampausic@gmail.com

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INTRODUCTION

The role of employers in obtaining, adjusting and retaining jobs for people with disabilities can be crucial. One of the most significant contributions in solving the high unemployment rate of persons with disabilities in Serbia is the adoption of the "Law on Professional Rehabilitation and Employment of Persons with Disabilities." This Law defines the rights, obligations and facilities of employers when employing persons with disabilities in order to increase the employment of this category of population. (Law on Professional Rehabilitation and Employment of Persons with Disabilities, 2009). Bearing in mind that the enactment of the "Law on Professional Rehabilitation and Employment of Persons with Disabilities" was one of the key factors aimed at improving the position of persons with disabilities in the labor market, previous research aimed at examining the employment rate of persons with disabilities shows a different picture. This is supported by the statement that during the first years of its implementation, the number of employed persons with disabilities increased by only 1% (Cvejić, 2013). During a survey conducted by the Center for Independent Living of the Disabled of Serbia in 2010, it was found that the number of persons with disabilities among employees of surveyed employers is only 1.95%, with most state-owned enterprises per hundred employees without a single person with disabilities (Ljubinković et al., 2010). One of the major obstacles to the employment of people with disabilities is the lack of a register of people with disabilities where employers could find potential candidates with the appropriate skills and competencies. In some cities, there is a much greater need to employ this population than those registered with the National Employment Service. In such situations, employers are left with the payment of a fine due to insufficient employment of persons with disabilities (Cvitanović et al., 2015). The long-term exclusion of persons with disabilities from the regular education system has resulted in the perpetuation of widespread prejudices about their poor work potential, in addition to the low level of education of this population. Among the large number of employers today, unfortunately, is still always generally accepted opinion that members of this population can not achieve the required level of productivity, do not have developed work habits to a sufficient extent, due to their health condition will often be absent from work compared to the population of workers without disabilities (Lakićević, 2012). In addition, employers often want a person with a disability who does not have a visible disability to avoid the costs of job adaptation and fear that business partners and clients will react to the fact that the company employs a person with a visible form of disability (Dimitrijević, 2016). Employers may also consider persons with disabilities as a burden on the enterprise (Kaye et al., 2011), and accordingly they are afraid of their reduced productivity, ie their work incompetence (Kiš-Glavaš i Skočiš-Mihić, 2010). Employers believe that the nature of work tasks is such that people with disabilities would not be able to do them effectively even with adaptation (Houtenville and Kalargyrou, 2012). Employers also worry about the cost of employing this population, and consider job adaptation a great financial burden, especially if it is a significant adjustment of the job.

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In addition, they are concerned about additional health insurance costs, as well as indirect costs such as enhanced supervision (Boni-Saenz et al., 2006). The basis for the development of positive attitudes of employers towards the employment of persons with disabilities lies in the experience of the employment of this population (Nota at al., 2013). Research by Gilbride et al. (2003) (Gilbride et al., 2003) showed that employers who already have experience in employing workers from marginalized groups have a positive attitude towards employment and people with disabilities, and as a reason they state that they consider disability differently. According to research by other authors, employers who have a close friend or member with a disability in their or their extended family are more likely to employ a person with a disability than employers who do not have such experience, which speaks in favor of the importance of direct contacts and the need for better acquaintance people with disabilities (Woodley and Metzger, 2012). The results of the research point to the exceptional importance of informing employers about the possibilities and abilities of persons with disabilities in order to alleviate or completely eliminate prejudices about the professional and work capacities of this population (Kiš-Glavaš i Skočiš Mihić, 2010).

The population of people with disabilities in economic terms is a very large source of labor, which still remains underutilized. Through many researches, their reduced employability has been noticed, which can be considered as a consequence of discrimination, negative attitudes and lack of information of employers. If we compare foreign and domestic research, we can see that this population has difficulty in establishing employment regardless of the country in which it is located (Žuvela, 2013). We can also say that the reasons for their non-employment are quite universal, such as possible slower performance of work tasks, costs of adjusting the working environment, inadequate education, safety at work, but also difficulties in dismissing an employee whose productivity is not satisfactory. In the developed world, there are numerous studies on the role of employers in the employment of people with disabilities (Yang at al., 1986). Similar research in our country is extremely rare, so the purpose of this paper was to examine what employers accurately perceive and see as difficulties in the potential employment of this part of the population.

MATERIALS AND METHODS

Sample

The sample consisted of 50 employers from state and private companies in the city of Novi Sad. The research was conducted during 2019. in the Public City Transport Company of Novi Sad, the Association of Paraplegics of the South Bačka District, the organization of the Multiple Sclerosis Society of Serbia, the company for production and wholesale of paints, varnishes and additives Vageli DOO, the Public Utility Company Tržnica Novi Sad and forty-five private companies.

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Design and procedure

Initial contact with the employers of these companies was established by telephone. On that occasion, the goal of the research was presented to them, and the date of the survey was agreed with those who agreed to participate in the research. Individual completion of the questionnaire took 5 to 15 minutes, depending on the need of employers for additional explanations or comments.

Instrument

The questionnaire for employers was created for the purposes of this research and consists of a total of 7 questions, of which 6 are closed-ended, to which respondents answered by circling one or more answers, and one open-ended question where employers briefly described their work experiences. with persons with disabilities. The questionnaire was created based on the Questionnaire of Employers' Motivation for Employment of Persons with Disabilities with the prior consent of the author (Kiš-Glavaš, 2003).

Statistical analysis

Descriptive statistics were used to analyze the obtained data.

RESULTS AND DISCUSSION

Of the total number of surveyed employers who participated in our survey on the question "Do you think that people with disabilities have the opportunity to progress in the workplace?" 80% of them answered yes, while 20% of respondents thought the opposite.
However, to the question "Have you ever employed people with disabilities in your company?" 73% of surveyed employers in the survey stated that they did not employ people with disabilities in their company, and only 27% of employers did so. Experiences of working with people with disabilities are positive in 27% of cases.
When we talk about the interest of employers in employing people with disabilities, the results show that 73% of employers included in our survey are interested in hiring a person with disabilities, while 27% are not.
Regarding the possibility of employers to employ a person with a disability in their company, the results show that only 27% of surveyed employers have the opportunity to employ a person with a disability in the company, while 73% believe that such an option does not exist.
Regarding the necessary additional information on jobs that people with disabilities can work on, 60% of the surveyed employers gave a positive answer, and 40% a negative one.

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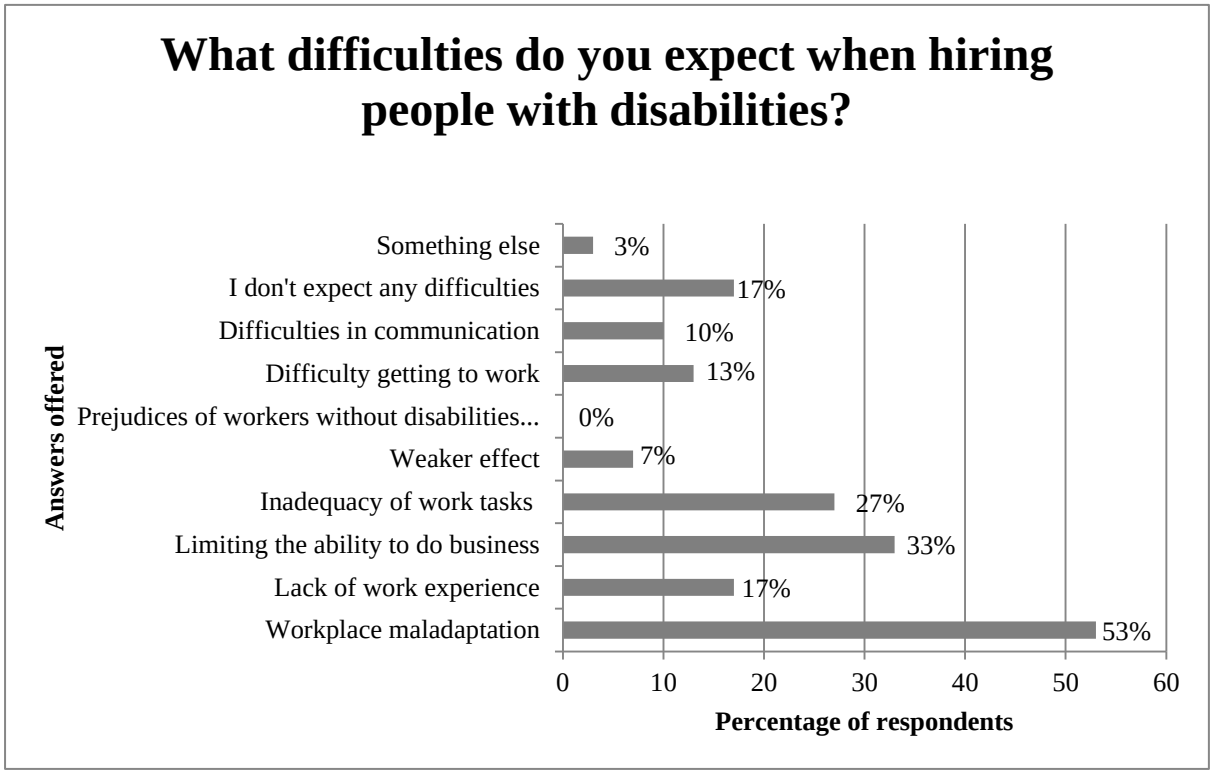

Graph 1. Expected difficulties in employing persons with disabilities perceived by the employer

From Chart 1 we can see that employers in the highest percentage (53%) expect difficulties in unadapted workplace, then 33% of employers state the limitation of the possibility of work by people with disabilities, and 27% of employers see difficulties in unadapted work tasks.

