

Correlation between Ketogenic Diet and Emotion Regulation in Early Adulthood

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Abstract---

Purpose: The purpose of this study is to determine whether there is a correlation between ketogenic diet and emotion regulation in early adulthood. One of the most common ways to get the ideal body weight is by diet. One of the popular diet is ketogenic diet with a composition of 60-70% fat, 15-30% protein, and 5-10% carbohydrate. Consuming excess fat will affect hormone balance and change emotion regulation.

Methodology: This research uses a quantitative approach with data collection techniques using a Ketogenic Diet Scale and an Emotion Regulation Scale. Subjects were 393 early adults aged 26-35 years who are on a ketogenic diet for at least 1 month and never cheated from the rules of diet program. The two research variables are interval scale and the data analysis technique uses Pearson Correlation Test.

Results: The results showed that there is a significant correlation between the ketogenic diet and the emotion regulation shown by $r = -0,352$, $P_{value} = 0,000$, $\alpha = 0,05$ ($P_{value} < \alpha$). This relationship means that the higher ketogenic diet related to the lower emotion regulation. The result is less in line with the goals of the ketogenic diet because the diet done without a doctor's supervision.

Applications/Originality/Value: Emotion regulation is a skill related to self-management that should be mastered by early adulthood. The results of this study indicate that one can gain emotional regulation skills by using the ketogenic diet, as long as this diet is done properly and under the supervision of a doctor.

Keywords--- Early Adulthood, Ketogenic Diet, Emotion Regulation.

I. INTRODUCTION SECTION

Overweight and obesity become great opportunities in the early adulthood. More than 20 percent in Western countries there has been a drastic increase in the number of individuals suffering from obesity (based on age, gender, and physical form) (Berk, 2012). Obesity has a major influence on psycho-social development including in it is self-confidence (Rupang, Opod, & Sinolugan, 2013). Therefore, weight is important in early adulthood.

One of the very common ways that many people do to lose weight is by diet (Nussy, Ratag, & Mayulu, 2014). Diet is an attempt to regulate nutrient intake for the body (Wulandini & Hamdani, 2017). One type of diet that is being popular is the ketogenic diet. Some of the mass media such as Intisari and Trubus magazines, JakFM, and

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NetTV discussed the ketogenic diet in the news. A ketogenic diet or commonly referred to as a *keto diet* is a type of diet that makes fats the primary energy source for the body (Vishnu, Berawi, & Wahyudo, 2017).

Changes in carbohydrate intake will significantly affect the hormonal balance, one of which is the cortisol hormone. Cortisol hormones are closely related to a person's stressful condition. High cortisol levels will affect other hormones, especially estrogen for women. Serious problems will be triggered by high cortisol such as menstrual disorders, infertility, and mood swing (Fatouros et al., 2010, in Sugiharto, 2012).

Mood swing can be an emotional overflow, sometimes this emotional overflow (good or bad) can seem overwhelming to beat the importance of the stimulus. Each individual has the ability to regulate his emotions, and it is named with emotion regulation. Emotion regulation is a conscious or unconscious strategy to maintain, strengthen, or mitigate one or more aspects of emotion response, emotion experience and behaviour (Gross, 2007).

The latest research conducted by scientists at the San Diego State University Research Institute in 2015 found that individuals who consumed trans-fats excessively would have low emotion regulation. The research has solved the problem beforehand. In 2013 at the University of California found that trans-fatty acids are very closely connected with higher levels of aggression (Holt, et al., 2015).

Early Adulthood

Age category according to the Department of Health of the Republic of Indonesia in 2009 early adulthood from age 26 years to 35 years. According to Danim (2013:112-113, in Hulukati & Djibran, 2018), there are several developmental tasks in early adulthood, including: (1) choosing a partner; (2) learning to live with a partner; (3) start life with a partner; (4) take care of children and administer households; (5) start working; (6) take responsibility as a citizen; (7) find a matching group.

In this early adulthood the individual began to consider health. When individuals grow older, some living patterns begin to be uncontrolled, such as getting used to not breakfast, irregular dietary habit, relying on snacks as the main source for all day, smoking and drinking alcohol, insomnia, and has an excessive eating so that weight becomes above average at his age (Cousineau, Goldstein, & Fraco, 2005, in Santrock, 2012).

