

Fluid Consumption, Mood, and Anxiety in Pencak Silat Athletes of Universitas Negeri Yogyakarta

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Abstract: Pencak Silat is a traditional Indonesian martial art and sport with a rich history. The Pencak Silat team at Universitas Negeri Yogyakarta (UNY) has garnered numerous achievements and recognition. Proper fluid intake plays a pivotal role in an athlete's mental state and performance. This study aimed to investigate the relationship between fluid consumption, mood, and trait anxiety among 18 athletes from the UNY Pencak Silat team, selected purposively. Data collection involved the Fluid Intake SQ-FFQ questionnaire, the Brunel Mood Scale (BRUMS), and the Trait Anxiety Inventory questionnaire. The data were analyzed using Pearson and Spearman correlation tests ($p < 0.05$). Among the participants, 12 athletes (66.67%) belonged to the fighter category, while six (33.33%) were in the art category. The study found that 16 athletes (88.89%) had moderate trait anxiety, while two athletes (11.11%) exhibited mild trait anxiety. Notably, the volume of fluid consumption did not demonstrate a significant correlation with an athlete's mood. However, specific types of fluids were correlated with distinct mood states. For instance, the consumption of milk and ice cream was associated with feelings of fatigue ($p = 0.046$) and ($p = 0.012$), respectively. Similarly, the consumption of vitamin C beverages was correlated with expressions of anger ($p = 0.045$) and depression ($p = 0.020$). Overall, this study did not find a significant correlation between fluid consumption and anxiety levels among these Pencak Silat athletes.

1 INTRODUCTION

Pencak Silat is a traditional sport that originated in Indonesia, deeply rooted in Malay culture and governed by the Indonesian Pencak Silat Association (IPSI) (Hariono, 2006). Indonesian Pencak Silat athletes have been achieving remarkable success, as evidenced by their outstanding performance at the 2023 Sea Games in Southeast Asia, where they clinched 16 medals, including nine gold, six silver, and one bronze, securing Indonesia's position as the overall champion. This success follows their impressive performance at the 2022 Pencak Silat World Championship in Malaysia, where Indonesia secured 11 gold, nine silver, and eight bronze medals (Febriati, 2023; Isnanto, 2022).

Despite these achievements, several studies have highlighted suboptimal performance among Pencak Silat athletes, attributed to various factors, including

inadequate nutritional intake. Inadequate protein consumption, for example, can adversely affect athletes' hemoglobin levels (Widiastuti et al., 2009). It has been observed that many Pencak Silat athletes in PAB Yogyakarta do not consume sufficient protein sources, and some exhibit an endomorphic ectomorphic somatotype, indicating a dominance of body fat over muscle mass (Agustin et al., 2018). Studies also reveal a correlation between energy intake and the fitness level of Pencak Silat athletes, emphasizing the importance of appropriate energy intake to enhance performance (Tahniah, 2018). Furthermore, energy and protein intake among Pencak Silat athletes fall short of recommended levels, with 73.63% and 73.40%, respectively (Mahmudah et al., 2017). Afriani et al. (2017) added that many Pencak Silat athletes lack an adequate understanding of their daily nutritional needs, especially in terms of carbohydrate sources.

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Dehydration is another concern among Pencak Silat athletes in one of the UKMs in Yogyakarta, with a substantial 85% showing dehydration based on urine specific gravity and 52.5% based on urine color. It's worth noting that 20 male athletes (66.7%) and 16 female athletes (84.2%) have inadequate fluid intake. On average, athletes consume 2,051.20 ml/day, including mineral water (55%) and other beverages (95%). However, there is no significant association between the amount and type of fluid consumed and hydration status. The recommended fluid intake includes 400-600 ml before exercise and 150-350 ml every 15-20 minutes during exercise, adjusted for weight loss (Rachmawati et al., 2014; Indrawati et al., 2017). Dehydration can significantly impact athletes' performance, with a loss of 2% of body weight leading to decreased performance (Murray, 2007; Prado et al., 2012).

