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ABSTRACT

Problems in college faced by students can cause stress. Ramadan fasting is beneficial for physical, psychic, and emotional health, among which it can reduce stress. This study aimed to understand the effect of Ramadan fasting on stress of preclinical medical students at UIN Syarif Hidayatullah Jakarta. The design of this study was prospective cohort analytic with a cross-sectional approach with a one group pre-test and post-test design. The consecutive sampling method was used for 242 respondents. To collect the data, the DASS-42 questionnaires are used. The Wilcoxon test were used to analyse the data. We found that 52 (21.5%) were experiencing stress while 190 (78.5%) were normal. The findings revealed that the stress scores fell during the pre-to post-Ramadan period for all subjects ($p=0.000$) either stress ($p=0.000$) or normal students ($p=0.000$). Based on the results, we found that Ramadan fasting can affect the stress scores of preclinical medical students in both normal and stressful students.

Keywords: *stress, Ramadan fasting, preclinical medical students.*

INTRODUCTION

The emotional disorder is an adaptive response of a person to various internal and external pressures and causes various disorders in the form of physical, mental, and behaviour disorders called stress (Goliszek, 2005). In 2018, the results of Basic Health Research (RISKESDAS, 2018) revealed that 98% of the population nationally experienced by emotional disorders.

Methods of healing against stress have been widely developed by researchers and religions. Besides the use of medication, a religious approach is also one of the methods of healing stress, namely fasting.

The definition of fasting Ramadan according to Qadrawi is the refrain of all who can break the fast from dawn until dusk with the intention and sincerely perform worship to Allah SWT (Yusuf, 2008). The command to fast is outlined in the Qur'an surah al-Baqarah verse 183 which means "O believers, it is obligatory upon you to fast as it is obligatory upon the people before you, that you may fear." The benefits of fasting Ramadan are many, both for physical, psychic, and emotional health, such as lowering stress. In the hadith narrated by Thabrani, the Prophet SAW said, "Fast, you will be healthy..." (Syafi'i, 2015).

The publication of studies on the effect of fasting on stress is still limited. A study by Romy Lauche reported that fasting Ramadan can benefit the health of Muslims (Lauche et al., 2016). Lauche found that good behavior, menu changes, and mealtimes during Ramadan can improve a good health and behavior during fasting. According to the research that conducted by Arati Amin on the effect of Ramadan fasting on stress, the result reported that stress scores decreased on day 28 of Ramadan (Amin et al., 2016). In another study that conducted by Omar Boukhris found that the time and quality of sleep before and after Ramadan fasting were increased significantly. However, food intake, muscle pain, fatigue, and mental stress did not change significantly (Boukhris, Trabelsi, et al., 2019).

Based on the background and the results of the studies as mentioned and described above made researchers interest to do this study to investigate the effect of Ramadan fasting on stress of preclinical medical students at UIN Syarif Hidayatullah Jakarta.

MATERIAL AND METHODS

The study was approved by the ethical committee of the faculty of medicine UIN Syarif Hidayatullah Jakarta (the number ethical clearance B-005/F12/KEPK/TL.00/9/2019). The study featured a prospective analytic cohort design by a cross sectional approach with a one group pre-test and post-test design.

The Respondents were selected using inclusion and exclusion criteria. The inclusion criteria were: 1) fasting during Ramadan; and 2) being willing to be a research respondent after provided informed consent to participate in the study. The exclusion criteria were; 1) The students who did

not complete and follow the one of the data retrievals times: 2) The students who were on leave or inactive. Therefore, using the consecutive sampling method, 242 subjects were selected.

The data was collected by interview method. The collected variables included the characteristics of subjects and stress scores. Stress measurements were carried out by a validated DASS-42 questionnaire (Damanik & Evelina Damanik, 2006) that originated from Lovibond SH DASS-42 questionnaire (Lovibond et.al, 1995). The collected data was then analysed by the Statistical Package for Social Sciences (SPSS) version 22 using the Wilcoxon test (Dahlan, 2014). The significant value if statistically found $p < 0.05$.

RESULT

Of the 242 respondents as shown in Table I, the majority of subjects (71.1%) were females, while 28.9 % were males. The stress levels before Ramadan fasting were found 78.5% of subjects and 21.5% were normal.

Based on Table 2, the average stress score before Ramadan fasting was 9.42 (SD 6.78), while the after Ramadan fasting was 8.04 (SD 7.29). A comparison of the stress scores before and after Ramadan fasting showed significance of 0.000 ($p < 0.05$). In subjects with normal stress levels at the first measurement, an average stress score before Ramadan fasting was 6.34 (SD 4.17) and after fasting 4.64 (SD 4.13). There was a significant difference in stress scores before and after Ramadan fasting in normal stress level subjects (p -value 0.000). Moreover, for subjects that experiencing of stress, an average of stress score before Ramadan fasting was 19.48 (SD 4.24), while after Ramadan fasting was 17.05 (SD 5.21). We found a significant difference of stress scores before and after Ramadan fasting for stress subjects (p -value 0.000).