One of the physical traits seen during this early adulthood is the physical performance that began to decline. Signs of decline can be seen through the health and strength of muscles that begin to decrease in the age of about 30 years. The part of the body that begins to undergo a decrease can be seen from the chin that begins to descend and the abdominal part is prominent. The complaint usually occurs in the age of the thirties characterized by reduced physical ability. (Santrock, 2012).

Ketogenic Diet

In 1920 the Keto diet is one of the alternatives that can be used for patients suffering from epilepsy to reduce symptoms of seizures (Kossoff, et al., 2009, as quoted in Paoli, 2014). In the beginning, the application of the Keto diet is aimed at the therapy of diseases such as epilepsy, diabetes, cancer and other diseases that are still being examined by experts until now (Ahmad, 2018). The ketogenic diet is dietary habit with nutrients consisting of high fat, adequate amounts of protein, and low carbohydrate amounts (Sihui & Suzuki, 2018).

A ketogenic diet is a high-fat, low-carbohydrate protein formulation that has been used for nearly a century to treat epilepsy that are hard to handle medically (Simeone, et.al, 2018). ketogenic diet is a type of diet that makes fats as the main energy source for the body, with a composition of fat 60-70%, 15-30% protein, and carbohydrate as much as 5-10% (Ahmad, 2018). ketogenic diets are dietary patterns with high fat and low carbohydrate nutrients that can produce weight loss and may increase some metabolic dysregulation in humans and rounder (Foster, et al., 2003; Roberts, et al., 2017, in Medak & Townsend, 2019).

Anas (2018) tried to explain some of the benefits of the ketogenic diet, including: (1) can lose weight; (2) lower blood sugar; (3) Clear skin and reduce inflammation; (3) Increase energy; (4) Optimizing brain cell metabolism; (5) The body is faster and easier to satiety; (6) More stable emotions (further research required); (7) Degenerative diseases therapy.

II. EMOTION REGULATION

Emotion

In modern psychology, the term emotions relate to cognition. It is considered so because emotions cannot be separated with human cognition and behavior. It is interconnected and affects each other, even in certain phases will integrate with each other (Sarwono & Meinarno, 2015). Emotions can be interpreted as a response that is evaluative and usually includes a combination of physiological stimuli, behavioral expressions, and subjective experiences (negative, positive, ambivalent) (Shiraev & Levy, 2012).

Nadhiroh (2015) explains that emotions can be interpreted as a complex form of each organism associated with physical change. There are six kinds of main emotions, including happiness/joy, surprise, angry, sadness/distress, disgust and fear. In a more concise category of emotions can be seen in the category of emotion table 1.

Table 1: Category of Emotions

Positive Emotions	Negative Emotions
<i>Eagerness</i>	<i>Impatience</i>
<i>Humor</i>	<i>Uncertainty</i>
<i>Joy</i>	<i>Anger</i>
<i>Pleasure</i>	<i>Suspicion</i>
<i>Curiosity</i>	<i>Anxiety</i>
<i>Happiness</i>	<i>Guilty</i>
<i>Delight</i>	<i>Jealous</i>
<i>Love</i>	<i>Annoyance</i>
<i>Excitement</i>	<i>Fear</i>
	<i>Depression</i>
	<i>Sadness</i>
	<i>Hate</i>

Emotion Regulation

Emotion regulation is the ability to monitor, evaluate, and modify an emotional reaction that occurs (Thompson, 1994, in Wang, et al., 2019), and has been shown to have an important role in adolescent mental health, relationships and academic Success (Compas, et al., 2017, in Wang, 2019). Emotion regulation refers to the efforts made by

individuals to influence the emotions they possess and how to spit the emotions then how to express them (Gross, Richards, & John, 2006, in Suzuki, Hamamura, & Takemura, 2018).

