

ORIGINAL ARTICLE

Ramadan Fasting: Effect on Anxiety Using The DASS-42 Scoring System

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ABSTRACT

Introduction: Ramadan fasting affects dietary propensity and mental health. As part of their courses, medical students encounter stressors such as examinations, college assignments, and others that can impact their mental health and contribute to conditions such as anxiety. Limited research has been conducted to date on the impact of Ramadan fasting on anxiety scores among college students. This study aimed to explore the impact of Ramadan fasting on anxiety using DASS-42 scoring system. **Methods:** A prospective cohort analytic study was conducted with a cross-sectional approach and a one-group pretest-posttest design. A total of 242 medical students were sampled and selected by consecutive sampling. The DASS-42 questionnaire was used to evaluate the respondents' anxiety scores. **Results:** We found 99 respondents were experiencing anxiety while 143 were normal. The findings revealed that the anxiety scores fell during the pre- to post-Ramadan period for all respondents ($p = 0.003$), the respondents who had anxiety ($p = 0.000$), and the normal respondents ($p = 0.001$). **Conclusion:** The current study reports that Ramadan fasting was proven to reduce the anxiety scores of all students including those who experienced anxiety and normal subjects. *Malaysian Journal of Medicine and Health Sciences* (2024) 20(1):186-190. doi:10.47836/mjmhs.20.1.24

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INTRODUCTION

Muslims all over the world are obliged to fast for one month during Ramadan. Ramadan Fasting is an obligation mentioned in Quran Surah Al Baqarah 183, "O you who have believed, decreed upon you is fasting as it was decreed upon those before you that you may become righteous." For Muslims, however, fasting involves not only refraining from eating and drinking, but also keeping one's mouth and other parts of the body away from everything that is prohibited by Allah (1).

In addition to affecting diet, fasting impacts mental health (2). In term of mental health in Indonesia, Basic Health Research Data 2018 revealed that for those aged 15 years and above, the prevalence of emotional mental disorders with symptoms related to depression and anxiety stood at around 9.8% of the total population (3). Anxiety disorders comprise a group of mental disorders associated with feelings of anxiety and fear, including General Anxiety Disorder (GAD), panic attacks, phobia, social anxiety disorder (SAD), and post-traumatic stress disorder (4).

The effect of Ramadan fasting on mental health is influenced by various factors and several studies have reported different opinions. In a study examining in the effects of Ramadan fasting on the mental health of university students in Iran via a systematic review, Gilavand A. and Jundishapur A. reported that fasting could improve the mental health of university students in Iran (5). Meanwhile, in another study in 2016, Sadruddin M. et al demonstrated the positive impact of Ramadan fasting to control emotions and improve mental health in university lecturers (6). However, in 2019, Chehovich C. et al reported that Ramadan fasting had an inverse effect on patients with schizophrenia, which increased the risk of psychiatric complications (7).

Several studies into the impacts of Ramadan fasting on anxiety have reached different conclusions. In 2016, Amin A. et al studied about the effect of Ramadan fasting on depression, anxiety, stress, and cognition. They reported that the level of depression and anxiety decreased on days 14 and 28 of Ramadan (8). The result of that study was similar to that of Erdem O. who also reported that anxiety scores decreased during Ramadan fasting (9). On the other hand, Koushali et al found that the effects of Ramadan fasting on emotional reactions in nurses in Iran did not produce a significant decrease in the anxiety score (10).

Therefore, this study aimed to investigate the effect of Ramadan fasting on the anxiety scores of preclinical medical students at UIN Syarif Hidayatullah Jakarta using the DASS-42 scoring system.

