Effect of hydration education with whatsapp group media in increasing in fluid knowledge, fluid intake and hydration status of football athletes

By Fillah Fithra Dieny

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Abstract

This study aim to determine the effectiveness of whatsapp group social media use to increase knowledge, fluid intake hydration status among football athletes. This type of research is experimental on athletes aged 15-18 years old in Bantolo football club. As many as 30 athletes were taken as sample by using consecutive sampling, divided into 3 groups. Nutritional information interventions regarding fluid regulation for athletes were given within a month by using different media for each group; PowerPoint (GPP), Whatsapp (GWA), and leaflet for control group. After the intervention there was an increase of knowledge in the GPP and the GWA. The subject has increase in fluid intake on the day before exercise, the training day and the day after. The increase in fluid intake for the training day was in the Control Group, GPP, and GWA. And after the intervention there was an increase in hydration status before training in the GPP, the GWA and in the hydration status after training there was an increase in the Control Group, the GPP, GWA. Thus, from the study, it could be concluded that Whatsapp is the most effective medium to increase nutritional knowledge and fluid intake the day before training, trainingday and day after exercise and hydration status before and after.Providing information using Whatsapp media is more effective in increasing nutritional knowledge, fluid intake and hydration status.

Keywords : *Whatsapp, nutritional knowledge, fluid intake and hydration status*

INTRODUCTION

The current condition of the hydration status of football athletes is still poor, proven by the results of research on adolescent football athletes in Semarang that showed that almost all athletes consume fluids during exercise which are classified as low, as many as 89.4% athletes experienced significant dehydration and 10.6% athletes experienced minimal dehydration (Putriana & Dieny, 2014). Meanwhile, the results of another study conducted on 107 teenage football athletes, 95 athletes were dehydrated even before training (Arnaoutis, Kavouras, & Kotsis, 2013). This condition should never occur in athletes who should have greater fluid requirements than non-athletes because of their high level of physical activity. Dehydration that occurs in athletes will greatly disrupt performance because it reduces concentration, inhibits the rate of energy production, and decreases skills in playing football such as shooting and passing the ball (Owen, Kehoe, & Oliver, 2012; Ramdhan & Rismayanthi, 2016) . Decreased performance in athletes due to dehydration will certainly have

an impact on the low chances of achievement in every competition they participate. Fluid control in athletes is important to prevent dehydration.

One of the causes of dehydration in athletes is due to low knowledge of fluid intake and inadequate fluid intake (Gordon, Kassier, & Biggs, 2015; Noor, Ulvie, Kusuma, & Agusty, 2017). Based on the initial survey conducted on football athletes, they did not get the information and education related to fluids and dehydration. In addition, the coach's knowledge about fluids intake and dehydration is still low, so that the control and evaluation of hydration in athletes is not optimal. In different studies that have been done with media such as PowerPoint, video playback and providing counselling turned out to be able to increase knowledge in athletes and can change athlete behavior to improve hydration status in football athletes (Masri, Ilham, & Gusti, 2018; Sobana & Many, 2014). However, education with the media takes a lot of time and must be direct meeting (Rahmawati, Isnawati, & Rahayuni, 2016). Meanwhile, Booklets and Leaflets cannot display animation and sound, making them less attractive. Moreover, during the COVID-19 pandemic, large-scale restrictions have been made so that face-to-face (direct) meetings cannot be performed freely as before the pandemic. Therefore, we need an educational method that can be done online (without meeting in person).

In 2019, based on Digital Report data, 83% of social media users are WhatsApp users. WhatsApp is also one of major social media used in Indonesia to communicate in text messages (Trisnani, 2017). Several studies on children at school have proven that using WhatsApp Social Media Groups can improve critical thinking and learning motivation which can be done anytime in a casual manner (Dar et al., 2017; Kartikawati & Pratama, 2017).

WhatsApp group feature can contain up to 256 members. They can exchange text messages, images, videos, voice and even voice and video calls (Barhoumi, 2015; "WhatsApp Features," 2020). This WhatsApp social media group can provide fast information even though the sender and recipient of the message are in distant places. In addition, delivered

message can also be kept confidential with the end-to-end encryption (Mazzuoccolo et al., 2018). Education provided with social media for 2 weeks to 1 month can increase knowledge, therefore one-month education would also be provided in this study (Firmansyah, Tamtomo, & Cilmiaty, 2019; Zaki & Sari, 2019). Moreover, education using WhatsApp media has not yet been used and evaluated for educational purposes for football athletes.