Ensuring proper nutrition compliance is crucial for optimizing athletes' performance. Nutritional intake, both from food and fluids, should be tailored to individual characteristics and exercise patterns. Many athletes lack the knowledge about the importance of meeting their nutritional needs, especially regarding their fluid intake, largely due to inadequate education. Extended physical exercise significantly increases fluid requirements, emphasizing the importance of consuming the right types and amounts of fluids (Setiawan, 2011; Murray, 2007; Zahra and Muhlisin, 2020; Ministry of Health of the Republic of Indonesia, 2014).

UKM Pencak Silat UNY is a prominent organization in Yogyakarta, known for its numerous medals and active participation in competitions, as observed in various tournaments, including the ASEAN Games (Supriyono, 2022). Preliminary studies at UKM Pencak Silat UNY have shown that athlete coaching is regularly administered by administrators and coaches, though mental coaching has not been a consistent practice. Mental well-being plays a pivotal role in coaching, directly impacting athletes' performance during competitions. Many athletes also lack understanding about the correct dietary and fluid intake while training and competing. The selection of the right fluid intake, including type and quantity, can significantly influence athletes' psychological stability and overall performance. Therefore, this study aims to investigate the correlation between fluid consumption and the mood and trait anxiety of Pencak Silat athletes.

2 SUBJECTS AND METHODS

This preliminary study was conducted in June 2023 at the UNY Pencak Silat Hall. The study participants consisted of Pencak Silat athletes who are members of the UKM Pencak Silat UNY, with a total of 18 individuals selected through purposive sampling. Inclusion criteria for participation required that the athletes be in good health and willing to participate as respondents. Data collected included respondent characteristics, fluid consumption data measured using the Fluid SQ-FFQ questionnaire, mood data assessed with the Brunel Mood Scale (BRUMS) questionnaires, and trait anxiety measured with The Trait Anxiety Inventory questionnaires. The Brunel Mood Scales and The Trait Anxiety Inventory were adapted from Afriani's (2014) research, which reported reliability coefficients of $r=0.881$ and $r=0.879$, respectively. Data analysis was performed using statistical software, with descriptive statistics provided for the mean and standard deviation of each variable. Bivariate analysis was conducted using the Pearson Correlation Test and Spearman Correlation Test ($p<0.05$). It is essential to note that this study obtained Ethical Clearance from the Health Research Ethics Commission, Faculty of Health Sciences, University of Respati Yogyakarta (approval number: 093.3/FIKES/PL/V/2023).

3 RESULTS

Table 1 displays the characteristics of the study's respondents. The age of the respondents ranged from 19 to 23 years. Among the participants, 12 athletes were classified in the fighter category, with another 6 falling into the arts category. The mood levels of the athletes were predominantly in the high category for the fatigue component, while other components were rated as sufficient. Notably, the athletes' daily fluid intake ranged from 2,519.58 to 5,379.38 ml.

Table 2 provides insights into fluid consumption, with water intake averaging around 2,000-3,500 ml per day. It's worth mentioning that most athletes had a preference for sugary beverages, including sweetened tea, vitamin C drinks, isotonic beverages, fruit juices, coffee, chocolate, and milk.

Table 3 illustrates the relationship between specific fluid consumption and mood and anxiety in Pencak Silat athletes. It revealed significant associations between milk consumption and fatigue ($p=0.046$) and ice cream consumption and fatigue ($p=0.012$). Additionally, there was a noteworthy

correlation between the consumption of beverages containing vitamin C and mood components, specifically anger (p=0.045) and depression (p=0.020).

Table 1: Characteristics of Respondents.

