

Profile of Pre-Practice Hydration Status of Indonesian Junior Sub-Elite Karate Athletes: Pilot Study

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Abstract—karate is high intensity sport which often leads to dehydration. The purpose of this study was to identify pre-practice hydration status of Indonesian junior sub-elite karate athletes. This descriptive cross-sectional research recruited junior (*under-17*) sub-elite karate athletes in Yogyakarta, Indonesia. The population sample entailed eleven players (6 male; 5 female, age 14.09 ± 2.34 years, weight 50.14 ± 10.85 kg, height 1.55 ± 0.11 m, BMI 20.65 ± 2.03 kg/m²). Hydration status was checked by urine specific gravity (USG) using urine strip test 15-30 minutes before training started. The values of USG were compared with the reference value to categorize the hydration status into *good hydration* (USG < 1.010), *minimal dehydration* (1.010 – 1.020), and *significant dehydration* (1.021 – 1.030). The study established that 90.9% (n = 10) of the participants suffered from dehydration and 10.1% (n=1) had good hydration before training. Six from 10 dehydrated athletes (60%) were categorized into minimal dehydration and the rest (40%; n = 4) were of significant dehydration. Incidence of pre-practice dehydration among junior sub-elite karate athletes in Indonesia was high. Education and promotive strategies are needed to prevent the risk of dehydration during exercise.

Keywords—*dehydration, karate, sub-elite, junior, Indonesia.*

I. INTRODUCTION

Karate is a popular kind of martial art in the world and it will be part of the 2020 Tokyo Olympics. Ideally, preparing high performance karate athletes starts at a young age. In Indonesia, both local and national government work together to build elite athletes. Local or provincial government covers scholarships for junior athletes, around 13 – 17 years old, to be trained as sub-elite athletes for competing in the national level events. Athletes with good performance will be trained to national level athletes (i.e. elite athlete) and will represent the nation in the international competitions.

Based on our observation, these sub-elite junior athletes undergo training sessions from afternoon to evening. They are trained within this timeframe period since they are student. The afternoon to evening training sessions becomes a concern due to the prior activities to the training that might potentially lead to lack of fluid intake in their body, a condition called dehydration. This occurs when the body lacks sufficient water intake, experiencing great water loss, or combination of these

two factors. Also, sweating is one of the most common factor resulting to body water loss.

Dehydration can influence sports performance and cause health problems. It also can lower cognitive or mental abilities, particularly when the level reaches more than 2% [1]. Cognitive abilities play important roles when performing a type of sport which requires skills, concentration and tactics such as karate. The cognitive functions and concentration level decreases can cause injuries especially if there is an incorrect technique or movement. Magee et al [2] assessed the hydration status of university or club athletes from various sports and showed that karate athletes were at the highest risk for dehydration during the training session compared to the others.

The high risk of dehydration among the athletes is due to the high level of intensity in this sport. Additionally, it is also attributed to wearing thick karate training apparel that will increase the level of sweat production during the training sessions. The pre-exercise dehydration suffered by the athletes can be of serious health problem because the fluid loss during training session will impair their dehydration status.

Dehydration prevention skills are needed for these athletes to fulfill water requirement level during exercise. Considering that hydration status assessment among junior sub-elite karate athletes has never been carried out thoroughly, it is indispensable to be performed.

This research aims to determine the hydration status profile among junior sub-elite karate athletes prior to training sessions. The data obtained can be used to create promotive-preventive programs regarding dehydration so that the athletes can understand the importance of fulfilling body fluid during exercise.

II. METHODS

A. Study Design and Participants

This descriptive cross sectional study recruited all junior sub-elite karate athletes in Yogyakarta, Indonesia. Subjects are junior athletes granted with scholarships provided by Yogyakarta Provincial Government, Indonesia in Karate sport. Interview method were conducted to ensure no

substances consumption that might influence the result of urine specific gravity test within 24 hours prior to test. The subjects and their parents agreed to join this research and signed the informed consent letter provided. This research was also approved by Faculty of Sports Science Universitas Negeri Yogyakarta, Indonesia.

B. Assessment of Hydration Level Status

The assessment of hydration level status was performed before the athletes were training. Subjects were asked to collect their urine sample 15-30 minutes before they started their training session. Athletes were not told about the intention of this urine sample collections to water intake habit remained the same (“real” condition).

