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NUTRITIONAL STATUS AND QUALITY OF LIFE DURING RAMADAN AMONG HIGHER INSTITUTION LEARNING CENTRE STAFFS WITH DIFFERENT BODY WEIGHT STATUS.

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ABSTRACT

Ramadan fasting altersmeal time and frequency of food consumed. Meals are exclusively nocturnal and less frequent; consequently, this may affect energy and nutrient intake. It is proven that what we eat will affect our quality of life (QoL), which also influenced our self-identification, social interactions, and psychological well-being.The aim of this study was to assess the total calorie and macronutrientsintake, as well as the quality of life (QoL), andalso toinvestigate any correlationson quality of life (QoL) towards dietary intake before, during and after Ramadan among UniSZA staffs. This study was conducted in four phases; a week before Ramadan, first week of Ramadan, second week of Ramadan, and after Ramadan. The total of 55 UniSZA staffs was recruited.Qualitative analysis of food consumed showed that the percentage of energy as carbohydrates, protein, and fat remained unaffected by Ramadan fasting. Therewere significance difference ($p < 0.05$) in the mean score of physical functioning, role-physical, bodily pain, general health, and vitality. Results showed that there weresignificant correlations ($p<0.05$) between calorie and general health; carbohydrate and physical functioning; carbohydrate and vitality; protein and physical functioning; protein and general health; protein and vitality; as well as fat and vitality. In conclusion, this study has found no significant correlation between quality

of life (QoL) and dietary intake during Ramadan among staffs in Institute of Higher Learning, UniSZA.

KEY WORDS :Ramadhan, Quality of Life, Dietary Intake and Anthropometry.

INTRODUCTION

Each year, millions of Muslims are abstained from eating or drinking from dawn (Sahur) to sunset (Iftar) during the holy month of Ramadan, which lasts between 28 to 30 days. The length of feast and fast periods of Ramadan are within 12 hours each on average [1]. The common dietary practice of Ramadan fasting is to consume one large meal after sunset and a lighter meal before dawn [2], but some Muslims consume supper before sleeping [3].It is one of the Muslims pillars which needs to be fulfilled when once reached puberty. Hence, all healthy Muslims are required to perform this fasting. Individuals who are sick, travelling, pregnant, breast-feeding, menstruating, or senile in which may harm oneself if fasting are not obliged to fast[4,5]. However, a great number of Muslims who deserve to be exempted from fasting will choose to fast by any chance [6].

Fasting in Ramadan is voluntarily performed in order to show the obedience towards the Creator and is not a prescribed imposition from the physicians except prior to surgery in certain medical cases. Ramadan is a month of self-regulation and self-training, which every Muslim prays to reach its end successfully and gain rewards afterlife. If the habits practised during Ramadan, either in terms of dietary intake or righteousness or even both, and are continued after Ramadan, theeffects will be long lasting. As a religious observance, fasting has been and still become a part of nearly all religions. Throughout the course of this month, all healthy individuals are enjoined to keep a strict fast from dawn to sunset. In Malaysia, Muslim children as young as six or seven years old are encouraged to practice fast of at least a few hours a day. By the age of ten, most children are able to fastfollowing the fasting period and enjoyeating and drinking between sunset and sunrise [7].

Currently, none of the previous studies have recorded assessment in correlation with quality of life among healthy adults before, during, and after Ramadan. Several methods have been developed to measure population-specific nutrition quality of life (NQoL) such as among patients with irritable bowel syndrome [8], cardiovascular metabolic disease [9], cancer [10],and malnutrition due to HIV infection [11] and many more. In addition, analysis of the recorded food intake in one study revealed that daily energy intake during Ramadan is reduced due to significant decrease of fat intake but not applicable to carbohydrate and

protein intake. Moreover, another study showed that both carbohydrateand protein intake were increased significantly during Ramadan compared to before Ramadan, however no significant changes were noted after Ramadan [12]. Further, some studies have found to report on significant decrease in energy intake [7, 13, 14]. It is hoped that study of dietary assessment and quality of life (QoL) before, during and after Ramadan among UniSZA staffs will giveample advantages to the community. The results obtained from this study can be used as a reference and new knowledge for future research activities.

