Original Article

Effects of Fasting on Student Performance in Exams at Northern Border University, Saudi Arabia

Abdelrahman M Abukanna[1*], Hafiz Osman IbnIdris[2], Atheer Muteb K Alenezi[3], Fai Nidaa H Alshammari[3], Shahad Hameed D Alanazi[3], Hibah Farhan B Alenezi[3], Wajd Hussein D Alenezi[3], Ghaida Hamad F Alanazi[3], Nadiyah Abdulrahman S Aloufi[3], Reem Abbas Q Alanezi[3], Nada Naif A Alanazi[3], Marwah khalil I Almalki[4]

[1]Department of Internal Medicine, NBU, Arar, Kingdome of Saudi Arabia (KSA). [2]Department of Internal Medicine, Alneelain University, Khartoum, Sudan. [3]Faculty of Medicine, Northern Border University, Arar, KSA, [4]Alrayan Medical College, Medina, Saudi Arabia.

Abstract

The creation of successful interventions to enhance university students' eating habits may be aided by an understanding of the potential relationship between food consumption and academic accomplishment. This essay investigates how Ramadan affects Muslim university students' academic performance at NBU, Arar, Saudi Arabia. A cross-sectional study was carried out by using an online administered questionnaire. The target sample was college students in Saudi Arabia. Utilizing the Social Sciences Statistical Package, data was gathered and examined (SPSS). The study included 445 participants, 78.9% of them were females and 21.1% were males. 98.9% of students fast during Ramadan. 87.4% go to university while fasting. 73% feel sleepy while fasting. 82.5% feel tired and exhausted while fasting. 73.7% feel a headache while fasting. 82.7% reported that fasting affects focus while studying (17.2% positively and 82.8% negatively). 72.6% reported that fasting affects their performance in tests (17.3% positively and 82.7% negatively). The result of tests performed while fasting was reported positive in 24.7% and negative in 44.7%. Fasting affects the academic performance of college students causing headaches, exhaustion, and disturbance of sleep schedule. However, most participants reported that fasting affects focus and performance on exams while studying (negatively more than positively).

Keywords: Fasting, Ramadan, Academic performance, Cognition

Introduction

Islam defines fasting as the behavior of refraining from things like food, drink, tobacco, and sexual activity. When the adhan of the Fajr prayer is sounded between dawn and dusk during the holy month of Ramadan, Sawm is observed. It is believed that fasting cultivates spirituality, modesty, and patience. People who are unable to fast for valid reasons should make up for the lost days by fasting an equivalent number of days at a different time [1].

In addition to the possibility of temporary difficulty imposed by hunger and a lack of fluids during fasting hours, which may affect one's physical and mental health, observing Ramadan can benefit both people and communities [2]. If it interferes with their capacity to review and prepare for critical exams, some Muslim jurists permit students who are struggling to break their fast during Ramadan [2].

Research on how nutrition affects educational outcomes is expanding. But university students have paid considerably less attention to the connection between food and academic success. Owing to the sluggish release of energy for brain role and consumptions of micronutrients, predominantly iron, iodine, and vitamin A, notwithstanding of other aspects, several studies highlight the implication of eating breakfast for understanding and education [3, 4].

Spirituality and religious beliefs are among the most significant factors that have an impact on mental health. Fasting is a religious obligation that Islam has long placed a strong emphasis on. One of Islam's religious responsibilities is fasting, which has been regarded in various ways by other faiths [5].

However, several factors might result in a favorable correlation between religious practice and academic achievement [5]. Variations in religious practices may be a reflection of variations in religiosity, which are related to

Address for correspondence: Abdelrahman M Abukanna, Department of Internal Medicine, NBU, Arar, Kingdome of Saudi Arabia (KSA).
amaabukanna63@hotmail.com

How to cite this article: Abukanna AM, IbnIdris HO, Alenezi AMK, Alshammari FNH, Alanazi SHD, Alenezi HFB, et al. Effects of Fasting on Student Performance in Exams at Northern Border University, Saudi Arabia. Arch Pharm Pract. 2022;13(4):82-7. https://doi.org/10.51847/LjRKD3atf2

traits of the character like drive and capacity for long-term planning as well as socio-emotional control, all of which contribute to the long-term improvement of human capital formation. The observance of religious rituals like Ramadan frequently calls for endurance, self-control, and patience. We anticipate that tighter religious practices will positively connect to academic achievement if these character traits have favorable effects on human capital growth [6].

