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IMPACT OF THERAPEUTIC HORTICULTURE ON PSYCHOSOCIAL ASPECTS OF FUNCTIONING IN ADULTS WITH INTELLECTUAL DISABILITY

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Abstract

Therapeutic horticulture (TH) is a non-invasive support treatment in which participants enhance their well-being through active or passive involvement in plant and plant-related activities. Positive effects of TH are mainly noticed in children and youth with intellectual disability (ID), while the effects of TH on adults with ID have not been extensively studied. The aim of this study was to determine the impacts of TH on psycho-social aspects of functioning in adults with moderate ID in institutional settings. The sample included 68 adults with moderate ID of both genders. The participants were divided into an experimental group (N=33), that participated in a designed ten-week program TH, and a control group (N=35). The Social Skills Rating System – SSRS (Gresham & Eliot, 1990) was used to assess social skills and behavioral problems and Self-Efficacy for Gardening Scale was designed for assessing self-efficacy. We compared the results before and after the intervention. The obtained results showed a significant decrease in different forms of problem behaviors, and an improvement of social skills and self-efficacy in experimental group. Results of this study provide the empirical proof for positive effects of TH on the improvement of the psychosocial well-being of adults with moderate ID in institutional settings. However, further research is necessary.

Key words: moderate intellectual disability, adults, therapeutic horticulture, institutional settings

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УТИЦАЈ ТЕРАПЕУТСКЕ ХОРТИКУЛТУРЕ НА ПСИХОСОЦИЈАЛНО ФУНКЦИОНИСАЊЕ ОДРАСЛИХ ОСОБА СА ИНТЕЛЕКТУАЛНОМ ОМЕТЕНОШЋУ

Апстракт

Терапеутска хортикултура (ТХ) је неинванзивни супортивни третман путем којег учесници унапређују своје благостање активним или пасивним укључивањем у активностима са биљкама. Позитивни ефекти ТХ се углавном приписују деци и младима са интелектуалном ометеношћу (ИО), док ефекти ТХ на одрасле особе са ИО нису детаљно проучавани. Циљ овог истраживања је утврђивање утицаја ТХ на психосоцијалне аспекте функционисања одраслих особа са умереном ИО у институционалном окружењу. Узорак је обухватио 68 одраслих особа са умереном ИО, оба пола. Учесници су били подељени у експерименталну групу (N=33) која је учествовала у осмишљеном десетонедељном програму ТХ и контролну групу (N=35). За процену социјалних вештина и бихевиоралних проблема коришћен је Систем за процену социјалних вештина (The Social Skills Rating System – SSRS, Gresham & Elliot, 1990), док је за процену самоефикасности примењена креирана Скала за процену самоефикасности у хортикултури. Извршено је поређење резултата пре и након интервенције. Добијени резултати су показали значајно смањење различитих облика проблематичног понашања и побољшање социјалних вештина и самоефикасности код испитаника експерименталне групе. Резултати ове студије пружају емпиријски доказ позитивних ефеката ТХ на побољшање психосоцијалног благостања одраслих особа са умереном ИО у институционалном окружењу. Међутим, потребна су даља истраживања.

Кључне речи: умерена интелектуална ометеност, одрасле особе, терапеутска хортикултура, институционално окружење

INTRODUCTION

The intentional use of plants and gardens for therapeutic outcomes is not a new idea. Even ancient Egyptians wrote about bringing plants indoors, but it was only in 1789 that Dr. Benjamin Rush introduced the use of horticulture activities as a treatment method in the medical field (Demers, 2013). The greatest expansion of horticulture activities happened after World War II (Detweiler et al., 2010). Today, plants, their products, and natural environment are used for therapeutic purposes in a wide range of purposeful gardening activities. Therapeutic horticulture (TH) is a non-invasive support treatment in which participants enhance their well-being through active or passive involvement in plant and plant-related activities (American Horticultural Therapy Association, 2017). The activities are facilitated by a registered horticultural therapist or other professionals with training in the use of horticulture and aspects of health and social care (Sempik, Rickhuss, & Beeston, 2014). TH programs are found in a wide variety of healthcare, rehabilitative and residential settings. However, we still lack the knowledge regarding its efficacy in what we might term “institutional settings” (Christie, Thomson, Miller, &

Cole, 2016, p. 4), such as homes for children, youth, and adults with disabilities, homes for elderly persons, psychiatric institutions, prisons, etc.