Characteristics	Sum (%)	Mean±Deviation Standard
Age (years old)	18 (100)	20 (19–23) [#]
Type of Pencak Silat Fighter Art	12 (66,67%) 6 (33,33%)	
Mood		
Anger	18 (100)	7,00±2,169
Confusion	18 (100)	7,44±2,254
Depression	18 (100)	6,55±1,580
Fatigue	18 (100)	10,00±1,571
Tension	18 (100)	7,61±2,872
Vigour	18 (100)	3,50(1,00–4,00) [#]
Trait Anxiety	18 (100)	31,05±5,93
Amount of Fluid	18 (100)	3.163,45 (2.519,58–5.379,38) [#]

[#]Description: Median (Min-Max)

Table 2: Amount of Fluid Intake from Various Beverage Types.

Type of Beverages	Total Intake [#]
Plain Water	2.250 (2.000-3.500)
Milk	28,57 (0-228,57)
Fermented Milk	0,445 (0-65)
Yoghurt	10,39 (0-500)
Ice cream	4 (0-42,86)
Soybean juice	0 (0-128,57)
Tea	1.714 (10,67-1.000)
Bottled tea	16,67 (0-357,14)
Coffee and chocolate	39,77 (0-714,28)
Carbonated drinks	1,86 (0-321,43)
Energy drinks	0 (0-6,67)
Cooling drinks	1,090 (0-142,86)
Spiced drinks	1,92 (0-75,24)
Mung Bean Juice	0,96 (0-142,86)
Fruit juice	57,14 (0-250)
Fruit-flavored drinks	0,68 (0-600)
Orange juice drink	3,35 (0-200)
Syrup	1,09 (0-57,14)
Isotonic drink, isotonic vitamin	69,05 (0-525,95)
Vitamin C drinks	83,54 (0-466,67)
Alcohol	0 (0-2,74)
Other (protein milk, coconut water)	1,37 (0-300)

Description: [#]Median (Min-Max)

Table 3: Relationship of Fluid Types with Mood and Anxiety in Pencak Silat Athletes^{##}.

Fluid Type	Sum (%)	p*						
		Anger	Confusion	Depression	Fatigue	Tension	Fatigue	Anxiety
Plain Water [#]								
Yes	18	0,95	0,30	0,51	0,74	0,51	0,22	0,46
No	0							
Milk								
Yes	17	1,00	0,53	0,73	0,04*	0,58	0,44	0,30
No	1							
Fermented Milk								
Yes	11	0,66	0,29	0,58	1,00	0,78	0,16	0,60
No	7							
Yoghurt								
Yes	12	0,65	0,57	0,84	0,76	0,46	0,29	0,47
No	6							
Ice Cream								
Yes	16	1,00	0,35	0,61	0,01*	0,42	0,84	0,12
No	2							
Soybean juice								
Yes	8	0,13	0,61	0,32	0,77	0,44	0,05	0,21
No	10							
Tea [#]								
Yes	18	0,56	0,97	0,58	0,39	0,49	0,16	0,68
No	0							
Bottled tea								
Yes	13	1,00	0,23	0,37	0,75	0,73	0,17	0,12
No	5							
Coffee								
Yes	16	0,31	0,35	0,33	0,05	0,28	0,47	0,78
No	2							
Carbonated drinks								
Yes	12	0,83	0,72	0,31	0,35	0,91	0,84	0,27
No	6							
Energy drinks								
Yes	1	0,16	0,12	0,09	1,00	0,21	0,44	0,30
No	17							
Cooling drinks								
Yes	11	0,67	0,28	0,79	0,77	0,31	0,16	0,31
No	7							
Spiced drinks								
Yes	14	0,20	0,96	0,54	1,00	0,92	0,31	0,35
No	4							
Mung Bean Juice								
Yes	10	1,00	0,25	0,31	0,77	0,20	0,95	0,21
No	8							
Fruit Juice								
Yes	16	0,74	0,72	0,38	0,65	0,48	0,84	0,89
No	2							
Fruit-flavored drinks								
Yes	6	0,17	0,72	0,61	0,35	0,78	0,29	0,93
No	12							
Orange juice drink								
Yes	9	0,40	0,15	0,14	0,77	0,12	0,38	0,24
No	9							
Syrup								
Yes	12	0,66	0,47	0,68	1,00	0,58	0,84	0,38
No	6							
Isotonic drink								
Yes	16	0,31	0,77	0,68	0,65	0,85	0,84	0,58
No	2							
Vitamin C drinks								
Yes	8	0,04*	0,114	0,02*	0,38	0,10	0,05	0,86
No	10							
Alcohol								
Yes	1	0,16	0,81	0,36	0,53	0,41	0,44	0,78
No	17							

