

## THE LEVEL OF PERCEIVED BENEFITS AND BARRIERS RELATED TO EXERCISE IN THE FEMALE STUDENTS OF THE UNIVERSITY OF SS. CYRIL AND METHODIUS

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### **Abstract**

*Physical activity considerably influences our health and well-being, but an important part of the young population, including the students, still remains insufficiently active. The purpose of this research was to establish the perceived benefits and obstacles related to exercise in the female students of the University of Ss. Cyril and Methodius in Skopje and analyze their relation with the level of physical activity. The sample consisted of 410 female students, classified as per the level of their physical activity (low, moderate high), and the data were collected by applying the questionnaires of EBBS and IPAQ. The results demonstrated that the female students with a high level of physical activity had considerably higher results on the scale of psychological benefits, physical performances, quality of life and social interaction, compared with the students whose activity was classified as moderate or low. Besides, they demonstrated importantly lower results on the scale of barriers as are lack of time, physical efforts, exercising environment and lack of family support. No differences were observed on the sub-scale of health prevention. The ratio between the benefits and the obstacles was the most favorable with the highly active respondents. These results demonstrate that the positive perceptions regarding the benefits and the reduced impediments play the key role in the maintenance of physical activity. The results emphasize the need of interventions directed towards the raising of the awareness about the benefits of physical activity and obstacle reduction, with the purpose of promotion of healthy life habits in students.*

**Key words:** *physical activity; students; motivation, benefits; healthy behaviour*

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### **Introduction**

The positive impact of physical activity on human health has already been proven, but a considerable part of the population still remains insufficiently active (WHO, 2010). Hypokinesia causes serious health problems, which are becoming an important concern for modern medicine. Sport and recreational activities are the basic means to compensate the lack of physical activity. Therefore, many developed countries introduce strategies for promotion of physical activity, which is a priority in the reduction of healthcare costs on the long run.

As prospective professionals, students have the potential to influence new generations. Nevertheless, the level of physical activity in young people drastically diminishes in adolescence (15–19 years of age) and in early adulthood (20–25 years of age), which places students in the risk group (Wallace et al., 2000). This problem has been recognized in many European countries, with terms like „coach potato society“ in Great Britain and “homo-sedentary population” in the Balkans.

Physical activity is a complex behaviour depending on internal and external factors, including socio-cultural, psychological and environmental aspects. Understanding these factors is of key importance for the development of interventions and programs which shall encourage involvement of young people (Sallis et al., 2000). Besides all the efforts, no long-term success in encouraging physical activity in women has been achieved. In order to create efficient health strategies, it is indispensable to additionally research the motives and the challenges of women for physical activity (Zunft et al., 1999).

The benefits and barriers of exercising are essential as mediators of physical activity (Nahas, Goldfine, & Collins, 2003). Research demonstrates that women that perceive more benefits and fewer barriers are more active than those of reverse viewpoint (Vaughn, 2009). This is consistent with the health belief model

(HBM) (Janz & Becker, 1984), which emphasizes the perceived sensitivity, level of difficulty, benefits and barriers as essential to health behaviour. The probability of participation in physical activity depends on the relation between the perceived benefits and barriers. Although the obstacles are important in foreseeing health behaviour, recent research indicate the complexity of this relation (El Ansari & Phillips, 2004).

Additionally, psycho-social factors as self-efficiency, demography, age, influence of peers and level of knowledge are also important for the participation and observance of physical activities (Rosenstock, Strecher & Becker, 1988). In this context, the purpose of the present research is to identify the perceived benefits and barriers in female students of different level of physical activity.

## Work methods

### *Sample of respondents*

The research was conducted on a sample of 410 female respondents, randomly selected from several faculties within the University of Ss. Cyril and Methodius in Skopje. This type of approach provided for the representative character of the sample, as well as for data from students from diverse academic and socio-cultural backgrounds. The survey was carried out electronically, which complies with the modern methodologies of data collection, providing convenience, efficiency, and access to a larger number of respondents.

This electronic survey was structured and organised in order to meet the scientific research standards. Each respondent was clearly informed about the purpose of the research, the method of data processing, as well as with the principles of volunteering and anonymity. The respondents were treated pursuant to the ethical principles established by the Helsinki declaration, which involved the provision of consent on their participation and guaranteed the protection of their privacy and confidentiality of data.

