

出國報告（出國類別：出席國際會議）

## 出席2017年第3屆全球議題之多學科學術 研究國際會議

服務機關：國立嘉義大學體育與健康休閒學系

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## 摘 要

2017 全球議題之多學科學術研究國際會議 (International Conference on Global Issues in Multidisciplinary Academic Research, GIMAR) 是一個國際化且跨領域多樣化學科的學術平台，提供探討對人類社會可持續發展及進步的創新途徑。GIMAR-2017 國際會議是由 Global Illuminators (GI) 主辦，此單位提倡研究開發、學習、知識共享、創新和能力的培養，透過多樣化學科學術研究方法，激發和培育研究的質量和創新。值得一提的是主要協助發展中和第三世界之國家，特別是亞洲學者的整體研究能力。此次國立嘉義大學體育與健康休閒學系師生共有三篇研究成果於會議中發表，其中一篇獲得最佳論文之提名。本出國報告書主要針對出席國際研討會議之過程提出心得及建議。

**關鍵詞：**研究能力、國際化、創新

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## 壹、參與之背景及目的

2017 全球議題之多學科學術研究國際會議 (International Conference on Global Issues in Multidisciplinary Academic Research, GIMAR) 由 Global Illuminators (GI) 主辦，是一個國際化且跨領域之多樣化學科的學術平台，該平台匯集了來自全球各類別之多學科領域的學者專家，希望能透過學術研究工作，對學術及社會做出貢獻，並且激發和培育研究的質量和創新。其中，主要協助發展中和第三世界之國家，特別是亞洲學者的整體研究能力。此外，亦鼓勵年輕研究人員能產出高品質之學術研究。此次 GIMAR-2017 國際研討會為第 3 屆會議，2 月 1~2 日為期 2 天於日本東京舉辦，前 2 屆則在阿拉伯大公國杜拜舉行。

此次國際研討會議為期兩天，台灣約莫有 10 個學校單位，例如：交通大學、台灣科技大學、嘉義大學、體育大學、長庚大學、元智大學、...等師生一同共襄盛舉。本單位由洪偉欽教授、林明儒助理教授及葉長樟博士生出席，一起隨同參與為體育大學蔡玄俊博士生，發表相關運動健康科學領域之學術研究，促進國際跨領域學術交流。因此，本次與會目的：

- 一、參與國際學術交流，見習其他專業領域之學術發表。
- 二、發表學術研究論文，增進實務英文發表能力。

## 貳、參與學術會議之過程與內容

本單位師生至日本東京參與 GIMAR-2017 國際學術研討會議，1 月 30 日由桃園國際機場出發，晚間抵達東京成田機場，用餐後入住飯店時已將屆凌晨。1 月 31 日中午前往研討會議舉辦地點，勘查地點並熟悉交通路線。2 月 1 日 9 點前即抵達會場，會議由主席 Dr. Farooq Ahmed Jam (圖一) 揭開序幕，歡迎與會者並說明此次會議的投稿相關事宜。接著，進行頒發感謝狀給予協助會議有功學者專家，以及開放與會人員拍照 (圖

二、三、四)。



圖一 會議主席報告



圖二 洪偉欽教授與會留影



圖三 林明儒助理教授與會留影



圖四 葉長樟博士生與會留影

此會議共分為商業管理及經濟研究科學、人文社會科學、健康與醫學科學、工程技術科學、物理與應用科學五個學術領域。本單位共有三篇論文被接受刊登如下：The Effect of Body Composition in Improved Plate on Elementary School Students，由洪偉欽教授進行口頭發表（圖五、六）；Effects of Active Recovery Exercise on the Indicators of Eccentric Exercise Induced Muscle Damage，由林明儒助理教授進行口頭發表（圖七、八）；另一篇 Specific Fitness Performance of Female Junior Badminton Players in Single and Doubles 由體育大學蔡玄俊博士生進行口頭發表。此篇 Effects of Active Recovery Exercise on the Indicators of Eccentric Exercise Induced Muscle Damage 榮獲大會 Best Paper Nominee List。本次會議共有投稿稿件共有 144 篇，接受刊登 90 篇，拒絕刊登 10

