THE EFFECT OF OLIVE OIL SUPPLEMENTATION IN ADOLESENCE

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Abstrak

Latar Belakang : Minyak zaitun telah terbukti menurunkan resiko kejadian aterosklerosis melalui efeknya sebagai anti inflamasi, anti oksidan, dan vasodilator. Polifenol yang dikandung oleh minyak zaitun berfungsi sebagai penangkal reaksi *Reactive Oxygen Species*. Pada Surah Al Mukminin ayat 20 disebutkan bahwa minyak zaitun dapat berguna sebagai penambah nafsu makan. Mekanisme kerja minyak zaitun dapat terjadi melalui kerja MUFA sebagai kandungan minyak zaitun pada *gut brain axis* melalui hormon ghrelin yang dihasilkan oleh usus. Anak remaja masih menjadi perhatian dikarenakan masa remaja merupakan masa terjadinya pertumbuhan dan perkembangan yang tentunya memerlukan asupan gizi yang adekuat. Terjaganya nafsu makan pada anak remaja menjadi penanda yang baik bagi tercukupinya kebutuhan gizi bagi tumbuh kembang yang optimal.

Tujuan : Penelitian ini bertujuan menilai pemberian minyak zaitun sebanyak 3 x 15 ml selama 14 hari terhadap skor nafsu makan anak remaja.

Metode Penelitian : Penelitian ini merupakan penelitian uji klinis acak buta tunggal yang berlokasi di Tahfizh Al Quran Zam-Zam. Melalui metode *purposive sampling* diperoleh 30 anak laki-laki remaja yang berusia 14- 17 tahun. Minyak zaitun sebanyak 3 x 15 ml diberikan selama 14 hari kepada 2 kelompok yaitu kelompok perlakuan (n =15) dan kontrol (n =15) yang memenuhi kriteria inklusi. Data indeks massa tubuh diambil dengan pengukuran berat badan dan tinggi badan. Penilaian skor nafsu makan dilakukan pre dan post intervensi sedangkan data rekam makan 24 jam diambil sebanyak 5 kali. Analisis statistik dilakukan dengan menggunakan uji *chi square* untuk melihat perbedaan persentase skor nafsu makan. Uji T dan *Mann Whitney* dilakukan untuk menghitung perbedaan asupan antar kelompok.

Hasil Penelitian : Tidak ditemukan perbedaan proporsi skor nafsu makan pada kelompok perlakuan (p = 1) ataupun kelompok kontrol (p = 0.46). Penelitian menemukan terdapat kenaikan asupan energi dan karbohidrat yang lebih tinggi pada kelompok kontrol dibandingkan kelompok perlakuan (p = 0,01, p = 0,02) berturut-turut.

Kesimpulan : Tidak ada perbedaan skor nafsu makan dengan pemberian minyak zaitun pada anak remaja.

Kata kunci : minyak zaitun, asupan makan, skor nafsu makan, anak remaja

Abstract

Background : Olive oil is well-known for its anti-inflammatory, antioxidant, and vasodilator effects. These effects have been proven to be able to reduce the risk of atherosclerosis. Polyphenols in olive oil are protective agent for Reactive Oxygen Species reaction. In Al Quran, Surah Al Mu'minin verse 20, it is stated that olive oil is appetite enhancer. This effect is resulted from the role of MUFA in olive oil where it affects ghrelin production in the intestine which later will enter the brain to induce appetite. The Adolescent is a significant period since this is a period of growth and development that requires adequate nutritional intake. The sustainability of appetite in adolescents is a good sign for fulfilling nutritional needs to support optimal growth and development.

Objective : This study aims to examine the effect of olive oil with dosage of 3 x 15 ml per day within 14 days supplementation on the appetite score in adolescents.

Methods : The study was a single blinded randomized controlled study in Tahfizh Al Quran Zam-Zam Islamic Boarding School. 30 subjects are divided into two groups: the treatment group (n = 15) and the control group (n = 15). Olive oil (3 x 15 ml) was given to treatment group and placebo for the control group within 14 days. We performed body mass index calculation, appetite score assessment, and 24 hours food recall interview. We performed Chi square to test proportion of appetite score. T test and Mann Whitney were used to calculate mean difference between groups.

