Advance Journal of Food Science and Technology 10(11): 887-889, 2016
DOI: 10.19026/ajfst.10.2281
ISSN: 2042-4868; e-ISSN: 2042-4876

Submitted: July 29, 2015 Accepted: August 20, 2015 Published: April 15, 2016

**Research Article**

# Effect of Diet Intervention on Amateur Swimmers

Bing Zheng
Department of Physical Education, Tangshan Normal University, Tangshan, 063000, China

**Abstract:** The objective of this study was to investigate the effect of the balanced diet intake in amateur swimmer. 34 swimming lovers in swimming course voluntarily participated in this study, they were randomly assigned to control group and diet intervention group and 17 people each group. This study lasted for 4 weeks and 3 times per weeks. After collecting the data and then analyzing them, the findings indicated that there were extremely significant difference between control and diet intervention group, the diet intervention has a significant role in amateur swimmers, it can improve the sport performance and reduce the exercise fatigue. The author suggests that the dietary intake should be balanced, the excessive protein or high fat diet will damage to the energy supply system and cause excessive fatigue in sports performer.

**Keywords:** Balanced diet, diet intervention, low-fat food, swimmer

## INTRODUCTION

It is well known that diet intake has an important role on everyday life and the researches on diet intervention have been performed in many fields by some scholars at home and abroad. In the previous literature, Sørensen *et al*. (2007) examined the effect of a 1-year exercise and diet intervention program on global self-concept, perceptions of the body, physical competence, exercise mastery, social competence, social comfort and fitness with 208 healthy individuals. Frenn *et al*. (2005b) examined the effectiveness of an eight-session health promotion/transtheoretical model Internet/video-delivered intervention to increase physical activity and reduce dietary fat among low-income, culturally diverse, seventh-grade students. In Lee *et al*. (2014) study, the findings indicated that the proportion of subjects who performed at least moderate-intensity aerobic exercise for at least 150min per week; ate 5 servings of F&V per day; and had overall improvements in dietary quality, physical functioning and appetite loss, fatigue and motivational readiness was greater in the intervention group than in the control group. Markos *et al*. (2014) pointed out that the original improvements from an 8-week exercise and MD intervention were still evident, particularly in the microcirculatory and cardiorespiratory assessments, 1-year after the initial study. Länsimies-Antikainen *et al*. (2010a) evaluated the comprehension of older volunteer participants in health research on an exercise and diet intervention trial. Kim *et al*. (2011) investigated the feasibility and preliminary effects of a simultaneous stage-matched exercise and diet intervention in breast cancer survivors. Länsimies-Antikainen *et al*. (2010b) evaluated whether informed consent is related to implementation and success in a lifestyle intervention study with older research participants. Snyder *et al*. (2009) have tested whether a home-based multi-behavior intervention focused on exercise and including a low saturated fat, plant-based diet, would improve physical functioning among 641 older population. Rokling-Andersen *et al*. (2007) observed a significant reduction in body weight and fat mass in a randomized, controlled, 2×2 factorial trial on the effect of long-term changes in diet and exercise. Frenn *et al*. (2005a) examined the effectiveness of an eight-session health promotion/transtheoretical model Internet/video-delivered intervention to increase physical activity and reduce dietary fat among low-income, culturally diverse, seventh-grade students. Tan *et al*. (2013) investigated underlying mechanisms of the effects of exercise and diet intervention on obesity-related sleep disorders, the role of gut microbiota in relation to poor quality of sleep and day-time sleepiness, as well as the levels of hormones responsible for sleep-wake cycle regulation. Lee *et al*. (2013) developed a Web-based self-management diet and exercise intervention program with the aid of the transtheoretical mode and to conduct formative evaluations.

In this study, by means of exploring the effect of the balanced diet intervention protocol on amateur swimmers, the author has an attempt to reveal the benefit of balanced diet on improving health and increasing physical performer, then give the sport performers and sports physicians some suitable suggestions on how to perform the balanced diet intake for exercise and everyday life.

Table 1: Crosstabulation of fatigue perception of diet intervention

| | | Fatigue index | | | | |
|---|---|---|---|---|---|---|
| | | A little tired | Rather tired | Very tired | Extremely tired | Total |
| Group | Diet | 36 | 101 | 36 | 7 | 180 |
| | Control | 7 | 68 | 69 | 36 | 180 |
| Total | | 43 | 169 | 105 | 43 | 360 |

Table 2: Description statistic and independent-sample T test between diet and control group

| Group | N | Mean | S.D. | S.E. Mean | t | Sig. |
|---|---|---|---|---|---|---|
| Diet | 180 | 3.00 | 0.634 | 0.047 | -10.927 | 0.000 |
| Control | 180 | 3.80 | 0.750 | 0.056 | | |

S.D.: Standard deviation; S.E.: Standard Error

## MATERIALS AND METHODS

**Subjects:** Thirty four amateur swimmers (age: 15.6±3.2 yrs; body height: 161.2±4.5 cm; body weight: 52.3±5.8 kg) in swimming courses voluntarily participated in this study. They were randomly assigned to 2 groups: control group and diet intervention group. This study lasted 4 weeks, all subjects in swinging course performed 3 times each weeks and 90 min per time. Subjects in control group eat do their dietary intake as usual and the subjects in the diet intervention group do the diet intake according to the dietary intake protocol designed by this study.