篇，不合格稿件 44 件，接受刊登率 55%。



圖五 洪偉欽教授進行口頭發表（一）



圖六 洪偉欽教授進行口頭發表（二）



圖七 林明儒助理教授進行口頭發表（一）



圖八 林明儒助理教授進行口頭發表（二）

經過口頭報告之後，與會的參與學者專家與報告者進行熱烈的討論（圖九、十），尤其針對 Effect of Body Composition in Improved Plate on Elementary School Students 所提及的餐盤專利，極富興趣並提出問題相互研討。



圖九 發表後進行討論(一)



圖十 發表後進行討論（二）

此次會議有多篇的研究發表，其中對於南韓首爾大學 Kim 學者發表的 Smartphone

Application Design for Children's Weight Control with their Parents，以及法國卡昂大學 Max Poulain 學者發表 The Return of Magical Thinking: Application to the Case of New Foods 特別有印象。Kim 學者提及兒童肥胖是全球所關注的議題，將引發許多的慢性疾病，除對生理健康之外，對心理及社會人際也會造成影響，在南韓國小的體重控制及健康維持問題也難以解決，因此提出父母親使用智慧型手機的應用設計，透過提示、常規及獎勵方式，對孩童的體重及健康生活習慣能達到管控及評估的需求。其次，Max Poulain 學者提出後現代社會之消費者的對於食品的消費模式有不同的認知，更對於飲食的精神層面上有更多的嚮往，尤其對於靈性領域越趨感到興趣，試圖以精神體驗的新形式達到個人的追求。

第一天會議於下午 6 點前結束，由主席 Dr. Farooq Ahmed Jam 再次主持綜合座談，與會學者專家提出建議相互交流。2 月 2 日第二天會議則安排 City Tour，讓與會者選擇是否參加東京市區景點旅遊。2 月 3 日早上 9 點 30 分班機起飛返回台灣，圓滿結束此次的會議。

## 參、心得及建議

此次是第一次參加 Global Illuminators (GI) 舉辦的國際性且跨領域之多樣化學科的學術研討會並在會議中以英文口頭發表論文及答覆提問，收穫良多。現今是跨領域的時代，與其說是跨領域，若以“穿領域”或“跨科際”表示則是更為貼切，因為研究需要多個專業研究領域共同合作，才能解決多面向的問題，此會議符合現代的需求，藉由不同專業領域的相互交流激盪，對學術發展及社會福祉有所貢獻。

本次研討會屬於小型的會議，可讓發表者與與會者有更多的討論互動機會，對於研究生或博士生更是一個很好的練習機會，如本會議的宗旨之一：協助亞洲學者（可能基於母語非英語系國家）的整體研究能力。這部分建議值得國內研討會加以借鏡仿效，也就是即便在國內發表，也積極鼓勵以英文發表，務實的推動才能與國際接軌。

其次，本會議值得學習之處為確實將投稿研討會論文進行審查，審查後列舉多點回覆建議，更詳細指出該文章可能有抄襲的部分占多少比例，也鼓勵可寫成全文發表在主辦單位發行的刊物，也在會後再次徵詢投稿者的刊登意願，這是在國內外研討會論文的投稿作業流程中少見的作法，通常僅是給予刊登證明。建議國內研討會可朝向這方面努力，將能使投稿者能感到受尊重及嚴謹的學術審查流程。

除此之外，參加此會議的費用確實價格不斐，以學生而言，美國運動醫學會 (ACSM) 大約 US\$130，GIMAR 則需要 US\$400，對參與學生的經濟無非是一大負擔，建議可做適當調整；場地的指引標示、容量規模及報到流程需要再更精進，例如因會議舉辦主要場地在 9 樓，應將指引標示明確的顯現，以利與會者容易到達；大會除了於當場發放紙本手冊及提袋之外，也細心地將手冊相關事宜及會議發表的文章內容存於隨身碟贈給與會者。