Based on the above-mentioned backgrounds, we are interested in using WhatsApp social media groups to provide education about fluid intake and to evaluate the effectiveness of WhatsApp social media groups in increasing fluid intake and hydration status of football athletes.

METHODS

The study was conducted at the Bantolo Sakti FC Football Club, Wirosari District, Grobogan Regency in June – July 2020. This research is an experimental study with a Quasi-Experimental approach with Control Group Pre-Post–Test Design. The study falls into sports nutrition field.

The study subjects were football athletes who were sampled by consecutive sampling. Consecutive sampling is a sampling technique in which every subject meeting the criteria of inclusion is selected until the required sample size is achieved. The number of subjects taken was 30 athletes using the Federer formula. From a total of 30 subjects, they were randomly divided into 3 groups consisting of 10 subjects in the control group, 10 subjects in the PowerPoint group (GPP) and 10 subjects in the WhatsApp group (GWA).

The independent variable in this study is the use of media in providing hydration education to athletes, namely WhatsApp Group, PowerPoint, and leaflets. Education about fluid and electrolyte regulation in athletes (fluid definition, function, fluid and electrolyte balance, fluid regulation in athletes, types of fluids for athletes), as well as about dehydration in athletes (definition, causes, consequences, how to prevent and overcome). The dependent variables in this study are nutritional knowledge, fluid intake and hydration status of football athletes. The data collected include the identity

data of the research subjects, the results of anthropometric measurements (weight, height), the level of nutritional knowledge of athletes who were measured using a validated and reliable knowledge questionnaire, the athlete's fluid intake on a day were measured using the 24-hour food and drink recall method, and the athlete's hydration status was measured using a urine colour scale which was categorized into 3, namely good hydration, poor hydration and dehydration.

All subjects had been given an overview about the study before hand separately in each group. The group that was given education through WhatsApp was conducted online without direct meeting for 1 month, while the PowerPoint group had a direct meeting once a week for 1 month via a lecture class. Similar to anthropometric data collection, fluid intake and hydration status are carried out directly on athletes. The entire process of education and data collection carried out offline during the COVID-19 pandemic had implemented strict health protocols accompanied by the coaches.

Data analyses were carried out using the SPSS 24.0 for Windows programme. The data were analysed by mean of Univariate method to describe the characteristics of the research subjects. Furthermore, Bivariate data analysis was carried out on the variables of nutritional knowledge, fluid intake and hydration status. The paired t-test would be used when the data has a normal distribution, while the Wilcoxon test for data that is not normally distributed. Both analyses aim to determine a significant difference before and after the intervention. The analyses then continued to the multivariate test using the ANOVA test to analyse more than 2 variables with normal distribution, and the Kruskal Wallis test on data that was not normally distributed. The test aims to determine which media is the most effective for increasing knowledge of nutrition, fluid intake and hydration status among football athletes.

RESULTS

Characteristics of the participants in this study include age, nutrition status, nutrition-related knowledge, fluid intake, and hydration status are

described in Table 1. Among all study participants, only one has a good score for nutrition-related knowledge (score= 85), while most of the participants have moderate scores, and the rest 40% have low scores.

Almost all study participants have fluid intake below the cut-off points of 77%. On average, the study participants consumed about 2.4 L of fluids within 24hours, on the training day. On average, the participants consumed about 1.5 L of fluids within the training session which was calculated 4 hours before and 4 hours after and during the training session.

Table 1. Mean and Standard Deviation of Variables Included in the Study

Subject Characteristics	Control Mean ± SD	GPP Mean ± SD	GWA Mean ± SD	p-value
Age (age)	16.9 ± 1.19	16.3 ± 1.2	17.1 ± 0.99	0.215
BMI (z-score)	-0.636 ± 0.75	-0.115 ± 0.41	17.1 ± 1.45	0.428
Fluid Knowledge (score)	64.5 ± 12.12	56 ± 10.7	58.5 ± 9.44	0.977
Fluid Intake (L)	2.4 ± 336.8	2,4 ± 265	2.4 ± 380	0.28
Hidration Status before exercise (score)	6.8 ± 1.03	6.8 ± 1.22	6.5 ± 0.97	0.776
Hidration Status after exercise (score)	7.4 ± 0.96	7 ± 0.81	7.3 ± 0.8	0.241