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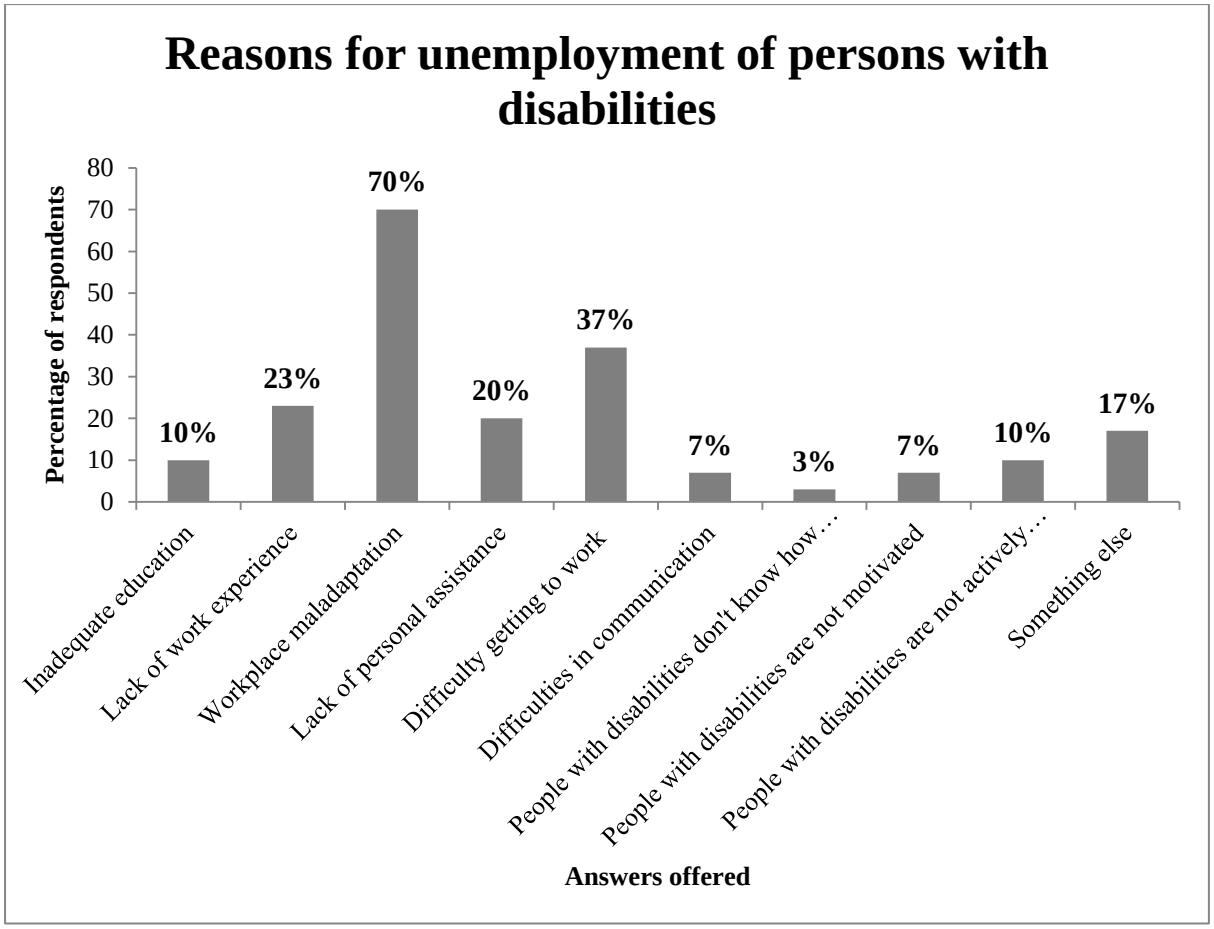

Graph 2. Reasons for unemployment of persons with disabilities

From this chart we can see that the highest percentage of employers 70% as the main reason for unemployment of persons with disabilities states job maladaptation, followed by difficulties in getting a job 37%, then lack of work experience 23%, inadequate education 10% while 3% surveyed employers state that the reason for unemployment is that people with disabilities do not know how to present themselves.

This research dealt with the perception of barriers to employment and work of persons with disabilities from the perspective of employers, such as the expected difficulties in employing this population, the interest and opportunities of employers themselves to employ persons with disabilities, the need for additional information on the professional abilities of these persons, as well as the most common reasons for unemployment in this category of the population. Given the size of the population, people with disabilities are considered the most populous minority and an untapped source of employment. Nevertheless, they very often experience negative socio-economic consequences in relation to people without disabilities, such as high unemployment rates, poverty, lower wages (Longhi, 2017). The most common causes of this situation are negative attitudes towards people with disabilities, concern about the costs of job adaptation, which was confirmed by our research (Chart 2), as well as concerns about productivity and legal responsibility.

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Although many employers consider the costs of job adaptation to be high, in practice these costs have been shown to be almost negligible, with many benefits for both disabled and non-disabled people (Australian Government, 2012). As one of the many advantages of workplace adaptation, we can say that the application of assistive technologies undoubtedly increases the productivity of people with disabilities, and also that the existence of elevators and adequate sloping planes, in addition to productivity, increases the mobility of employees without disabilities. In our research, as more one of the significant obstacles to the employment of persons with disabilities was the fact that most of the surveyed employers are interested in employing these persons, but that they have never applied such a practice in their company. One of the reasons is the lack of opportunities for employers to decide on this step and the lack of experience in contacts with people with disabilities. Another study shows that larger companies are more willing to employ people with disabilities and have more experience (Hanry et al, 2014). In contrast, small and medium companies are very often unaware of the resources and information that could be helpful in hiring people with disabilities. One in a series of obstacles is the lack of additional information on the capabilities of people with disabilities and the work tasks on which they can be engaged. In practice, it is not uncommon for people with disabilities not to accept the performance of the assigned tasks, with the explanation that they are not capable of them. Such cases and explanations of persons with disabilities can frustrate employers, who begin to wonder what are the work restrictions of persons with disabilities, ie. it is a matter of their will, and it is a matter of their abilities and capabilities, and how best they can engage them in carrying out the tasks for which they are capable. We believe that an adequate solution to this problem would be greater availability of support from vocational rehabilitation professionals, which would mean especially to employers who have not previously had experience with this type of employment. The research (Gelenčer, 2016) proved to be a successful strategy to nurture inclusive practices in companies, which means adapting and making available assistive technology that will be available to all employees, equal treatment of all employees, focus on work performance, not on disability as well as flexibility in work. In addition to all the above, it should be noted that employers who successfully employ people with disabilities have the ability to focus on the potential of the employee and thus can match the right person with a particular job. When employing this population, it is necessary to develop training programs for people with disabilities, to include job evaluation in order to determine which jobs people could work in depending on the type, degree and type of disability. Finally, it is necessary to determine with the person the time, scope and type of work he can perform (Bahtijarević-Šiber, 2014). Employment of people with disabilities can increase the competitiveness of companies in the market. It is considered that people with disabilities can contribute to the business of the company through a different perspective in work. One in a series of difficulties among employers is finding the necessary staff. Adequate education and / or work experience that employers require from new employees when recruiting new workers is often not in line with the labor market offer, especially when a number of healthy employees need to find people with disabilities that meet the employer's current needs.

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In addition to the problem of education, employers also recognized as a problem the fact that the support of the whole society is directed towards people with disabilities, something that contributes to their social integration, including employment. This support significantly affects the attitude of people with disabilities, their self-confidence and proactivity.

It is important to emphasize that the employers included in our research singled out the adaptation of the workplace and access to means of transport as one of the biggest obstacles. If we look at the level of education, we can say that employers are included in our survey of the opinion that it is not as important as the fact that people with disabilities can adequately respond to the demands of the job they are assigned to and that the work they perform is appropriate. their abilities.

People with disabilities should not be seen as less valuable because they, with adequate adaptation and adaptation of jobs, can perform work tasks on an equal footing with their colleagues without disabilities. However, in order to improve the position of persons with disabilities in the labor market, it is necessary to adequately apply legal regulations and legal acts, as well as work on achieving strategic directions of action.

CONCLUSION

Positive attitudes of employers towards the employment of people with disabilities open the door for the inclusion of these people in the labor market, but also more widely, in the life of the local community. However, regardless of the significant influence that employers have in the employment of people with disabilities, the responsibility for the successful employment of these people lies in their ability to work. There is a great need for employers for additional information on the employment opportunities of persons with disabilities on the one hand, while on the other hand it is necessary to educate employers on incentives for employment of these persons and the availability of equipment, aids and assistive technologies necessary for adaptation and adaptation with disabilities. Given the specifics of the existence of some form of disability, as well as the fact that people with disabilities face a large number of obstacles that contribute to their difficult employment, we believe that in order to improve the situation of this population in the labor market should work to raise awareness among both employers and the general population that people with disabilities can perform their tasks just as well as workers without disabilities, remove architectural barriers, develop a personal assistance service, provide tax relief for those employers who employ a large number of people with disabilities in their companies, which is provided by existing legal provisions. As a limiting factor that we encountered during this research, we can state that the research covered employers of state and private companies only in the city of Novi Sad, so the results can not be generalized to all employers in the Republic of Serbia. In order to gain a deeper insight into the attitudes or perspectives of employers regarding the employment of people with disabilities, it is important to take into account their first-hand experiences, as well as what worries them and what they feel insufficiently competent when a word on this subject.

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In this way, the circumstances and possible reasons that make it difficult for them to make decisions for the employment of persons with disabilities could be realistically considered, all with the aim of encouraging positive changes and improving the quality of support.

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THE ATTITUDES OF STUDENTS OF HUMANITIES TOWARD PEOPLE WITH DISABILITY AND INCLUSIVE EDUCATION

STAVOVI STUDENATA DRUŠTVENIH NAUKA PREMA OSOBAMA SA OMETENOŠĆU I INKLUZIVNOJ EDUKACIJI

Bojana Arsić[1], Svetlana Todorov[2], Anja Gajić[3], Aleksandra Bašić[4], Dragana Macešić-Petrović[5], Ruzica Zdravković Parezanović[6], Jovana Nikolić[7]

[1, 3, 4, 5, 7] University of Belgrade – Faculty for Special education and rehabilitation, Visokog Stevana 2, Belgrade, Serbia
[2] Special education school 'Jelena Varjaski', Zarka Zrenjanina 22, Vrsac, Serbia
[6] Center for speech and language therapy 'Logopediliste', Omladinskih brigada 4, Belgrade, Serbia

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ABSTRACT

Although the attitudes toward people with disabilities had improved, there is still evidence that they remain stigmatized. The aim of this research was to determine the differences in attitudes toward people with disabilities among participants based on their sociodemographic characteristics and attitudes toward inclusive education.
The sample consisted of 261 students that were surveyed using the Multidimensional Attitudes Scale toward Persons with Disabilities, and a questioner designed by the authors regarding attitudes toward inclusion.
Students who have had previous contact with people with disabilities had more positive attitudes. The majority of them had positive attitudes towards inclusive education and had the opinion that children who are enrolled in inclusive classes do not disrupt typically developing children's' educational process.
It is of great importance to examine attitudes of students toward people with disabilities, because it is considered that attitudes of students represent future attitudes of the population.

Key words*:* attitudes, students, disability, inclusion.