最後，非常感謝及承蒙學校單位的支持補助，得以讓本單位師生能夠順利發表及與會，能夠進一步實際了解國際學術研討會的脈動，從中吸取經驗，做為往後舉辦研討會的參考依據。

## 伍、附錄

### 附錄一 攜回資料名稱及內容

一、會議手冊及論文集

二、電子檔論文集及會議手冊



**Conference Title:** 3rd International Conference on Global Issues in Multidisciplinary Academic Research (GIMAR-2017), Tokyo, Japan

**Study Title:** The effect of body composition in improved plate on elementary school students

**Presenter:** Wei-Chin Hong, National Chiayi University, Taiwan. indy@mail.ncyu.edu.tw

#### ABSTRACT

The purpose of this study was to investigate the nutritional dishes eating behavior change, the impact on the composition of the body on elementary school students. In this study, 200 are research object of the Chia-yi City Elementary fifth and sixth grade, the study time of eight weeks; research tools In Body 220 Body Composition Analyzer, questionnaires to be supplemented by analysis. Data analysis was conducted using the SPSS statistical software for Windows 12.0. ANCOVA were used as the statistical method at a significance level ( $\alpha$ ) of .05. Results: Statistical analyses showed that there were significant differences in BMI, fat mass, muscle mass, body weight, WHR & fat%, and better than control group. There were no significant difference in water mass, protein mass, mineral mass & BMR. According to the results treatment group could affect control there fat mass. Suggest: if proposed intervention "time" and "diet" there will be significant effect for obesity treatment.

**Keywords:** plate diet, body composition, elementary students

## 1. Introduction

The investigation of nationals nutrition shows Taiwan element school students intake too much percentage of protein and fat, but inadequate intake of Calcium, Iron, vitamin B1, B2, B6 and folic acid [1]. The investigation of National Institutes of Health shows elementary school students have habit of eat fast food, only 15% of elementary school student never drink beverages with sugar, 92.6% of 8 to 13 years old boys and 95.3% of 8 to 13 years old girls have habit of eating snakes and watching TV or chatting[2]. Furthermore, the Department of Health investigation of the nutrition and health condition of Taiwan elementary school students at 2001 to 2002 year shows students' diet habits are bad, intake more than the recommended on caloric, protein and fat, and inadequate intake on Carbohydrates, dietary fibre, Calcium and Iron[3]. Evidently, the children in Taiwan have a lot of dietary problem, in perspective of excessive intake of caloric; we can expect the prevalence of obesity of children in Taiwan will rise.

Nowadays, because of people have diet habits of high-oil and high-salt, it influence nutrition intake of school students, the parents have more vegetables and fruits in diet, their children have more vegetables and fruits too, it can be found that parents are obesity, their children's obesity percentage will rise, that a high proportion in school students are diet with parents, dietary behaviours will influence children's dietary habits [5]. Many chronic diseases were being found such as hypertension, diabetes and sleep apnoea, the suffering age of these chronic diseases was slowly declining from older to younger. Therefore, we must pay attention to sources of diet and intake of children, if not planning and proper diet concept for children early, develop good diet habits, it will cause serious influence of national life health and social development, so this study hopes to develop good dietary habits by influence of plate's percentage and concepts of reduce oil.

## 2. Methods

### 2.1 Subjects

The purpose of this study was to investigate the nutritional dishes eating behavior change, the impact on the composition of the body on elementary school students. In this study, 200 are research object of the Chia-yi City Elementary fifth and sixth grade, the study time of eight weeks, research tools In Body 220 Body Composition Analyzer, questionnaires to be supplemented by analysis.

### 2.2 Tools

Research this utilize the intersection of nutrition and dinner plate that research and develop by oneself, picture (the intersection of the Republic of China and the intersection of patent and new the following: M444115 number) After change its behaviour of diet, and then used the dinner plate of nutrition to study the pupil of primary schooling, impact on its health makes up, BMI one. This dinner plate merges the following concepts:

1. The food is balanced: Fruit and vegetables should take half in a meal, and protein is that the weight is minimum in the whole dinner plate. Cereal than more, and advise that there are ' half the whole cereal ' at least in to account for whole dinner plate, about this, some nutritionists think this leave too many spaces for those more unhealthy exquisite cereal (such as rice and white toast) .