The concept of regulation of emotions is a psychological process and manner of behavior that people can use to regulate their own emotional response adaptively (Gross & Thompson, 2007, in Zysberg & Raz, 2019). This concept is regarded by most individuals as the basis for emotional and social adaptation (Appelhans & Luecken, 2006; McRae, et al., 2012, in Zysberg & Raz, 2019). According to Gross (2007) Emotion regulation is a strategy that is done consciously or unconsciously to maintain, strengthen, or reduce one or more aspects of emotional response i.e. experience of emotion and behaviour. A person who has an emotion regulation can maintain or enhance the emotions that he or she has felt both positive and negative.

There are five emotion regulatory processes occurring at different points in the emotion formation process: the situation selection, situation modification, attention dissemination, cognitive change, and modulation response (Gross, 1999, in Bucich & MacCann, 2019). Some aspects of the emotion regulation according to Gross (2007) are able to regulate emotions well (can be either positive emotions or negative emotions), can control emotions in a conscious state (can be easily or automatically), can be mastering stress conditions that suppress the consequences of the problems faced by (Hidayati, Mulawarman, & Awalya, 2018). In Nansi and Utami (2016) It is explained that Gross has four aspects that are commonly used to determine the individual's emotion regulatory capacity: (1) The ability of emotion regulatory strategies; (2) The involvement of the objectives of behaviour; (3) emotional response control; (4) acceptance of emotional response.

III. OVERVIEW IN THE ISLAMIC PERSPECTIVE

Diet in Islamic Perspective

Diet in Islam is implemented not only to beautify the body so that it looks attractive and beautiful viewed, but also in terms of maintaining health and to be easy to find clothes. Individuals with excessive body weight are easily stricken with various kinds of diseases, such as obesity, heart disease, shortness of breath, cholesterol and so on. Therefore, Islam allows to do the diet, but do so should be in the right way according to the guidance of Rasulullah SAW. Here are some ways to do a diet that is good for health and is allowed: *"Always consume food that is halal, healthy and nutritious"*.

Islamic religion teaches how to dieting well with its people from the first, how the correct diet and can know the benefits of the diet itself. Based on the verses and hadith that exist, there is a diet that is good and correct and it is dietary habit in Islam. The describing of good and correct to Islamic lifestyle is modeled by Rasulullah, including: eating and drinking *halal* and good, adequate rest, fasting and exercising (Djatnika, 1993, in Hanum, Nurhayati & Riani, 2014). Rasulullah said: *"Melt your food with dzikir to Allah SWT and pray, and do not immediately sleep after eating, because it can make your heart become hard"* (H. R Abu Nu'aim from Aisyah R.A in Riani, 2014).

Dietary habit applied by Rasulullah is able to provide benefits to the body such as having a healthy body, strong and fit. In addition, by following the diet taught by Rasulullah is very suitable with biological rhythms such as the digestive cycle of the human body so as to increase the metabolism of the body, it has the characteristic that burning

calories and fat In the body will be more efficient and weight will decrease (Khumaidi, 1994, in Hanum, Nurhayati & Riani, 2014).

There are several examples of Islamic religion related to the health, one of them is a commandment to choose a good and halal food and do not eat in excessive ways. The example verses in the Qur'an that explain this is Surah Al-Baqarah verse 168 which means: "*O all men, eat the lawful one from the things which are on the earth, and do not follow the steps of Satan, for verily, Satan is a real enemy to you*" (Anam, 2016).

Eat and drink sufficiently, not excessive

Excessive eating and drinking certainly makes the body disappear in control either in terms of controlling lust and weight. Therefore in Islam there is a recommendation before the hunger and stop before full. Rasulullah said in a hadith: "*It is not the children of Adam's grandson to fill the worse container of his belly. Actually, some bribes are enough to uphold the ribs. If he had to fill it, then a third of his meal, a third for a drink, and a third for breathing*" (Al-Tirmidhi, Ibn Maajah and Muslim in Sohrab, 2016).

Avoiding excessive and greedy attitude in dietary habit is a food arrangement done by the Prophet Muhammad. There are some evidence to explain the prohibition of eating excessively, one example is in Sura Al-A'raf verse 31 which means: "*O son of Adam, put on your beautiful cloth in every (entering) mosque, eat and drink, and Do not extravagance. Indeed, Allah does not like those who extravagance*".