The application of this ethical approach helped create confidence and higher level of sincerity upon the respondents' answers, which is crucial for obtaining reliable results. The sample was balanced in order to reflect the differences in the students' population of the University of Ss. Cyril and Methodius, and included respondents from both rural and urban backgrounds, and from diverse academic disciplines. This approach was the basis for general conclusions about the perceptions of female students from different backgrounds regarding the benefits and the barriers pertaining to physical activity.

### *Sample of variables*

The data were collected by the method of a structured survey questionnaire. The variables have been defined on the basis of the survey questionnaires and they are categorized into two groups:

**Exercise Benefits/Barriers Scale [EBBS]:** The perceived benefits and barriers of exercise were evaluated by means of the EBBS (Sechrist, Walker & Pender, 1987) questionnaire, which is divided into two scales: the benefit and the barriers assessment scale. The benefit assessment scale consists of 29 statements and it is divided into five sub-scales: quality of life, physical performances, psychological benefits, social interaction and health prevention. The barrier assessment scale includes 14 statements and it is divided into four subscales: exercising environment, lack of time, physical efforts and family discouragement. The identified internal consistency (alpha) on the scale of evaluation of the benefits and barriers of exercising is, in the research effected so far, between the values of 0.95 and 0.86, the level of reliability identified through the test-retest method was of 0.89 and 0.77 (Gyurcsik, et al., 2006). In this sample of respondents, the internal consistency of the scale of assessment of the benefits of exercise had the value of 0.91, whereas the level of the scale evaluating the perceived barriers to exercise was of 0.83. All the statements of the scale of assessment of the perceived benefits and barriers of exercise were evaluated according to the Likert's scoring system from 1 to 4 points, whereby 4 equaled "I entirely agree", 2 equaled "I do not agree" and 1 equaled "I entirely disagree".

**Physical Activity Questionnaire (IPAQ):** What was applied in the evaluation of the physical activity was the translated version of the short modified version of the standardized international questionnaire referring to physical activity (International Physical Activity Questionnaire - IPAQ). The questions were structured so as to enable for detailed insight into physical activity in three categories: physical activity of high intensity (Vigorous MET), physical activity with moderate intensity (Moderate MET) and light physical activity related to travelling/transportation (Walking MET). On the basis of the standard instruction and the standardized algorithm for the analysis of the overall scope and number of days for assessment of physical activity, the students were classified into the following three categories: students with high, moderate and low level of physical activity (IPAQ Research committee, 2005). Craig and

colleagues (Craig et al. 2003) researched the reliability of the questionnaire in 12 countries. The Spearman's correlation upon the test-retest method was within the scope of .46 to .96, but its most frequent value was of .80, indicating the high reliability of the questionnaire.

### Data processing methods

The relation between the perceived benefits and barriers of exercise and the level of physical activity has been established by applying the one-factor analysis of variance, by the post-hoc tests (Bonferroni - test) as well. The data are processed by the statistical package SPSS for Windows Version 26

### Results

The one-factor analysis of variance was applied with the purpose of establishing whether the values of the both scales and of the five sub-scales applied for the assessment of the perceived benefits and the four sub-scales assess the perceived barriers to exercise differ among the female respondents with different levels of physical activity (low, moderate and high).

Table 1. Differences in the scales and subscales for assessment of the perceived benefits and barriers of exercise among the respondents classified as with different level of physical activity of female respondents

	Low (1)		Moderate (2)		High (3)		F	Sig.	Post hoc pairwise comparison		
	Mean	SD	Mean	SD	Mean	SD			1-2	1-3	2-3
Quality of life	2,97	0,44	3,03	0,38	3,18	0,51	9,15	<b>0,000</b>	ns	<	<
Physical performances	3,14	0,40	3,24	0,39	3,41	0,51	15,37	<b>0,000</b>	ns	<	<
Psychological attitude	3,24	0,41	3,28	0,43	3,45	0,47	10,74	<b>0,000</b>	ns	<	<
Social interaction	2,81	0,47	2,74	0,50	3,04	0,57	17,58	<b>0,000</b>	ns	<	<
Health prevention	2,64	0,53	2,66	0,51	2,67	0,48	0,20	0,817	ns	ns	ns
All advantages	2,96	0,31	2,99	0,32	3,15	0,39	15,48	<b>0,000</b>	ns	<	<
Exercising environment	2,30	0,58	2,08	0,51	2,01	0,51	11,08	<b>0,000</b>	>	>	ns
Lack of time	2,42	0,64	2,31	0,53	2,20	0,58	5,42	<b>0,005</b>	ns	>	ns
Physical efforts	2,40	0,58	2,39	0,56	2,24	0,56	4,58	<b>0,011</b>	ns	>	>
Family discouragement	2,31	0,74	2,12	0,63	1,96	0,70	9,19	<b>0,000</b>	ns	>	ns
All barriers	2,36	0,53	2,23	0,41	2,10	0,42	12,07	<b>0,000</b>	>	>	>