Description: [#]Pearson Correlation test, ^{##} Spearman test, *Significant (p<0,05)

4 DISCUSSIONS

Athlete performance is influenced by a myriad of factors, encompassing technical ability, tactics, physical fitness, and the psychological and physiological aspects of athletes (Stolen et al., 2005). Notably, mood fluctuations, including emotions like anger, fatigue, and vigor, can be substantially impacted by mild dehydration (Armstrong et al., 2012). It is well-established that fatigue can lead to negative mood states, cognitive impairments, and reduced performance (Hockey et al., 2000). Furthermore, physical stressors can induce changes in behavior and increase anxiety levels (Chotiwat & Harris, 2006; Krause et al., 2008).

Proper nutritional intake, both in terms of type and quantity, plays a pivotal role in enhancing athletic performance. The need for precise dietary regulation extends to the composition and quantity of nutrients to meet specific requirements (Ministry of Health of the Republic of Indonesia, 2014). According to the AKG (2019) recommendations, men aged 19-29 years typically require around 2,500 ml of fluid per day for daily activities. In the context of this study, athletes' daily fluid intake ranged from approximately 2,519.58 to 5,379.38 ml, indicating that, on the whole, their fluid consumption was adequate. However, some athletes might need adjustments, particularly with regard to training requirements. It is noteworthy that many athletes in this study exhibited a penchant for consuming sugary beverages, including milk, sweet tea, packaged tea, packaged coffee, orange-flavored drinks, and both natural and packaged orange juice. This aligns with other research that suggests a high percentage of Pencak Silat athletes frequently indulge in and favor sweet foods and beverages, which are known contributors to overweight issues (Faizal & Hadi, 2019).

This pattern of fluid intake is in line with prior studies indicating that athletes often fall short in terms of the amount, type, and timing of their fluid consumption. One study, for instance, identified a correlation between energy drink consumption and an elevated pulse rate in athletes at the PS Sleman Development Center (Afriani et al., 2022). Another study revealed that a substantial proportion of athletes (92%) were experiencing mild dehydration, with 88.0% of athletes falling into the category of inadequate water consumption, averaging only 68% or 2,300 ml per day (Ulvie et al., 2017).

Selecting the right fluid intake is paramount for athletes, especially during prolonged exercise sessions lasting over an hour. Beverages like soft drinks, syrups, and fruit juices should be avoided

within an hour of training or competition. Likewise, diuretic beverages such as tea, coffee, and carbonated drinks are not recommended for consumption during training or competition (Sasmarianto & Nazirun, 2022; Kuswari & Gifari, 2020).

Dehydration can have adverse effects on aspects such as vigor, self-esteem, short-term memory, and attention. Rehydration through water supplementation has been shown to alleviate fatigue, improve attention, and enhance reaction times (Zhang et al., 2019). In this study, a correlation was observed between milk consumption and fatigue, with a correlation coefficient of -0.476, signifying that higher milk consumption is associated with reduced fatigue among athletes. This aligns with research indicating that milk, as a source of protein, aids in the muscle recovery process. Several studies have demonstrated that consuming chocolate milk can replenish fluids lost during exercise and restore glycogen stores in muscles, ultimately reducing fatigue. This effect is further enhanced by the antioxidant content in chocolate milk, which helps combat free radicals. Opting for low-fat milk is a wise choice given its rich B vitamin and calcium content, which supports nerve transmission and muscle contraction (Jauhari et al., 2014; Glenniza, 2015; Kameswara & Fitriyanti, 2015).