In a recent survey, Margolis and Reed discovered that Muslim med students who observe Ramadan increase their daytime sleeping time to successfully adjust and prevent a spike in daytime somnolence. The primary way that Ramadan improves educational outcomes is by fasting [7].

The research used spatiotemporal variance in annual fasting hours to examine how the intensity of Ramadan influences educational outcomes. Increases in student performance are associated with longer fasting periods. By encouraging the development of social capital and social identity among students through increased religious participation and shared experiences, the study's findings support the concept that a challenging Ramadan during adolescence affects educational outcomes [8].

Consequently, taking into account the significance of Ramadan as a religious month for Muslims, as well as the role that religion and religious rituals play in mental health, the current study aims to determine whether fasting during Ramadan can improve the mental health of students who engage in religious practices [9]. This study investigates how Ramadan affects Muslim university students' educational outcomes at NBU, Arar, Saudi Arabia.

Materials and Methods

Study Design and Period

A cross-sectional study design was adopted during the period 1 June to 1 September 2022.

Study Area and Setting

The study was carried out at Northern Border University (NBU), Arar, Saudi Arabia.

Study Setting

Saudi students participating in NBU of both genders in all academic years were eligible for inclusion in the study, provided they fulfill the inclusion criteria as follows:

- Saudi
- University student at NUB
- Both genders
- All collages
- Welling to participate

Exclusion Criteria

- Non-Saudi
- Students with chronic diseases such as DM, hypertension, and any other disease prevent him/her from fasting
- Not willing to participate

Sample Size

- According to the equation: $N=z^2 p (1- p) / d^2$.
- Where n=the desired sample size.
- The standard normal deviation (i.e 1.96).
- P= the prevalence of the problem.
- d =the degree of accuracy required (0.05).

The study was conducted during the period from June 1st to September 31st, 2022.

In our study, the desired sample was 420 students distributed among different colleges.

Data Collection Tool

Data was gathered using a pre-made online questionnaire that was created to achieve the goals of the study. There were two sections in the questionnaire. The socio-demographic information in the first section includes the participants' age, gender, marital status, educational level, and grade point average. The second portion talked about fasting and how it affected students' academic results. A brief introduction outlining the purpose of the study will be included in the questionnaire for respondents.

Data Collection Technique

To gather data, the researchers created an electronic Google form. Online distribution channels for the questionnaire included Twitter, Facebook, and WhatsApp. The research team went through each participant's information and responses one at a time using Gmail access to ensure that they wouldn't be repeated. The participants were required to sign a written consent form that was attached to the questionnaire.

Statistical Analysis

SPSS Inc. Chicago, IL, USA was used for data entry and analysis. The use of descriptive statistics was used. For qualitative characteristics, percentages were provided. The Chi-square test was used to identify the determinant factors.

Ethical Considerations

Research Ethics Committee at Northern Border University approved the study. The deans of the faculties granted formal permission. Participants could withdraw from the study whenever they need to, and data confidentiality was guaranteed. The questionnaire included the written consent form, signed by the participants.

Results and Discussion

The study included 445 participants, 78.9% of them were females and 21.1% were males. 66.5% of participants were aged between 20- 30 years old while 21.3% were aged less than 20 years. 75.7% of participants were single and 22.7% were married. 47.6% of study participants were students in the medical field as illustrated in **Table 1**.