The population of people who still live in institutional settings in most Eastern European countries, as well as in some developed countries such as the Netherlands, Ireland, Germany, Spain and Greece (Kozma, Mansell, & Beadle-Brown, 2009; Tatlow-Golden et al., 2014) are people with moderate, severe and profound intellectual disabilities (ID). In the Republic of Serbia, most of these people also live in typical institutions with highly regulated restrictive environments (Brkić, Jugović, & Glumbić, 2014; Petrović, Stojisavljević, & Lukuć, 2016). A poor and diminished social experience in institutions does not stimulate the development of their social skills. As a result, these individuals have an external locus of control, low self-esteem and self-efficacy, externalizing and internalizing behavior problems (Tyrer et al., 2006). Apart from that, the aging process itself causes physical disorders, cognitive decline and mental health problems (for a review, see Alcedo, Fontanil, Solís, Pedrosa & Aguado, 2017).

Bearing in mind that many emotional and behavioral problems may pose a risk to the health or safety of a person and/or those in his/her immediate environment (McVilly, 2002), medical treatment was prevalent in institutions, which resulted in side effects (O'Dwyer et al., 2017). In recent years, the positive influence of various alternative and complementary therapies applied in treating people with ID, including the application of various horticultural interventions, is being mentioned more frequently. Kim and colleagues (Kim, Park, Song, & Son, 2012) report findings that indicate a positive influence on the improvements in attention and motivation in children with ID, sociality and social relationships, self-concept and linguistic communication skills. It was also found that purposeful gardening activities reduce inappropriate behavior and stress and strengthen self-confidence and self-efficacy in children with ID. Positive effects of various programs using plants and gardens mainly refer to children and youth with ID, while their effects on adults with ID have not been extensively studied (Lai, Ho, Kwan, Fung, & Mak, 2017).

Bearing in mind the lack of empirical findings on the effects of horticultural activities in adults with ID, specifically in people with moderate intellectual disability, the research was conducted with the aim to determine the impact of TH on psychosocial aspects of functioning in institutional settings.

METHODS

Participants and Location

The research was conducted in a large social protection institution in Belgrade, which, in accordance with the Law on Social Protection of the Republic of Serbia, residentially accommodates around 300 people

with intellectual disabilities. It is located in the suburbs of Belgrade, covering 18 hectares of land in a pleasant green environment. Before the research process began, the researchers explained the purpose of the research to the management and professional team members of the Institution. The whole research study was conducted in accordance with the ethical standards Declaration of Helsinki.

First, sociodemographic data was collected and the sample was selected. Data on gender, age and the level of intellectual functioning were taken from medical-psychological records. Persons with sensory and physical disabilities and allergies were excluded from the sample. The presence of moderate intellectual disability was documented in 80 participants. All of the participants were diagnosed in childhood, and the clinical picture of moderate intellectual disability was confirmed for each participant by a psychiatrist before the study began. After basic sociodemographic data was collected, the participants were randomly divided into two groups, each including 40 participants. Both groups were acquainted with the plan of activities in detail, and each participant could state whether or not they wanted to participate in the research. They were assured that there would be no penalties, regardless of when they withdrew from the study. At that point, 12 participants withdrew. They were also informed that they could withdraw from the research at any time, which did not happen. Finally, the sample included 68 participants, 21 to 47 years of age (M=30.10; SD=7.47). The first, experimental group (EG), included 33 (48.5%) participants, while the control group (CG) included 35 (51.5%) participants. There were 17 (51.5%) male and 16 (48.5%) female participants in the EG, while the CG consisted of 20 (57.1%) male and 15 (42.9%) female participants. Gender and age of the participants were uniform ($\chi 2=0.499$; $p=.480$).