MATERIALS AND METHODS

This was a cohort study. The outcome from participants in each cohort was measured and relationships with specific characteristics were determined. All measurements in this study were made based on four phases; a week before Ramadan, first week of Ramadan, second week of Ramadan, and after the month of Ramadan. The sampling method used in this research was purposive sampling whereby the subjects were confined to individuals whom willing to provide desired information.Participants were chosen among UniSZA staffsbased the inclusion criteria; aged between 25-40 years, apparently healthy, metabolically normal (not have metabolic problems), and Muslim (practice fasting in Ramadan). While the exclusion criteria were participants with chronic illness or metabolic syndrome, on medications, pregnancy, and gave birthfor the last two months.Ethical clearance was obtained from Medical Research Ethics Committee, Faculty of Medicine and Health Sciences, Universiti Sultan ZainalAbidin(UniSZA.N/1/628-1 (3)).

Socio-Demographic Background

Upon written consent, participants were given a copy of socio-demographic data form which consisted of eight (8) questions; gender, age, race, marital status, education level, occupation, monthly income, and category of residential.

History Of Dietary Intake

The dietary intake of the participants was obtained by having the multiple-past 24-hour diet recall method for three days by performing face to face interview. Participants were asked to recall the foods and drinks that had been taken for the past 24hours for three selective days; two days of working day and a day of weekend. More detailed information was recorded with observation towardsthesize of the portion consumed based on the household measurement. Thorough information on the brand of foods and drinks were highlighted together withthe method of preparation and cooking. The data of nutrient intake was analysed using

Nutritionist Pro software based on the Malaysian Food Composition table [15]. Meanwhile, beveragesthat were not listedin the software were replaced with similar foods with nearest characteristics. This dietary intake was recorded in the form of structured diet history. However, for female participants who were menstruating during second or third session of diet history intake and are illicit to fast, they were requested to keep a three day records of food intake and submitted the completed forms later.

Determination Of Quality Of Life (Qol)

Quality of life was assessed with 36-items questionnaire (SF-36). The SF-36 questionnaire measures eight sub domains of health quality: Physical functioning, Role physical, Bodily pain, General Health, Vitality, Social functioning, Role Emotional and Mental health. A total score of each domain of health in the SF-36 was altered to a score of 0–100, showing the percentage of the potential score, with a score of 100 indicating optimal health by using SF-36 computerised database.

Statistical Analysis

The primary analysis involved descriptive statistics for all demographic characteristics, which were presented as frequencies and percentages. Statistical analysis was performed by using the Statistical Package for Social Sciences, SPSS version 17.0. Results were expressed as mean and standard deviation (SD). Comparisons between groups were performed using Student's t-test and categorical variables were compared using Chi-square test. Normal distribution of data was verified with histogram. A p-value of less than 0.05 was considered to be statistically significant.

RESULTS AND DISCUSSION

Demographic Characteristics

The basic demographic characteristics of participants are presented in Table 1.2. A total of 55 subjects, with 100% response rate were recorded and arranged according to the faculty.

Table 1.1. Number of respondents according to the faculty

Faculty	No. of respondents
Faculty of Informatics	17
Faculty of Languages and Communication	3
Faculty of Islamic Contemporary Studies	7
Faculty of Business Management and Accountancy	3
Bursary Department	2
Library Department	4

Faculty of Medicine and Health Science	4
Transportation Department	2
Faculty of Food Technology	3
Social Work Department	1

The majority of the respondents were female (70%), married (85%), obtained master degree (46%) with monthly income ranging from RM3000 to RM5000 (39%), and living in rural area (54%) with majority of the respondents working as a lecturer. The age of respondentswas between 25 to 40 years.

Table 1.2. Demographic characteristics of respondents (n=55)

Variable	Frequency	Percentage (%)
Gender		
Male	14	30
Female	32	70
Status		
Single	7	15
Married	39	85
Education		
PMR	1	2
SPM	7	15
STPM/Diploma	4	9
Degree	12	26
Master	21	46
PhD	1	2
Income		
RM500-RM1000	1	2
RM1001-RM3000	14	31
RM3001-RM5000	18	39
>RM5000	13	28
Place		
Urban	21	46
Rural	25	54

Dietary Assessment

The mean and standard deviation (SD) of energy and macronutrient consumption are as shown in Table 2.1.