[1] **Coresspondence to:**
Bojana Arsić, University of Belgrade – Faculty for Special education and rehabilitation
E-mail: bojana.arsic57@gmail.com

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SAŽETAK

Iako su se stavovi prema osobama sa ometenošću popravili, oni su i dalje stigmatizovani. Cilj ovog istraživanja je da se utvrde razlike u stavovima prema osobama sa ometenošću među ispitanicima u zavisnosti od njihovih sociodemografskih karakteristika, kao i da se utvrde stavovi prema inkluzivnoj edukaciji.

Uzorak se sastojao od 261 studenata, a korišćeni instrument je Multidimenzionalna skala o stavovima prema osobama sa ometenošću, koja je dopunjena upitnikom konstruisanim od strane autora o stavovima prema inkluzivnoj edukaciji. Studenti koji su imali prethodne kontakte sa osobama sa ometenošću imaju pozitivnije stavove.

Većina uzorka ima pozitivne stavove prema inkluzivnom obrazovanju i smatra da deca koja su uključena u takav sistem obrazovanja ne ometaju proces usvajanja znanja svojih vršnjaka. Od velikog je značaja ispitati stavove studenata prema osobama sa ometenošću zato što se smatra da studenti predstavljaju buduće stavove opšte populacije.

Ključne riječi: stavovi, studenti, ometenost, inkluzija.

INTRODUCTION

Attitudes of general population toward people with disabilities are predominantly negative and result in prejudice and exclusion of people with disabilities (Roessler & Bolton, 1978). Those attitudes are often based on lack of understanding, fear of the unknown and learned stereotypes (Brillhart, Jay & Wyers, 1990; Jaffe, 1967).

Discrimination is defined as injust difference in actions toward different population categories, denying them their rights and responsibilities as rightfull citizens (Thornicroft et al., 2009). Those negative attitudes have behavioral implications, because our attitudes toward someone affect the way we treat them (Antonak & Livneh, 1988). Prejudice and discrimination can be manifested as avoidance (Snyder, Kleck & Mentzer, 1979), lack of sympathy towards others or social avoidance (Crandall & Moriarty, 1995). Stigma includes three elements: problems of knowledge (lack of knowledge about a certain population or disinformation), problems of sttitudes (prejudice) and problems of behavior (discrimination) (Thornicroft, Rose, Kassam & Sartorius, 2007) and it deepens social isolation of the stigmatized population (Farina, Fisher & Fischer, 1992). Stigma and discrimination unable social integration and they lower the person's quality of life (Stolzman, 1994) and as a result lead to potential problems regarding person's confidence (Roessler & Bolton, 1978).

Internalized stigma or self stigma refers to prejudice that people with disability have towards themselved (Corrigan & Watson, 2002) and a concept of internalized stigma is crucial in explaining psychological effects of stigma (Corrigan, 1998). Being aware of stereotypes that affect us is not necessary to develop self stigma, but it is needed for a person to have accordance with those stereotypes and internalize them (Link, Mirotznik & Cullen, 1991).

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This especially affects people with disabilities, because having a disability alone has an impact on identity development, which affects the perception of self value (Goffman 1963).
Antoanak (1980) states that finding the origin of those negative attitudes is of crucial value and that this is the only way of possibly preventing their occurrence in the future. Therefore, the existence of proper instruments that measure attitudes toward people with disabilities (Tait & Purdie, 2000) that will indicate which demographic data has the most impact (English, 1971; Tait & Purdie, 2000) on their development is essential. Even though it is stated that general publics' opinions on people with disabilities have improved over the years (Siperstein, Norins, Corbin & Shriver, 2003), there is evidence that these populations are still stigmatized (Ali, Hassiotis, Strydom & King, 2012). With this being said, the value of our research is clear and especially knowing that negative attitudes toward people with disabilities in general will result in having negative attitudes toward inclusion of this population in education system and concequently treating them poorly (Cialdini, Petty & Cacioppo, 1981).
Abundant number of instruments were designed to measure attitudes toward people with disability (Tringo, 1970) and mayority of them assess the level of discomfort in situations of proximity with this persons. It is believed that mentioned discomfort origins from misinformation related to this population, as well as hesitations in approaching them, or lack of knowledge about what to expect from this interaction (Gething & Wheeler, 1992), which is frequently disguised by having a positive approach (Vilchinsky et al., 2010).
The aim of this research was to determine the differences in attitudes toward people with disabilities between participants in terms of gender, year of studies, population size in origin city, parental education level, previous contact with people with disability, having a family member with disability and attitudes toward inclusive education.

MATERIALS AND METHODS
Participants

The respondents filled out the online questioneere voluntarily and anonimously. The sample consisted of 261 participants, 20 male (7.66%) and 241 female (92.34%). 57 participants originate from a city with a population count over 500.000 (21.84%), 39 participants originate from a city that has between 100.000 and 500.000 habitants (14.94%), 53 participants originate from a town with population count between 50.000 and 100.000 (20.31%), 54 participants originate from a town with population count between 10.000 and 50.000 (20.69%) and 58 participants originate from a place with less than 10.000 habitants (22.22%). 75 participants attend Faculty for special education and rehabilitation (28.74%), 58 attend Faculty for psychology (22.22 %), 65 participants attend Teacher training faculty (24.90%), and 63 participants study at the Faculty for preschool teacher training (24.14%).

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The data collected shows that 38 participants are first-year students (14.56%), 55 participants are second-year students (21.07%), 69 participants are on their third year of studies (26.07%), 30 participants are fourth-year students (11.49%), 21 participants are on their super senior year of studies (8.05%), 46 participants are enrolled in master studies program (17.62%) and two participants attend the doctoral studies (0.77%).

Highest obtained education level of respondents' mother is for 23 participants elementary school (8.81%), for 151 participants is high school (57.85%), for 31 is college (11.88%), for 37 is university (14.18%), for 13 is master studies (4.98%) and for six is doctoral studies (2.30%), while the highest obtained education level of participants' father is for 17 participants elementary school (6.51%), for 160 is high school (61.30%), for 33 is college (12.64%), for 40 is university (15.3%), for five is master studies (1.95%) and for six is doctoral studies (2.30%).

Only 53 participants have a family member with disability (20.31%) and 208 of them do not have a family member with disability (79.69%), while 226 of them have had previous contact with a person with disability (86.59%) and only 35 of them did not have any type of previous contact (13.41%). 194 participants stated that they support inclusive education (74.33%), while 67 said they do not support it (25.67%). 94 participants believe that children who are enrolled in inclusive classes disrupt typicaly developing childrens' educational process (36.02%) and 167 of them believe the opposite (63.98%).

Masuring instrument

The instrument used was *Multidimensional Attitudes Scale toward Persons with Disabilities* (Findler, Vilchinsky & Werner, 2007), that was revised and translated into Serbian language (Milacic-Vidojevic & Colic, 2016). The instrument represents a half-projective scale, where the respondent should select feelings, thoughts and actions of an imaginary person during an incounter with a person with disability. The assumption is that a respondent will project their own feelings, thoughts and actions onto that person (Dragojevic, Milacic-Vidojevic & Hanak, 2010). The instrument consists of 44 items, which are in a form of statement and measured by a five-step Likert type scale, where numbers indicate the level of accordance with the statement (1-can not occur, 5- will most likely occur).

Besides the standardized instrument, we used self constructed questioneere thich included questions regarding sociodemographic information about the participants, as well as two questions regarding attitudes toward inclusion of children with disabilities, regarding whether the respondent supports this type of setting, as well as attitudes about whether if children with disabilities who are included in regular classrooms are impeding typicaly developing childrens' educational process.

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Measures and statistical analysis

The data was inserted and interpreted by an IBM SPSS Statistics 23 program.

RESULTS AND DISCUSSION

By performing a t-test analysis, we did not obtain statistical significance (p>0.5) by comparing gender (f=0.685; p=0.409) and attitudes toward people with disabilities (*Table 2*).

Table 1. Difference in stances toward people with disabilities in terms of participants' gender

Gender	N	AS	SD	F	p	t	df
Female	240	88.98	18.387	0.685	0.409	1.553	257
Male	19	82.26	14.586			1.892	22.786

It is important to highlight that sample variation is explained by the data that among students who graduated at faculties for humanities, more than 71% are female (Republic Bureau of Statistics, 2014). Our results are similar to the research of Tamm and Prellewitz (2001) who did not obtain gender differences in terms of attitudes toward people with disabilities. However, Townsend and associates (1993) found in their study that woman have more positive attitudes toward people with disability. Same results were obtained by Antoanak and associates (1995) and Tervo, Azuma, Palmer and Redinius (2002).

In terms of year of studies that our participants attend, they were divided into two groups. First consisted of students that attend lower years (first and second) and the second group consisted by students who attend higher years (third, fourth, super senior year, masters and doctoral level studies). By performing a t-test analysis, we did not obtain statisticaly relevant difference (p>0.5) between year of studies that students attend (f=0.301; p=0.584) and attitudes toward people with disabilities (*Table 2*).

Table 2. Difference in stances toward people with disabilities in terms of year of studies

Year of studies	N	AS	SD	F	p	t	df
Lower years	93	90.33	18.676			1.180	259
Higher years	168	87.56	17.906	0.301	0.584	1.166	183.300

On the contrary, Antoanak and associates (1995) found that younger students, who concequently attend lower years of studies, have more positive attitudes toward people with disability in comparison with older students.

By performing ANOVA analysis, we found a significant correlation (p<0.5) in terms of population size of respondents' place of origin (F=2.745; p=0.029) while examining the attitudes toward people with disabilities (*Table 3*).

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Table 3. Difference in stances toward people with disabilities in terms of population size of respondents' place of origin

Population size of respondents' place of origin	*N*	*AS*	*SD*	*F*	*p*	*MIN*	*MAX*
More than 500.000	57	87.49	16.104			39	118
100.000-500.000	39	82.54	22.784	2.745	0.029*	43	150
50.000-100.000	53	89.57	20.128			40	132
10.000-50.000	54	86.91	15.216			52	118
Less than 10.000	58	94.22	16.205			55	133

*p<0.05

To determine the level of attitude positivity, we further conducted Tuckey test for multiple comparisons (*Table 4*) and the results indicated that students who come from places that have between 100.000 and 500.000 habitants have the most positive attitudes toward people with disabilities (AS=82.54), while students who origin from places with less than 10.000 habitants have the least positive attitudes (AS=94.22).

