VITICULTURE AS THE OPTIONAL PHYSICAL ACTIVITY FOR ELDERLY

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ABSTRACT

Purpose: Adequate physical activity (PA) of elderly is currently an intensively discussed topic. In urban agglomerations, physical activity for this population group is often implemented as a variety of intervention programs. The question is whether some of the normal work activities in the countryside can provide sufficient amount of physical activity? And whether this activity is suitable for elderly? In our study we want to verify whether viticulture can be an interesting and suitable alternative of physical activity for elderly.
Methods: Our research is designed as a case study based on one-year observation. Subject of the observation was 65 years old man living in South Moravia region (CZE). Observation was realized from spring to fall 2017. Descriptive statistical methods were used for quantitative analysis and energy expenditure during work activities was set up according to the work of (Ainsworth et al., 1993) and (Novotný, 2003)
Results: During one year (March – October), the observed person made 36 visits to the vineyard. Mean of the visit duration was almost 3.5 hours and mean energy expenditure was 4663 kJ (1114 kcal) per visit. Within one year he has realized 20 different types of operations based of various abilities: endurance, strength-endurance, flexibility and balance. Some of the operations also needed fine motor skills.
Conclusions: Our study shows that viticulture could be an interesting activity for elderly. It brings a sufficient amount of PA, which is also quite diverse (from strength to fine motor skills). Moreover, the material results of this activity serve as a suitable motivational factor for regular implementation of vineyard care. However, the disadvantage of a given PA is its seasonal character (March – October) and the risk of overloading during long-term activity.

Keywords: Physical Activity; Hypokinesia; Elderly; Sedentary Lifestyle

Introduction

Sufficient physical activity is nowadays highlighted matter in an all-society independently on age group. Human movement insufficiency – hypokinesia is marked as the biggest problems in this field (Hendl & Dobrý, 2011). Trend of hypokinesia is sufficiently described on the local level (Frömel, Chmelík, Nykodým, & Et, 2007); (Máček & Máčková, 2013); (Matoulek, Svačina, & Lajka, 2014), (Bebcakova et al., 2015), (Zháněl, 2014) as well as on the all-European (Kahlmeier et al., 2015) or world levels (Hendl & Dobrý, 2011).

Primarily has hypokinesia and sedentary lifestyle negative consequences at medical level. Consequent health impacts resulting from insufficient physical activity have been medically diagnosed. Whether it is cardiovascular diseases (Ortega et al., 2011), metabolic disease and risk factors (Ekelund et al., 2007);(Martins, Morgan, Bloom, & Robertson, 2007) or orthopaedic diseases (Varo et al., 2003) including bone health (Sofková, Přidalová, Mitáš, & Pelclová, 2013), authors

commonly agree about the negative impact of low or insufficient physical activity on health status. This phenomenon is referred in numerous studies as a sedentary lifestyle (Etemadi et al., 2012); (Tremblay, Colley, Saunders, Healy, & Owen, 2010); (Tudor-Locke, Craig, Thyfault, & Spence, 2013). In wider spectrum of factor is hypokinesia mentioned as negative impact at the economic level where it can reduced productivity, employability, costs of health care etc.

Our study focused on the age group of elderly (age 60 +). In this age group, we can find, in addition to natural physiological changes associated with ontogeny, a lot of other risk factors. In the Czech Republic, this age is usually connected with retirement (leaving a job), which is usually connected with a change in the exercise regimen of an individual. From described reason many preventive and interventional programmes for this age group are prepared to reduce risks and negative impact of hypokinesia. Unfortunately majority of this programmes is realized only as the additional physical activity and is organized especially in cities with greater population. Question (and also aim of our study) is whether some of the normal working activities in the countryside can provide sufficient amount of physical activity and substitute the organized interventional programmes? And whether this activity could be suitable for elderly?

Some of these aspects and positive impact of gardening has described (Ainsworth et al., 1993). They recommend gardening as the Czech phenomenon for elderly to meet the lifelong demands for a healthy life. Viticulture in our study could be described as specific variant of gardening. Viticulture represents activity that is connected with cultivation of vineyard and vine production. Viticulture is typical for South Moravia region. Vineyards take the area of 174.5 km^2, and in addition to large wine farms, there are numerous small private producers whose vineyards do not have more than 500 plants. These vineyards are characteristic of a manual work without using mechanisation.

Methods

The research is designed as case was study based on a one-year observation of the respondent, supplemented with his individual working activity records. The monitored person was a 65 years old man from the small village in Znojmo region (CZE). The man was selected based on the principle of availability and he was not informed about the objectives of the study. During 2017 his working activity was monitored at the vineyard with the area of 769 m^2, where he managed 420 grape vine plants.

Descriptive statistical methods were used for quantitative analysis and energy expenditure during work activities was set up according to the work of (Ainsworth et al., 1993) and (Novotný, 2003).

The estimate of energy expenditure of a working activity was carried out by two experts independently, and consequently confronted. In the context of the taxonomy of abilities according to Měkota (Měkota & Novosad, 2005), the activities were further divided to groups according to their character: endurance, strength-endurance, dexterity, flexibility and balance and involvement of fine motor skills. Subsequently the potential health risk was evaluated.

The list of activities is described in Table 1.