Procedure

With regard to the fact that TH is a relatively new field in empirical research, and that it is still unexplored in Serbia, as well as the fact that there are no registered horticultural therapists, our study was conducted in collaboration with the Faculty of Forestry - Department of Landscape Architecture and Horticulture and the Faculty of Special Education and Rehabilitation – Department of Special Education and Rehabilitation of People with Mental Difficulties. The applied TH program was jointly created by the authors of the study, two landscape architects (LA1 and LA2), and three special educators (SER1, SER2 and SER3) before the beginning of the study. While designing the program, basic principles of working with persons with moderate ID were respected, with special emphasis on safety measures (e.g. eliminating toxic plants, sharp objects, etc.). The program includes seven areas, each consisting of four types of activities: (1) Maintenance of planters (hand-weeding; tool-

weeding; collecting waste with hands; watering with cans); (2) Sowing (making sowing rows/holes; separation of seeds; sowing; putting dirt in seed holes with hands); (3) Creating support (transferring material; stabbing sticks; stabbing pickets; dragging rope); (4) Care and maintenance of garden beds (tool-weeding; hand-weeding; collecting and transporting waste with wheels; watering with a hose); (5) Planting (leveling the soil with a rake; digging planting holes; planting in garden beds; putting dirt over plants with tools); (6) Replanting (digging the seedlings up with tools; placing them in crates; transferring them to planting site; planting in planters) and (7) Harvest (harvesting vegetables; picking fruit from trees; washing fruit/vegetables, preparing (removing leaves) and sorting).

The total research period was five months, from March to July 2018, and it included three phases. In the first phase, the participants were assessed (pre-test) by special educators, while landscape architects were in charge of preparing the materials, tools and equipment for TH, as well as setting up a provisional fence in the Institution's courtyard around the area designated for the application of TH program. During the second phase, TH was conducted over 10 consecutive weeks in 90-minute sessions, three times a week. The intervention program included the total of 30 sessions. Activities within Sowing, Planting and Harvesting lasted for two weeks each due to heavy workload, while the other activities lasted one week each. TH program in the experimental group was carried out by landscape architects (LA1 and LA2) with support from two special educators (SER1 and SER2). In order to avoid "special treatment" the control group engaged in free outdoor recreational activities (ball games, walking, running) in the Institution courtyard, in the presence of two special educators (one researcher, SER3 and one educator/therapist from the Institution). Due to living in institutional settings, both groups of participants had the same daily routine, from waking up, through daily activities, to going to bed. Thus, the impact of various additional interventions or treatments was eliminated. The third research phase was performed immediately after the completion of the TH program, when the post-test was conducted.

Instruments

The Social Skills Rating System – SSRS (Gresham & Elliot, 1990), was used to assess social skills and behavioral problems. It includes forms for different sources of assessment. In our paper, we used the form for adults. Therapists/educators, special educators by profession, were the informants. Since they had known the participants for at least two years, they used a three-point scale (1 – never, 3 – sometimes, and 5 – always) to asses the frequency of behaviors on two instrument scales: a) *Social Skills Scale* which measures positive social behaviors (30 items, 3x10) and consists of the following subscales, each including 10 items: *Coop-*

eration (behaviors such as helping others, sharing things and respecting rules and guidelines), *Assertion* (behaviors such as asking others for information or responding to the actions of others), and *Self-Control* (behaviors that are manifested in conflict situations, such as responding appropriately to provocation, or in situations where there is no conflict but where it is necessary to compromise attitudes) and b) *Problem Behaviors Scale* which measures behaviors that can interfere with the development of positive social skills (18 items, 3x6). It assesses behavior in three subscales: *Externalizing Problems* (e.g. aggressive acts and poor temper control), *Internalizing Problems* (e.g. sadness and anxiety) and *Hyperactivity* (e.g. fidgeting and impulsive acts). Internal consistency values before and after TH intervention were very reliable (Table 1).

Table 1. Cronbach's α coefficients for SSRS, before and after TH

The Social Skills Rating System	EG (N=33)		CG (N=35)	
	pre-test	post-test	pre-test	post-test
Social Skills Scale	.955	.928	.972	.969
Cooperation	.949	.889	.950	.937
Assertion	.959	.928	.963	.962
Self-Control	.925	.908	.961	.962
Problem Behaviors Scale	.911	.856	.909	.905
Externalizing Problems	.910	.728	.911	.890
Internalizing Problems	.882	.720	.842	.837
Hyperactivity	.890	.866	.870	.861