The intention of the verse is that it is advisable to consume food and drink which is the basic human need. But God forbade the way of eating and drinking excessively because it caused an unhealthy effect to the body (Sohrab, 2016).

No sleep after meals

After eating then sleep makes the calories and fat in the body increasingly buried. Therefore, to minimize the calories and fats that are in the body with excessive weight is required active on moving. As the Prophet SAW after eating he performed activities such as dzikir, prayers and others.

To strengthen the fasting of Sunnah and to carry obligatory fasting

A Muslim is obliged to do fasting during the month of Ramadan, and the fasting of Sunnah is encouraged outside Ramadan. Not only exercising lust and patience, fasting is also beneficial to rest the stomach from processing and digestive feeding. In Islam, Sunnah fasting is one alternative to the diet.

Emotion Regulation in Islamic Perspectives

The inability of the individual to regulate his emotions could result in unreasonable evaluation, and also the inability to make a decision on a wide variety of things (Nansi & Utami, 2016). Described in a hadith of Rasulullah PBUH said the meaning: "*It is not a strong person (the truth) with (always beat his opponent in) the struggle (the fight), but no other strong (the real) person is capable of controlling Himself when angry*" (al-Bukhari and Muslim in Nansi & Utami, 2016).

The regulation of emotion in the Qur'an are explained in the examples of daily life. Sometimes man living life must always be accompanied with gratitude to what he has, the gratitude by saying to Allah SWT with a positive attitude. On the other hand, there are some human beings faced with problems that can cause a sense of anger, so that at that time needed is to be patient, be positive thinking, and always be optimistic in facing problems. The problems experienced should be faced with positive emotions (Depag RI, 2005, in Irwansyah, 2017).

Allah SWT has said in the Qur'an surah An-Nisa verse 123 which means: "*(the reward of God) it is not according to your own empty and not (also), according to the wishful of the book. Whoever does evil, will be given vengeance on the evil and he cannot be protective and not (also) a helper for him apart from God*" (Irwansyah, 2017).

But to refrain from negative emotions then it is necessary to always control the emotions and maintain attitudes (Irwansyah, 2017). Allah SWT has said in Qur'an Surah Al-Baqarah verses 153 which means: "*O believers, make patience and prayer as your refusal. Indeed, Allah is with those who are patient*" (Irwansyah, 2017). The verse means that people who have faith are expected to be patient from all the problems that are given to him. People should take the wisdom or positive side of the problem. When associated with Gross theory, it goes into the cognitive reappraisal strategy. Therefore, by the time the human being can be patient then the negative attitude will be controlled by oneself.

Humans are not allowed to overflowing their negative emotions. In the Qur'an is explained in Surah Al-A'raf verse 199 which means: "*Be thou forgiving and have a man do that which is ma'ruf, and turn from those who are foolish*" (Sohrah, 2016). The verse has the meaning that as a man should be able to withstand anger and become forgiving. Anger is an expression of negative emotions so it is necessary to minimize or eliminate it by regulating emotions (Irwansyah, 2017).

IV. HYPOTHESIS

Research hypothesis

There is a correlation between ketogenic diet and emotion regulation in early adulthood.

Statistic hypothesis

$H_0: r = 0$ (there is no correlation between the ketogenic diet and the emotion regulation in early adulthood)

$H_1: r \neq 0$ (there is a correlation between the ketogenic diet and emotion regulation in early adulthood)

With r = Pearson correlation coefficient

V. METHOD

This study uses quantitative research types where it is a research process on a particular population or sample, using a test tool or research instrument to collect the data analyzed with statistical methods aimed at testing a determined hypothesis (Sugiyono, 2017). The method used is a correlation analysis method because the research want to determine the degree of relationship between two or more variables using statistical data (Silalahi, 2015).

Participants

The subject of this study is individual who run a ketogenic diet with the following characteristics: (1) Aged 26-35 years, (2) experiencing obesity, (3) already running a ketogenic diet at least 1 month, (4) Never do cheating (out of Dietary rules of ketogenic diets). The population are the members of the Facebook group “ketogenic diet” with 22,403 members.