Hydration status was assessed using urine strip test to measure urine specific gravity (USG). The result were then compared to the value references, namely (1) *good hydration* = less than 1.010 (2) *minimal dehydration* = 1.010-1.020 and (3) *significant dehydration* = 1.021-1.030 [3].

C. Data Collection and Analysis

Basic data such as name, gender, age, height and weight were recorded before the urine sample collection. Urine strip result was assessed by 2 experts to avoid miss-interpretation. An additional professional would be engaged to assess the urine strip if the two have different interpretation. All data collection was performed by the same person. The collected data was tabulated and processed using SPSS 22.00 software.

III. RESULTS

3.1 Participants

Eleven subjects consist of 6 males and 5 females, participated in this research. The characteristics of subjects are described in Table I.

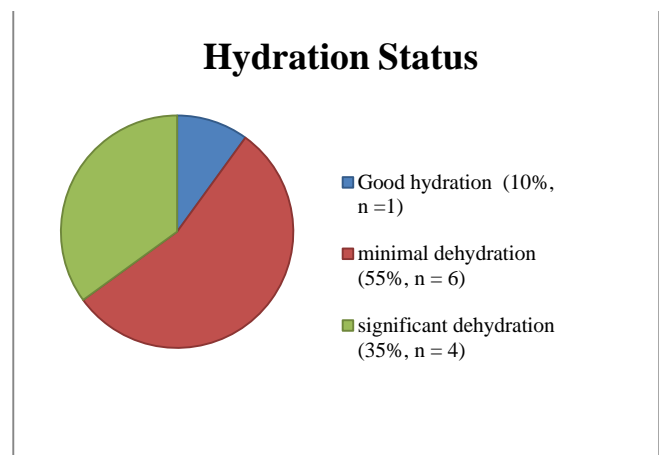
TABLE I. SUBJECTS CHARACTERISTICS

Characteristics	Subjects (n=11)
Age (year)	14.09 ± 2.34
Weight (kg)	50.14 ± 10.85
Height (m)	1.55 ± 0.11
BMI (kg/m ²)	20.65 ± 2.03

3.2 Hydration Profile of Subjects

Hydration level assessment showed that there are 90.9 % (n=10) of subjects were dehydrated before training and only 10.1% (n = 1) of the subjects were in hydration (good hydration). From 10 dehydration subjects, 6 (60%) subjects were categorized as “minimal dehydration” while the rest (40%, n =4) were categorized as “significant dehydration”. The result of this hydration status is presented in Table II.

TABLE II. HYDRATION STATUS OF THE SUBJECT



IV. DISCUSSION

This research showed that the incidence of pre-practice dehydration among junior sub-elite athletes in Yogyakarta is high (90.9%), indicating that athletes and their parents do not understand about the seriousness of fulfilling fluid requirement level in their body prior to training. The research result is similar to a research conducted by Spulveda et al which showed that many young athletes started their training in dehydrated conditions [4, 5].

Pre-exercise dehydration suffered by these junior sub-elite karate athletes will be harmful considering that even in a minimal dehydration level (1-3% water loss) can impair the cognitive-motor task and aerobic performance [6], [7]. Prevention of dehydration through education can be delivered to junior athletes following the American College of Sport Medicine (ACSM) and National Athletic Trainers Association (NATA) recommendation. They suggest to consume mineral water at least 500-600 ml 2-3 hours before exercise, 200-300 ml at 10-20 minutes prior to exercise and continue to drink of 200-300 ml water every 15-20 minutes during exercise. The fulfillment of the body fluid after exercise is sustained by taking 500-1000 ml of water/hour for 2 hours [1], [3].

This research used urine specific gravity (USG) to determine the hydration status of the athletes. Zubac et al stated that the hydration status assessment performed to athletes should use USG test and recommend measuring their weight as well [8].

V. LIMITATION

This study used limited number of subjects in this research, only engaged junior sub-elite karate athletes in 1 out of 34 provinces in Indonesia.

VI. CONCLUSIONS

The incidence of pre-practice dehydration in junior sub-elite karate athletes was high. Pre-practice dehydration decreased performance and caused health problems. Educating the athletes, parents, and coaches on the importance of water intake before, during, and after exercise is needed to prevent dehydration during exercise.

COMPETING INTERESTS STATE

None of the authors declare competing for financial interests.

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