Starting from the fact that self-efficacy refers to specific, situational assessment of one's own efficacy, with the precise prediction of human behavior being possible only by measures of self-efficacy, which are precisely adapted and narrowly limited to the area of the assessed psychic functioning (Bandura, 1977), the authors designed *Self-Efficacy for Gardening Scale* for the purpose of this research. The instrument includes twelve items (I can: 1) isolate and count the seeds, 2) sow the seeds, 3) pull out weeds by hand, 4) collect the weeds and transfer them to the waste yard, 5) stab plant support into the ground, 6) tie a rope to a picket, 7) water a plant, 8) pull out/remove weeds with a hoe 9) flatten the ground with rakes, 10) plant a plant, 11) remove the seedling from the ground and 12) move the seedling into a crate). The researchers (SER 1,2,3) read the items to participants individually. In the pre-test, each item was additionally explained by visual support in the form of a short video clip on a laptop. In the post-test, the researchers provided additional verbal explanations as needed, which were uniform for all participants and provided in equally detailed scope. Since the CG did not take part in plant-related activities, the participants from this group took care of the green area within the Institution for 15-30 minutes once a week (e.g. pull-

ing out weeds, watering plants, collecting leaves), in order to apply the designed self-efficacy instrument. The answers for this instrument were distributed from 1 (completely disagree) to 5 (completely agree). The theoretical range of responses was from 12 to 60 maximum. The result of Cronbach's α coefficient for testing internal consistency before TH program was α=.869, and α=.816 after the program for the experimental group, while it was α=.897 and α=.905 for the control group.

Statistical Analysis

The data was analyzed using descriptive statistics (means, standard deviations, frequency) and bivariate statistical methods (t-test, Chi-square test). Cronbach's alpha was used to investigate internal consistency of questionnaire (sub)scales. In order to test the treatment impact, we used repeated measurements, with the group (EG – CG) as the between subject factor and testing (pre-post) as the within subject factor. The significant threshold was 0.05 ($p < .05$).

RESULTS

Before the intervention, there were no statistically significant differences between EG and CG in the obtained results of the applied subscales of *The Social Skills Rating System* in adults with moderate ID in institutional settings. The differences were determined after the intervention in all subscales except in the Assertion scale (Table 2).

Gender analysis was conducted in order to obtain detailed information on the impact of TH on EG (Table 3). The obtained data indicate that TH had equal impact on participants of both genders within *Cooperation, Externalizing Problems* and *Hyperactivity* subscales. Also, the effect was greater for male participants in all subscales.

There was no statistically significant difference in the result obtained from the Self-efficacy scale before the intervention (Table 4). In EG participants, a statistically significant difference was determined in the level of Self-efficacy before and after the intervention, while no such difference was determined in CG participants.

Further analysis tested the difference of TH impact on Self-efficacy with regard to gender within EG, and no statistically significant differences were determined (F=.004; p=.952), i.e. it was determined that TH had equal impact on participants of both genders.

Table 2. Comparison of the results for SSRS between EG-CG

SSS		EG (N=33)		CG (N=35)		t	p
		Mean	SD	Mean	SD		
CO	Pre-test	43.48	8.03	41.74	8.24	.882	.381
	Post-test	46.90	4.67	42.37	8.06	2.782	.006
		F=22.970; p=.000; η^2=.426		F=4.993; p=.032; η^2=.128			
AS	Pre-test	29.69	11.42	32.85	12.13	-1.104	.273
	Post-test	37.69	9.08	34.37	12.31	1.272	.208
		F=111.15; p=.000; η^2=.776		F=16.365; p=.000; η^2=.325			
SC	Pre-test	34.38	9.14	34.45	10.60	.012	.991
	Post-test	41.45	7.21	35.65	10.64	2.643	.010
		F=76.452; p=.000; η^2=.705		F=6.811; p=.013; η^2=.167			
Σ	Pre-test	107.66	23.18	109.05	27.11	-0.217	.801
	Post-test	127.75	17.25	112.40	26.98	2.797	.007
		F=86.936; p=.000; η^2=.737		F=21.383; p=.000; η^2=.386			
PBS		EG (N=33)		CG (N=35)		t	p
		Mean	SD	Mean	SD		
EP	Pre-test	10.69	4.85	10.94	4.83	-.209	.835
	Post-test	8.27	2.29	10.05	3.95	-2.291	.026
		F=19.761; p=.000; η^2=.382		F=6.690; p=.014; η^2=.164			
IP	Pre-test	12.30	5.30	12.31	4.61	-.009	.835
	Post-test	9.00	2.77	11.88	4.64	-3.131	.003
		F=33.397; p=.000; η^2=.511		F=1.452; p=.237; η^2=.041			
HA	Pre-test	9.90	5.02	10.65	4.41	-0.653	.516
	Post-test	8.18	3.37	10.68	4.28	-2.636	.010
		F=13.666; p=.001; η^2=.299		F=.000; p=1.000; η^2=.000			
Σ	Pre-test	32.90	11.88	33.91	11.12	-.360	.720
	Post-test	25.45	6.59	32.60	9.97	-3.462	.001
		F=36.626; p=.000; η^2=.534		F=3.098; p=.087; η^2=.084			