Table 4 – Results of Tuckey test for multiple comparisons

Population size of respondents' place of origin		I-J	Std. Error	p	Lower bound	Upper bound
More than 500.000	100 000-500 000	4.953	3.732	0.675	-5.30	15.21
	50 000-100 000	-2.075	3.427	0.974	-11.49	7.34
	10 000-50 000	0.584	3.410	1.000	-8.78	9.95
	Less than 10 000	-6.733	3.349	0.264	-15.93	2.47
100.000-500.000	More than 500 000	-4.953	3.732	0.675	-15.21	5.30
	50 000-100 000	-7.028	3.789	0.345	-17.44	3.38
	10 000-50 000	-4.369	3.774	0.775	-14.74	6.00
	Less than 10 000	-11.686*	3.719	0.016*	-21.90	-1.47
50.000-	More than	2.075	3.427	0.974	-7.34	11.49

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100.000	500 000					
	100 000-500 000	7.028	3.789	0.345	-3.38	17.44
	10 000-50 000	2.659	3.472	0.940	-6.88	12.20
	Less than 10 000	-4.658	3.412	0.651	-14.03	4.72
10.000-50.000	More than 500 000	-0.584	3.410	1.000	-9.95	8.78
	100 000-500 000	4.369	3.774	0.775	-6.00	14.74
	50 000-100 000	-2.659	3.472	0.940	-12.20	6.88
	Less than 10 000	-7.317	3.396	0.201	-16.65	2.01
Less than 10.000	More than 500 000	6.733	3.349	0.264	-2.47	15.93
	100 000-500 000	11.686*	3.719	0.016*	1.47	21.90
	50 000-100 000	4.658	3.412	0.651	-4.72	14.03
	10 000-50 000	7.317	3.396	0.201	-2.01	16.65

*p<0.05

Our results are compatible with research conducted by Palmer, Redinius and Tervo (2000) that measured the attitudes of students of related proffessions and found that students who come from rural areas which concequently have less habitants, have negative attitudes toward people with disabilities in comparison with students who origin from bigger cities with more dense population.

By performing ANOVA analysis, we found a significant correlation (p<0.5) between participants' faculty type (F=4.363; p=0.005) and attitudes toward people with disabilities (*Table 5*).

Table 5. Difference in stances toward people with disabilities in terms of faculty that students attend

Faculty	N	AS	SD	F	p	MIN	MAX
Faculty for special education and rehabilitation	75	94.57	17.605	4.362	0.005*	59	143
Teacher training faculty	65	87.74	18.085			45	131
Faculty for psychology	58	86.14	16.802			43	114
College of pree-school teacher training	63	84.43	18.822			39	150

*p<0.05

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To determine the level of attitude positivity, we further conducted Tuckey test for multiple comparisons and the results indicated that students who attend College of pree-school teacher training have the most positive attitudes toward people with disabilities (AS=84.43), followed by students who attend Faculty for psychology (AS=86.14), than students who attend Teacher training faculty (AS=87.74) and the most negative attitudes have students who attend Faculty for special education and rehabilitation (AS=94.57) (*Table 6*).

Table 6. Results of Tuckey test for multiple comparisons

Faculty		I-J	Std. Error	p	Lower bound	Upper bound
Faculty for special education and rehabilitation	Teacher training faculty	6.835	3.026	0.111	-0.99	14.66
	Faculty for psychology	8.435	3.122	0.037*	0.36	16.51
	College of pree-school teacher training	10.145	3.051	0.006*	2.25	18.04
Teacher training faculty	Faculty for special education and rehabilitation	-6.835	3.026	0.111	-14.66	0.99
	Faculty for psychology	1.601	3.225	0.960	-6.74	9.94
	College of pree-school teacher training	3.310	3.157	0.721	-4.85	11.47
Faculty for psychology	Faculty for special education and rehabilitation	-8.435	3.122	0.037*	-16.51	-0.36
	Teacher training faculty	-1.601	3.225	0.960	-9.94	6.74
	College of pree-school teacher training	1.709	3.249	0.953	-6.69	10.11
College of pree-school teacher training	Faculty for special education and rehabilitation	-10.145	3.051	0.006*	-18.04	-2.25
	Teacher training faculty	-3.310	3.157	0.721	-11.47	4.85
	Faculty for psychology	-1.709	3.249	0.953	-10.11	6.69

*p<0.05

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It is interesting that students who will be working closely with children with disabilities in regular schools, respectively teachers, or in schools for educating children with special needs, respectively special educators have the worst attitudes toward people with disabilities among all four groups of students. Our results are in conclusion with previous research conducted in our region (Brojcin, Pavlovic, Mastilo & Glumbic, 2015) that focused on attitudes of students who attend Faculty for Special education and rehabilitation in Bosnia toward people with disabilities. They found that some of the participants in the sample had clearly negative attitudes, while some had mildly positive attitudes. The authors emphasize that it is necessary for students who are being educated in this field to have more positive attitudes toward this population.

In terms of highest obtained education level of respondents' mother, the participants were divided into two groups. First one consisted of participants whose mother obtained lower educations levels (elementary school and highschool) and the second one consisted of participants whose mother obtained higher education levels (college, university, masters' degree and doctoral degree level). By performing a t-test analysis, we did not obtain statistical difference ($p>0.5$) in terms of level of education of participants mother ($f=0.997$; $p=0.319$) and attitudes toward people with disability (*Table 7*).

Table 7. Difference in stances toward people with disabilities in terms of highest obtained education level of respondents' mother

Highest obtained education level of respondents' mother	N	AS	SD	F	p	MIN	MAX
Lower education levels	174	89.98	17.730	0.997	0.319	1.809	259
Higher education levels	87	85.68	18.875			1.772	162.860

Our results are incompatible with previous research conducted by Antoanak and associates (1995) which indicated that people who obtain higher levels of education have more positive attitudes toward people with disabilities.

In terms of highest obtained education level of respondents' father, the participants were divided the same way. By performing a t-test analysis, we found a statistical difference ($p<0.05$) by comparing students' fathers education levels ($f=0.196$; $p=0.0.43$) and their attitudes toward people with disabilities (*Table 8*).

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Table 8. Difference in stances toward people with disabilities in terms of highest obtained education level of respondents' father

Highest obtained education level of respondents' father	N	AS	SD	F	p	p2	t	df
Lower education levels	177	90.12	18.818	0.196	0.658	0.043*	2.037	259
Higher education levels	84	85.24	16.432			0.034	2.137	184.726

*p<0.05

Our results are similar to previous studies (Antonak et al., 1995) that found that people who obtain higher levels of education have more positive attitudes toward people with disabilities, than people who obtain lower levels of education.

By performing a t-test analysis, we found a statisticaly significant correlation (p<0.5) between existence of previous contact with people with disabilities (F=0.358; p=0.039) and attitudes toward them (*Table 9*).

Table 9. Difference in stances toward people with disabilities in terms of having a previous contact with person with disability

Having a previous contact with person with disability	N	AS	SD	F	p	p 2	t	df
Yes	226	87.63	18.164	0.358	0.550	0.039*	-2.078	259
No	35	94.46	17.527			0.038	-2.133	46.059

*p<0.05

Having a previous contact with this population is the best way to reduct stigmatization toward them and to improve attitudes associated with this population (Corrigan & Penn, 1999), regardless of contact type and its intensity (Yuker & Hurley, 1987; Yuker, 1994). Our results are similar to findings of a previous study (Packer et al., 2000) that implied that students of humanities who had previous contant, contact simulation, experience or additional education about this population have more positive attitudes than students who did not have any of the mentioned. Research conducted by Tervo, Azuma, Palmer and Redinius (2002) which measured the attitutudes of 90 students are in accordance with our results and the authors emphasize the importance of providing opportunities for humanities students to have frequent contants with this population in order for them to have their attitudes improved.

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By performing a t-test analysis, we did not obtain statisticaly relevant difference (p>0.5) between presence of a family member with disability (f=0.301; p=0.584) and attitudes toward this population. Participants who have family members with disability have the same attitudes toward them as students who do not have a family member with disability (*Table 10*).

Table 10. Difference in stances toward people with disabilities in terms of having a family member with disability

Having a family member with disability	N	AS	SD	F	p	p 2	t	df
Yes	53	88.64	20.634			0.967	0.042	259
No	208	88.52	17.577	1.215	0.271	0.970	0.038	72.385

By performing a t-test analysis, we obtained a statisticaly relevant difference (p<0.5) between supporting inclusive education of children with disabilities (F=0.351; p2=0.005) and attitudes toward people with disabilities (*Table 11*).

Table 11. Difference in stances toward people with disabilities in terms of attitudes toward supporting inclusive education of children with disabilities

Supporting inclusive education of children with disabilities	N	AS	SD	F	p	p 2	t	df
Yes	194	86.69	17.254			0.005*	-2.844	259
No	67	93.93	19.860	0.351	0.554	0.009	-2.656	102.509

*p<0.05

Even though mayority of students believe that these children should be enrolled in regular school system, it is worrying that a quarter of our sample (25.67%) does not agree. Our results are incompatible with previous studies (Jobe & Deana, 1996) that examined attitudes of these students toward inclusion of children with disabilities and found that in general, attitudes toward inclusion are positive. The research of Vaz and associates (2015) that included 74 participants who work in schools whose classrooms are attended by children with disabilities found that negative attitudes toward including these children in general education system origin from the lack of knowledge and experience of teachers about working with this population.

By performing a t-test analysis, there was a statistically significant correlation (p<0.5) in terms of opinion that children with disabilities who are enrolled in inclusive classes disrupt typicaly developing childrens' educational process (F=0.666; p2=0.003) (*Table 12*).

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Table 12. Difference in stances toward people with disability in terms of opinion that children with disabilities who are enrolled in inclusive classes disrupt typicaly developing childrens' educational process

Opinion that children with disabilities who are enrolled in inclusive classes disrupt typicaly developing childrens' educational process	N	AS	SD	F	p	p 2	t	df
Yes	94	93.01	17.715			0.003*	3.019	259
No	167	86.04	18.033	0.666	0.415	0.003	3.034	195.811

*p<0.05

Results are concerning, because more than a third of our sample (36%) believe that children with disabilities disrupt children without disabilities in classrooms. Even though there is a large number of students who will work closely with children with disabilities after finishing their studies believe this, research of Tripp, French and Sherill (1995) which examined the attitudes of typicaly developing children toward their peers with disabilities with a sample of 455 children, who were nine to twelwe years old, found that children who have classmates with disabilities have more positive attitudes than children who are enrolled in classes without any children with disabilities. This data has numerous practical implications, because it is highlighted in previous research (Vilchinsky & Findler, 2004) that having negative attitudes toward peers with disabilities disrupts their inclusion process, therefore increases mental health issues of children with disabilities.

CONCLUSION REMARKS

It is of great importance to examine attitudes of students toward people with disabilities, because it is considered that attitudes of students represent future attitudes of the entire population (Brojčin, Pavlović, Mastilo & Glumbić, according to Ćirović, 2011) and attitudes of general public toward this population can have a negative impact on the process of integration and inclusion of people with disabilities.