Table 2 shows that most participants have a moderate score for nutrition-related knowledge, but the rest 40% has low scores. Moreover, most of the participants have low fluid intakes resulting in poor hydration status. There were no athletes with optimum hydration status, and most of them were dehydrated during training sessions. On average, the participant's urine colour was scored 6 before the training session with dark yellow colour, which therefore classified as dehydrated. After the training session ended, the participant's hydration status worsened; 96.7% (n=29) participants were dehydrated with average urine colour scored 7, showing a very thick yellow colour.

Table 2. Characteristics of Subjects Before Intervention

Subject Characteristics	Control (n=10)	GPP (n=10)	GWA (n=10)	Total	n %
Age					
15 years	2	4	1	7	23.3
16 years	1	1	1	3	10
17 years	3	3	4	10	33.3
18 years	4	2	4	10	33.3

Nutrition Status					
Underweight	1	0	1	2	6.7
Normal	9	10	6	25	83.3
Overweight	0	0	2	2	6.7
Obese	0	0	1	1	3.3
Fluid knowledge					
Good	1	0	0	1	3.3
Enough	6	6	5	17	56.7
Less	3	4	5	12	40
Fluid intake on exercise days	1	1	0	2	6.6
Adequate	9	9	10	28	93
Less					
Hydration status before exercise					
Hydrated	0	0	0	0	0
Low hydrated	1	2	1	4	13.3
Dehydration	9	8	9	26	86.7
Hydration status after exercise					
Hydrated	0	0	0	0	0
Low hydrated	0	1	0	1	3.3
Dehydration	10	9	10	29	96.7

Table 3 shows an increase in nutrition-related knowledge scores for GPP and GWA. After one month of intervention, there was a significant increase in fluid intake in all treatment groups both during, before, and after the training session. However, there was no significant difference found in the control group before the training session and GPP after the training sessions. On the day before the training session, there was a significant increase in GPP and GWA compared to the control group. After the intervention, there were a lot fewer athletes with dehydration, which was showed by a significant improvement in hydration status for GPP and GWA.

Table 3. The difference in Nutrition-Related Knowledge, Fluid Intake, and Hydration Status, Before and After Intervention for Each Group

Group	Before Mean ± SD (ml)	After Mean ± SD (ml)	p-value
Fluid knowledge			
Control	64.5 ± 12.12	70.5 ± 16.74	0.074[a]
GPP	56 ± 10.7	77.5 ± 11.11	**0.000[a]**
GWA	58.5 ± 9.44	93 ± 4.2	**0.000[a]**
Fluid Intake before exercise			
Control	1885 ± 349.6	1901 ± 351.7	0.149[a]

GPP	1965 ± 281.9	2280 ± 256.2	2.001[a]
GWA	2075 ± 331.03	2645 ± 140	0.000[a]
Fluid Intake in exercise days			
Control	2370 ± 336.81	2517 ± 278.7	0.015[a]
GPP	2395 ± 265.04	2752 ± 190.19	0.000[a]
GWA	2365 ± 380	3290 ± 231.42	0.000[a]
Fluid Intake after exercise			
Control	2040 ± 240.13	2168 ± 240	0.015[a]
GPP	2145 ± 292.92	2330 ± 235	0.118[a]
GWA	2435 ± 402	3005 ± 368.51	0.003[a]
Hydration Status Before Exercise			
Control	6,8 ± 1.032	5.9 ± 0.99	0.191[a]
GPP	6,8 ± 1.22	4.3 ± 1.63	0.005[b]
GWA	6,5 ± 0.97	2.8 ± 1.22	0.000[a]
Hydration Status After Exercise			
Control	7.6 ± 0.51	6.9 ± 0.87	0.008[b]
GPP	7.4 ± 0.96	5.3 ± 1.15	0.005[b]
GWA	7 ± 0.81	4.3 ± 1.15	0.007[b]

[a] Paired T-test, have a significant difference (p<0.05)
[b] Wilcoxon Test, have a significant difference (p<0.05)

Table 4 shows a significant difference in the delta of participant's nutrition-related knowledge between the three media. The Bonferroni table shows a p-value <0.001 for the WhatsApp group; indicated that WhatsApp media is more effective compared to PowerPoint and the control group. The average score for nutrition-related knowledge in GWA was the highest (score= 93) compared to the other groups. The delta value for the increase in knowledge in GWA was also the highest compared to other groups.