The results of the analysis (table 1) indicate that the respondents classified as highly physically active give, statistically, considerably higher results in the scales and in the majority of the subscales (psychological benefit, benefits related to the improvement of physical performances, improvement of the quality of life and social interaction) for the assessment of the perceived benefits of exercise and lower results in the scales and subscales (physical effort, lack of time, exercising environment and lack of family discouragement) for the evaluation of barriers to exercising compared to the respondents who are classified as having moderate or low physical activity. No statistically important differences were identified among the respondents with different level of physical activity only in the subscale of health prevention. The value of the benefits/barriers relation in respondents with high level of physical activity amounted 1.50, the relation of benefits/barriers in respondents with moderate physical activity was of 1.34, whereas the benefits/barriers relation level in respondents of low level of physical activity was of 1.25

### Discussion

Appropriate physical activity is essential for well-being and quality of life (McAuley & Rudolph, 1995). University is a very important institution in the promotion of attitudes improving human health. It is considered that this age group is adequate as it can easily be influenced in favor of health-improving attitudes. This is also a time when individuals can establish habits, which can then persist in adulthood (Wallace et al., 2000). Therefore, university environment is a crucial opportunity to promote good physically active behavior. But, the lack of sufficient data related to the perception and the attitude of the student population towards exercising limits the designing of efficient interventions in promotion of physical activity. The purpose of this research was to establish the way in which male and female student population perceive the benefits of exercise and identify the most frequent barriers to their physical activity.

The results of the research indicate that the respondents either agree or entirely agree with the majority of statements from the scales of evaluation of the perceived benefits, whereas they either demonstrate neutral result or approach the acceptance of the majority of statements from the scale of assessment of the perceived exercise barriers. It indicates that this sample of respondents of the student population perceives a higher level of benefits from than barriers to exercise.

The research results reflect the relation between the perceived benefits and barriers and the level of physical activities, they demonstrated that the male and female respondents with a high level of physical activity achieve considerably higher results on the scales and subscales for assessment of the perceived benefits and lower results on the scales and subscales for evaluation of the perceived barriers to exercise than the respondents whose level of physical activity is moderate or low. It indicates that these students demonstrated positive attitude to exercising, which resulted in a positive health behavior (i.e exercise). These results are in compliance with the previous researches indicating that the greater the perceived benefits of exercise, the more active a person is. (El Ansari & Lovell, 2009). Besides, and as pursuant to the social and cognitive theory, individuals tend to act in ways that according to their perception, will lead to positive results, but avoid the behavior that, will lead to negative results according to their expectations (Young et al., 2014). Nevertheless, maybe it was the physical activity that influenced the students classified as highly physically active to achieve better results in the scales and subscales which were a constitutive part of the EBBS questionnaire. In other words, the relationship between them can be bi-directional. The students who exercise can have a good attitude towards physical activity, as they have felt its benefits through regular exercise. This concept of learning through experience is crucial to change in behavior.

Although the biggest part of our sample recognized the benefits of exercise, interventions should still be designed with the purpose of educating this young population about the need to establish good habits of physical activity early in life, in order to reduce their risk of chronic diseases.

This study also has some limitations. Its design was transversal, due to which it was impossible so no causality could be determined. In future, researches should be conducted in which the entire student population in Republic of Macedonia will be included, separately referring to young people living in rural, sub-rural and urban regions; the sample would include respondents from all ethnic communities, taking into consideration their socio-economic status as well. It would also be desirable to conduct such research on the other age categories as well, including children of younger age as well as adults and on some special population categories as respondents who are overweight or suffer from some heart disease. Further research will have to provide for insight in the interaction of the different factors on benefits/barriers and/or how to model the variables. Longitudinal studies can also provide proofs for the directions of causality.

## Conclusion

Statistically, female respondents with a high level of physical activity demonstrated considerably higher results on the scales and subscales referring to the perceived benefits from exercise, especially referring to psychological benefits, to the improvement of physical performances, of quality of life and social interaction compared to the moderate and low activity performance. Additionally, they demonstrated considerably lower results on the scales of perceived barriers, as are the physical efforts, the lack of time, the exercising environment and lack of family support. No differences were identified only on the subscale of health prevention, indicating that this component is not directly related to the level of physical activity. These results suggest that the positive perceptions about the benefits and the reduced barriers play the key role on the maintenance of active lifestyle.