Table 1: Result of Respondents Characteristic

Variables	N	Percentage
Sex		
Male	70	28.9
Female	172	71.1
Stress level		
Stress	52	21.5
Normal	190	78.5

Table 2: Result of Bivariate Analysis

Stress Score	Stress Level				Total	
	Stress		Normal		mean±SD	P-value
	mean±SD	P-value	mean±SD	P-value		
Before Ramadan fasting	19.48±4.24	0.000*	6.34±4.17	0.000*	9.42±6.78	0.000*
After Ramadan fasting	17.05±5.21		4.64±4.13		8.04±7.29	

*at α 0,05, there is a significant relationship

Table 3: Result Analysis of Changes for Stress Score

Stress level	Change In Stress Value						Total	
	Decreased		Remained		Increased		n	%
	N	%	n	%	N	%		
Stress	38	73.1	2	03.8	12	23.1	52	100.0
Normal	103	54.2	24	12.6	63	33.2	190	100.0
Total	141	58.3	26	10.8	75	30.9	242	100.0

As shown in Table 3, 58.3% subjects have a decrease of stress score (54.2% of subjects with normal stress levels, and 73.1% of subjects who experiencing of stress) while 10.8% of subjects have a remained the same of stress score (12.6% of subjects with normal stress levels and 3.8% of subjects who experiencing of stress). This table also showed 30.9% of respondents who experiencing of stress to have an increase of stress scores (33.2% of subjects with normal stress levels and 23.1% of subjects who experiencing of stress).

DISCUSSION

The results of this study were similar with the research that conducted by Erdem (Erdem, 2018). Erdem found a significant effect of Ramadan fasting on stress reduction by p-value 0.01. This result was also as same as with the research of Ali Noruzi K, which showed that fasting Ramadan can reduce stress with a significance of $p < 0.01$ (Koushali et al., 2013). Moreover, the result of this study was also in line with the results of the research that conducted by Arati Amin, which showed that the stress score on the 28th day of Ramadan decreased with the significance of the p-value < 0.01 (Amin et al., 2016). However, different from our study, the study that conducted by Boukhris reported that there were no significant changes in mental stress leading up to and after Ramadan fasting (Boukhris, Hsouna, et al., 2019). The causes of the results were can different due to the limited amount of sample (only 14 subjects), and they used a different questionnaire. a Hooper questionnaire (Hooper & Mackinnon, 1995) that were used by Boukhris usually to monitor excessive athlete sports.

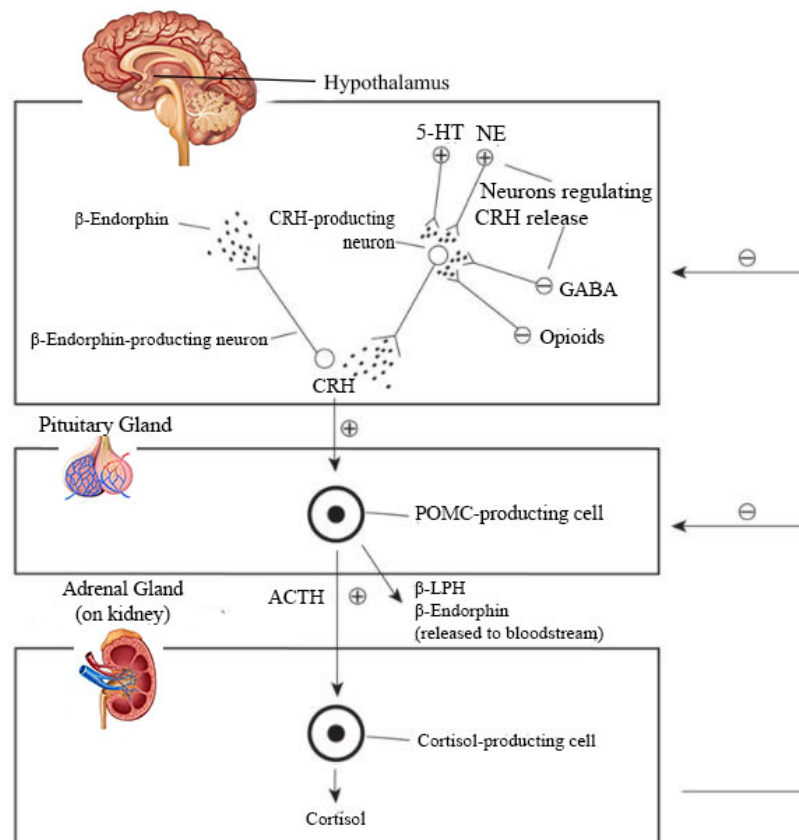


Figure 1. The major components of the stress response were mediated by the hypothalamic-pituitary-adrenal (HPA) axis. Note: (+) excites; (-) inhibits