**Dietary intake protocol:** In order to compare with the freely or convention dietary intake, this study designed the following dietary protocol:

150 g grains per day, 1 bowl porridge in grains including rice, millet and the like with a piece of bread at breakfast; 100 g cooked rice or noodle at lunch or supper.

500 g vegetables per day: dark veggies, such as broccoli and spinach; red & orange veggies, such as red pepper, tomato; beans and peas, such as red beans; starchy veggies, such as potato, other veggies

400 g fruit per day: whole fruit or cut-up fruits such as apple, pear, peaches and cherries.

600 g dairy per day: fat-free or low-fat milk, cheese, yogurt etc.

160 g meats: lean meat such as pork, beef and mutton and poultry such as chicken and duck.

All the amount of above diet intake was 1810 g. As we known, the amount of diet intake was different according to different subjects, so the researcher in this experiment give some additional suggestion to the subjects as follows, according the med of the subjects, the subjects can increase or decrease their foods intakes in proportional to the above diet intake protocol, i.e. If you intake 2705 g foods, you should eat 225 g grains, 750 g vegetables, 600 g fruits, 900 g dairy, 240 g meats per day, the species in each category can be chosen according to personal taste.

**Data collection:** In order to record the effect of the diet intervention, all subjects were questioned after each swimming course. The response adopted the Likert scale, the fatigue index was set at 5 levels: extremely tired, very tired, rather tired, tired, a little tired and not tired, the fatigue index was set from 5 to 1 score according to the degree of fatigue.

**Data processing:** All data collected from this study were analyzed with SPSS 16.0 for Windows. Independent sample T test were used in this study. All significant level was set at $p<0.05$ level and extremely significant level at $p<0.01$.

## RESULTS AND DISCUSSION

**Results:** As indicated in Table 1, the fatigue perception of the swimmers in control group have the higher tired index than the diet intervention group, the fatigue index of very tired and extremely tired in control and diet group were 19.2 vs. 10 and 10 vs. 1.9%, respectively.

After independent-sample t test (Table 2), the test showed there were extremely significant difference ($t = -10.327$, $p = 0.000<0.01$) in fatigue perception in amateur swimmers between diet intervention and control group.

## DISCUSSION

As known, in everyday life, one should choose suitable foods for heath and vigorous life and performance, the suitable foods refers to increase the intake amount of vegetables, fruits, roughage grains, low-fat foods. And so on and at the same time, the fine grains and sugar-rich foods should be limited in diet intake. Swimming is the self-propulsion of a person through water or another liquid, usually for the purpose of recreation, sport, exercise, or survival. Swimming motion achieved through coordinated movement of the limbs, the body, or both. Humans are able to hold their breath underwater and undertake rudimentary locomotive swimming within weeks of birth, as an evolutionary response. Swimming is consistently found to be among the top recreational activities undertaken by the public and in some countries, swimming lessons are a compulsory part of the educational curriculum. And swimming is popular in mass sports, especially in summer in the most countries.

In the swimming, swimmers should spend a lot of energy because they performed exercise in water need much body strength and the heat consumption in water is as well more than in the air. All those need people who exercise in water need have more diet intake. Besides considering the amount of intake, one should

consider the balanced diet, those include the following rules: fruit intake should be considered; vegetable intake containing various types and kinds; choosing the calcium-rich foods; the main foods should be more than half of the total foods intake, choosing the low-fat foods, limiting of fat, salty and sugar intake. In this study, after interviewing with the subjects in the control group, it was revealed that they intake their foods in accordance with their personal taste and did not consider the balance of different categories foods, so, after the vigorous swimming, their fatigue perception were higher than the diet intervention group, for the diet intake in the diet intervention group was more balanced than the control group.

For each individual, the heat intake should be meeting the need of consumption in order to achieve the balance of energy and the control of body weight. The diet intervention made some suggestion on limitation of high energy foods intake for those foods contain less beneficial nutrient elements for your health. And the suggestion pointed out that the nutritious foods can enable the sufficient vitamins and minerals intake. Choosing the foods such as roughage grains, fruits, vegetables and low-fat and high-protein foods can meet the requirement of both the energy and nutritious elements.