Table 2.1. Energy and macronutrient consumption.

Consumption	Before Ramadan (n=55)	During Ramadan (n=55)	After Ramadan (n=55)
Energy (kcal)	1615 ± 193.8*	1154 ± 150#	1674 ± 200.9
Carbohydrate % of energy	51.7 ± 6.2	53.5 ± 7.0	52.5 ± 6.4
Protein % of energy	16.1 ± 1.9	16.7 ± 2.2	16.2 ± 1.9
Fat % of energy	32.2 ± 3.9	29.8 ± 3.9	31.3 ± 3.7

*Significant difference ($p<0.05$) between before and during Ramadan;

#Significant difference ($p<0.05$) between during and after Ramadan.

Data showed that the total daily energy intake remained comparable before, during, and after Ramadan, despite the decrease in meal frequency. Qualitative analysis of food consumed showed that the percentage of energy as carbohydrates, protein, and fat were unaffected by Ramadan fasting. Nonetheless, the amount of carbohydrates, protein, and fatwere observed with no difference. Analysis of dietary intake data showed that subjects expressed an average energy intake below the recommended daily energy intake for Malaysian male and female adults, which are 2440-2460 kcal and 2000-2180 kcal respectively (RNI, 2005) before, during, and after Ramadan.The proportion of energy intake amongparticipants before Ramadan was 66% of the recommended nutrient intake (RNI), 47% during Ramadan, and 68% after Ramadan.Interestingly, the composition of carbohydrates (CHO) and protein were within normal values when compared to the Malaysian Dietary Guidelines (MDG, 2010); 50%–60% and 15%–20% respectively. However, total composition of fat was observed to be slightly exceeded the normal values when compared to MDG before and after Ramadan (20-30%).

Studies carried out previously among adult respondents have reported a reduction in meal frequency [16] and energy intakes [13] during Ramadan. Some authors observed a decrease in energy intake (103 kcal/d), though not statistically significant, which also shown to be correlated with meal frequency [17]. There was no significant difference in carbohydrate, protein and fat consumption during and before Ramadan fasting. Nevertheless, a number of studies haverecordedincreased intake of fat during Ramadan fasting [16,18, 19, 20]. Previous studies conducted by Husain et al.[13], Sweilehet al. [14], Pohet al.[7] and Fakhrzadehet al. [20] have reported significant decrease in energy intake. Meanwhile, in another study, the results highlighted that the total energy intake was not significantly different between the pre-Ramadan and during Ramadan period; the observation was consistent with few other studies [18, 19]. These findings were contradictory with the common belief that Muslims tend to overeatingwith regards to the fasting during Ramadhan. However, under-reporting of intakes among the subjects in this study was suspectedas there was a significant difference observed between total calorie intake before and during Ramadan even thoughvalues for CHO, protein and fat between before and during Ramadan remained with no significant difference. An energy intake: basal metabolic rate (EI: BMR) < 1.35 was considered to represent an under-reporting and EI: BMR ≥ 2.4 as over-reporting of EI [18].

Quality of Life (QoL), SF-36

The mean SF-36 subscale scores for eight variables are shown in Table 3.1. The higher the score indicates better perceived of quality of life.

Table 3.1.Mean scores for eight variables for SF-36 before, during, and after Ramadan.

SF-36 Domains	Before Ramadan (n=55)	During Ramadan (n=55)	After Ramadan (n=55)
Physical Functioning (PF)	92.0 ± 11.7	97.6 ± 8.7*	96.4 ± 10.1#
Role-Physical (RP)	81.5 ± 10.6	87.0 ± 10.4*	83.7 ± 8.3#
Bodily Pain (BP)	74.6 ± 8.9	77.9 ± 7.0*	73.0 ± 4.3#
General Health (GH)	66.4 ± 9.0	70.8 ± 8.4*	73.2 ± 5.8#
Vitality (V)	69.2 ± 8.3	71.7 ± 8.6*	73.4 ± 7.3#
Social Functioning (SF)	91.1 ± 10.9	96.0 ± 8.6	96.6 ± 6.1
Role-Emotional (RE)	94.9 ± 11.3	99.5 ± 12.1	97.9 ± 8.2
Mental Health (MH)	81.4 ± 10.5	85.7 ± 7.7*	88.9 ± 5.3