Note: SSS-Social Skills Scale; CO-Cooperation; AS-Assertion; SC-Self-Control; PBS-Problem Behaviors Scale; EP-Externalizing Problems; IP- Internalizing Problems; HA-Hyperactivity

Table 3. The impact of TH with regard to gender

SSS		Male (N=17)		Female (N=16)		F	p	η^2
		Mean	SD	Mean	SD			
CO	Pre-test	40.82	8.56	46.06	6.69	2.580	.119	.079
	Post-test	46.11	4.87	47.80	4.43			
		F=21.564; p=.000; η^2=.574		F=5.587; p=.033; η^2=.285				
AS	Pre-test	25.52	10.64	34.12	10.81	11.651	.002	.273
	Post-test	35.70	9.29	39.81	8.64			
		F=101.154; p=.000; η^2=.863		F=47.501; p=.000;η^2=.760				
SC	Pre-test	31.94	7.85	37.18	9.88	18.567	.000	.375
	Post-test	41.58	6.37	41.31	8.21			
		F=91.906; p=.000; η^2=.851		F=28.810; p=.000; η^2=.658				
Σ	Pre-test	98.29	20.84	117.93	22.58	5.756	.023	.161
	Post-test	123.41	15.72	126.18	16.39			
		F=99.439; p=.000; η^2=.861		F=16.559; p=.001;η^2=.542				
PBS		Male (N=17)		Female (N=16)		F	p	η^2
		Mean	SD	Mean	SD			
EP	Pre-test	11.82	5.65	9.50	3.63	2.860	.101	.084
	Post-test	8.85	2.74	8.00	1.75			
		F=13.445; p=.002; η^2=.457		F=7.941; p=.001; η^2=.346				
IP	Pre-test	14.41	5.56	10.06	4.05	4.426	.044	.125
	Post-test	10.00	3.24	7.93	1.69			
		F=32.258; p=.000; η^2=.668		F=7.868; p=.013; η^2=.344				
HA	Pre-test	11.82	5.60	7.81	3.38	2.378	.133	.071
	Post-test	9.41	4.1	6.87	1.58			
		F=12.349; p=.002; η^2=.436		F=2.791; p=.116; η^2=.157				
Σ	Pre-test	38.05	12.67	27.43	8.25	5.695	.023	155
	Post-test	27.94	7.72	22.81	3.81			
		F=30.538; p=.000; η^2=.656		F=11.621; p=.004;η^2=.437				

Note: SSS-Social Skills Scale; CO-Cooperation; AS-Assertion; SC-Self-Control; PBS-Problem Behaviors Scale; EP-Externalizing Problems; IP- Internalizing Problems; HA-Hyperactivity

Table 4. Comparative results for Self-efficacy for Gardening Scale

	EG (N=33)		CG (N=35)			
	Mean	SD	Mean	SD	t	p
Pre-test	45.24	10.42	40.42	10.82	1.866	.066
Post-test	55.00	6.64	40.54	11.25	6.388	.000
	F=70.110; p=.000; η^2=.687		F=.126; p=.724; η^2=.004			

DISCUSSION

People with ID age similarly to people without ID, however, they are predisposed to a higher prevalence of pre-existing and age-related health issues, such as cognitive decline, diminished adaptive abilities, affective and anxiety disorders (Myrbakk & von Tetzchner, 2008; Glaesser, & Perkins, 2013). Preventive effects of horticultural interventions on psychological and behavioral aging symptoms were identified in typical elderly people (Kamioka, et al., 2014; Lin & Yen, 2018), while the positive effects of horticulture are especially significant for elderly people in long-term care facilities (Nicholas, Giang, & Yap, 2019).