2. Equilibrate calorie: Enjoy and receive table delicacies, but don't be excessive; Avoid the food of the large weight.

3. Eat more good things: Try every possible means to let half of the plates full of vegetables and fruit, select defatting or ox's milk of low lipoprotein.

4. Eat few bastards: Drink the soup, bread and frozen food of sodium with less content; Replace boiled water, return the candy beverage.

5. Dinner plate this set in the trough offering have several the intersection of v and the intersection of collection and oil groove of shape each, save meal, flow grease spot that got off in order to profit, because it is plain to contain high salt, high oil, high bad smell in the grease spot, high chemical residue, so using the dinner plate of this nutrition can avoid eating these too many unhealthy materials any more while having a meal.

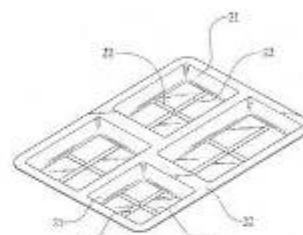


Fig.1 improved plate

### 2.3 Body Composition Test:

Subjects remove any metallic belongings or metal items before the test. After which, subjects should stand on the InBody 220 body composition analyser with bare feet in contact with the metallic sheets on the analyser, and with both hands relaxed while holding onto a bio impedance electrode each. Subjects should relax and face forward. The analyser uses the bioelectrical impedance method to perform the body composition analysis.

### 3. Statistics and data analysis

Data analysis was conducted using the SPSS statistical software for Windows 20.0. Analysis of covariance (ANCOVA) was used as the statistical method at a significance level ( $\alpha$ ) of .05.

## 4. Results and Discussion

### 4.1 Results

Table1. The Summary of t-test on body composition (Experimental group)

Variables	Pretest	Posttest	<i>t</i>	<i>p</i>
BMI	17.96±2.49	17.46±1.94	2.98	.01*
Water(kg)	22.24±7.09	21.16±4.65	1.48	.14
Protein(kg)	5.83±1.29	5.58±1.35	1.55	.12
Mineral(kg)	2.32±1.84	2.20±1.46	0.57	.57
Fat(kg)	8.33±3.75	7.25±2.87	9.33	.00*
Muscle(kg)	15.87±5.32	14.80±3.88	1.86	.07
Weight(kg)	38.17±8.74	36.09±8.01	2.77	.01*
WHR	.83±.04	.83±.04	1.77	.08
Fat (%)	21.33±6.49	19.75±5.69	3.78	.00*

BMR	1014.34±139.58	992.16±136.81	1.37	.17
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(\*p<.05)

Table2. The Summary of t-test on body composition (Control group)

Variables	Pretest	Posttest	t	p
BMI	18.53±3.10	19.39±3.41	-3.77	<b>.00*</b>
Water(kg)	20.75±4.21	21.90±5.24	-2.13	<b>.04*</b>
Protein(kg)	5.53±1.13	5.83±1.42	-2.07	<b>.04*</b>
Mineral(kg)	2.02±.37	2.10±.48	-1.71	.09
Fat(kg)	9.2±4.84	10.59±5.98	-3.8	<b>.00*</b>
Muscle(kg)	14.69±3.43	15.61±4.24	-2.12	<b>.04*</b>
Weight(kg)	37.51±8.8	40.45±11.49	-4.31	<b>.00*</b>
WHR	.85±.04	.85±.04	.47	.64
Fat (%)	23.48±8.16	24.99±8.20	-1.81	.07
BMR	987.49±123.27	1014.93±153.48	-213	.36

(\*p<.05)

