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Research Trend of SPORT Nutrition Science in the Republic of KOREA

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Abstract

In this study it is aimed to classify and identify studies in the Journal of Korean Society of Exercise Nutrition(The Journal of Exercise Nutrition & Biochemistry) published from 2000 until 2014 by the topics and by the subjects so as to create the raw data for direction and quality of future researches of the exercise nutrition.

When summed up the research topics presented, the studies on anti-oxidation appeared to be 42(14%) as the most, followed by 36(12%) on energy metabolism, 29(10%) on fat, 28(10%) on supplements, 28(10%) on general nutrition, 27(9%) on endurance exercise, 17(6%) body composition, 12(4%) on carbohydrate, 11(4%) on immunity, 10(3%) on minerals, 8(3%) on resistance exercise, 7(2%) on vitamins, 7(2%) on protein and 4(1%) on water intake in the order. When viewed by comprehensive research topics, it had been reported as 231 researches(57%) were performed on exercise nutrition, 90(22%) on exercise physiology, 65(16%) on training, 11(3%) on growth development, 6(1%) on measurement and evaluation, and 3(1%) on special physical education in the order. Based on the study subjects, there were 198 researches(49%) performed in laboratory animals showing the highest ratio. The classification was done followed by 123 studies(30%) in adults, 30 studies(7%) in athletes, 27 studies(7%) in youth and 8 studies(2%) in elderly subjects.

As such as intake of fats is relatively increased largely due to westernized diets in Korea, such as cardiovascular diseases and metabolic syndromes are rapidly increased following after the increase of obesity and visceral fat. Therefore, not only in Korea, but the regular exercise as well as the nutritional knowledge for health promotion has been demanded greatly worldwide. To this end, a variety of studies for the sports science as well as for the public health should be attempted in the study of Exercise Nutrition in Korea. Therefore, the future trends of researches on Exercise Nutrition in Korea, It will be activated such as Molecular exercise nutrition research, Energy metabolism during exercise, Antioxidant mechanisms induced by exercise, Health and brain health, Ergogenic Aids, Anti-fatigue and anti-obesity, Sports drinks and sports supplements research, Natural drug research.

[Keywords] ***Sport Nutrition, Exercise Nutrition, Journal of Korean Society of Exercise Nutrition, The Journal of Exercise Nutrition & Biochemistry, Republic of Korea***

1. Introduction

Exercise and Nutrition is a science that studies not only how to enhance the ability of athletes to perform exercise but also the knowledge needed to maintain and promote optimal nutrition necessary for the movement and activities in scientific manners. In Korea, the lectures of nutrition science was started since the mid-1970s at the department of physical education and up to the early eighties, most lectures were done at general nutrition level by the external professors from the department of Home Science and the department of Food and Nutrition[1]. However, in special circumstances of exercise, all of human metabolism process and adaptation effect of energy metabolism by training

are difficult to explain in the perspective of general nutrition. Therefore, it can be said that the exercise and nutrition science was born as a new integrated study of 'Exercise and Nutrition'[2].

The momentum for full scale research of Exercise and Nutrition as an academic science in Korea was 1988 Seoul Olympic Games, under the proposition of making the sports as a science, and it settled as a discipline so called the Exercise Nutrition Science or the Sports Nutrition Science in the course of today's physical education curriculum related subjects. Thereafter, this has repeated the break through with the establishment of the Korean Society of Exercise Nutrition in 1996[3].

Exercise Nutrition Science can be described as a study of all phenomena taking place in the human body while living, on the basis of such as physiology, biochemistry and nutrition.

In particular, in the 21st century, the correct application of the exercise and sport nutrition is needed to improve the quality of life through improving physical fitness and health promotion of the public, so its value is further increased. To embrace the needs, many domestic scholars specialized in the Exercise Nutrition have been fostered, but still requiring establishment of relevant data and trend in research.

Therefore, in this study it is aimed to classify and identify studies in the Journal of Korean Society of Exercise Nutrition published from 2000 until 2014 by the topics and by the subjects so as to create the raw data for direction and quality of future researches of the exercise nutrition.

2. Major Trends of Researches

The contents and trends of researches identified by analyzing the Journals of Korea Society of Exercise Nutrition published from 2000 to 2014, are as presented in <Table 1>. The articles reported in the Journal of Nutrition Exercise for 14 years are a total of 455 pieces, presenting various study results. The main topics presented are as follows.

- Energy metabolism during exercise
- Effect of endurance and resistance training
- Antioxidant mechanisms induced by exercise
- Health and brain health
- Ergogenic Aids
- Anti-fatigue and anti-obesity
- Exercise and diet composition
- Exercise and diet
- Effect of bone density and anti-diabetes

Table 1. Research trend of exercise nutrition science in Korea.