The sample is based on Sugiyono (2017) which are some of the numbers and characteristics of the research population. Sampling techniques use non-probability sampling, which means that each member of the population does not have the same opportunity to become a sample (Sugiyono, 2017). The researchers used the purposive sampling technique, taking into account certain criteria (Sugiyono, 2016). By using Slovin formula and error level 5% obtained the number of samples as much as 393 people.

Measures

The instruments in this study used the Likert scale due to variable characteristics in this study of intervals. The interval scale indicates the distance from one data to another and has the same weight (Riduwan, 2011). The scale used in this study without the middle category can further reduce the social desirability when compared with the middle category (Garland, 1991, Tahrir, 2016).

The measuring instrument uses 4 response options. For favorable item, the value 1 or answer option 1 is „very inappropriate „while the value 4 is given for answer option 4, which is „very suitable“. Done in reverse rating for unfavorable item, which is scale 1 with value 4, scale 2 with value 3, scale 3 with value 2, and scale 4 with value 1. The data is interpreted using the reference of Guilford’s classification or norms.

Table 2: Conditions score items scale ketogenic diet and emotion regulation.

Alternative Answer	Value	
	Favorable	Unfavorable
Very Appropriate (VA)	4	1
Appropriate (A)	3	2
Inappropriate (IA)	2	3
Very Inappropriate (VIA)	1	4

Table 3: Interpretation of Guilford’s coefficient of correlation

Value	Description
0.00 – 0.19	Very low
0.20 – 0.39	Low
0.40 – 0.59	Moderate
0.60 – 0.79	High
0.80 – 0.99	Very high
1.00	Perfect

Ketogenic Diet Scale

Ketogenic diets are one of the ways that individuals do to reduce excess weight. Such ketogenic diets can be measured in three aspects, i.e. 70% fat, 25% protein, and 5% carbohydrate (Ahmad, 2018), then converted into gram units of food to be consumed by individuals who perform ketogenic diets in accordance with nutritional guidelines Health regulation of the Republic of Indonesia number 41 year 2014. These three aspects contain a statement about the diet that is being lived by individual ketogenic dieters. Items are rated on a Likert scale with four categories “very appropriate”, “appropriate”, “inappropriate”, and “very inappropriate”. From here the interval measurement data is obtained.

Emotion Regulation Scale

The scale of emotion regulation is based on aspects of emotion regulation (Gross, 2007), namely: (1) Strategies, (2) Goals, (3) Impulse, and (4) Acceptance. These four aspects will then be lowered into the measuring instrument that each

item is rated according to the Likert scale with the four categories “very appropriate”, “appropriate”, “inappropriate”, and “very inappropriate”. From here the interval measurement data is obtained.

Validity and Reliability of Instruments

Testing the instrument is carried out with the aim of knowing whether the measuring instrument used by the researcher deserves to be an instrument or not yet feasible. There are several steps that will be conducted by researchers to test the instrument. These measures include item analysis, validity, and reliability tests. Not conducted item analysis, validity, and reliability test for ketogenic dietary variables due to the items made to the standards referring to the balanced nutrition guidelines in the Department of Health regulation number 41, year 2014. Number of items on a ketogenic diet scale as much as 55 items.

Based on the results of the calculation of item analysis for scale or emotion regulation measuring instrument obtained 38 items received and 0 items rejected. Included in the item received due to the item which correlate $r \geq 0.30$. The results of the calculations that have been done to scale the emotion regulation in its dimensions are strategy, goal, impulse, and acceptance are included in the category of very high validity, because in each dimension has a correlation value between 0.80-0.99 (on the Guilford scale). Therefore, the emotion regulatory scale used in this study is capable of measuring what is to be measured according to research objectives. Based on the calculation of the emotion regulatory scale, obtained a value of 0.844 which includes very high reliability criteria. Thus, the scale of the emotion regulation used in this study has the reliability or the achieve in its measurements.