Instead of conclusion, we give implications for conducting further research in the area of attitudes toward people with disability.

1. Determine attitudes of typicaly developing children towards classmates with disability.
2. Determine attitudes of parents of typicaly developing peers toward their childrens' classmates with disability.
3. Determine attitudes toward people with disability in terms of type of disability.
4. Determine attitudes toward people with disability in terms of presence of maladaptive behavior.

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5. Determine attitudes toward people with autism spectrum disorders.

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THE ROLE OF KINDERGARTEN IN THE FUNCTION OF PREPARING CHILDREN FOR STARTING SCHOOL

ULOGA VRTIĆA U FUNKCIJI PRIPREME DJECE ZA POLAZAK U ŠKOLU

Mejrima Tajar Škaljo[1]

Gornja čikma 16, Bistrik, 71 000 Sarajevo

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ABSTRACT

The partnership between kindergarten and family has a special function and importance in the upbringing and education of the child. The content of the topic refers to the introductory part, which explains what we will be researching. The partnership between family and kindergarten has a special significance and role in the function of preparing children for school. Numerous definitions of family are mentioned in the literature, but given the diversity of structure, relationships, functions, ways of formation, there are many combinations and it could be said that each family is unique or a separate definition should be made for each family. The child is the center of attention in the partnership. The results show that parents are involved in kindergarten activities, and that they are available for cooperation. This is the first prerequisite for establishing, above all, quality communication, and thus cooperation. All parents are interested in the progress of their child and want to cooperate with the kindergarten in this area. This research is of a theoretical-empirical character. We used specifically descriptive statistics, which have special significance. The educational preparation of a child refers to what we call the formation of work habits of learning, on the one hand, and the acquisition of prior knowledge, on the other. Kindergarten children do not read or write, make figurines, play, draw, learn numbers up to ten. Educators need to continuously learn and establish a partnership with the family and the child, in order for the child to feel accepted, satisfied, happy and successful. It is certainly evident, through our theoretical research, that we can conclude that educators need to be specially educated to work with the population of preschool children with a special "dose" of sensibility.

Key words: child, kindergarten, family.

[1] **Coresspondence to:**
Mejrima Tajar Škaljo, Preschool Education, Gornja čikma 16, Bistrik, 71 000 Sarajevo
E-mail: mejrima.85@gmail.com

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INTRODUCTION

Pedagogy studies education as its main activity. The fundamental question of pedagogy is the question of raising a child. Parents' preoccupation with work nowadays requires constant "care and trust of the child", especially parents take their children to kindergarten, where the child spends more than half of the time in kindergarten, and the kindergarten becomes a "second" home for children. Continuous cooperation between kindergarten and family contributes to the development of the child and the improvement of the work of educators, as well as to the development of the parental role. The first step in planning cooperation is to get to know the possibilities and expectations of the family. The importance of cooperation between the preschool institution and the family for achieving the goals of educational work has a special impact on the upbringing of the child. The family plays a key role in a child's life. Getting acquainted with the basic characteristics of the family (social, cultural, biological) has a key character in the direction of further upbringing and education of the child. The family and the kindergarten are most responsible for the upbringing and quality of children's development. The joint work of the kindergarten and the family as a contribution to better physical and health development, development of mental abilities, as well as the development of work, moral, aesthetic, environmental and other educational components leaves a mark on children's education in the future. Kindergarten and the family should focus on creating conditions for the action of all educational factors, in order to provide the most favorable conditions for the socialization and humanization of children. The obligation of the kindergarten and the family to work together to solve all the problems and difficulties that accompany the child's development, both in the family and educational environment. Guided by this goal, the kindergarten and the family should cooperate, and the forms of cooperation between the family and the kindergarten can be direct or indirect. The direct form of cooperation between the family and the preschool institution can be meetings only with parents, and meetings with both children and parents (group). Defining the concepts and basic starting points of the role of families and kindergartens in the function of preparing children for school.

Going to school in a way restricts the freedom a child had in preschool. It brings with it new experiences. Children who have attended kindergarten certainly socialize faster and develop certain necessary skills more efficiently. Through the program of preschool education, educators instill in children forms of desirable behavior, recognize and respect children's needs and interests, and encourage activities that will help them develop their potential. All this is achieved by arranging a stimulating material environment for children for individual activities, e.g. in the workshop for the development of pre-reading skills, various picture books, posters with picture stories in a row, dictionaries, papers and writing utensils were placed. In musical workshops, musical instruments are placed, in the drama one, puppets and toys for dramatization are placed, and the like. The role of educators is also important in the adoption of discipline and respect for rules in children.

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Talking to the child, creating a stimulating and motivating family environment and a positive attitude towards school and teachers, is part of preparing the child for school. At the same time, mutual trust and quality cooperation between the family and the kindergarten are important. Children in the circle of peers develop new and upgrade existing abilities and form their own personality. We must not forget that every child is an individual for himself and that everyone copes with change in a different way (some children need a shorter and some a longer time to adjust to school). Kindergarten / Preschool is an institution for the care and upbringing of children until they start school. According to the Law on Preschool Education in BiH, Pedagogical Standards for Preschool Education of BiH (Official Gazette of Sarajevo Canton), the Basic Provisions states: for future life and work ". Upbringing is a process of human formation and lasts from birth to death.

There are several stages in the process of human development that are conditioned by physiological, psychological, intellectual, social and moral maturation. Maturation and development of man are possible only with the help of upbringing. Therefore, care must be taken that the most adequate upbringing corresponds to each level of human development. With regard to the age of the pupils, education is divided into pre-school education, school education, higher education and adult education ". (Omerović, M., Music, H., Šehović, M., Tomić, R., 2009)

An educator is a person who takes care of children during their stay in a preschool institution, who nurtures, educates, socializes and directs them on the right path from the very beginning of life. His work is based on the plan and program of the institution itself, which are adapted to the age and abilities of children, and were adopted with the consent of the Ministry of Education. A child, according to the Convention on the Rights of the Child (Article 1), is any human being below the age of 18 years, unless, under the law applicable to the child, majority is attained earlier.

The obligation of the kindergarten and the family to work together to solve all the problems and difficulties that accompany the development of the child, both in family and educational environments, as well as in the immediate and wider environment. The educator and parent should act as a team. In cooperation with a pedagogue, psychologist, speech therapist, social worker, the problems of individual educators are solved, for example: "In case two or three children in kindergarten have the same problem, it is convenient to organize this form of cooperation in agreement with parents and their mandatory presence. , so that experiences can be exchanged ". The primary program (Miljak, A., 1996) is considered to be programs that include the care, upbringing and protection of children from the age of one to the beginning of school. Involvement in preschool activities is beneficial for the child, family and program, it provides emotional and physical participation. Emotional inclusion means that the child and parents are happy with themselves, productive, energetic, renewed and ready to face life again, eager to play.

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A strong desire to participate with someone or something, a sense of belonging to a group are important emotional indicators for both the child and the parents, especially for the kindergarten. Physical participation implies that the child and parents are ready for the aspect of developing new skills, forgetting worries, fun and joy, relaxation, meeting new people, overcoming stress. It is useful to gather once a year teachers, educators and parents of children who go to school in order to reach an agreement, inform parents about the organization of work in school and other activities that are important for the child's further education. A quality kindergarten environment is the result of breaking the influence of various components of spiritual and material and interpersonal relationships. Especially the interactions between adults and children, emphasize the authors Males and Stričević, 1996)

The participation of parents in such activities in kindergarten can be especially useful in solving certain problems that parents face personally, as well as parents who have certain difficulties in raising their children. Preparation of programs for parents and children in kindergartens is done by the Ordinance on the general basics of preschool program, which contains:

1. Basics of care programs for children up to three years of age;

2. Basics of the program of preschool education of children from three years to inclusion in the program of preparation for school.

The institution adopts the Preschool program (in accordance with the Rulebook on the general basics of the preschool program). At the level of the educational group, a program of educational work is developed in accordance with the needs, possibilities and interests of the children of a specific group (the program is built and developed in cooperation with the parents of the children). The program is a supplement to family education. Establishing links (continuous cooperation) between the two parts of the unified system of education and upbringing (PU and OŠ) should facilitate the child's transition to a new environment and is a joint work and responsibility of educators and teachers, kindergartens and primary schools.

Qualifications and training of professional staff have the greatest impact on the quality of work and are especially related to better achievement in preparation for reading and writing. Active involvement of parents in all activities encourages the intellectual and social development of children. Involvement of children in the preschool program contributes to the development of children's cognitive skills, development of socio-emotional competencies, and literacy (Vandell et al., 2010; Loeb et al., 2007; Gormley et al., 2004). Curricular approach to the preschool program includes:

a) Contents are dependent on children's interests and developmental abilities. With a quality and enriched spatial material environment and social incentives, the educator enables the choice of individual contents and topics.

b) The contents of the work are related to the areas in which the child acquires competencies:

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1. Speech, expression, creation;

2. The child and his environment;

3. Natural environment;

4. Social environment,

5. Elementary mathematical concepts;

6. Development of a positive self-image;

7. Physical and health education;

8. Improving the preparation of children for school.

c) Developmental tasks are indicated according to the areas of development (overview of developmental tasks can be used in planning.This approach in modern practice of early and preschool education is slowly being abandoned in the direction of competencies as expected outcomes.

Tasks of educational work in the year before starting school

It is necessary, after a long time of working with the child, to determine how and in what way to present the content to the child and in what way the child will most easily adopt such content. Most often, the child adopts the content, prepared by the educator:

1. When he feels safe, well, and content;

2. When new experiences build on his personal experiences;

3. When he is encouraged in learning, when his "small" steps are noticed and supported;

4. When learning has meaning for him, when it is related to his needs;

5. When he is allowed to learn in his own way, quickly, more slowly, by manipulating the questions he asks;

6. When he is offered contents that he can master only or with the help of an adult;

7. When the demands placed on him are a little above his capabilities (the so-called zone of further development);

8. When his way of understanding the world and the environment is respected;

9. When he is given the opportunity to choose and when his choice is respected;

10. When he is given the opportunity to process his experience;

11. When his experience is expanded by events, experiences;

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12. When he has the possibility of self-expression, creation;

13. When the way of work and process is such that the child actively participates in it;

14. When he has the opportunity to exchange with other peers, older than himself, younger;

15. When he is free to exchange information, learned with the educator.

Continuous cooperation and mutual exchange of information and data during the year and during preparations for enrollment in primary school (in cooperation with the local self-government unit, health centers in the municipality), there is a high probability that such a child will be more successful than a child not prepared for school . It is useful to gather once a year teachers, educators and parents of children who go to school in order to reach an agreement, inform parents about the organization of work in school and other activities that are important for the child's further education. Continuous and more frequent contacts between parents and educators (introduction to the programs, ways of their implementation) are also important for establishing a safer access of children to school and school activities. Creating opportunities for mutual socializing and various activities of children and students (compulsory visits of children to school, introduction to school space, teachers, visits to school hours, joint exhibitions of creativity, sports events) open greater opportunities for such children to more easily bury themselves in school content. Considering the possibility of joint use of facilities and resources available to the preschool and primary school have an important impression on the child before starting school and adapting the child in school activities.