Resultm : Neither intervention nor control groups revealed no significant difference in appetite score. (p = 1, p = 0.46) respectively. Control group showed higher mean intake of energy and carbohydrate compared to intervention group (p = 0.01, p = 0.02)

Conclusion : There is no difference of the appetite scores on the administration of olive oil in adolescents.

Keywords : olive oil, food intake, appetite score, an adolescent

Introduction

In Al Quran, Olive fruit was recited seven times e.g., Q.S Al-An'am-41; Q.S. Al-An'am - 99; Q.S. An Nahl - 11; Q.S. Al Mukminuun - 20; Q.S. Abasa - 29, Q.S. At Tin - 1. Several hadith of Prophet Muhammad was also stated about olive oil benefit. (1)

Unsaturated fat properties of olive oil including oleic, linoleic, and linolenic benefits human health. Moreover, vitamin A, E, and beta carotene and polyphenols was antioxidants properties that contains in olive oil. (2)(3)(4)

Previous study showed the effect of Mediterranean diet that rich in olive oil proved to prevent cardiovascular events.(5) Extra virgin olive oil supplementation decreased the risk of atherosclerosis by their mechanism as anti-inflammation, anti-oxidant, and vasodilator (6) Polyphenol in olive oil is able to catch free radical, superoxide anion, reactive nitrogen species, and stop Reactive Oxygen Species (ROS) reaction. Moreover, Monounsaturated Fatty Acid (MUFA) properties will increase high density lipoprotein (HDL) level and decline level of low-density lipoprotein (LDL), which will further combat the generation of atherosclerosis. (7)

Today, the effect of olive oil on appetite control is still ongoing research. Most studies included olive oil as a substitution on energy for weight management. Nevertheless, analysis on the association between a specific component of olive oil and appetite level was not broadly studied yet. The involvement of olive oil on leptin hormone through the gut-brain axis is offered as a potential mechanism to influence the appetite center. (8)(9)

Adolescence is a critical period of human life cycle. The growth and development continue to occur during this time. Appetite is one of the essential factors

that contributes to the fulfillment of energy requirement in adolescents.

Thus, this present study is aimed to evaluate the effect of olive oil supplementation on appetite scores in adolescents.

Methods

This study was located at Pesantren Tahfidz Al Quran Zam-Zam, Makassar, Indonesia. We involved 30 consented children divided into two groups: intervention group (n =15) and control group (n=15). Children with a history of chronic disease were excluded from the study. The intervention was performed within 14 days. During the study time, no dropout participants (Figure 1).

This was a single-blind randomized clinical trial. Simple randomization was done to determine sample groups. We gathered and listed all the consented participant and appointed 1st subject as intervention and 2nd as control, alternately, until all 30 subjects are included in groups. Samples and enumerators were blinded from group information. The intervention group was instructed to drink 15 ml of olive oil three times a day while the control group took a placebo drink with the same procedure.

Olive oil. For the intervention group, we used olive pomace® which contains 120 Calories and 14 grams fat per 15 ml. Olive pomace was obtained from 2-4% of olive oil blended with refined extra virgin olive oil. Olive pomace consists of oleic oil (C:18) as the highest percentage between 59.03-63.81%(10)

Interview. We obtained data such as sex, age, diseases history, and food allergy data by using questionary.

24 hours-food recalls. Interviews was performed using a questionary and food model by skilled enumerators. We examined 24 hours-food recall data for six times during study period (Day-0, day-3, day-5, day-7, day-12, day-14).

Appetite score. We determined the appetite score using *visual analog scale* (VAS) form, which categorized into moderate and high appetite. (11)

Body mass index. We determined body mass index (BMI) data by performing weight (kg) and height (cm) measurements. BMI was calculate by formula of (weight(kg)/height^2 (cm).(12)

Statistical Analysis

We assessed the distribution of data using Kolmogorov Smirnoff. We presented

numerical data in mean ± SD for normally distributed data and median (interquartile range, IQR) in non-normally distributed data. The difference in food intake in each group was calculated with the Wilcoxon test. Independent t-test and Mann Whitney test were used to examine the difference between the group. The association between olive oil supplementation and appetite score was calculated using the Chi-Square test. P value < 0.05 was considered significant.