There exists a notable relationship between ice cream consumption and fatigue conditions, with a correlation coefficient of -0.543, indicating a substantial correlation. Ice cream is rich in milk protein, boasting an excellent biological value due to its abundance of essential amino acids. It predominantly consists of milk, which is high in lactose, facilitating hydrolysis into glucose and galactose, thus enhancing calcium and phosphorus absorption in the body. Milk is also a rich source of calcium, phosphorus, and other health-beneficial minerals. Moreover, ice cream contains lactoferrin and cytokines that can enhance immunity. The inclusion of additional ingredients like vegetables, fruits, probiotics, spirulina, and nuts can make ice cream a healthier option for consumers (Deosarkar et al., 2016; Patil & Banerjee, 2017).

Furthermore, there is a significant correlation between vitamin C consumption and reduced anger (correlation coefficient -0.477) and depression (correlation coefficient -0.542) among athletes. The results of this study indicate that competitive Pencak Silat athletes consume more vitamin C than their art counterparts ($p=0.043$), in line with studies demonstrating links between plasma concentrations of vitamin C and levels of depression and anger (Pullar et al., 2018). Additionally, research shows that the consumption of 1000 mg/day of vitamin C for

four weeks can enhance work motivation, focus, and cognitive performance (Sim et al., 2022). Wang et al. (2013) suggest that administering 500 mg of vitamin C twice a day can reduce mood disorders and psychological stress. Vitamin C plays a pivotal role in enzymatic reactions, neurotransmitter transport, and hormone biosynthesis. It is directly associated with the dopamine β -hydroxylase reaction, producing norepinephrine to stabilize psychological well-being (Parker, 1997).

This study reveals that trait anxiety among Pencak Silat athletes predominantly falls into the moderate category, with ten individuals, compared to the six art athletes. Notably, athletes experiencing dehydration tend to exhibit increased anxiety (Ganio et al., 2011). However, this study did not establish any significant relationship between the amount and type of fluid intake and trait anxiety conditions. Trait anxiety is influenced by various factors. Consuming large quantities of caffeinated beverages like tea, coffee, and chocolate drinks may have detrimental effects, leading to anxiety, reduced focus, irritability, insomnia, and physiological disturbances such as cardiac arrhythmias (Spriet, 2014).

Anxiety is often a consequence of insufficient fluid intake, as evidenced by increased blood pressure and pulse rate. Consuming water along with carbohydrates and vitamin C can reduce state anxiety and pulse rate in athletes (Afriani et al., 2016). However, another study found no significant correlation between fluid intake and vitamin C consumption and anxiety conditions in soccer athletes (Afriani et al., 2017). Trait anxiety in athletes often stems from innate personality traits and can significantly impact physiological changes in blood pressure and pulse rate due to the instability of sympathetic and parasympathetic nerves (Passer & Smith, 2007). Consequently, emotional stability plays a crucial role in an athlete's performance during training and competition. Positive motivation is essential to increase the activity of neurotransmitters like dopamine and serotonin (Lane et al., 2010; Silverthorn, 2013).

Several studies emphasize that providing athletes with the appropriate type and quantity of beverages can effectively counter dehydration, improve mood, alleviate anxiety, and enhance VO₂ max values (Afriani et al., 2015; Afriani et al., 2017; Puspaningtyas et al., 2015). To enhance athletes' understanding of regulating fluid intake and managing mood and anxiety, comprehensive education is essential. Providing education can significantly increase knowledge and foster positive attitudes. Nutrition education, in particular, can

enhance athletes' knowledge and attitudes towards selecting appropriate food and beverage options (Waryana and Wijanarka, A., 2013; Sari et al., 2018; Puspaningtyas et al., 2019; Afriani et al., 2021).

5 CONCLUSION

In conclusion, this study demonstrates a correlation between fluid consumption and mood components, specifically fatigue, anger, and depression. However, no significant correlation was found between fluid consumption and athletes' anxiety. It is imperative to investigate and educate Pencak Silat athletes about the management of mood, anxiety, and fluid intake to enhance their overall performance.

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