## CONCLUSION

- There were extremely significant difference between control and divert intervention group. The diet intervention has a significant role in amateur swimmers; it can improve the sport performance and reduce the exercise fatigue. The dietary intake should be balanced, the excessive protein or high fat diet will damage to the energy supply system and cause excessive fatigue in sports performer.
- In order to improve the performance and enhance the physical competence, the sports performer should pay some attention on their dietary intake protocol. The balanced diet intake should be considered in exercise and everyday life.

## REFERENCES

Frenn, M., S. Malin, R.L. Brown, Y. Greer, J. Fox, J. Greer and S. Smyczek, 2005a. Changing the tide: An Internet/video exercise and low-fat diet intervention with middle-school students [J]. Appl. Nurs. Res., 18(1): 13-21.

Frenn, M., S. Malin, R.L. Brown, Y. Greer, J. Fox, J. Greer and S. Smyczek, 2005b. Changing the tide: An Internet/video exercise and low-fat diet intervention with middle-school students [J]. Appl. Nurs. Res., 18(1): 13-21.

Kim, S.H., M.S. Shin, H.S. Lee, E.S. Lee, J.S. Ro, H.S. Kang, S.W. Kim, W.H. Lee, H.S. Kim, C.J. Kim, J. Kim and Y.H. Yun, 2011. Randomized pilot test of a simultaneous stage-matched exercise and diet intervention for breast cancer survivors [J]. Oncol. Nurs. Forum, 38(2): 97-106.

Länsimies-Antikainen, H., A.M. Pietilä, V. Kiviniemi, R. Rauramaa and T. Laitinen, 2010a. Evaluation of participant comprehension of information received in an exercise and diet intervention trial: The DR's EXTRA study [J]. Gerontology, 56(3): 291-297.

Länsimies-Antikainen, H., A.M. Pietilä, T. Laitinen, V. Kiviniemi and R. Rauramaa, 2010b. Is informed consent related to success in exercise and diet intervention as evaluated at 12 months? DR's EXTRA study [J]. BMC Med. Ethics, 11(1): 123-139.

Lee, M.K., H.A. Park, Y.H. Yun and Y.J. Chang, 2013. Development and formative evaluation of a web-based self-management exercise and diet intervention program with tailored motivation and action planning for cancer survivors [J]. JMIR Res. Protocol, 2(1): 11-19.

Lee, M.K., Y.H. Yun, H.A. Park, E.S. Lee, K.H. Jung and D.Y. Noh, 2014. A web-based self-management exercise and diet intervention for breast cancer survivors: Pilot randomized controlled trial [J]. Int. J. Nurs. Stud., 51(12).

Markos, K., A. Ahmad and M. Geoff, 2014. Long-term effects of an exercise and Mediterranean diet intervention in the vascular function of an older, healthy population [J]. Microvasc. Res., 95: 103-107.

Rokling-Andersen, M.H., J.E. Reseland, M.B. Veierød, S.A. Anderssen, D.R. Jacobs, P. Urdal, J.O. Jansson and C.A. Drevon, 2007. Effects of long-term exercise and diet intervention on plasma adipokine concentrations [J]. Am. J. Clin. Nutr., 86(5): 31-37.

Snyder, D.C., M.C. Morey, R. Sloane, V. Stull, H.J. Cohen, B. Peterson, C. Pieper, T.J. Hartman, P.E. Miller, D.C. Mitchell and W. Demark-Wahnefried, 2009. Reach out to ENhancE Wellness in Older Cancer Survivors (RENEW): Design, methods and recruitment challenges of a home-based exercise and diet intervention to improve physical function among long-term survivors of breast, prostate, and colorectal cancer [J]. Psycho-Oncol., 18(4): 429-439.

Sørensen, M., S. Anderssen, I. Hjerman, I. Holme and H. Ursin, 2007. Exercise and diet interventions improve perceptions of self in middle-aged adults [J]. Scand. J. Med. Sci. Spor., 7(5): 312-320.

Tan, X., A. Saarinen, T.M. Mikkola, J. Tenhunen, S. Martinmäki, A. Rahikainen, S. Cheng, N. Eklund, S. Pekkala, P. Wiklund, E. Munukka, X. Wen, F. Cong, X. Wang, Y. Zhang, I. Tarkka, Y. Sun, M. Partinen, M. Alen and S. Cheng, 2013. Effects of exercise and diet interventions on obesity-related sleep disorders in men: Study protocol for a randomized controlled trial [J]. Trials, 14: 235-244.