Result

The total sample was 30 children with a mean age of 14-15 years old with a range of normal nutritional status (12). Both groups have a similar 24 hours-food recall before the intervention started.

Furthermore, a mean difference in total energy and carbohydrate intake was higher in the control group than in the intervention group, respectively (p = 0,005, p = 0,022).

No significant found on appetite level between intervention and control groups. Link to appetite score result, the difference between day-0 and day-14 24-hours food recall were not significant.

Discussion

There was no significant difference in appetite score between groups. We considered the fluctuated appetite level was also affected by other factors, which are not captured daily as the assessment of appetite score only two times during the study period. The mean of food intake in pre and post-study time was showed similar to the result of appetite score. Also, we cannot associate the two times assessment of appetite score with the mean of food intake since we counted the total food intake during 14 days of intervention.

Polyphenol contents in olive oil is anti-oxidant properties that potentially take part to combat inflammation(14). While in the appetite regulation, IL-6 as inflammation cytokine, has a contradictive action with leptin, the anorectic hormone. Polyphenol might play role in increasing appetite by counteract the inflammation cytokines.(15)

We considered several limitations in this study. The VAS tool that applied for the appetite score assessment originally develop to assess desire for a specific food. Regardless of the ability to evaluate appetite level (11), this tool probably has limitations, such as only focusing on investigating appetite level on a particular food. To our knowledge, the availability of appetite assessment tools for healthy subjects is rare (16)(17). Also, the study location, Pesantren, is a boarding school, and the food was provided from catering which assumed to have limited menu variation(13)(18)(19).

For this reason, the possibility to gain variation on appetite score appeared to be tough.

Conclusion and recommendation

In this study, we found no effect of olive oil supplementation on appetite score in adolescents. Further study with more frequent assessment on appetite level, improved tools, and different study population are needed to reveal the significant result.

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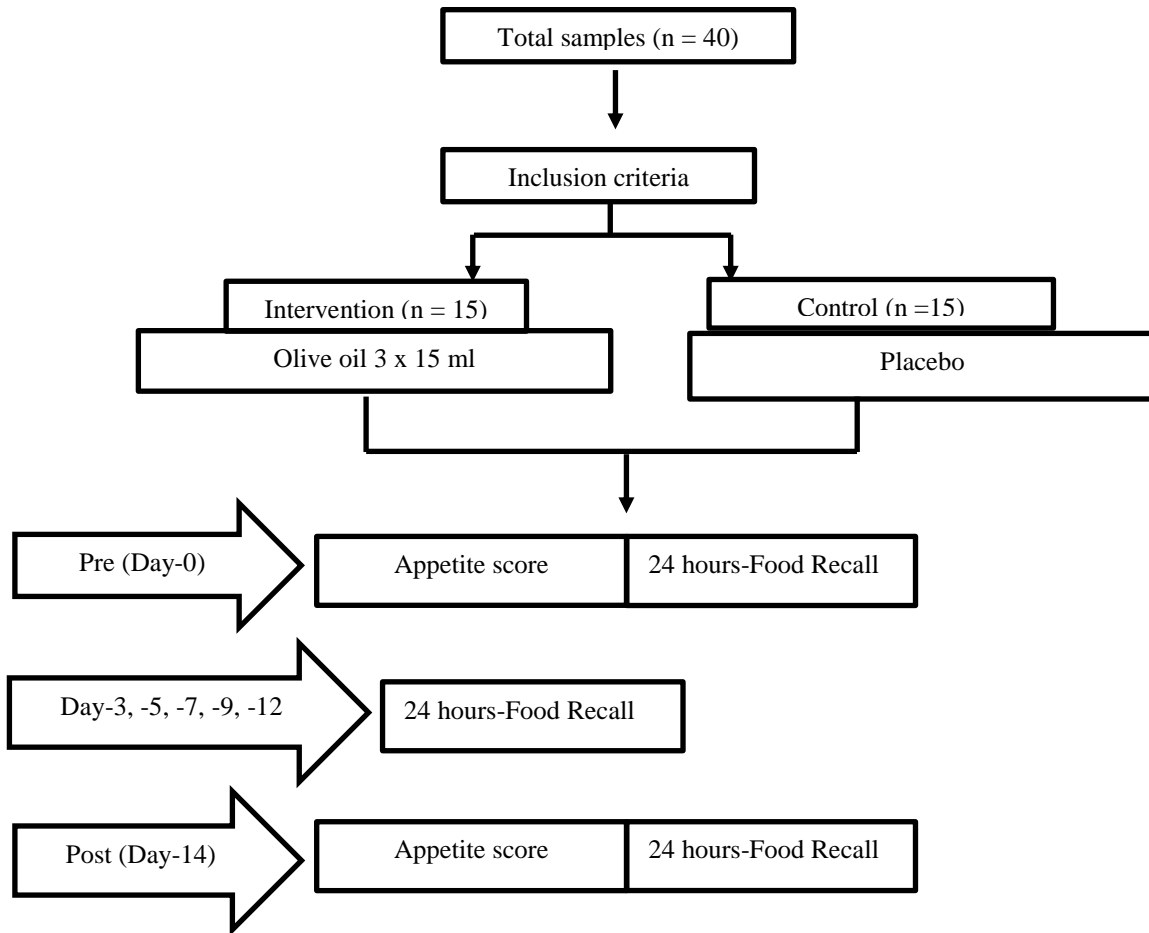
Figure 1. Flowchart of the study