MATERIALS AND METHODS

The study was approved by the ethical committee of the Faculty of Medicine UIN Syarif Hidayatullah Jakarta (ethical clearance number B-005/F12/KEPK/TL.00/9/2019). The study featured a prospective cohort analytic design with a cross-sectional approach and a one-group pretest-posttest design. The subjects were the preclinical medical students at UIN Syarif Hidayatullah Jakarta. The subjects were selected using exclusion and inclusion criteria. The exclusion criteria were students who were on leave or inactive, and students who did not complete the questionnaire before and after Ramadan. Meanwhile, the inclusion criteria were fasting during Ramadan, and the respondents provided informed consent to participate in the study. The sample size formula used for this research was:

$$n1 = n2 = \left(\frac{(Z\alpha + Z\beta)S}{x1 - x2} \right)^2 = \left(\frac{(1.64 + 1.28)1.3}{1} \right)^2 = 14$$

As sample size calculation above, each of groups should have 14 minimum samples, hence the total sample were 28. The number of samples were added by 10% of the sample (drop-out rate) so that the total sample was at least 31 respondents. However, to minimize the occurrence of bias and the results can be generalized academically, the researchers took the number of samples with the consecutive sampling method. Finally, the total number of samples in this study were 242 respondents. After collecting the respondents' data by informed consent, the questionnaires were completed during the two weeks before and after Ramadan.

The demographic data collected included gender, while the DASS-42 questionnaire by Lovibond was used to measure the anxiety score (11). DASS-42 scoring system is more evident and more specific symptom information other than DASS-21 which is a shortened form of DASS-42 (11). The assumption why the DASS-42 was developed is there are the differences between depression, anxiety, and stress experienced by normal subjects and differences in degrees were based on population compared to other questionnaires that using for sick person and to find the severity level of the disease. The study only used the DASS-42 questionnaire which contains 14 questions about anxiety. Anxiety group score of DASS-42 focuses on physiological arousal,

feelings of panic, and fear. Surely, before conducting the research, the questionnaires were revalidated using "Pearson Cochrane Coefficient" by good results (the Pearson correlation for all anxiety questions of this questionnaire are more than r-table=0.138).

The data were then analyzed statistically by SPSS-22 using a paired t-test for normally distributed data and the Wilcoxon test for non-normally distributed data (12).

RESULTS

The demographic data of the 242 students showed that 29% were males and 71% were females. The samples were also divided based on anxiety. A total of 99 students (41%) were found to have anxiety and 143 (59%) were normal as shown in Table I.

The Wilcoxon was used to analyze the data as they were not normally distributed (p<0.05). A comparison of the anxiety score between before and after Ramadan fasting showed a significance of 0.003 (p<0.05), meaning there were statistical differences in the anxiety scores before and after Ramadan fasting. Additionally, the median anxiety score for all samples fell from 6.00 before Ramadan to 5.00 after Ramadan as shown in Table II. Based on all samples, there were 127 subjects showed a decreased anxiety score, 25 subjects remained the same, and 90 students had an increased anxiety score (Fig. 1). Of the 113 normal subjects, a total of 62 recorded a lower anxiety score, 33 remained the same, and 18 students had a higher anxiety score. The median anxiety score for the normal subjects fell from 3.00 before Ramadan to 2.00 after Ramadan with a significance of p=0.001 (p<0.05), meaning it was statistically significant as shown in Table II.

Of the subjects with anxiety, 65 showed a lower anxiety score, 27 remained the same, and 7 students showed a

Table I: Distribution of sample

Variables	n	%
Sex		
Male	70	29%
Female	172	71%
Category		
Anxiety	99	41%
Normal	143	59%

Table II Comparison of anxiety scores between before and after Ramadan Fasting using Wilcoxon test

	All Subject		Normal Subjects		Anxiety Subjects	
	Median (Min-Max)	P Value	Median (Min-Max)	P Value	Median (Min-Max)	P Value
Before Ramadan	6.00 (0-32)	0.003	3.00 (0-7)	0.001	12.00 (8-32)	0.000
After Ramadan	5.00 (0-41)		2.00 (0-7)		8.00 (0-41)	