## Reference

- Ajzen, I., & Madden, T. J. (1986). Prediction of goal-directed behavior: Attitudes, intentions, and perceived behavioral control. *Journal of experimental social psychology*, 22(5), 453-474.
- Alsahli, M. (2016). *Benefits and barriers to physical activity among Saudi female university students in the kingdom of Saudi Arabia and the United States* (Doctoral dissertation, Middle Tennessee State University).
- American College of Sports Medicine. Position stand on the recommended quantity and quality of exercise for developing and maintaining cardiorespiratory and muscular fitness, and flexibility in adults. *Med. Sci. Sports Exerc.* 1998, 30, 975-991.
- Armstrong, N., & McManus, A. (1994). Children's fitness and physical activity-a challenge for physical education. *British Journal of Physical Education*, 25(1), 20-26.
- Arzu, D., Tuzun, E. H., & Eker, L. (2006). Perceived barriers to physical activity in university students. *Journal of sports science & medicine*, 5(4), 615.
- Biddle, S. J., & Bailey, C. I. (1985). Motives for participation and attitudes toward physical activity of adult participants in fitness programs. *Perceptual and Motor Skills*, 61(3), 831-834.

- British Heart Foundation (2004). *Couch kids: the continuing epidemic*. London: British Heart Foundation
- Brown, S. A. (2005). Measuring perceived benefits and perceived barriers for physical activity. *American journal of health behavior, 29*(2), 107-116.
- Buckworth, J., & Dishman, R. K. (1999). Determinants of physical activity: research to application. *Lifestyle medicine, 1016-1027*.
- Cheng, K. Y., Cheng, P. G., Mak, K. T., & Wong, S. H. (2003). Relationships of perceived benefits and barriers to physical activity, physical activity participation and physical fitness in Hong Kong female adolescents. *Journal of sports medicine and physical fitness, 43*(4), 523-529
- Craig, C. L., Marshall, A. L., Sjöström, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., ... & Oja, P. (2003). International physical activity questionnaire: 12-country reliability and validity. *Medicine & science in sports & exercise, 35*(8), 1381-1395.
- Daşkapan, A., & Atalay, K. D. (2013). Perceived exercise benefits and barriers among Turkish women: a pilot study. *Fizyoter Rehabil, 24*(1), 127-134.
- Deci, E. L., & Ryan, R. M. (1980). Self-determination theory: When mind mediates behavior. *The Journal of mind and Behavior, 33-43*.
- Determinants of physical activity and interventions in youth. *Med. Sci. Sports Exercise, 24*(6 Suppl), S248-S257.
- Ekeland, E., Heian, F., Hagen, K. B., Abbott, J., & Nordheim, L. (2004). *Exercise to improve self-esteem in children and young people* (Cochrane review). In The Cochrane Library, Issue 2. Chichester, UK: John Wiley & Sons, Ltd.
- El Ansari, W., & Lovell, G. (2009). Barriers to exercise in younger and older non-exercising adult women: a cross sectional study in London, United Kingdom. *International journal of environmental research and public health, 6*(4), 1443-1455.
- El Ansari, W., & Phillips, C. J. (2004). The costs and benefits to participants in community partnerships: a paradox?. *Health Promotion Practice, 5*(1), 35-48.
- Frederick, G. M., Williams, E. R., Castillo-Hernández, I. M., & Evans, E. M. (2020). Physical activity and perceived benefits, but not barriers, to exercise differ by sex and school year among college students. *Journal of American College Health, 1-8*.
- Gabal, H. A. M., Wahdan, M. M., & Eldin, W. S. (2020). Perceived benefits and barriers towards exercise among healthcare providers in Ain Shams University Hospitals, Egypt. *Journal of the Egyptian Public Health Association, 95*(1), 1-9.
- Gad, N., Arrab, M., & Alsayed, S. (2018). Perceived Benefits and Barriers Of Exercise among Female University Students. *Int. J. Adv. Res, 6, 570-582*.
- Gontarev, S., Kalac, R., & Aleksovska, L. V. (2016). Perceived Exercise Benefits And Barriers Of Non-Exercising In Adolescent Female In The Macedonia. *Research in Physical Education, Sport & Health, 5*(2).