Table 3. The Summary of covariance on body composition

Variables	Source	SS	DF	MS	F
BMI	Covariate	882.95	1	882.95	236.82
	interval	113.28	1	113.28	<b>32.60*</b>
	Error	684.57	197	3.48	
Fat(kg)	Covariate	2945.03	1	2945.03	427.71
	interval	325.95	1	325.95	<b>47.34*</b>
	Error	1356.47	197	6.89	
Muscle(kg)	Covariate	261.18	1	261.18	17.12
	interval	60.91	1	60.91	<b>3.99*</b>
	Error	3005.29	197	15.26	
Weight(kg)	Covariate	9698.93	1	9698.93	199.31
	interval	1189.32	1	1189.32	<b>24.44*</b>
	Error	9586.38	197	48.66	
WHR	Covariate	.02	1	.02	15.07
	interval	.01	1	.01	<b>8.43*</b>
	Error	.08	197	.00	
Fat (%)	Covariate	3430.83	1	3430.83	106.30
	interval	791.45	1	791.45	<b>24.52*</b>
	Error	6358.47	197	32.28	
Water(kg)	Covariate	443.42	1	443.42	19.81
	interval	61.73	1	61.73	2.76
	Error	4408.80	197	22.38	
Protein(kg)	Covariate	34.95	1	34.95	20.07
	interval	6.18	1	6.18	3.55
	Error	343.06	197	1.74	
Mineral(kg)	Covariate	1.68	1	1.68	1.41
	interval	.24	1	.24	.20
	Error	234.56	197	1.19	
BMR	Covariate	480618.60	1	480618.60	25.63
	interval	60448.37	1	60448.37	3.22
	Error	3694733.39	197	18754.99	

(\*p<.05)

## 4.2 Discussion

Ministry of Education examines students' height and weight in every domestic school quantity at the beginning of every term in such a manner that BMI makes up as health of student's commenting amount, calculate its BMI value uploads to the websites of Ministry of Education [6], with the health examination result of student of 6-23 years old, contrast the percentile rank according to gender, age to divide the standard, divide for being too light (<5%) , moderate (5-85%) , overweight (85%) And fat (95%) Compare with this research all in the standard range in experiment group and control group, but BMI and weight have downward trends after the experiment group is in the entering of dinner plate, its influence factor including eating habit, living environment, family's economic conditions, living attitude, disease, etc., among them the eating habit includes parents' eating habit [7] too. The family is the earliest social environment of child's contact, secondly it is in the school, so if parents often ingest the high heat or food with rich fat, children are choosing on the diet, will be influence [8] too, research reveals: Parents rich in more fruit vegetables at the diet is chosen, its child chooses to have more fruit vegetables in the diet too, so the diet rate by dinner plate of 8 weeks gets involved on the choice of the food, taught by the rate of dinner plate, make the child understand correct idea, even reach the change of the eating habit at dinner too except in Chinese food, therefore improve its weight and size, as decline BMI of the weight being thereupon decline.

According to investigation result of the nutrition of National Health Administration, the unbalanced phenomenon appears in the pupil's nutrition, including: Absorb too much meat, the situations of the fish, egg, beans, and the staple food, fruit vegetables and milks have insufficient phenomena, nutrition dinner plate that research get involved this classify their every major kind of food rate, teach student's idea on one hand, on the other hand help the uptake on child's food, no matter number value of cholesterol of cholesterol, low density or three impractical glycerin lipoprotein, etc. that relevant investigation finds teenagers too, the looks is found than already obviously and by a wide margin soaring in the past ten years the oil that the dinner plate leaches is twice of the dinner plate of nutrition on the market by this result of study, count experiment body of group fat serious to drop with the control group up to and shows the difference and is superior to the control grouping too on the number value, the standard diet rate makes the child's health number value controlled.

## 5. Conclusion and Recommendation

This research proves the design of the dinner plate of nutrition can control the uptake of oil quantity effectively, can include tactics one of in when being fat to control, reach apparently in the intersection of body and the intersection of fat and in weight through involvement of six week, can elongate "time", get involved with control by diet, believe to have apparent result on being fat to treat.