Table 4. Alteration in Nutrition-Related Knowledge Score and Fluid Intake After Intervention

Variabel	Grup Kontrol (n=10)	GPP (n=10)	GWA (n=10)	p – value
	Mean ± SD	Mean ± SD	Mean ± SD	
Δ Score of Fluid Knowledge	6 ± 9.36	21.5 ± 8.51	34.5 ± 10.3	**0.000ᶜ**
Δ Fluid intake before exercise (ml)	16 ± 32.04	315 ± 194.43	570 ± 237.11	**0.000ᶜ**
Δ Fluid intake during exercise (ml)	147 ± 154.2	357 ± 170.16	925 ± 407.05	**0.000ᶜ**
Δ Fluid intake after exercise (ml)	128 ± 134.39	185 ± 338.33	570 ± 445.47	**0.012ᶜ**

ᶜAnova Test, have a significant difference (p<0.05)

Furthermore, the ANOVA test performed to the data of the fluid intake on the day before, during, and after training sessions resulting in a p-value <0.05(Table 4); there were differences between media used (WhatsApp, PowerPoint, and Control). The Bonferroni table shows that WhatsApp media has the most significant value compared to the PowerPoint and the control group.

Table 5. Alteration in Hydration Status After Intervention

Parameter	p-value
Hydration Status Before Exercise	**<0.001ᵈ**
Δ Control – GPP	**0.005ᵉ**
Δ Control – GWA	**0.000ᵉ**
Δ GPP – GWA	**0.049ᵉ**
Hydration Status After Exercise	**0.002ᵈ**
Δ Control – GPP	**0.001ᵉ**
Δ Control – GWA	**0.006ᵉ**
Δ GPP – GWA	0.237ᵉ

ᵈ Kruskal Wallis test, have a significant difference (p<0,05)
ᵉ Mann Whitney U Test, have a significant difference (p<0,05)

The difference (delta) in hydration statuses before the training session was analysed using the SPSS to determine which media has the most influence in hydration status change. Because the data was not normally distributed, the Kruskal-Wallis test was performed to observe any difference between the three groups. The Mann-Whitney-U-Test was performed in each group to find which groups have significant differences. Table 5 shows a significant difference in the hydration status between GPP and GWA before a training session; based on the average increase, GWA

has the most increase compared to GPP, meaning that WhatsApp is more effective than PowerPoint. The hydration status of GPP and GWA after a training session was better compared to the control group. However, there was no difference observed in the comparison between GPP and GWA, which shows that both PowerPoint and WhatsApp were equally effective in increasing hydration status. Right after hydration, the GPP and GPA showed a similar result: poor hydration level.

DISCUSSION

A total of 30 participants was involved in this study. The participants were then divided into three groups of 10; the control group, the PowerPoint group (GPP), and the WhatsApp group (GWA). The study participant is a football athlete from the Bantolo Sakti Football Club at Kabupaten Grobogan. Nutrition education was provided to these groups using three different media to assess which media is the most effective education media. After the nutrition education intervention was delivered using PowerPoint and WhatsApp, the study results showed an increase in nutrition-related knowledge in GPP and GWA. Subjects in GPP and GWA was able to answer questions correctly by 70% and 90%, respectively.

Based on the recall data on fluid intake and fluid-related knowledge obtained by interviews before the intervention, we found that the participants did not know the amount of fluid should be consumed and which drinks were prohibited and recommended. After the intervention, participants understand the recommended fluid intake that is useful to support their performance. WhatsApp media has the most significant value–meaning that WhatsApp is the most effective media to increase nutrition-related knowledge. This is in line with a study conducted on students to increase their knowledge; WhatsApp can be an interesting and fun learning media that enables the educators to share some pictures used in the learning process to enhanced students understanding (Amry, 2014). Besides, the utilisation of WhatsApp media also allows participants to freely express their opinion at any time. WhatsApp provides freedom to send messages and

allowing participants to re-read old messages, so the participants can review the previously provided learning materials (Akpan, Kufre, & Abe, 2017; Gon & Rawekar, 2017). Meanwhile, the learning process using PowerPoint media requires participants and teachers to meet face-to-face; usually, participants cannot re-read the information that has been provided. Besides, this one-way learning process with the informant as a centre of information will lead to boredom for the recipients (Hanida, Iriani, & Arthur, 2015).