Educator profile

It is of elementary importance what the profile of the educator in the preschool institution is. They should be among children not as guardians, but as a stimulus for their growth and an example for their behavior. The development of a preschool child largely depends on the ability and commitment of educators. Therefore, it is not only the parents who are responsible for the upbringing of their children, together with them the educators also participate in the upbringing and education of the children. Children need not only a teacher, but also an actor, inspirer, leader, creator, screenwriter, artist, collaborator, researcher, fighter, evaluator, etc. They need a versatile educator who will put the interests, needs and abilities of children first. Such an educator will motivate, encourage and support their development. The educator should have the following characteristics:

- education in pre-school education;

- special education and interests in other sciences and activities;

- high moral characteristics;

- confident;

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- cheerful and open spirit;

- to have skills for sports, music, drama activities;

- to have knowledge of IT;

- accessible for children, communicative;

- instills confidence in children;

- always ready to help and be a role model for children.

The educator (Omerović, M., Music, H., Šehović, M., Tomić, R., 2009) has the role of "conductor", who increasingly shares his role with the participants - children, so that in the future his role will be all minor but not unimportant. He should first know: name and surname, residential address, age, colors - recognizes and names most sour / sweet / salty / bitter, hot / cold /, lukewarm, who his mother is, names of grandparents, brother / sister . Acquiring basic elements about yourself and the environment through a partnership between family and kindergarten:

1. About myself, basic concepts, temporal orientation, spatial orientation, quantities, sizes, knowledge of letters, reading letters, counting, counting, writing letters.

2. Time orientation means, seasons, days, time of day (morning, evening, afternoon, night, day, morning), yesterday / today / tomorrow / the day after tomorrow / the day before yesterday / last year / next year, days of the week, months (number, names of some).

Spatial orientation: left / right, up / down, larger / smaller / medium, higher / smaller / medium, below / above.

3. Knowledge of letters, eventually, because in kindergartens the child does not learn to read and write, through play he learns and adopts knowledge, notices, notices, eliminates, separates.

4. Counting and counting (number strings: repeat a string of 3 numbers in reverse order); repeat a series of up to 5 numbers in the given order, counting up to 10, and even up to 100 (if the child has an interest), adding up to 10.

The subject of the research is the role of kindergarten on the child's readiness for school. Within the subject of the research, we dealt with issues such as: the issue of the role of kindergarten in preparing children for school, issues related to the educator, the child and the kindergarten. The elementary goal of our research is to determine the role of educators, kindergartens in preparing children for school.

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This research aims to find out more information about the contents of the curriculum of kindergartens intended for preschool group, what they are aimed at and to what extent they are implemented, and whether there are contents of kindergarten work aimed at easier adaptation of children to school. This research is based on the determination of the existing situation and its analysis. No new factors will be introduced into the existing situation, nor will their effect be measured. Therefore, the basic method of this research was a descriptive method, since the research is of a scientific nature. And the descriptive method corresponds to the set tasks. The descriptive method, of course, is not understood only as describing, recording phenomena, but implies analysis, comparison, drawing conclusions, as well as establishing connections and relationships between phenomena.

It, in fact, includes what some authors denote by the causal method in non-experimental application. Within the descriptive method, we used quantitative and qualitative analysis, and the comparative method in research comments. Survey and content analysis research techniques will be used to collect data. The research was conducted in kindergartens in the area of Sarajevo, in the kindergarten "Swans" Novi Grad, and the kindergarten Children of Sarajevo "Children's Joy" Mojmilo. The sample consists of educators and parents of kindergartens from the area of Sarajevo. The study involved 26 parents of children aged 6 to 7 years and 22 educators. The parents ranged in age from 30 to 42 years. The research was conducted in the form of an anonymous questionnaire for parents and educators. Parents were asked to answer 8 questions, of which 2 questions with a complete sentence and 6 questions with a choice of offered answers "Yes" and "No". Educators were expected to answer 10 questions, 1 of which was to be supplemented with a sentence and the remaining ones to be answered by rounding off the offered statements. We came to the information that going to school is a big step in the life of every child. The child begins to learn consciously and has to deal with all the demands of the school, new strangers and adapt to a situation where it is no longer the most important, but becomes part of a peer group where everyone is equal. . Therefore, it is extremely important that the child is mature enough to start school and to enroll in school at the right time. The child needs to be emotionally, physically, intellectually and socially mature to start school. Kindergarten and cooperation with the school have an important role in the preparation for starting school, but also parents who have been with their child since birth, this research has confirmed. It is evident that a special plan and program is implemented in the work with preschool children, kindergartens follow the plan and program for children.

Educators are trained to work with children. A large number of educators have graduated from high school, college, and some of them have master's degrees. Research has shown that educators believe that a child's preparation is much more important at the cognitive level than at other levels. We came to the conclusion that, children in preschool kindergarten do not learn to read and write, because that is the content that is adopted during schooling. The family, for the most part, expects greater involvement of educators in preparing their children for school, because they believe that educators, kindergarten, pay for it.

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A large number of parents are busy with work and do not have the time to fully dedicate themselves to working with the child, so children are often left to educators and kindergarten. In practice, this is a problem, as we have been able to conclude through our research. In general, we found that the role of kindergarten in preparing children for school is of particular importance. Therefore, it is necessary for parents to be more involved in working with their children, in the sense of the overall preparation of children for starting school. In this way, they would make it easier for themselves and the children to adapt to the "school desks". In the future, it is necessary to examine, in more detail, the relationship between parents and educators in terms of preparing children for school and the adequacy of the child's adaptation to school, and their cause-and-effect relationships and competencies.

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EDUCATIONAL INTEGRATION OF PEOPLE WITH VISION IMPAIRMENTS

ODGOJNO-OBRAZOVNA INTEGRACIJA OSOBA OŠTEĆENOG VIDA

Gorica Kurtuma, Ševala Tulumović, Hurma Begić*

Faculty of Education and Rehabilitation Sciences, University of Tuzla
Univerzitetska 1 Street, 75000 Tuzla, Bosnia and Herzegovina

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ABSTRACT

The educational integration of blind and visually impaired children has proven to be an upward trajectory in the process of upbringing, education, acquisition of knowledge and competencies in children with visual impairment. In addition to the benefits for the child's intellectual development, the integration process is of great importance in the social context. The education system has changed over time, both for visually impaired students and for their without visual impairment peers. Modern approaches and methods in the process of upbringing and education have made many means for work and learning for children who are blind and visually impaired inaccessible. We strive to adapt the environment for children with disabilities in order to fully include them and give them the opportunity to follow the most modern methods and use modern teaching aids in the process of upbringing and education.

Key words: modern approaches, modern methods, integration, blind, visually impaired

SAŽETAK

Odgojno-obrazovna integracija slijepe i slabovidne djece pokazala se kao uzlazna putanja u procesu odgoja, obrazovanja, sticanja znanja i kompetencija kod djece sa oštećenjem vida. Pored dobrobiti za djetetovo intelektualno usavršavanje proces integracije ima veliki značaj u socijalnom kontekstu. Obrazovni sistem se vremenom mijenjao, kako za učenike sa oštećenjem vida tako i za njihove vršnjake intaktnog vida. Savremeni pristupi i metode u procesu odgoja i obrazovanja kreirali su mnoga sredstva za rad i učenje koja su nedosutpna za djecu sa oštećenjem vida.

* Corresspondence to:
Hurma Begić, Faculty of Education and Rehabilitation, University of Tuzla
E-mail: hurmabegicjahic@gmail.com

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Teži se ka prilagodbi okoline za djecu sa invaliditetom radi njihovog potpunog uključivanja i davanja mogućnosti da prate najsavremenije metode i koriste savremena didaktička sredstva u procesu odgoja i obrazovanja.

Ključne riječi: savremeni pristupi, savremene metode, integracija, slijepa i slabovidna djeca.

INTRODUCTION

The educational process is very dynamic and brings a large number of changes from generation to generation. It is necessary that students, in accordance with their individual abilities, are educated according to approaches and methods that are the same for each student. Involving visually impaired children in educational integration is not an easy task for the students themselves, and thus for a large number of professionals and the environment.
Students with visual impairment differ from each other as do their peers with intact vision, except in terms of the type of impairment they may differ in terms of perceptual functions, intellectual and emotional maturity, motor development or in terms of compensatory mechanisms they use.

THE OLDEST RESEARCH AND INTENION TO INNOVATION

Experts from educational-rehabilitation science as well as related sciences monitored, researched and evaluated new approaches, methods and aids in working with blind and students with vision impairment in the educational process. Emphasis is placed on a wide range of methods that help in orientation, mobility, learning, communication and various activities with the aim of overcoming existing methods and strategies, and the introduction of computer technology and innovative solutions.
Orienteering is a time running race that uses maps and compasses to get to checkpoints on an unknown track. It can be used in conjunction with orientation and mobility programs to improve the skills of blind and partially sighted people[1]. It is necessary to determine the efficiency of teaching methods and different types of equipment, such as: Mowat sensor, Braille compass, hearing maps and tactile-visual maps in orienteering programs for the visually impaired. Research has been made to examine the abilities of detection and orientation on tactile maps and developed strategies to promote these skills. Further understandings of the transformation from two-dimensional to three-dimensional space were made, which reaffirmed the so-called cross-modal transfer between sight and touch[2]. Models for computer-assisted mediation are presented and its application in the field of education of blind children is presented. The model consists of five elements: domain model, student model, pedagogical model, and dynamic and static projection of learning. A system based on stored expertise guides the child in what he or she can or wants to learn. Efficiency is dynamically evaluated in order to constantly adjust the teaching methodology[3].