	2000	2001	2002	2003	2004	2005	2006	2007
General nutrition	2	4	2	3	7	2	2	1
Energy metabolism				3	3		2	
Body composition	1		1	6	2	2	3	
Carbohydrate	1	1	1	4	3	1		
Fat	2	1	2	5	4	2	2	1
Protein		1		2	1		1	
Fluid intake	1				1			
Vitamins	1				1		1	
Minerals			2		3	3		1
Immunity		1			1		1	2

Antioxidant	1	2	2	4	4	6	2	
Supplement	1	3	5	4	3	3	2	1
Resistance training				1	1	2		
Endurance exercise				3	6	5	3	4
Obesity	1			3	2	2	3	6
Anti-fatigue				3		1	3	1
Anti-diabetes				1		1	1	
Brain health						1	2	
Health				3	9	4	4	10
Bone density						4	5	2
Etc				3	3		2	3
Total	11	13	15	48	54	39	39	32

	2008	2009	2010	2011	2012	2013	2014	Total
General nutrition		3	2					28
Energy metabolism	2	2	4	4	4	4	8	36
Body composition			1				1	17
Carbohydrate	1							12
Fat	3	1	1			3	2	29
Protein	1			1				7
Fluid intake							2	4
Vitamins	1		1			1	1	7
Minerals						1		10
Immunity	3	1	1			1		11
Antioxidant	3	5	1	4	2	3	3	42
Supplement		2	1	1	2			28
Resistance exercise	1			1			2	8
Endurance exercise	1	1	2		2		2	27
Obesity	2	2	3		2	2	2	30
Anti-fatigue			1	1	2	2	1	15
Anti-diabetes		2	1		2	1	3	12
Brain health	2	3	1	3	4	2	5	23
Health	2	3	3	2	1	2	8	51

Bone density	2	1		2		1	3	20
Etc		4	5	2	3	1	2	28
Total	24	30	27	21	23	24	45	445

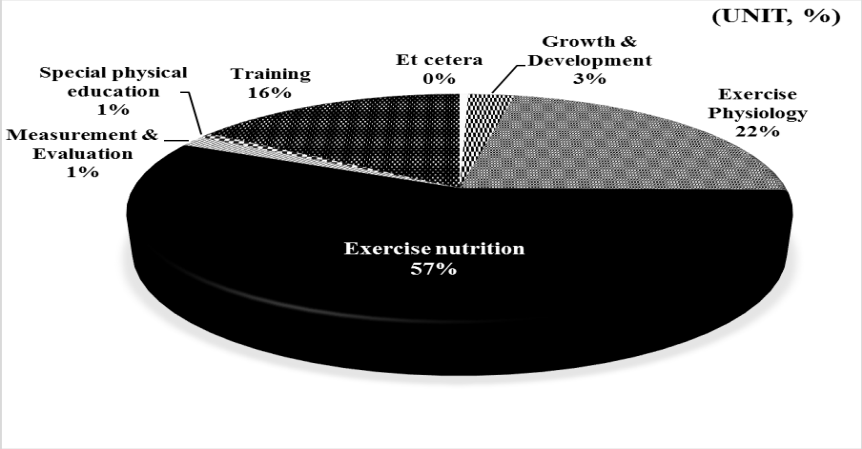
The research topics in the early 2000 were such as body composition, supplements, anti-oxidation and nutrients, indicating various research studies were implemented. After2007, in particular, studies on such as obesity, anti-oxidation, health, brain health, and bone density were increased, but it was reported that the research topics were more or less reduced than the early 2000. However, as the most of studies were convergent researches implemented based on exercise and nutrition, it would be difficult to affirm that the topics of research was reduced.

When summed up the research topics presented, the studies on anti-oxidation appeared to be 42(14%) as the most, followed by 36(12%) on energy metabolism, 29(10%) on fat, 28(10%) on supplements, 28(10%) on general nutrition, 27(9%) on endurance exercise, 17(6%) body composition, 12(4%) on carbohydrate, 11(4%) on immunity, 10(3%) on minerals,8(3%) on resistance exercise, 7(2%) on vitamins, 7(2%) on protein and4(1%) on water intake in the order.

Another area to note was the researches on energy metabolism which was steadily decreased from 2000, found to be increased every year since 2008, thereby, it was accounted for a large proportion together with studies on obesity and health. This is considered as because the importance of the metabolism in human body in principle has been re-recognized unlike the early to mid-period of the 2000 where the researches had focused only on the field of molecular biology.

When viewed by comprehensive research topics, it had been reported as 231 researches(57%) were performed on exercise nutrition, 90(22%) on exercise physiology, 65(16%) on training, 11(3%) on growth development, 6(1%) on measurement and evaluation, and 3(1%) on special physical education in the order <Figure 1>.

Figure 1. Distribution of the field of study(%).