Literature review determined that behavioral problems in people with ID often coincide with functional decline and that they are most pronounced in people living in institutional settings (McClintock, Hall, & Oliver, 2003; Tamaš, 2016). Since the participants from our sample are in this category, the results obtained in *Problem Behavior Scale* after the implementation of TH program were encouraging. A significant statistical difference for this scale was determined in EG, while it was not determined in the control group. The influence of TH was determined in all subscales (*Externalizing Problems, Internalizing Problems and Hyperactivity*) with stronger effect on male participants, in whom various forms of behavior problems occur more frequently (McClintock et al., 2003; Tyrer et al., 2006). The designed TH program influenced the reduction of externalizing behavior problems (rage attacks, quarrel and impulsive reactions) in EG (38%). That is important information because there is a broad consensus that behavioral problems create significant challenges for support providers (Brown, Brown, & Dibiasio, 2013) especially in institutional settings. The results obtained after recreational activities explain 16% of the variance and suggest the possibility of applying other types of outdoor treatments, which may focus on modifying externalizing behavioral problems in adults with moderate ID. On the other hand, the results of the control group do not show statistically significant differences in *Hyperactivity* and *Internalizing Problems* subscales, which is why we can conclude that TH is a more effective form of treatment than recreational activities in these behaviors. Expressing and sublimating negative behaviors through creative destructive actions such as cutting, breaking, and crumbling material, etc. for various horticultural activities may have the potential to improve attention and hyperactivity (Kim et al., 2012, p. 322). Apart from that, the implemented TH program showed a significant effect on reducing internalizing behavioral problems (sadness, depression, anxiety, withdrawal) in EG participants. A positive influence of various horticultural interventions on certain manifestations of internalizing disorders, primarily depression and anxiety, was confirmed in both typical population (Beyer et al., 2014; Gonzalez, Hartig, Patil, Martinsen, & Kirkevold,

2011; Kamioka et al., 2014; Nicholas et al., 2019), and in persons with disabilities (Wilson & Christensen, 2011).

The results of *Social Skills Scale* obtained before the intervention showed that there were no differences between the research groups, and that differences were determined after the program was implemented. A positive effect of TH (74%) was determined for *Social Skills Scale* (Table 2) which is in accordance with the results of South Korean researchers (Kim et al., 2012; Kim, Cho, Park, Joo, & Son, 2008). Therefore, we believe that a professionally designed outdoor program with plants can be applied as a complementary treatment to existing occupational or recreational therapies within an active and quality aging program in an institutional setting.

The literature states that activities in natural environments improve trust, increase the number of friends and group cohesion in people with disabilities (Chapman, 2000; Mustapa, Maliki, & Hamzah, 2015), which was confirmed by our results for *Social Skills Scale* in both groups of participants. The control group participated in outdoor recreational activities, which improve social skills and experience in people with intellectual disability (McGuire & McDonnell, 2008), but their influence on our participants was smaller than the influence of TH. TH is also an outdoor program, but all the activities within it were group activities requiring mutual cooperation (joint separation of seeds, handing the tools, transferring materials, etc.) which allowed stronger interaction among the participants. The average values were high in *Cooperation* subscale, which is equally effective for participants of both genders. Similar results were obtained by authors of a study conducted during a 90-day program of social and therapeutic horticulture in a heterogeneous group of vulnerable participants, predominantly with a learning disability (Sempik et al., 2014). The influence of TH was also significant in *Self-Control* subscale, which is a complex and problematic area in persons with ID. Since the effects were strong, especially in male participants, we believe that, in institutional settings, this form of treatment can be effective for the development of positive behavior and mood, i.e. that it can contribute to better everyday functioning of a user.

It is interesting that statistically significant differences between EG and CG were not determined after the intervention with regard to the *Assertion* subscale. We assume that the entire context of the development and functioning of persons with moderate ID in institutional settings does not contribute to the development and manifestation of this form of behavior, because they are not exposed to different situations (e.g. demanding their rights, expressing wishes, rejecting unjustified demands, etc.) from which this dimension of social skills would develop. After the intervention, the results showed that the influence of recreational activities explained about 33% of variance, while 78% of variance can be attributed to

the effect of the TH program, which was stronger in male participants. In addition to following working instructions, participating in TH enabled the participants to choose materials and equipment, talk about program activities, thus improving their sense of achievement and self-confidence which are thought to improve their assertiveness (Kim et al., 2012).