Table 1. Sample Characteristics

Variable	Intervention (n = 15)	Control (n = 15)	p
Age (years)	14.8 ± 2.78	15.6 ± 2.15	0.35
Weight (kg)	51.54 ± 16.89	50.13 ± 11.41	0.79
Height (cm)	153.5 ± 12.84	156.83 ± 7.48	0.39
Body mass index (BMI)	21.55 ± 5.44	20.34 ± 4.35	0.51

Data presented in mean ± SD, P < 0.05, *Independent t-test*

Table 2. Mean difference of energy, carbohydrate, fat, and protein intake between intervention and control

Variable	Intervention (n = 15)	Control (n = 15)	P
Energy (kkal/day)	60.70 ± 220.85	368 ± 322	0.01*
Carbohydrate(gram/day)	-17.11 ± 49.56	31.44 ± 59.69	0.02*
Fat(gram/day)	11.49 ± 18.26	20.01 ± 17.36	0.2
Protein (gram/day)	4.26 ± 12.55	12.24 ± 11.23	0.08

Data was presented in mean ± SD, p < 0.05, *independent t-test*

Table 3. Pre and post energy, carbohydrate, fat, and protein intake between intervention and control

Variable	Intervention (n = 15)		Control (n = 15)		P^2 (pre)	P^1 (post)
	Pre	Post	Pre	Post		
Energy (Cal/day)	1361.77 (206.12)	1416.32 ± 286.42	1315.23 (326.78)	1628.11 ± 397.31	0.44	0.11
Protein (Cal/day)	40.05 (5.53)	45.02 ± 11.56	38.7 (7.46)	49.96 ± 12.43	0.51	0.27
Fat (Cal/day)	43.9(9.3)	52.87 ± 18.31	41.9(16.51)	60.98 ± 18.93	0.94	0.24
Carbohydrate (Cal/day)	189.51(29.26)	186.44 ± 48.65	178.89(50.41)	215.02 ± 62.82	0.16	0.18

Data was presented in mean ± SD, median (IQR), p < 0.05, [1]Independent t-test, [2]Mann Whitney test

Table 4. The proportion of appetite score between intervention and control group

Variable	Intervention (n = 15)		Control (n = 15)		P (VASpre)	P (VASpost)
	Pre (n(%)	Post (n(%)	Pre (n(%)	Post (n(%)		
Moderate level	6 (46.2)	7 (41.2)	7 (53.8)	10 (58.8)	1	0.46
High level	9 (52.9)	8 (61.5)	8 (47.1)	5 (38.5)		

Data was presented in n(%), p < 0.05, chi square. VAS=visual analogue scale