VI. PROCEDURE

Preparation phase

At this phase researchers choose and determine the first interesting theme or research topic, which would be used as a research variable. Then do the review literature to know more about the variables to be researched, conducting preliminary research using the poll via Google Form to obtain preliminary data. Then, determine the research title

and create a background problem, compose the framework of thinking as well as create hypotheses. Then determine the research methodology to be used and the measuring instrument for data retrieval.

Implementation phase

In this stage researchers calculate the number of samples of the population studied, prepare and disseminate polls or questionnaire through Google Form for data retrieval to research respondents and examine the completeness of the data respondents such as identity and answer on each poll.

Data processing phase

This phase performs scoring and tabulation, doing statistical calculations for data scoring. Then the data obtained is analyzed, interpreted the results of the analysis and asked some advice and criticism for further research to be better.

Final phase

In this phase, the researcher compiled a report based on the results of the research, as well as making improvements to the results report.

VII. RESULTS

Descriptive Analysis Results

It is a statistical technique used to analyse data by describing data that has been obtained as it is without intending to make any generally valid conclusions or generalization (Sugiyono, 2015). Based on the data obtained in the field:

Table 4: Frequency and percentage of ketogenic diet

Kategonic Diet	Σ	Proportion (%)
Height ($X \geq 149$)	288	73.28 %
Low ($X < 149$)	105	26.72 %
Σ	393	100 %

The Table 4. shows that 288 subjects or 73.28% of the total subjects had a high ketogenic diet. This means that adulthood with this category conduct a dietary ketogenic diet that corresponds to the rules, and 105 subjects or 26.72% of the total subject has a low ketogenic diet. It means that early adulthood in this category recently do a ketogenic diet main, so that the diet of ketogenic diets performed low.

While based on the category of emotion regulation obtained:

Table 5: Frequency and percentage of emotion regulation in general

Emotion Regulation	Σ	Proportion (%)
Height ($X \geq 106$)	197	50.13 %
Low ($X < 106$)	196	49.87 %
Σ	393	100 %

The Table 5. shows that 197 subjects or 50.13% of the total subjects had high emotion regulation. Early adulthood in the category of high-emotion regulation has the ability to regulate emotions and reactions related to emotions, and 196 subjects or 49.87% of the subject amount have low emotion regulation. Low emotion regulation means that individuals cannot control their emotions well.

Table 6: Cross distribution of ketogenic diet and emotion regulation.

		Kategori Diet		Total
		Tinggi (positif)	Rendah (negatif)	
Emosi Regulasi	Tinggi	92	105	197
	Rendah	196	0	196
Total		288	105	393

The results of a cross tabulation analysis between the ketogenic diet and emotion regulation in early adulthood showed that 196 early adulthood have a high ketogenic diet and low emotional regulation, and 105 early adulthood have a low ketogenic diet and high emotion regulation.

A total of 92 early adulthood have a high ketogenic diet and high emotion regulation, which means there are other factors that make low-emotional regulation (not a ketogenic diet). A number 0 early adulthood have a low ketogenic diet and low emotion regulation, meaning that if not doing a ketogenic diet then it has nothing to do with emotion regulation.

The Result of Inferential Analysis

In this study, researchers used a correlation analysis with the goal to know the degree of relationship between two or more variables (Siegel, 1992). The scale used to measure both variables of the interval scale, therefore using the *Product Moment* test. After the data is collected then proceed to the correlation analysis Product Moment.

Table 7: Pearson-test result

		Kategori Diet	Emosi Regulasi
Diet Kategori	Pearson's Correlation	1	-.352**
	Sig. (2-tailed)		.000
	N	393	393
Emosi Regulasi	Pearson's Correlation	-.352**	1
	Sig. (2-tailed)	.000	
	N	393	393

Based on the results of inferential analysis that there is a correlation between ketogenic diet and emotion regulation in early adulthood. Where seen in the significant result $P\text{value} < \alpha$ is $0.000 < 0.05$ which shows H_0 rejected and H_1 accepted which means there is a link between the ketogenic diet with emotion regulation in the early adulthood. Whereas when viewed from the coefficient (r) that is -0.352 . Pearson's correlation coefficient has a negative value, so there is a negative relationship. The value of these negative coefficients has the meaning if a high ketogenic diet then the emotion will be low or if the diet is low ketogenic then the emotion regulation will be high.