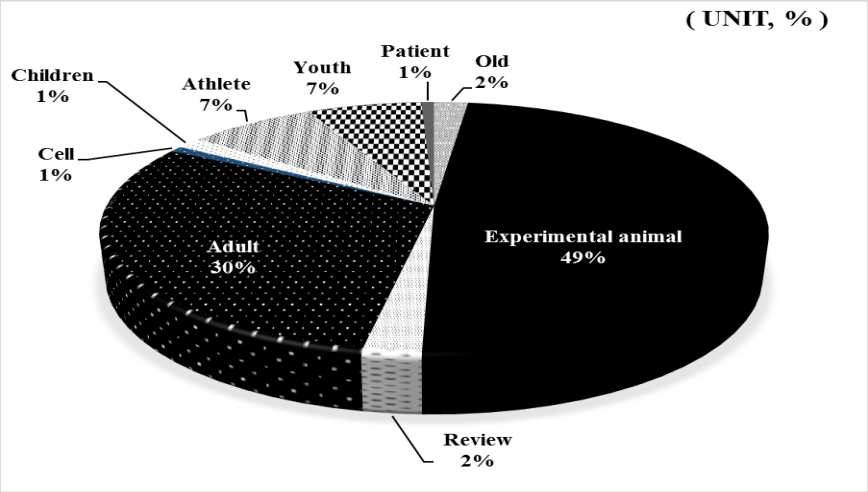
Based on the study subjects, there were 198 researches(49%) performed in laboratory animals showing the highest ratio. The classification was done followed by 123 studies(30%) in adults, 30 studies(7%) in athletes, 27 studies(7%) in youth and 8 studies(2%) in elderly subjects <Figure 2>.

In the researches on exercise nutrition, there are many studies performed in laboratory animals and still increase every year than

any other field of physical education, this is because if performing those studies in human, they will be limited very much.

For the Exercise Nutrition, the research is conducted in a variety of subjects(athletes, obese population, people with diabetes, and youth groups) and in addition it requires dietary regulation or intake of supplements under rather special condition of exercise unlike general nutrition, therefore there should be sufficient pre-clinical studies before implementing any clinical studies. In addition, researches on exercise nutrition show a continuously increasing trend of animal studies using mouse and rat as they intend to identify and analyze diversified mechanisms, gene expression and signaling pathways[4][5].

Figure 2. Classification by subjects(%).



3. Conclusion

Researches listed on the Journal of Korea Society of Exercise Nutrition from 2000until2014 were a total of 455studies, presenting a variety of topics and subjects. There searches in early 2000were conducted with topics mainly such as supplements and nutrients that improve exercise performance capacity, anti-oxidation and body composition, and after 2008, the studies on molecular biology and energy metabolism had been increased in addition to the studies related to obesity and health.

When summarized the research topics presented, the studies with the highest ratio were conducted on anti-oxidation as 42(14%), followed by 36studies(12%) on energy metabolism, 29studies(10%) on fat, 28 studies(10%) on supplements, 28 studies(10%) on general nutrition, 27 studies(9%) on endurance exercise, 17 studies(6%) on body composition, 12 studies(4%) on carbohydrate, immunity 11 studies(4%) on immunity, 10 studies(3%) on minerals, 8 studies(3%) on resistance exercise, 7 studies(2%) on vitamins, 7 studies(2%) on protein, and 4 studies(1%) water intake in the order.

It had been reported that 231 studies(57%) out of a total of 455 researches were performed on exercise nutrition, 90 studies(22%) on exercise physiology, 65 studies(16%) on training, 11 studies(3%) on growth development, 6 studies(1%) on measurement and evaluation, and 3 studies(1%) on special physical education in the order. Based on the study subjects, there were 198 researches(49%) performed in laboratory animals showing the highest ratio. In the classification, it was followed by 123 studies(30%)

in adults, 30 studies(7%) in athletes, 27 studies(7%) in youth and 8 studies(2%) in elderly subjects.

Analyses are being conducted on various items exploring such as training effects[6], conditioning[7], anti-fatigue[8], nutrition intake[9], and physiologic active substances[10] and recently, as the genetic analyses are attempted, studies on mechanisms focusing on specific gene and protein expressions are being implemented. Furthermore, it has been found that even analyses on various physiological indices and intra-cell mitochondria are being widely activated[11][12].

As such as intake of fats is relatively increased largely due to westernized diets in Korea, such as cardiovascular diseases and metabolic syndromes are rapidly increased following after the increase of obesity and visceral fat[13][14][15].

Therefore, not only in Korea, but the regular exercise as well as the nutritional knowledge for health promotion has been demanded greatly worldwide. To this end, a variety of studies for the sports science as well as for the public health should be attempted in the study of Exercise Nutrition in Korea. The future trends of researches on Exercise Nutrition in Korea are as follows.

Future Trends of Research on Exercise Nutrition in Korea

- Molecular exercise nutrition research
- Energy metabolism during exercise
- Antioxidant mechanisms induced by exercise
- Health and brain health
- Ergogenic Aids
- Anti-fatigue and anti-obesity
- Sports drinks and sports supplements research
- Natural drug research

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