Moreover, biochemically, as shown in Fig.1, the induction of nerve cells in the hypothalamus is caused by stress then produces and releases corticotropin-releasing factor (CRF). In the hypothalamus, stimuli from CRF produce the releasing of β-endorphins. CRH is also transported into the pituitary gland then stimulates the production of proopiomelanocortin protein (POMC). POMC serves as the basis for some stress-related hormones, such as adrenocorticotrophic (ACTH), β-endorphins, and β-lipotropin (β-LPH). Stimulation of the pituitary gland by ACTH produces the stress hormone cortisol. When cortisol levels reach a certain level, the release of CRF and ACTH is reduced. Other neurons secreting serotonin (5-HT), norepinephrine (NE), γ-aminobutyric acid (GABA), or endogenous opioids also regulate the release of CRH. (Stephens & Wand, 2012)

Stressful situation activates the hypothalamic-pituitary-adrenal (HPA) axis in the brain. Activation of axial HPA will result in the releasing of hormones such as β-endorphins, serotonin, norepinephrine, GABA, and glucocorticoids into the systemic circulation. Glucocorticoid hormones are hormones that provide physiological responses to stress stimulation, while endorphin hormones serve to keep stable and trigger pleasure, calm, and happiness (Amir et al., 1980).

One of the hormones that affect emotional changes in stress condition is the cortisol. Suhad Bahijri's research found that cortisol levels changed on the morning of Ramadan (Bahijri et al.,

2013). Cortisol levels in the morning of the months outside of Ramadan was higher than at night. However, during Ramadan, cortisol levels in the morning was lower than outside of Ramadan. Also, cortisol levels at night in Ramadan are higher than in the months outside of Ramadan. Besides, the research that conducted by Zangeneh found that in women who experiencing of PCOS, the cortisol and nor-adrenaline levels after Ramadan fasting significantly decreased compared to before Ramadan fasting ($p < 0.05$) (Zangeneh et al., 2015)

In addition, another an influential hormone that involve in coping stress processing is the endorphin. Research by Lahdimawan revealed that there was a significant increase in endorphin serum and PBMC on days 7 and 21 of Ramadan compared to before Ramadan (Lahdimawan et al., 2013). Besides, Ramadan fasting can also affect cognitive function and mood. The research that conducted by Qasrawi showed that Ramadan fasting affect to sleep quality, circadian rhythm, and cognitive function (Qasrawi et al., 2017). A study by Cherif also showed that intermittent fasting has an effect on physical performance and mental health such as coping and decision-making strategies (Cherif et al., 2016).

The results of this current study as mention above showed that fasting Ramadan can reduce stress scores for all subjects, both stress and normal subjects. This result was similar by the Hadith of Prophet Muhammad that said: " Fast, you will be healthy...." (Syafi'i, 2015). The benefits of Ramadan fasting can be physically and mentally healthy. On other hand, according to WHO, health includes not only disease, weakness/disability, but also physical, mental, and social (World Health Organization, 1947). Therefore, it can be stated that fasting Ramadan is not only for the sick person but also beneficial for individual who are physically and mentally healthy.

Some of the results of the research as described above can be used as evidences of the authenticity of the hadith that said the fasting is good for health, especially mental health. This current study can answer the benefits of Ramadan fasting for mental health by religious coping methods. Many activities in Ramadan can affect the decreasing of stress scores on the subject, such as multiplying alms, doing evening prayers, reading the Qur'an, and giving the zakat. However, this study did not investigate those activities that could influence the decreasing of stress scores of the subjects.

Increasing high-stress score (30.9%) of the subjects is believed to be caused by the time of taking the samples, such as the time was close to the final examinations that can influenced the increasing of stress scores. These conditions are related to the research that conducted by Amiruddin who found many factors such as housing, off-campus organizations, and tuition fees are associated with the stress scores of the subjects (Amiruddin, 2017).

Although this study aimed to assess the impact of Ramadan fasting on stress, this study did not evaluate the causes of the stress during Ramadan. Besides, researchers did not measure the quality of fasting of the subjects based on researchers believed that only Allah can evaluate the quality of the human fasting.

CONCLUSION

Stressor events that facing by preclinical medical students can induce and trigger mental disorders and lead to stress condition. The majority of subjects (58.3%) that experiencing stress during Ramadan fasting have a decreasing of stress scores. The current study also demonstrated that Ramadan fasting can reduce the stress scores ($p=0.000$) in both normal ($p=0,000$) and stressful subjects ($p=0,000$). Finally, as a part of religious coping, Ramadan fasting can be used as media treatment for everyone especially Muslims to achieve a good mental health status.

Author's Contributions

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Sayid Ridho and Akbar Maulana. All authors working together to write first of manuscript and gave some comments on previous version. All authors read and approved final manuscript.

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