*Significant difference ($p<0.05$) between before and during Ramadan;

#Significant difference ($p<0.05$) between during and after Ramadan

The mean score of physical functioning, role-physical, bodily pain, general health, and vitality before, during, and after Ramadan have showed to be statistically significant. Meanwhile, there was a significant difference in the mean score of mental health before and during Ramadan. The data also showed that there was no significant difference in the mean score of social functioning and role-emotional either before, during, or after Ramadan. Analysis of quality of life (SF-36) data showed that respondents expressed an increased average score of physical functioning, role-physical, bodily pain, general health, vitality, and mental health during Ramadan compared to before Ramadan.

Increased in average score of physical functioning, role-physical, and bodily pain also recorded after Ramadan compared to during Ramadan. Currently, there is no study yet conducted on quality of life among healthy adults before, during, and after Ramadan. Most of the studies focussed on quality of life in disease-related population, for example among patients with irritable bowel syndrome [8], cardiovascular metabolic disease [9], cancer [10] and malnutrition due to HIV infection [11].

Besides that, problems at working places or other personal matterswhich also contribute to physical health also recorded lower during Ramadan compared to after Ramadan. In addition, the respondents experienced lesser body pain or limitations during Ramadan compared to after Ramadan. Nevertheless,the results obtained fromrespondent's personal healthwerenoted to be better and more energetic after Ramadan compared to during Ramadan.In similar,

another study also proved that respondents feel more peaceful, happy and calm after Ramadan compared to during Ramadan [25].

Physical Functioning can be used to assess limitations in physical activities due to health problems. Role-Physical evaluates problems with daily activities as a result of physical health, while Role-Emotional identifies problems with activities as a result of emotional disturbance. Vitality measures perception of fatigue or energy. Bodily Pain calculates the extent of this symptom where as General Health measures perception of health based on physical and emotional limitations as well as well-being. Social Functioning measures limitations in social activities with regards to the physical or emotional problems and Mental Health measures psychological well-being and distress. These scores are then transformed into a score of 0–100, with higher scores indicating better functioning or well-being. A score of 100 represents optimal health [24]. Quality of life is a complex concept with various dimensions. Nevertheless, the use of the SF-36 questionnaire for evaluating the physical and mental dimensions of quality of life is generally accepted, and demonstrated to be valid and reliable in many population-based studies [18].

Correlation of Dietary Intake and Quality of Life (QoL)

The correlation between calories; macronutrients and domains of SF-36 of the respondents and the correlation between calories; macronutrients and summary measures (PCS and MCS) of SF-36 of respondents are shown in Table 4.1 and Table 4.2 respectively. The correlationsbetween variables were obtained by Chi Square test where Pearson Correlation Coefficient was used to determine the correlation between quality of life (QoL) and dietary intake before, during and after Ramadan among UniSZA staffs.

Table 4.1.Correlations between calorie; macronutrients (CHO, protein, fat) and sub-domains of SF-36 of respondents.

Variables	p-value		
	Before Ramadan (n=55)	During Ramadan (n=55)	After Ramadan (n=55)
KCal*General Health (GH)	0.003	>0.05	0.003
CHO*Physical Functioning (PF)	0.011	>0.05	>0.05
CHO*Vitality (V)	0.044	>0.05	0.022
CHO*General Health (GH)	>0.05	>0.05	0.000
CHO*Social Functioning (SF)	>0.05	>0.05	0.015
CHO*Mental Health (MH)	>0.05	>0.05	0.033
Prot*Physical Functioning (PF)	0.001	>0.05	>0.05
Prot*General Health (GH)	0.025	>0.05	0.001
Prot*Social Functioning (SF)	>0.05	>0.05	>0.05