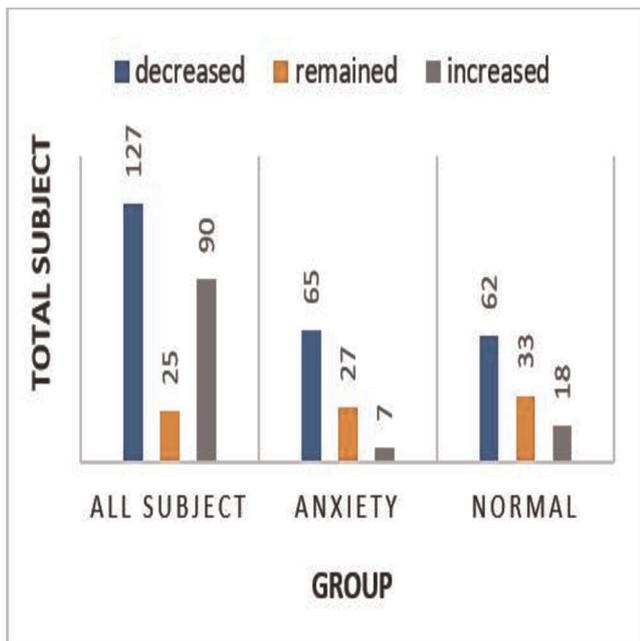


Figure 1: Changes in Anxiety Score

higher anxiety score (Fig 1). A comparison of the pre- and post-Ramadan anxiety scores revealed a fall in the median score from 12.00 to 8.00 with a significance of $p= 0.000$ ($p<0.05$) as shown in Table II.

DISCUSSION

Ramadan fasting is an obligation for all Muslims and constitutes the fifth pillar of Islam according to commands from Allah. The wisdom of fasting during Ramadan is to improve physical health by refraining from eating from dawn until dusk, and also improve spiritual health (2). By fasting, Muslims train themselves to abstain from lust so that it has an impact on mental health.

The decreasing anxiety scores revealed in this study prove that there is harmony with the Prophet Muhammad’s hadith regarding the benefits of Ramadan fasting to improve mental health. As explained in the hadith “... *Fast, you will be healthy. Go to war, surely you will be wealthy ...*” (Hadith by Thabrani) (1).

Armutcu F was stated that fasting has a positive impact on human health (13). The WHO’s (1947) definition of healthy broadly covers not only medical aspects, but also mental and social aspects, it constitutes more than a state of being free from disease, disability, and weakness (14). Fasting can be a treatment for and help to prevent chronic diseases such as cardiovascular disease, cancer, diabetes, and neurological disorders (13). Ramadan fasting is characterized as a strong religious belief that can affect all aspects of mental health; it also enables the individual to train themselves to better deal with psychological crises (5). This is therefore linked to the decrease in anxiety scores after Ramadan fasting since anxiety is one of the most commonly experienced mental health disorders.

Moreover, anatomically, the amygdala is one of the structures that play a role in anxiety pathway. Two core groups in the amygdala play a role in the anxiety pathway, namely Basolateral Amygdala Complex (BLA) and Centromedial Amygdala Complex (CeA). The electrical stimulation of these two structures induces a sense of fear and anxiety initiated by the thalamus and sensory association cortex (Fig. 2) (15).

In addition, biochemically, changes in neurotransmitters affect the development of anxiety symptoms. Various neurotransmitters impact anxiety symptoms including norepinephrine, serotonin (5-HT), and GABA. In several different studies, increased levels of serotonin (5-HT) in the brain have been found to increase anxiety levels in a person. Fear and stress will activate the serotonergic pathway (16). Anxiety is also influenced by a decrease in the GABA neurotransmitter, which acts as an inhibitory neurotransmitter. Therefore, excitatory neurotransmitters such as glutamate will have higher activity, as illustrated in figure 2 (17).