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**Conference Title:** 3rd International Conference on Global Issues in Multidisciplinary Academic Research (GIMAR- 2017), Tokyo, Japan

**Study Title:** Effects of Active Recovery Exercise on the Indicators of Eccentric Exercise Induced Muscle Damage

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#### ABSTRACT

**Purpose:** To investigate the effects of prolonged running following eccentric exercise on exercise induced muscle damage indicators. **Methods:** Twenty young untrained men assigned into active recovery (AR) and control (CON) groups based on their pre-determined  $\dot{V}O_{2max}$ . During the process of eccentric contraction (MAX) exercises, the subjects in the AR and CON groups performed 10 sets of 10 maximal isokinetic MAX of knee extensors (KE) and knee flexors (KF). After the MAX, AR group performed 1 hour level running at low-intensity of their pre-determined 50% $\dot{V}O_{2max}$ . The CON group performed the same MAX, as the AR group, without the running exercise. Maximal isokinetic voluntary contraction strength (ISO), muscle soreness (SOR) measured before, immediately, 1~5 days after MAX. Body temperature (BT) and mean blood flow (MBF) at femoral artery of ultrasound imaging were measured immediately before and after the level running. All data were analyzed by two-way repeated mixed-designed measures ANOVA. **Results:** After the MAX, ISO of the CON group significant reduces, and their SOR significant increases were observed ( $p < .05$ ). After the MAX, 1 hour level running significantly increased BT and MBF for AR group ( $p < .05$ ). Moreover, the indicators of EIMD of AR group was significantly smaller than the CON group ( $p < .05$ ). **Conclusion:** These results showed that recovery exercise promoted recovery rate after EIMD of both KE and KF by prolonged running.

**Keywords:** prolonged running, body temperature, ultrasound

#### INTRODUCTION & LITERATURE REVIEW

Cool-down (Recovery) exercise is an intervention used for recovery of exercise-induced muscle damage (EIMD) as previous studies indicate an increase in mean blood flow (MBF), mean blood velocity, elevate muscle temperature, increase range of motion is beneficial to attenuate symptoms of EIMD (Cheung, Hume, & Maxwell, 2003; Connolly Sayers, & McHugh, 2003; Howatson & van Someren, 2008). Effect of recovery exercise on EIMD is currently inconclusive. Most literatures target on a single muscle group [e.g. knee extensors or flexors (KE or KF)] for eccentric exercise (Takahashi, Ishihara, & Aoki, 2006; Olsen, Sjøhaug, van Beekvelt, & Mork, 2012), and the results cannot be generalized to the recovery of EIMD on bilateral lower extremity. Previous research mostly focus on recovery exercise can attenuate EIMD but not on the muscle temperature and blood flow change after recovery exercise, which had not been simultaneously monitored before. To date, no study has examined the effect of low intensity running active recovery exercise to the recovery on bilateral thigh muscles (KE and KF). Therefore, the purpose of this study was to investigate whether 1 bout of low intensity active recovery running exercise can cause significant change in muscle temperature and blood flow to speed up recovery process targeting bilateral thigh muscles (KE and KF).

#### METHODS

##### Subjects and general procedures

Twenty young untrained men ( $21.5 \pm 1.8$  yrs,  $171.7 \pm 2.3$  cm,  $67.5 \pm 6.5$  kg, and  $50.3 \pm 2.9$  ml·kg<sup>-1</sup>·min<sup>-1</sup>, respectively) assigned into active recovery (AR) and control (CON) groups based on their pre-determined  $\dot{V}O_{2max}$ . During the process of maximal isokinetic eccentric contractions (MAX) exercises, the subjects in the AR and CON groups performed 10 sets of 10 maximal isokinetic (ROM: 0°↔120°; 60°/s) MAX of KE and KF for bilateral lower limb. After the MAX, AR group performed 1 hour level running at low-intensity of their pre-determined 50% $\dot{V}O_{2max}$ . CON group only carried out MAX. Speed of the warm-up running exercise was 113.0±7.8m/min, at the rate between jogging and brisk walking.

##### Criterion measures

Maximal isokinetic voluntary contraction strength (60°/s; ISO) and muscle soreness (SOR) measured before, immediately, 1~5days after MAX. Body temperature (BT) and MBF at femoral artery of ultrasound imaging were measured before, immediately after the level running.

##### Data analysis



All data were analysed using a two-way repeated mixed-designed measures ANOVA. When a simple main effect was evident, a Tukey's post hoc test was conducted. A significant level was set at  $\alpha \leq .05$ .