Big influence of TH on self-efficacy of EG participants, no difference to gender, indicates the improvement in the beliefs of persons with moderate ID about their own abilities to organize and perform certain actions necessary to achieve the desired goal. Positive effects of a twelve-week therapeutic horticulture program on social self-efficacy in adults with ID were determined in research conducted in Hong Kong (Lai et al., 2017). These authors stated that the intervention was very pleasant for the participants and that it promoted the competency domain within the assessed Quality of Life construct. This certainly confirms the claim that performance in one area tends to generalize to other areas or activities (Bandura, 1986). However, due to the fact that very little research has been conducted on this topic, we will observe our results only with regard to participants' functioning in gardening activities, and not as any other aspect of self-efficacy, which can be the subject of future research studies.

According to our research, the psychosocial benefits of TH have the potential to be quite significant in persons with moderate ID in institutional settings. Our key findings are the results obtained for all subscales within *The Social Skills Rating System*. TH had a significant influence on the reduction of various forms of problematic behavior and the improvement of social skills and self-efficacy.

Favorable findings of TH application can have a positive impact, not only on better quality of life of these individuals in the institution, but also on the staff, which generally implies a more relaxed atmosphere within the institution. Based on the obtained results on the efficacy of TH, we believe that it can easily be included as a component of preventive health care programs for people with ID in institutional settings.

Since this is the first study that applied horticultural activities in working with persons with moderate ID in Republic of Serbia, there are certain limitations. The first limitations relate to the AB design study and the fact that researchers could not control every potentially intervening variable. The second refers to the fact that the study was not blind to the researchers. Also, the effects of the intervention were monitored immediately after the completion of TH. The recommendation to future researchers is to evaluate long-term effects after three or six months. Since the research included adults with moderate ID in institutional settings, the results cannot be generalized to other persons with ID who live in different environments, who are younger, or who have a higher or lower level of intellectual functioning.

By summing up the obtained results on the effects of applying TH program as a complementary treatment of people with moderate ID, we can conclude that TH provides empirical support for improving their psychosocial functioning in institutional settings, especially in countries in which this is the only type of housing. With regard to the potentials of the TH program, further research is needed to explore the processes of such experiences, share evidence of the effectiveness of horticultural interventions and promote it.

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УТИЦАЈ ТЕРАПЕУТСКЕ ХОРТИКУЛТУРЕ НА ПСИХОСОЦИЈАЛНО ФУНКЦИОНИСАЊЕ ОДРАСЛИХ ОСОБА СА ИНТЕЛЕКТУАЛНОМ ОМЕТЕНОШЋУ

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Резиме

Терапеутска хортикултура (ТХ) је неинванзивни супортивни третман путем којег се учесници активно или пасивно укључују у различите активности са биљкама ради унапређења свог благостања. Ово истраживање има за циљ да утврди утицај ТХ на психосоцијалне аспекте функционисања одраслих особа са интелектуалном ометеношћу у институционалном смештају. С обзиром да је ТХ релативно нова емпиријска област, као и чињенице да у Републици Србији не постоји регистровани хортикултурни терапеут, примењени програм ТХ су заједно креирали аутори студије, два пејзажна архитекта и три дефектолога. Програм ТХ обухвата седам области, од којих се свака састоји од четири врста хортикултурних активности. Реализован је током 10 континуираних недеља (3 пута недељно у трајању од 90 минута). Узорком је обухваћено 68 испитаника са уме-

реном интелектуалном ометеношћу, старости од 21 до 47 година, подељених у две групе. Прва, експериментална група укључује 33 учесника (17 мушких и 16 женских), док контролна група има 35 учесника (20 мушких и 15 женских). За процену социјалних вештина и бихевиоралних проблема коришћен је Систем за процену социјалних вештина (The Social Skills Rating System – SSRS, Gresham & Elliot, 1990), док је процена самоефикасности извршена путем дизајниране Скале за процену самоефикасности у хортикултури. Пре почетка интервенције извршене су процене испитаника и нису утврђене статистички значајне разлике између експерименталне и контролне групе. Након примене програма ТХ, код испитаника експерименталне групе утврђено је значајно смањење различитих облика интернализованих и екстернализованих проблема у понашању, као и унапређење социјалних вештина и самоефикасности. Позитиван утицај терапеутске хорикултуре има већи утицај на испитанике мушког пола. Добијени резултати пружају иницијалну емпиријску подршку у примени овог комплементарног третмана код особа са умереном ИО у циљу побољшања њиховог психосоцијалног функционисања у институционалним окружењима, посебно у земљама у којима је ово најчешћи тип становања.