Table 1. Sociodemographic characteristics of participants (n=445)

Parameter		No.	%
Gender	Male	94	21.1
	Female	351	78.9
Marital status	Single	337	75.7
	Married	101	22.7
	Divorced	7	1.6
Age	Less than 20	95	21.3
	20-30	296	66.5
	31-40	36	8.1
	41-50	18	4.0
Academic year	first	87	19.6
	the second	70	15.7
	the third	66	14.8
	the fourth	74	16.6
	Fifth	41	9.2
	Sixth	107	24.0
Specialization	Business Management	56	12.6
	Communications, computers, and information	39	8.8
	Education and Arts	59	13.3
	Mining	3	7.
	nutrition	8	1.8
	Sciences	4	9.
	Applied College	3	7.
	The medical field	212	47.6
	Engineering	24	5.4
	secondary	4	9.
	Islamic studies	6	1.3
	pharmacy	1	2.
	Student	3	7.
	Sciences	1	2.
	Medical Sciences	5	1.1
	Law	3	7.
	College of Science Chemistry	2	4.
	chemistry	1	2.
	Accounting	11	2.5

As illustrated in **Table 2**, only 51.2% of participants have breakfast daily. 43.6% have breakfast immediately after waking up, 41.6% have breakfast between 9- 11 am and 14.8% have breakfast after 11 am. 98.9% of students fast during Ramadan. 87.4% go to university while fasting. 73% feel sleepy while fasting. 82.5% feel tired and exhausted while fasting. 73.7% feel a headache while fasting. 50.1% feel stressed while fasting. 75.7 reported that fasting affects their sleep schedule. 72.4% remember better while fasting. 35.3% control the study time during fasting. 64.3% reported that fasting affects academic discussion with colleagues. 82.7% reported that fasting affects focus while studying (17.2% positively and 82.8% negatively). 72.6% reported that fasting affects their performance in tests (17.3% positively and 82.7% negatively). The result of tests performed while fasting was reported positive in 24.7% and negative in 44.7%. **Table 3** shown no significan associacion between sociodemographic charecters of participants with fasting effect of their academic performance.

Table 2. Effect of fasting on the academic performance of study participants (n=445)

Parameter		No.	%
Having breakfast daily	yes	228	51.2
	no	51	11.5
Breakfast time	Sometimes	166	37.3
	Immediately after waking up	194	43.6
	From 9-11 am	185	41.6
	After 11 am	66	14.8
Fasting the month of Ramadan	yes	440	98.9
	no	5	1.1
Going to university while fasting	yes	389	87.4
	no	56	12.6
Feeling sleepy while fasting	yes	325	73.0
	no	120	27.0
Feeling tired and exhausted while fasting	yes	367	82.5
	no	78	17.5
Getting a headache while fasting	yes	328	73.7
	no	117	26.3
Being stressed while fasting	yes	223	50.1
	no	222	49.9
Fasting on a sleep schedule	yes	337	75.7
	no	108	24.3
Remembering while fasting	yes	322	72.4
	no	123	27.6
Controlling the study time during fasting	yes	157	35.3
	no	288	64.7
Fasting affects academic discussions with colleagues	yes	286	64.3
	no	159	35.7
Fasting affects focus while studying	yes	368	82.7
	no	77	17.3
If yes, affect positively or negatively	positive	62	17.2
	negative	298	82.8
Fasting affects performance in tests	yes	323	72.6
	no	122	27.4
If yes, affect positively or negatively	positive	56	17.3
	negative	267	82.7
Result of tests performed while fasting	positive	110	24.7
	negative	199	44.7
	No difference from the previous one	136	30.6

Table 3. Association between sociodemographic characteristics of participants with the effect of fasting on their academic performance (n=445)

		Fasting effect on academic performance		Total (N=445)	P value
		Yes	No		
Gender	**Male**	71 22.0%	23 18.9%	94 21.1%	**0.471**

	Female	252	99	351	
		78.0%	81.1%	78.9%	
Age	**less than 20**	71	24	95	**0.124**
		22.0%	19.7%	21.3%	
	20 -30	219	77	296	
		67.8%	63.1%	66.5%	
	31 – 40	20	16	36	
		6.2%	13.1%	8.1%	
	41 -50	13	5	18	
		4.0%	4.1%	4.0%	
Marital status	**Married**	74	27	101	**0.250**
		22.9%	22.1%	22.7%	
	Single	242	95	337	
		74.9%	77.9%	75.7%	
	Divorced	7	0	7	
		2.2%	0.0%	1.6%	
Academic year	**first**	66	21	87	**0.445**
		20.4%	17.2%	19.6%	
	the second	57	13	70	
		17.6%	10.7%	15.7%	
	the third	45	21	66	
		13.9%	17.2%	14.8%	
	the fourth	52	22	74	
		16.1%	18.0%	16.6%	
	Fifth	29	12	41	
		9.0%	9.8%	9.2%	
	Sixth	74	33	107	
		22.9%	27.0%	24.0%	