## RESULTS

After the MAX, ISO of the CON group significant reduces, and their SOR significant increases were observed (Figure 1 & 2,  $p < .05$ ). After the MAX, 1 hour level running at  $50\% \dot{V}O_{2\max}$  significantly increased BT (pre=31.9°C, post=34.4°C) and MBF (pre=346.4ml/min, post=899.6ml/min) for AR group ( $p < .05$ ). Moreover, the indicators of EIMD of AR group were significantly smaller than the CON group (Figure 1 & 2,  $p < .05$ ).

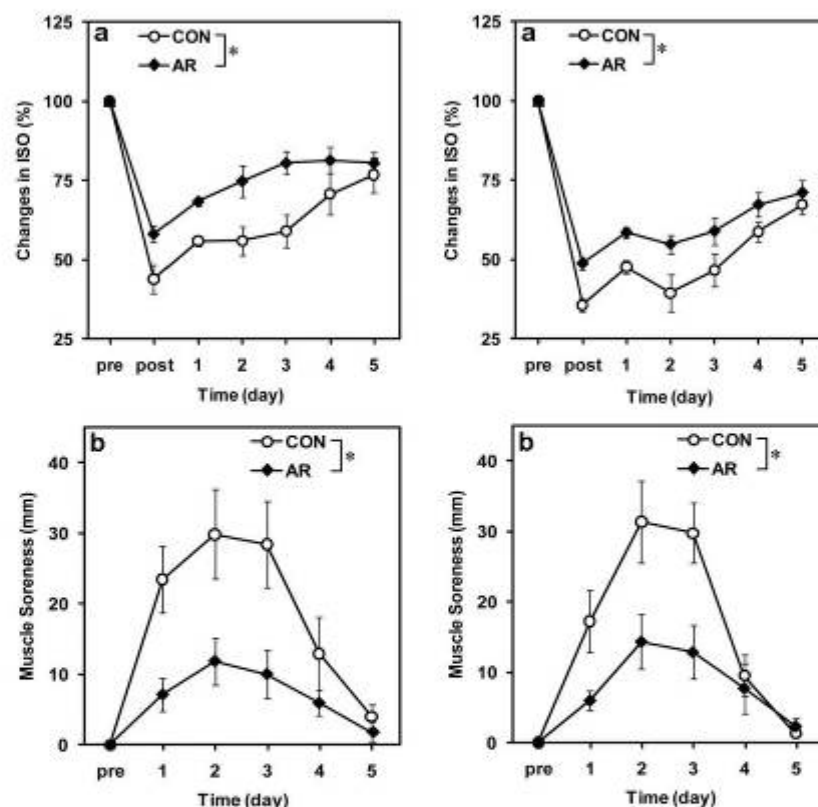


Figure 1. Changes in ISO (a) and SOR (b) for KE (left) and KF (right) after MAX. \*Significant difference between groups.

## DISCUSSION

This result supports the hypothesis proposed by Cheung et al. (2003) and Howatson and Someren (2008) that active recovery exercise can speed up EIMD recovery. BT and MBF post- running values of AR group were significantly increased, possibly due to a continuance of low intensity concentric contraction after the muscles were injured, with increased circulation to the muscle (Mohr, Akers, & Wessman, 1987; Robergs, Icenogle, Hudson, & Greene, 1997; Sergueef, Nelson, & Glonek, 2004) oxygen deliverance is increased and swelling reduced, thereby enhance recovery (Mohr et al., 1987). In addition, AR group represented a desired cool-down protocol without affecting neither exercise performance nor cause muscle damage. This notion is supported by previous studies reported by Genovely and Stamford (1982) with a 60 minute running at  $40\% \dot{V}O_{2\max}$  and Lin, Chen, Chen, Wu, and Tseng (2009) that discussed the effect of 30 minute leveled running exercise to muscle damage.

## CONCLUSION

These results showed that low intensity cool-down (active recovery) running exercise proved to increase muscle temperature and promote circulation, which efficiently promote recovery rate of EIMD indices for both KE and KF muscles.

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