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OVERVIEW OF STRATEGIES AND ARRIVAL OF BIO-PSYCHO-SOCIAL STRUCTURE

Strategies for classroom teachers include: avoiding the use of words such as “this,” “that,” and “there,” which will be meaningless to students with visual impairment;
ensuring that descriptions of problems or techniques used are carefully worded to avoid ambiguity; pronouncing everything written on the board and pronouncing new words as they are written; providing transparent foils and notes for teachers to transcribe them into Braille so that students can use them at their desks; when describing the terms, it is recommended to use everyday objects, by choosing objects that the visually impaired student can easily access and understand; providing printed copies of textbooks and brochures to students who are blind, which the reader will use at home; providing additional table space for Braille materials; oral testing / oral questioning; provide a person who can read math assignments to check in Braille and arrange the proceeding of assignments and answer keys to the teacher in advance[4]. At the beginning of the 21st century, efforts are being made to correct mistakes in the educational system for blind and partially sighted students. The open education scheme aims to replace residential schools with the blind, rather than stressing that they need to be supplemented[5].
The pursuit of educational integration would imply the use of traditional models of education with the addition of modern means and teaching methods. An approach that would give satisfactory and innovative results should unite a team of experts and include the students' social skills in the process.
In relation to the faculty, as well as in the classrooms of primary and secondary schools, teachers for visually impaired students do not have the opportunity to put emphasis on learning social skills[6]. Books for the blind use tactile perception as a substitute for sight. A number of different systems have been proposed in different periods of scientific advancement, but the Braille alphabet is undoubtedly the most commonly used script by blind people around the world[7]. The development of print reading and Braille in blind and partially sighted children was compared with Chall's stage model of reading development. Chall’s model includes a pre-reading period, in which concepts are developed, intermediate stages, in which the skills needed to decode the text are developed, and later stages, which distinguish skilled readers based on their highly developed schemes and cognitive skills necessary for effective understanding and integration. The results speak of the effectiveness of a better method for teaching based on Braille, in students with visual impairment[8]. We observe blindness and its meaning through the domain of the man as a bio-psycho-social structure. This structure includes elements of social, psychological, biotic nature and they are mutually correlated [9].
Given the new understanding, the entire educational system needs to change and supplement its relationships, methods and strategies towards people with visual impairments.

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method of oral expression (the teacher should speak loudly, clearly, grammatically correct, good intonation and rhythm, and with a calm tone); the method of conversation (the teacher should try to alleviate verbalism, it should be concrete, precise and short, and make sure that the words have an idea, experience); method of written and illustrative conversations (the teacher should give the student a plan of the board and the content on Braille, speak loudly and clearly what he/she writes on the board, and blind students can make some tables and diagrams using the number system, and use foil accessories for drawing and rubber pads); demonstration method (whenever possible the teacher should have the actual subject he / she talks about, before watching the slide, film, cassette, it is obligatory to orally explain to the student the content to be shown, maps, diagrams, charts, tables and sketches for the visually impaired student should be individual, simple, embossed and sharp contrast); method of printed works (blind students use materials printed on Braille, (letters, numbers, symbols and other signs), but can use so-called audio books); methods of laboratory work (blind students individually practice the manipulation of objects, tools and instruments, group work is carried out with the help of teachers, and to work in the space outside the classroom it is necessary to provide help from a guide to move and get to know the space)[10]. After reviewing new methods in the educational process, the emphasis is on technology and the ability to find additional, compensatory systems, software, aids that will make the education system more accessible, cheaper, easier and more personalized for people with visual impairments.

In order to avoid an inefficient learning system for blind and partially sighted students and to reduce the degree of complexity of the adoption of teaching units, it is proposed to teach Braille via a haptic device. The device includes the functionality of six balls representing six Braille cells, once fully assembled they create the desired pattern[11]. The use of assistive technology is a compensatory skill because it allows blind and partially sighted students to undertake tasks that are often performed by people without visual impairment[12].
An interactive test method for assessing the degree of material adopted includes a device with an LCD screen and a custom keyboard. This system reduces the set of necessary paperwork and workload, eliminates the use of Braille sheets and thus saves on costs, and helps teachers reduce the level of workload. Audio, visual and tactile output with sound announcement on the LCD screen allows visual verification, and the information obtained provides a better level of understanding and learning, insight into feedback on the material[13]. The modern world of higher education students requires the adoption and implementation of e-learning. The addition of e-learning access and storage platforms can be used successfully to facilitate the inclusion of students with visual impairments in the educational process, giving them greater access to brochures, notes and lecture notes. However, individual variability in students with visual impairment means that e-learning should not be considered an "easy solution"[14].

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In order to save time, it is necessary to harmonize the already existing mechanisms, systems and aids with even more modern technology and shorten the path for a blind and partially sighted student to reach a solution. Research suggests that screen readers should allow way right to the main content, skip peripheral or duplicate content, which would save a lot of time for the blind user and keep the user from getting tired. A particular website should also be divided, defined and should indicate exactly what could be found where, for example: main part, header, advertisement, contact, announcements, so that the blind student can orient himself/herself faster and easier, and thus reach the information he/she needs [14].

Modern computer tools are able not only to convert digital data into a suitable audio channel or Braille point for the blind, but also to provide the blind with a complete computerized place to work, with all possibilities, from text work, Internet access or mastering appropriate programming languages. The digital talk book, which covers both audio and text data, is an invaluable multimedia information source for the visually impaired[15]. Promoting the inclusion of students with disabilities in E-learning systems has brought a number of challenges to researchers and teachers. The use of synchronous communication tools, such as interactive whiteboards, was considered an obstacle to inclusive education and the inclusion of visually impaired students in the educational process. With available descriptions, students can navigate through the elements and explore the content of the lecture using a screen reader. Evidence of the applied concept has shown that many further possibilities for improving the interaction of blind users with educational content on whiteboards can be explored, and from this proposal further pedagogical approaches and more innovative methods can be explored[16].

THE ROLE OF TEACHERS IN EDUCATIONAL INTEGRATION AND NEWER LEARNING SYSTEMS

From the perspective of teachers of blind students, teaching methods must be in line with typical student learning habits, such as the proper use of the board. It is well known that, no matter how advanced modern teaching methods are, blackboard writing cannot be completely replaced in classroom teaching[17]. The research sought to determine the degree of professionalism and innovative standards of teachers who teach visually impaired students. The results of the research showed that there is not enough knowledge and skills among teachers regarding the implementation of teaching for students with visual impairments[18]. Formal assessment, including exams, is an integral part of most education. Standard exam formats and procedures can pose particular challenges for blind and partially sighted students, leading them to fail to demonstrate their abilities under standard examination conditions[19]. McSig, a multimodal system for teaching blind children cursive handwriting so they can create a personal signature, was introduced. For blind people, handwriting is very difficult to learn, as it is an almost zero feedback activity that is needed only occasionally, but in important situations; for example, to make attractive and repeatable signatures for legal contracts.

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McSig helps teach signature by translating digital ink from a teacher's pen gesture into three non-visual forms: the audio pen and its height represent the x and y movement of the pen; kinaesthetic information is provided to the student using a haptic pen with a reciprocating force that mimics the movement of the teacher's pen, and a physical tactile line is created on the writing sheet with the haptic pen[20].

In relation to the individual abilities of students with visual impairment, teachers should adjust the contents of individual subjects.

Depending on personal preferences and possibilities, the contents of the literature can be adopted with the help of audio and digital recordings (CD, mp3) and analogue recordings (audio cassettes for classic or four-channel cassette player). For the contents of media culture, in the classes in which the blind student is included, the same media are used, videos - digital and analogue recordings provided by the subject curriculum (CD, DVD, videocassettes etc...)[21]. Learning becomes meaningful when it is seen as the science and art of imparting knowledge - science because it follows systemic principles and theories, and art because it requires creative skills and innovation [22]. The teaching staff should also pay attention to the educational medium that a student with visual impairment, in the educational process, chooses as an adequate access to information and content in textbooks. Total access to information means that the blind student uses all available ways of accessing written information during classes and then uses three different educational media (black press, Braille, and audio recording)[21].

MODERN AGE AND MANDATORY USE OF INFORMATION TECHNOLOGY IN EDUCATION

The last decades in the educational process involve the use of innovative methods and computer technology in the process of transferring knowledge and skills. Expert research is focused on examining the efficiency of the use of information technology as well as descriptions of the most modernly designed support systems, software and assistive technology that are increasingly applicable in the methodology of working with students with visual impairments.

The opinion (98.8%) of teachers indicates the necessity of using information technology for work in schools for students with visual impairments, primarily for reading and writing, as well as for various applications of technology with blind and partially sighted students. The results of the research, which examined the competencies and level of computer literacy of high school students with visual impairments, showed that students on the screen must have easy access to the Internet and search engines, in terms of easy and fast reading.

Website source codes, as well as web designers, should, along with each animation, include a description of the text, instructions that will be set up so that screen readers successfully display information to a blind user[23].

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It was examined whether in the learning process blind and partially sighted children will better understand the appropriate representative technique, and whether it will enable the identification of objects more effectively, that is, which technique is uniformly suitable for all blind people. The results showed better recognition of textured images than thermoformed and elevated line images[24].

Information and media literacy are indispensable in the modern world. Little attention has been paid to specific aspects of information and media literacy suitable for people with disabilities, and especially for blind and partially sighted people. Media and technology are even more important in the world of people with visual impairments. Media literacy and skills imply personal independence and improved quality of life as well as a higher degree of participation in society and education[25]. The use of modern information technology to provide information to blind people is an urgent problem, the solution of which has found new approaches in education[26].

In referring blind and partially sighted students to information technology in education, it is necessary to find the simplest and cheapest solutions.

Students who are blind or visually impaired are often at a disadvantage when information is given to them in the regular education system. This is especially true of curricular areas such as mathematics and science, which often rely on visual elements to convey key aspects of content. There are a number of methods that provide accessibility, such as 2D tactile graphics, 3D physical models, video description, etc. However, most often these items are not available to every child due to costs and many other circumstances. The use of cheap computer technology can be an alternative means of providing access to information to people with visual impairments. There are thousands of computer programs for educating blind children, but very few computer educational applications for students who are visually impaired[27]. A new method for introducing algorithmic thinking using a haptic model (e.g. LEGO boards and cubes) suitable for all students has been proposed. The method was evaluated in a case study with 5 blind students, teaching them three basic search algorithms: linear search, binary search, and search in the binary search tree. It turned out that the haptic method facilitates the understanding of basic algorithmic ideas. Furthermore, it has the advantage of inhibiting the common problem of thinking about many steps at the same time, because it forces students to perform steps successively with their hands. This also facilitates the transfer from the model to the source code. The new haptic method is a convenient way to teach visually impaired students the basic algorithmic thinking[28]. Recent advances in three-dimensional (3D) printing technology have created low-cost systems that can translate 3D models of terrain shapes and elevations into physical models. Affordable, commercially available 3D printers are able to use data from topographic maps, radar, altimetry and digital terrain models and convert them into accurate 3D models from multiple materials within hours. The resulting models not only provide material for the study of lunar and planetary terrains and small space bodies, but also enable the creation of libraries of physical objects accessible to the visually impaired.[29].