Religious fasting can have an impact on one's physical health in addition to spiritual benefits. Three types of religious fasting have received particular attention from the scientific community [10]. The first is Islamic Ramadan, a holy month for Muslims that lasts 28–30 days and is observed by fasting from sunrise (Sahur) to sunset (Iftar). Because the twelve hours fasting time is followed by a twelve hours feast period, Ramadan fasting is comparable to Alternate-Day Fasting (ADF). Because drinking water is inhibited during the 12-hour fast, it differs from ADF [11]. Ramadan causes metabolic alterations from a physiological standpoint. The main modification is the daily intermittent depletion and replenishment of liver glycogen. The primary energy source in the morning is a carbohydrate; more recently, in the afternoon, lipids have started to take center stage, and so on until the fast breaks at dusk. This technique alters circadian rhythms and hormone secretion, particularly cortisol, growth hormone, insulin, ghrelin, leptin, prolactin, sex hormones, and adiponectin [12].

Given that glucose is an essential component of the central nervous system and that its metabolism rises in certain areas of the brain during cognitive engagement, the performance loss we observed at 1600 h may be caused by low blood glucose levels. The peripheral nerve system, which the brain relies on for a consistent supply of glucose because it cannot make its own, will run out in the late afternoon in patients who are fasting [12, 13].

The capacity to keep the brain active throughout a task is known as task engagement. It is usually assessed using the RT and accuracy of prolonged execution of easy activities. In a modified version of a serial subtraction task, Zajac and colleagues [14, 15] had participants count backward from a random number between 800 and 999 by 3 and then by 7 more times. Normally, this task tests working memory and attention and lasts only a few seconds, but the authors made it last for two minutes in each block. They found no discernible difference between the circumstances. This result is at odds with two findings (from the same study) from our earlier review [16], which proposed substantial diminishing in the fasted condition compared to unfasted conditions in similar tasks [17].

Eating regularly is a healthy or recommended eating behavior, and studies have linked more frequent meals with better nutrition quality [18]. Breakfast is included in this every day. Theoretically, higher academic achievement in children who eat consistently may be related to improved dietary quality. A recent study by Burrows *et al*. [18] found a correlation between a more balanced diet and improved academic performance in kids and teenagers. Additionally, there is currently insufficient evidence to support the link between diet and university student's academic performance, and additional demographic and health factors, like a lower SES and insufficient sleep, may also be at play [18].

After adjusting for semester-course-class fixed effects, student, class, and course variables, Nuryakin, Chaikal, *et al*. [19] investigated the effect of fasting on students' learning outcomes in Indonesia and found no indication of Ramadan's detrimental impacts on students' test scores. The investigation consistently finds no proof of morning-afternoon differential effects. The lack of (or muted) impacts of Ramadan is most likely attributable to Muslim students' earlier adaptation to the fasting environment, which allowed them to perform better as the exam time went on. The regression analysis's findings also imply that students with lower academic standing may benefit more from fasting.

The impact of fasting on students' emotional intelligence was studied by Nikfarjam *et al*. The research involved 32 male religious students. According to the findings, those who fast may have changes in their emotional intelligence [20]. To understand how Ramadan fasting affected students' mental health, Shafie *et al*. performed a study whose findings showed that students who took part in it scored on average higher for their mental health than they had before Ramadan. Additionally, before and after Ramadan, male students scored averagely better in mental health than female students [21-24].

Conclusion

Fasting affects the academic performance of college students causing headaches, exhaustion, and disturbance of sleep schedule. However, most participants reported that fasting affects focus and performance on exams while studying (negatively more than positively).

ACKNOWLEDGMENTS: None
CONFLICT OF INTEREST: None
FINANCIAL SUPPORT: None
ETHICS STATEMENT: Research Ethics Committee at the Northern Border University approved the study (HAP-09-A-043) no. (4/44/H) dated on 28.9.2022.

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