After an intervention on the participant's fluid intake was performed, a significant increase in fluid intake was observed, especially in GWA. The increase in fluid intake in GWA on the day of the training session was 925 mL with a mean intake of 3290 mL (± 231.42SD). The increase in fluid intake is in line with fluid-related knowledge. Based on research conducted on adolescents, good knowledge on fluid intake leads to appropriate water adequacy (Bakri, 2019). The fluid intake in GWA is sufficient based on the comparison of fluid intake and the overall participant's needs. While in GPP, the average intake during the day of the training session is 2752 mL (± 190.19 SD), but some athletes still had an insufficient fluid intake. The fluid intake in GWA after the intervention during the day of the training session reached 2506 mL and the intake increased to 893 mL.

The increase in GWA fluid intake is higher than GPP because the increase in GWA knowledge is more significant than GPP. Providing education with the WhatsApp group can increase the participant's fluid intake due to an increase in knowledge about fluid regulation for football athletes. An increase in knowledge leads to an increase in the cognitive abilities of a person, so hopefully, the compliance of a person to the regulation of his intake will also increase (Roring, Posangi, & Manampiring, 2020). In addition, the WhatsApp media feature that can send messages at any time and in a short time can be used as a reminder for the participants and to evaluate the fluid intake. On the contrary, the PowerPoint media did not have such features.

All subjects were measured for hydration status with urine colour samples at baseline and after the intervention. Preceding the intervention, most of the participants were dehydrated even before the training session. Dehydration experienced by the participants which might cause by inadequate fluid intake, was due to low nutrition-related knowledge. After the intervention, there was an increase in the hydration status of the participants. The increase in the athlete's hydration status was due to an adequate fluid intake–the participants consumed more fluids than before the intervention. Furthermore, regular fluids intake during the training session could reduce dehydration levels (Gordon et al., 2015). The hydration status in the treatment group was classified as adequate and poor hydration. Even when there were no participants who experienced dehydration a after training session, the participants still had a poor level of hydration. In addition, the types of fluid consumed by the participants also affect their hydration status (Anggita, Ali, & Mukarromah, 2018). The increase in the participant's hydration status was also enhanced by the weight loss measured ± 30 minutes before training. The body weight measurements after training were carried out immediately after the training session ended. The average weight loss on GWA after the intervention was 0.7% while before the intervention was 1.5%. Whereas in GPP the weight loss before and after the intervention was 1.6% and 0.9%, respectively and the weight loss in the control group before the intervention was 1.6% and after the intervention was 1.5%. Participants who lost 1% to 3% of body weight experienced thirst, dull taste, feelings of discomfort, increased heart rate and decreased performance by 10% (Penggalih, Hardiyanti, & Sani, 2016). Based on the test results and the increase in hydration status before training, the GWA had the most significant improvement by incorporating WhatsApp as an education media which can effectively improve hydration status in football athletes compared to other media. However, both PowerPoint and WhatsApp can improve participant's hydration status which was measured after the training session ended.

The WhatsApp group is considered capable of delivering good information so that it might increase the athlete's knowledge leading to adequate fluid intake and increases in the hydration status. During the current COVID-19 pandemic, which requires everyone to maintain a distance, avoid crowds to prevent the transmission, and many people were quarantined or isolated, this condition makes the face-to-face learning process is impossible. Therefore, an online learning process can be a good solution (Masters et al., 2020; Radha, Mahalakshmi, Kumar, & Saravanakumar, 2020). Overall, the WhatsApp Groups can be a good alternative for learning media.

CONCLUSION

Most of the Bantolo Sakti FC football athletes had poor knowledge before the intervention, this is in line with low fluid intake and the number of athletes who were dehydrated even before training/matches. Providing nutrition education through WhatsApp Groups can be a good option in increasing knowledge, fluid intake, and improving the hydration status of football athletes.

ACKNOWLEDGMENT

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