- Gordon-Larsen, P., McMurray, R. G., & Popkin, B. M. (1999). Adolescent physical activity and inactivity vary by ethnicity: The in physical activity, barriers to participation and suggestions for increasing participation. *Adolescence 40, 155-170*
- Grubbs, L., & Carter, J. (2002). The relationship of perceived benefits and barriers to reported exercise behaviors in college undergraduates. *Family & Community Health, 25*(2), 76-84.
- Gyurcsik, N. C., Bray, S. R., & Brittain, D. R. (2004). Coping with barriers to vigorous physical activity during transition to university. *Family & Community Health, 27*(2), 130-142.
- Gyurcsik, N. C., Spink, K. S., Bray, S. R., Chad, K., & Kwan, M. (2006). An ecologically based examination of barriers to physical activity in students from grade seven through first-year university. *Journal of Adolescent Health, 38*(6), 704-711
- Irwin, J. D. (2004). Prevalence of university students' sufficient physical activity: a systematic review. *Perceptual and motor skills, 98*(3), 927-943.
- Janz, N. K., & Becker, M. H. (1984). The health belief model: A decade later. *Health education quarterly, 11*(1), 1-47.
- Kenneth R.A., Dwyer J.M., Goldenberg E., Fein A., Yoshida K.K., Boutilier M. (2005) Male adolescents' reasons for participating
- Kenneth R.A., Dwyer J.M., Makin S. (1999) Perceived barriers to physical activity among high school students. *Preventive Medicine 28, 608-615*.
- Kgokong, D. (2018). *Perceived benefits and barriers to exercise and levels of physical activity of undergraduate physiotherapy students in the Western Cape* (Master's thesis, University of Cape Town).
- Kgokong, D., & Parker, R. (2020). Physical activity in physiotherapy students: Levels of physical activity and perceived benefits and barriers to exercise. *African Journal of Physiotherapy 76*(1), a1399
- King, A. C., Blair, S. N., Bild, D. E., Dishman, R. K., Dubbert, P. M., Marcus, B. H., ... & Yeager, K. K. (1992). Determinants of physical activity and interventions in adults. *Medicine & science in sports & exercise*.
- King, A. C., Castro, C., Wilcox, S., Eyler, A. A., Sallis, J. F., & Brownson, R. C. (2000). Personal and environmental factors associated with physical inactivity among different racial-ethnic groups of US middle-aged and older-aged women. *Health psychology, 19*(4), 354.
- Leslie, E., Sparling, P. B., & Owen, N. (2001). University campus settings and the promotion of physical activity in young adults: lessons from research in Australia and the USA. *Health education*.
- Lovell, G. P., El Ansari, W., & Parker, J. K. (2010). Perceived exercise benefits and barriers of non-exercising female university students in the United Kingdom. *International Journal of Environmental Research and Public Health, 7*(3), 784-798.
- McAuley, E., & Rudolph, D. (1995). Physical activity, aging, and psychological well-being. *Journal of aging and physical activity, 3*(1), 67-96.
- Nahas, M. V., Goldfine, B., & Collins, M. A. (2003). Determinants of physical activity in adolescents and young adults: The basis for high school and college physical education to promote active lifestyles. *The Physical Educator, 60*(1).
- National Longitudinal Study of Adolescent Health. *The Journal of pediatrics, 135*(3), 301-306.
- O'Neill, K., & Reid, G. R. E. G. (1991). Perceived barriers to physical activity by older adults. *Canadian journal of public health= Revue canadienne de sante publique, 82*(6), 392-396.
- Prochaska, J. O., & Marcus, B. H. (1994). The transtheoretical model: Applications to exercise.
- Ransdell, L. B., Detling, N., Hildebrand, K., Lau, P., Moyer-Mileur, L., & Shultz, B. (2004). Can physical activity interventions change perceived exercise benefits and barriers?. *American Journal of Health Studies, 19*(4).
- Reed, G. R. (1999). Adherence to exercise and the transtheoretical model of behavior change. *SJ Bull (Ed.), Adherence issues in sport and exercise, 19-46*.

- Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social learning theory and the health belief model. *Health education quarterly*, 15(2), 175-183.
- Rovniak, L. S., Anderson, E. S., Winett, R. A., & Stephens, R. S. (2002). Social cognitive determinants of physical activity in young adults: a prospective structural equation analysis. *Annals of Behavioral Medicine*, 24(2), 149-156.
- Sabharwal, M. (2018). Perceived barriers of young adults for participation in physical activity. *Current Research in Nutrition and Food Science Journal*, 6(2), 437-449.
- Sallis, J. F., & Hovell, M. F. (1990). Determinants of exercise behavior. *Exercise and sport sciences reviews*, 18(1), 307-330. Sallis, J. F., Hovell, M. F., & Hofstetter, C. R. (1992). Predictors of adoption and maintenance of vigorous physical activity in men and women. *Preventive medicine*, 21(2), 237-251.
- Sallis, J. F., Prochaska, J. J., & Taylor, W. C. (2000). A review of correlates of physical activity of children and adolescents. *Medicine and science in sports and exercise*, 32(5), 963-975.
- Sallis, J.F., Hovell, M.F., Hofstetter, C.R., et al. (1989). A multivariate study of determinants of vigorous exercise in a community sample. *Preventive Medicine*, (18), 20-34.
- Sechrist, K. R., Walker, S. N., & Pender, N. J. (1987). Development and psychometric evaluation of the exercise benefits/barriers scale. *Research in nursing & health*, 10(6), 357-365.
- Shaikh, A. A., & Dandekar, S. P. (2019). Perceived Benefits and Barriers to Exercise among Physically Active and Non-Active Elderly People. *Disability, CBR & Inclusive Development*, 30(2), 73-83.
- Shaikh, A. A., Dandekar, S. P., & Hatolkar, R. S. (2020). Perceived Benefits and Barriers to Exercise of Physically Active and Non-active School Teachers in an Education Society from Pune: An Analysis using EBBS. *International Journal of Health Sciences and Research*, (10)6, 201-206
- Sparling, P. B., & Snow, T. K. (2002). Physical activity patterns in recent college alumni. *Research quarterly for exercise and sport*, 73(2), 200-205.
- Telama, R., & Yang, X. (2000). Decline of physical activity from youth to young adulthood in Finland. *Medicine and science in sports and exercise*, 32(9), 1617-1622.
- Trost, S. G., Pate, R. R., Saunders, R., Ward, D. S., Dowda, M., & Felton, G. (1997). A prospective study of the determinants of physical activity in rural fifth-grade children. *Preventive medicine*, 26(2), 257-263.
- Valencia-Rico CL, Franco-Idárraga SM, Vidarte-Claros JA, Vasquez-Gómez AC, Castiblanco Arroyave HD. (2020) Physical Activity: Benefits and Barriers Perceived by University Students. *J Comm Pub Health Nursing* 6, 239.
- Vaughn, S. (2009). Factors influencing the participation of middle-aged and older Latin-American women in physical activity: a stroke-prevention behavior. *Rehabilitation Nursing*, 34(1), 17-23.
- Wallace, L. S., Buckworth, J., Kirby, T. E., & Sherman, W. M. (2000). Characteristics of exercise behavior among college students: application of social cognitive theory to predicting stage of change. *Preventive medicine*, 31(5), 494-505.
- Wankal, L.M. Decision making and social support structures for increasing exercise adherence. *J. Cardiac Rehab.* 1980, 4, 124-128.
- Wankel, L. M. (1980). Involvement in vigorous physical activity: Considerations for enhancing self-motivation. In *Fitness motivation: Proceedings of the Geneva Park workshop. Toronto: Research Council on Leisure*.
- Wengreen, H. J., & Moncur, C. (2009). Change in diet, physical activity, and body weight among young-adults during the transition from high school to college. *Nutrition journal*, 8(1), 32.
- Winters E.R., Petosa R.L., Charlton T.E. (2003) Using cognitive theory to explain discretionary, "leisure time" physical exercise among high school students. *Journal of Adolescent Health* 32, 436-42.
- World Health Organization. (2010). Global recommendations on physical activity for health.
- Young, M. D., Plotnikoff, R. C., Collins, C. E., Callister, R., & Morgan, P. J. (2014). Social cognitive theory and physical activity: a systematic review and meta-analysis. *Obesity reviews*, 15(12), 983-995.
- Ziebland S., Thorogood M., Yudkin P., Jones L., Coulter A. (1997) Lack of willpower or lack of wherewithal?. "Internal" and "External" barriers to changing diet and exercise in a three year follow up participants in a health check. *Social Science Medicine* 46, 461-465.
- Zunft, H. J. F., Friebe, D., Seppelt, B., Widhalm, K., de Winter, A. M. R., de Almeida, M. D. V., ... & Gibney, M. (1999). Perceived benefits and barriers to physical activity in a nationally representative sample in the European Union. *Public health nutrition*, 2(1a), 153-160.