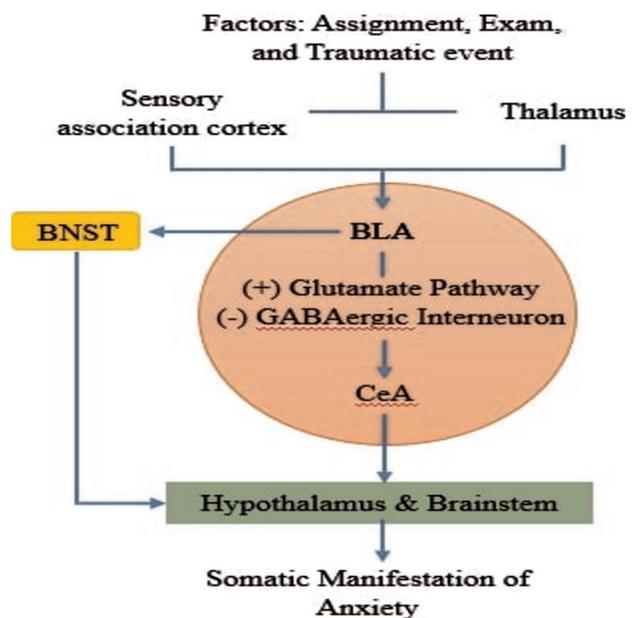


Figure 2: Anxiety disorder pathway
 Abbreviations: BLA, basolateral amygdala; BNST, bed nucleus of the stria terminalis; CeA, central nucleus of the amygdala

Several prior studies have shown the effect of fasting on neurotransmitter anxiety. In 2017, Bastani A showed an increase in serotonin levels on the 14th day of Ramadan fasting (18). In 2009, Violante I et al reported a relative increase in levels of the GABA neurotransmitter during fasting (19).

Amin A et al reported a significant decrease in anxiety scores on days 14 ($p<0.05$) and day 28 of Ramadan fasting compared with the baseline values. The decrease was thought to be due to the direct effects of Ramadan in improving mental health (8). The result was similar to that found by Erdem O who reported a decrease in the

anxiety score after Ramadan fasting (9). As such, both of these studies reported the same results as the present study, which found a decrease the anxiety scores of preclinical medical students before (median= 6.00) and after (median= 5.00) Ramadan (8,9).

However, the results of this study were different from those reported by Koushali et al. They found that the decrease in anxiety levels before and after Ramadan fasting was not significant ($p > 0.05$). Of the 313 respondents investigated, there was a 3.2% decrease in anxiety scores (10). Koushali et al in 2013 used the DASS-21, which has some differences compared to the DASS-42. This may explain the differences with the results of this study. Additionally, in 2016, Khatun A reported that male students who did not fast had less anxiety than male students who fasted. This difference in anxiety levels proved to be significant. Khatun A in used a questionnaire based on the GAD-7 Anxiety questionnaire which could be the reason for the difference in the results compared to the present study (20).

The decrease in the before and after Ramadan anxiety scores was in line with the results of several other extant studies showing the effect of fasting on the main neurotransmitters that cause anxiety. In their 2019 study, Violante et al showed that fasting mice had elevated levels of n-hypothalamic [3-13C] lactate and [2-13C] -aminobutyric acid (GABA) in the brain (19). A rise in GABA levels during fasting would reduce the risk of anxiety. This is because an increase in GABA, which is an inhibitory neurotransmitter, is accompanied by a decreased in the activity influenced by excitatory neurotransmitters; in other words, the symptoms of anxiety also decrease. Therefore, in this study, there was a decrease in anxiety scores after Ramadan fasting.

In addition, fasting can affect emotions. In seeking peace, Muslims should be encouraged to always worship God Almighty; one method of doing this is by fasting. Calmness derives from the patience and covers anger held within the chest as per the hadith: "Sabbath fasting and fasting on three days every month can eliminate anger in the chest." (Hadith by Ahmad) (2).

Another hadith states that fasting will increase an individual's level of patience in facing tests from Allah SWT. In accordance with the hadith of the Prophet Muhammad: "*Fasting is half the patience.*" (Hadith by Ibnu Maajah) (2).

Patience helps in developing the mentality to be unyielding and strong despite various problems. Therefore, fasting can help to prevent psychological symptoms of anxiety such as uneasiness, tension, and an ability to relax (21).

CONCLUSION

Stressful events can trigger mental disorders and lead to anxiety. For Muslims, Ramadan fasting is a form of worship that can be beneficial in terms of preventing anxiety. Ramadan fasting was found to significantly reduce the pre- and post- Ramadan anxiety scores of preclinical medical students at UIN Syarif Hidayatullah Jakarta with a median difference of 1.00 and a significance of 0.003 ($p < 0.05$). Therefore, the current study has demonstrated that Ramadan fasting was effective in reducing the anxiety scores of all students both on students namely those who experienced anxiety and normal students.

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