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Adaptation of computer technology, input, output, application of computer programs, and interaction with appropriate computer equipment also depends on the individual psychophysical, cognitive and sensory abilities of students[30]. Although there are various traditional and modern computer techniques, the realization of technical (mathematics and physics) education of blind and partially sighted students is currently not an easy task[31]. The participation of blind and partially sighted students is needed to design and create the best possible solution and use a modern method in order to eliminate problems, overcome barriers and more easily master the intended content.

For visually impaired and blind people, assistive software has been developed, closely dependent on existing assistive devices and assistive technologies, as an alternative to the modern educational process, but above all useful, aimed at developing basic professional skills and social skills needed for their social inclusion and learning[32]. New technologies create a highly interactive learning environment. Education is increasingly using combinations of different communication technologies to improve the ability of students and teachers to communicate with each other[33]. When creating and using modern approaches and methods intended for blind and partially sighted students in the process of educational integration, it is important to pay attention to the associated obstacles and the effectiveness of the application of new technologies. The more severe difficulties of children are blindness, deafness, complete absence of speech communication, motor impairments, significantly reduced intellectual abilities, autism and multiple difficulties, combinations of mild difficulties or any mild difficulty combined with mild intellectual disabilities[4].

It is necessary to choose an adequate aid in relation to the type of difficulty.

Some of the adaptive technology devices include: Braille, tactile maps and diagrams, including devices that print text using optical devices and screen readers. Categories of adaptive technology for blind and partially sighted students include: academic and teaching aids, computer access and instruction, professional and vocational aids, and visual aids[35]. New decades have also brought a new understanding of tactile materials, especially tactile maps in the process of raising children with visual impairments[36].

The new approach is one of the new inventions - it enables people with visual impairment to visually enlarge the relevant parts of tactile maps. These audiovisual tactile maps can be used in conjunction with tablets and smart phones. By integrating conductive elements into tactile maps printed in 3D, they can be recognized with a single touch on the screen of a mobile device, which facilitates the management of blind and partially sighted people[37]. Schools for the blind suffer from marginalization in terms of easy access and use of communication and assistive technology [38].

It is necessary to make assistive technologies and the latest system software available to schools for blind and partially sighted students, thus achieving better results of the institutions themselves in the process of modern ways to integrate students with visual impairments.

The goal of technology leadership is to integrate and deliver technology for teaching and learning and to bring transformation to improve the performance as well as the results of the institution[39].

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Combining the latest advances in computer technology and visual impairment and artificial intelligence using revolutionary deep-region networks (R-CNN), recurrent neural networks (RNN) and speech, we have sought to help provide individuals with visual impairments with an interactive learning experience.[40].

It is necessary to consult with students in order to get an interactive approach and avoid creating unnecessary obstacles and mistakes in choosing the technology to be used in the educational process.

The non-use of any textual material during lectures, and sending homework, vocabulary and exercises via E-mail was considered by the students to be a very successful method. The students were completely satisfied and stated that this method is the most effective[41]. The main contribution to the educational process by modern technology is the introduction of a cheap robot based on the Arduino system, compatible with the robotic framework and integrated with audio feedback and text-to-speech converter[42].

In addition to information literacy and its importance, it is important not to lose the connection with relaxation through art and the creation of new, innovative art content that is accessible to blind and partially sighted children.

In case of impairment or loss of visual functions, a person's artistic potential is most secure when applied to music and that art acts as an optimal field for the artistic development of blind and partially sighted students. It is necessary to focus on methods that can help the student understand the need to think, feel, learn, create and discover meaning. It is the only possible way to introduce his/her life into the creative search and realization of full artistic activity[43].

THE MOST SIGNIFICANT INNOVATIONS IN THE PREVIOUS THREE YEARS

Output files created using the XML language to indicate the structure of the input content provide a representation of content in a variety of shapes and styles. For example, XML files and source image files can be used not only for print products but also for Braille fonts, font size, HTML pages, audio files, DAISY readable books or with the help of speech synthesizers, etc. The main developer of this standard is DAISY, which has communicated with a number of professional and civic organizations and formed the conceptual framework of the standard in close collaboration with the leading staff of a number of libraries, scientists and users. Science and technological innovation are aimed at the main target group - students with visual impairments and users with other physical disabilities.

The DAISY book is multimedia content with synchronization of text, audio and graphic information[44]. Tactile graphics play a key role in imparting knowledge to blind people. The solution may be the concept of tactile graphics printed in 3D, which offers the use of audio-tactile graphics with smart phones or tablets. Using capacitive markers simplifies the connection of tactile graphics to a mobile device. These tactile graphics that integrate markers can be printed in a single line using a 3D printer without any post-processing and allow us to use multiple height levels for graphic elements[45].

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Music computer technologies (MCT) open wide possibilities for blind students to more efficiently study various contents and methods of presentation of educational material in informatics, contributing to the achievement of positive learning outcomes in a shorter time. This is especially important for children studying in music schools. Mastery of MCT in children with visual impairment has a number of characteristic features, which are most clearly manifested in the initial period of learning computer science.

With the help of modern computer technologies (speech synthesizers, Braille screens, etc.), as well as the possibility of using "hotkeys", blind students can quickly master many MCT programs[46]. The main modules of IT training for visually impaired students consist of the following thematic blocks: introduction to special equipment installed in the classroom, its main characteristics and possibilities of practical application; computer device and operating system, computer capabilities for a person with visual impairment; working with a computer keyboard, the location of the keys and the main functions of the keyboard; basic principles of working with screen access programs; principles of operation of the operating system Red "Windows"; what are "intervention keys" and how they can help in work; work with files and folders using keyboard shortcuts; work with data (information), data transfer to various removable media (flash disks, portable hard disks and CDs); work with dialogues and pop-up system messages, work in popular text editors, scanning books, photos, documents; work with electronic libraries, work with sound, music, audio files; work with E-mail and popular site searches, dating; work on social networks, etc.[47]. The influence of the iPad on the achievements of blind students in algebra and solving mathematical problems was researched. Students learned algebraic subjects, such as drawing and paragraphs, using an iPad. The results showed that the application of the device is easier and motivating for blind students to learn[48]. Although digitally enhanced learning tools can provide valuable access to information as well as personalized support, people with specific accessibility needs, such as severe visual impairment, can often be excluded from their use. This requires technology developers to build a more comprehensive design and to offer learning experiences that can be used by students with mixed visual abilities. There is also room to integrate a DIY approach and provide educators-rehabilitators with the opportunity to design their own low-cost educational tools, tailored to pedagogical goals and the various visual and cognitive abilities of their students[49].

New pedagogical relationships require learning new technologies and considering innovative approaches to teaching and assessment, redesigning pedagogical practice in an effort to involve blind and partially sighted students in the educational process[50].

There are many problems with the teaching and assessment of students with disabilities in higher education, especially in technical sciences, where knowledge is represented mainly by structural information such as: mathematical formulas, graphs, etc. The development of an e-learning platform for distance education solves this problem only in part due to the lack of accessibility for the blind[51]. Today, the presence of children with special needs in regular education is common.

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What they need to have enabled is the use of state-of-the-art information technology so that they can participate in the teaching process in the easiest possible way[52]. In the last decade, many studies have shown that learning based on digital games is emerging as an effective way to combine the process of teaching and learning with the attractiveness of digital technologies because they are dynamic. However, the vast majority of these digital resources, such as educational games, are still basically visual, preventing access for people with visual impairments[53].

A study was conducted aimed at designing, developing and testing the effectiveness of teaching an online-based English vocabulary exercise program, developed for visually impaired high school students. Quantitative results revealed that students showed significant progress on vocabulary tests and maintained their achievements after the research[54]. Graphic content is an important resource for transmitting information and its use is fundamental in the teaching process. Visually impaired people do not have easy access to this resource due to their impairments. They mainly use tactile graphics to explore visual content. It is necessary to develop tools for tablets intended for visually impaired people in the interpretation of tactile graphics. After studying the different research strategies of tactile graphics adopted by visually impaired people, an application that prefers a wealth of multimodal interactions should be used[55]. Modern society requires a new level of development of the basics of special education for special, integrated, combined and inclusive education and upbringing[56].

The integration of visually impaired students into the educational environment is one of the main challenges. This requires curricula that fit into such a category and overcome barriers to their learning[57]. Features of the methodology and a new approach in teaching visually impaired people with special educational needs are offered, including completely blind people on the example of foreign language teaching. This technique is innovative and can be used for didactic purposes in teaching any topic with people with visual impairments, of all ages, including completely blind people in terms of inclusive education.

The results of the experimental research are based on the testing of a dedicated computer program "Communicative English for students with visual impairments", which has been successfully implemented and can be used in all educational institutions[58]. Universal Learning Design is a framework for a teaching and learning transaction that conceptualizes knowledge through a focus on student accessibility, collaboration, and community [59].

ADJUSTMENT OF METHODS TO CONTINGENT CHANGES

The COVID-19 pandemic has imposed dramatic changes in day-to-day functioning, but especially in children with developmental disabilities. The Robert Hollman Foundation decided not to interrupt the service for all visually impaired children and launched a remote support project. It was an online process that covered all aspects of child support and included audio-video calls, videos and tailor-made multisensory material created specifically for each child.[60].

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The need to improve methods and techniques in the educational process is necessary in order to achieve maximum efficiency and create the least restrictive environment for the education of blind and partially sighted students. Unforeseen (contingent) situations, such as the current pandemic, are just one of the indicators that the introduction of computer technology in the process of educational integration is not just a desire but a necessary need.

CONCLUSION

In the process of educational integration, it is necessary to include a whole team of experts who will adapt modern approaches and methods for students with visual impairments.

Most of the innovative solutions and modern methods used in the modern methodological approach with students with intact vision are not available to students who are blind and visually impaired.

Finding new solutions and adapting informatics should be available to every student with visual impairment in accordance with individual characteristics and remaining abilities in order to fully integrate into the school and social system. Some unforeseen situations, such as the pandemic, have forced everyone, even students with disabilities, to adapt to the situation, and modern approaches have shown their true meaning and complete value. Once the use of modern technology was a choice, now there is a need for the most basic things and full involvement in the educational system.

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RESEARCH IN EDUCATION AND REHABILITATION

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