VIII. DISCUSSION

The results of the analysis in Table 4. showed that early adulthood who performed a ketogenic diet with a high category is 288 people (73.28%), it means early adulthood with this category conducted a dietary ketogenic diet that corresponds to the rules. Ahmad (2018) defines a ketogenic diet as a type of diet that makes fats as the primary energy source for the body, with composition; 60-70% fat, 15-30% protein, and carbohydrate as much as 5-10%.

Ketogenic diet is a feeding behavior with a composition consisting of high fat, adequate amount of protein, and low carbohydrate amount and there are benefits to aid in weight loss (Ahmad, 2018). Early adulthood conducting a ketogenic diet with a low category of 105 people (26.72%), meaning the early adult in this category is new to do the ketogenic diet main, so that the dietary habit of ketogenic diets does not perform low.

In Islam, the diet has been taught since the first, how to diet in right way and get the benefits of the diet itself. When viewed in verses and hadith that there can be understood the existence of a good and correct diet is a diet in Islam. The good and true describing of the Islamic lifestyle is the life modeled by Rasulullah, among them eating and drinking halal, adequate rest, fasting and exercising (Djatnika, 1993, in Hanum, Nurhayati & Riani, 2014). The verse in the Qur'an that explain this matter is Surah Al-Baqarah verse 168: "*O all men, eat the good from the things which are on the earth, and do not follow the steps of Satan, because the truth is Satan It is a real enemy to you*" (Anam, 2016).

According to Judarmanto (2012, in Marfu'ah & Sari, 2018) fasting has a wide range of benefits for the body, including the balance of anabolism and catabolism, does not result acid in the blood, the decline in blood glucose and weight. It can control HDL and LDL levels in the blood, improve the function and performance of cells, effective in increasing the concentration of urine, boost the immune system, and improve psycho-social communication both with God and to the other, as well as reduce adrenaline. The psychological situation which is calm and not full of anger as fasting can lower the adrenaline. Adrenaline can increase blood pressure, increase heart rate, and increase cholesterol formation which can lead to the risk of vascular disease, coronary heart and stroke (Marfu'ah & Sari, 2018).

The result of the analysis obtained in table 5 indicates that 197 early adulthood (50.13%) have an emotion regulation with a high category. High emotion regulation means that individuals can control their emotions well. According to Gross (2007) emotion regulation is a strategy that is done consciously or unconsciously to maintain, strengthen, or reduce one or more aspects of emotional response i.e. emotion experience and behaviour. Early adulthood who are in the category of high emotion regulation have the ability to regulate emotions and reactions related to emotions.

The low category of emotion regulation is 196 early adulthood (49.87%). Low emotion regulation means that individuals cannot control their emotions well. One cause of low emotion regulation of persons is consuming excessive fat, and closely relation with high level of aggression (Holt, 2015). Hormonal changes occurring in the body can be caused by consuming excessive fat which will later affect one's emotion regulation (Fatouros et al., 2010, in Sugiharto, 2012).

The emotion regulation in the Qur'an is modeled in daily life. There are some people who are given the test by Allah SWT to test how strong the faith is, besides, there are some human beings faced with problems that trigger the emergence of anger. Therefore, it needs a patient attitude, positive thinking, and always thinking optimistic in facing the problem. Allah SWT has said in the Qur'an surah An-Nisa verse 123 which means: "*(the reward of God) it is not according to your own empty and not (also), according to the wishful of the book. Whoever does evil, will be given vengeance on the evil and he cannot be protective and not (also) a helper for him apart from God*" (Irwansyah, 2017).

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When associated with Gross theory, it goes into the cognitive reappraisal strategy. Therefore, by the time the human being can be patient then the negative attitude will be controlled by oneself. Humans are not allowed to overflowing their negative emotions. In the Qur'an is explained in Surah Al-A'raf verse 199 which means: "*Be thou forgiving and have a man do that which is ma'ruf, and turn from those who are foolish*" (Irwansyah, 2017).