Table 1 *List of activities*

activity	MET	E expenditure [kJ/hod]	health risk	type of activity	Activity realization							
					March	April	May	June	July	August	September	October
cutting of branches	3.5	1125	2	2; 4	x							
transport of branches	4	1287	0	2; 3; 4	x			x	x			
removal of protectors	3.5	1125	0	4	x							
treatment after cutting	3	963	0	4; 5	x							
binding	3.5	1125	0	2; 5	x							
spraying the vineyard	4.5	1444.5	2	1; 3; 4		x	x	x	x	x		
lawn mooving	4	1287	0	1		x	x	x	x	x		
digging	4	1287	1	1; 4		x	x	x	x	x		
digging away	5.5	1768.5	1	1; 4			x					
breaking out of branches	3.5	1125	0	2; 3; 5			x	x	x	x		
weeding	7	2250	2	1; 4			x					
watering	4.5	1444.5	2	1; 4				x			x	
threading of branches	3.5	1125	0	4; 5				x				
hacking of branches	4.5	1444.5	2	1; 3; 4					x	x		
tearing off leafs	3	963	0	2; 3; 5					x	x	x	
guarding	3	963	0	2						x	x	
grape harvest - cutting	3.5	1125	2	2; 3; 4; 5							x	
manuring	4	1287	0	2; 3							x	
grass raking	4	1287	2	1; 4	x							
plowing	8	2574	2	1; 3; 4								x

Legend:

HEALTH RISK: 0 – minimum risk; 1 – high risk, imbalance; 2 – moderate, possible risk after log overload

TYPE OF ACTIVITY: 1 – strength-endurance; 2 – endurance; 3 – dexterity; 4 – flexibility and balance; 5 – fine motor skills

Results

All the results are generated regarding to basal metabolism of the respondent – 8,712 kJ (2,082 kcal). During the season 2017 the observed person has visited the vineyard 36 times in total. His visits were spread over the period of March – October. The month with highest number of visits was May (10 visits). In total, the senior worked for 121.5 hours in the vineyard and on average, he spent there almost three and half working hours per visit. On average, the respondent performed during one visit work with mean energy expenditure 4663 kJ (1114 kcal) per visit.

Duration of the visits was very different. The shortest visits wasn't longer than one hour and on the other side the longest time the respondent spent in the vineyard was 12 hours. May was the month with the highest number of visits. But the duration of the visits was shorter during this month and also average energy expenditure per visit was the lowest (2470 Kj/visit). In August the most energy demanding works were performed. An average energy expenditure of the senior was more than 5692 kJ/visit in August, which is more than twice in comparison with May.

Table 2 *Vineyard visits during 2016*

	No. of visits	Visit duration TOTAL [hours]	Visit duration MEAN [hours]	E expenditure TOTAL [kJ]	E expenditure [kJ/visit]
January					
February					
March	5	21	4.2	26862	5372.4
April	4	16.5	4.1	19245	4811.3
May	10	25	2.5	24705	2470.5
June	5	13.5	2.7	26590	5318.0
July	4	11	2.8	15791	3947.8
August	5	23	4.6	28462	5692.4
September	2	10	5.0	10968	5484.0
October	1	1.5	1.5	4356	4356
November					
December					

Within one year the senior has realized 20 different types of operations based of various abilities. Abilities with the highest representation were: dexterity (22), flexibility and balance (21), strength-endurance (19), endurance (18). Eleven of the visits during the season required also fine motor skills.

During the season we have also detect three periods with higher accumulation of work that could indicate potential overload and health risk. One was in the spring during cutting of the vineyard in March, second was connected with digging and digging away at the turn of April and May. The last physically demanding period was end of the August when digging and cutting operations were realized.

Discusion

Our study seeks to show that it is not absolutely necessary to only prepare specific interventional physical activities for elderly that has character of additional or artificially invented physical activity. When optimal natural working activity is utilized it could bring other positive aspect.

Primarily is no problem with motivation because activity as viticulture usually motivates with material outputs. It also often take longer time than usual interventional activities in the gym (lesson – 45 minutes, 1 hour). Other positive aspect is also variety of operations during the season and spectrum of skills and abilities that is used.

In the social level we can also mentioned that the activities associated with viticulture also represented the possibility of senior's socialisation in a social group which is culturally connected with the region.

On the other side this type of activity also has its limitation. The general problem is seasonality, because start of the season is in middle March and end at the turn of September and October. This causes a problem of searching another supplementary physical activity for the period of November – March. Other negative aspect is potential overloading during long lasting operations. Especially cutting and digging operations could bring health risk connected with imbalanced load and unilateral activity.

In global, when we compare observed results with the recommendations of WHO ("WHO | Global recommendations on physical activity for health," n.d.) on minimum PA we can mentioned that respondent meets the recommendation during almost all weeks from March till the end of August.

Conclusion

The study present research focused on physical activity of elderly and investigates whether viticulture can be used as optional activity with sufficient load and complexity of the movement. The respondent was 65 year old senior from South Moravian region (CZE). For the period March–October 2017 the senior visited the vineyard 36 times. During every visit he performed the mean working activity with energy expenditure 4663 Kj. By doing so he usually met the recommendations of WHO for the PA standards. Limitation factor for using viticulture as optimal PA for elderly could be accumulation of specific working activities that could leads to unilateral overloading of the body. Potential problem is also seasonality of viticulture.

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