Therefore, Islam has taught since the first how to diet right and good for body and keep yourself to be able to control emotions correctly.

It can be seen in table 6 that is the result of cross-tabulation analysis between ketogenic diet and emotion regulation in early adulthood shows that 196 early adults have a high ketogenic diet and low emotion regulation, and 105 have low ketogenic diet and high emotion regulation. A total of 92 early adulthoods have a high ketogenic diet and high emotional regulation, which means there are other factors that make low emotion regulation (not a ketogenic diet). A total of 0 early adulthood have a low ketogenic diet and low emotion regulation, it means that if not doing a ketogenic diet then it has nothing to do with emotional regulation.

The study aims to know the relationship between ketogenic diets and emotional regulation in early adulthood. The analysis results that have been obtained in Table 7 show the value of Pearson's correlation coefficient of -0.352. Pearson's correlation coefficient has a negative value, so there is a negative relationship. The value of these negative coefficients has the meaning if a high ketogenic diet then the regulation of emotions will be low or if the diet ketogenic is low then the regulation of emotions will be high.

To know the relationship is meaningful, it can be seen the significance value in table 7. It can be noted that the significance value of 0.000 is less than 0.05 then the zero hypothesis is rejected. This means H₀ is rejected and H₁ is accepted so there is a negative connection between the ketogenic diet and emotion regulation in early adulthood. To

know the closeness of the relationship, it can be seen magnitude coefficient of correlation in table 3 interpretation of Guilford's correlation coefficient. Value-0.352 belongs to the category of low relationships. A low relationship means that there are other factors affecting the emotion regulation (other than the ketogenic diet).

The results of this study in accordance with the previous studies that showed that the higher the individual consuming fat will have low emotional regulation. A study conducted at Duke University, researched 120 people who had more weight then did a low carbohydrate diet (high in fat). The results showed that there were hormonal changes that could lead to low emotion regulation (Freeman, et al, 2008).

Then research conducted by scientists at the San Diego State University Research Institute in 2015 showed that consuming too much fat would have low emotional regulation, the study perfected previous research conducted in 2013 at the University of California which showed that there was a close connection between consuming fat to high aggression (Palmquist, 2009).

It can be seen from the two previous studies that the results showed the higher the consumption of fat will have high emotion regulation. Therefore, this research can strengthen that there is indeed a negative relationship between ketogenic diet and the emotion regulation.

IX. CONCLUSIONS AND SUGGESTIONS

Conclusions

Based on the results and the discussions that have been obtained, it can be concluded that:

- A. A total of 288 subjects have a high ketogenic diet, and 105 subjects have a low ketogenic diet.
- B. A total of 197 subjects have high emotion regulation and 196 subjects have low emotion regulation.
- C. There is a negative relationship between the ketogenic diet and the emotional regulation in the early adulthood with the Pvalue of $< \alpha$. This means that if early adulthood have a high ketogenic diet then its emotional regulation is low (cannot control emotions), otherwise if early adulthood have ketogenic diet which is low the hence emotion regulation is high (can control emotions).
- D. Diets that are not based on adequate knowledge can cause a variety of physical and psychological disorders. One of the impacts arising from the lack of knowledge of the ketogenic diet is the presence of low emotional regulation (less in control emotions). In Islam, it has been proven that the correct and good procedure of diet for the body is fasting. In addition to having benefits for losing weight, fasting also has benefits for a psychic state that is refraining from the lust (emotion).

X. SUGGESTIONS

The results of research that has been done with full of researchers' various limitations, the researchers ask some suggestions to be used as consideration including:

For further researchers

First, this research is specific only to individuals who are in the early adulthood aged 26-35 years, so there is expected further research for larger populations. Second, the results derived from this study indicate a negative relationship, then the next study is expected to see if there is an influence (predictive correlation).

For individuals who do ketogenic diets

First, for individuals who do a ketogenic diet is expected to consult doctor or nutritionist, if the ketogenic diet is performed without doctor, it will affect hypertension and impact on the emotion regulation. Second, it can be used as a reference and evaluation for the future to know what psychological impacts will arise after doing a ketogenic diet.

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