Prot*Vitality (V)	0.004	>0.05	0.048
Prot*Social Functioning (SF)	>0.05	>0.05	0.029
Fat*General Health (GH)	>0.05	>0.05	0.000
Fat*Social Functioning (SF)	>0.05	>0.05	0.015
Fat*Mental Health (MH)	>0.05	>0.05	0.033
Fat*Vitality (V)	0.032	>0.05	0.022

p-value> 0.05: no significant correlation; p-value < 0.05: significantly correlated

Table 4.2 showed that there were significant correlations (p-value < 0.05) between calorie and general health, carbohydrate and physical functioning, carbohydrate and vitality, protein and physical functioning, protein and general health, protein and vitality, as well as fat and vitality before Ramadan.In similar, there were also significant correlations (p-value < 0.05) between calorie and general health, carbohydrate and vitality, carbohydrate and general health, carbohydrate and social functioning, carbohydrate and mental health, protein and general health, protein and vitality, protein and social functioning, fat and general health, fat and social functioning, fat and mental health, as well as fat and vitality after Ramadan.

In addition, Table 4.2 also highlighted that there was no significant correlation obtained between calorie, macronutrients (carbohydrate, protein, and fat) and domains of SF-36 after Ramadan due top-values of the variables were more than 0.05. Therefore, observation from this study has confirmed that there was no significant correlation between quality of life (QoL) and dietary intake during Ramadan among Institute of Higher Education (UniSZA) staffs.Besides the eight sub-domains, correlations were also tested on two summary measures of SF-36, namely Physical Component Score (PCS) and Mental Component Score (MCS). The summary scores were the aggregated measures of physical health and mental health subdomains underlying the questionnaire.

Table 4.2.Correlations between calorie; macronutrients (CHO, protein, fat) and summary measures (PCS and MCS) of SF-36 of respondents.

Variables	**p-value**		
	Before Ramadan (n=55)	**During Ramadan (n=55)**	**After Ramadan (n=55)**
KCal* Physical Component Score (PCS)	0.032	>0.05	>0.05
Prot* Physical Component Score (PCS)	0.024	>0.05	0.021
Prot* Mental Component Score (MCS)	>0.05	0.040	>0.05
Fat* Mental Component Score (MCS)	>0.05	0.019	>0.05

p-value> 0.05: no significant correlation; p-value < 0.05: significantly correlated

As shown in Table 4.2, there were significant correlations between calorie and PCS,as well as protein and PCS before Ramadan. Meanwhile, there were significant correlationsbetween protein and MCS,and fat and MCS during Ramadan. Besides, there was alsosignificant correlation between protein and PCS after Ramadan. These results might be due to QoL questionnaires used which did include appropriate items to assess respond from the participants with regards to the nutritional information. According to Kind and Carr-Hill (1987), most quality-of-life tools which are currently used include only few or no item that directly related to nutrition. Therefore, generic tools must be built in order to fulfil the function.

In paralel, based on the previous study done byPohet al. [7], a detailed nutrition-related QoL measure is needed to obtain accurate information presenting food-related behavioural problems within the normal population. Many methods have been developed to measure population-specific nutrition quality of life (NQoL) with disease-related, such as among patients with irritable bowel syndrome [8], cardiovascular metabolic disease [9], cancer [10] and malnutrition due to HIV infection [11]. According to these results, it can be concluded that this study was unable to establish the correlation between quality of life (QoL) and dietary intake during Ramadan among Institute of Higher Education (UniSZA) staffs.

CONCLUSION

In this study, the estimated total calorie and macronutrients (carbohydrates, proteins and fats) intake among UniSZA staffs before, during and after Ramadan were assessed by using Nutritionist Pro Software. The results obtained demonstrated that the percentage of energy as carbohydrates, protein, and fat remained unaffected by Ramadan fasting; the amount of carbohydrates, protein, and fatconsumed also remained similar which is not statistically significant. The proportion of energy intake by respondents before Ramadan was 66% of the recommended nutrient intake (RNI), 47% during Ramadan, and 68% after Ramadan fasting.

Interestingly, the composition of carbohydrates and protein were within normal values when compared to the Malaysian Dietary Guidelines (MDG, 2010) which are 50%–60% and 15%–20% respectively. However, composition of fat was slightly exceeded the normal value when compared to MDG before and after Ramadan (20-30%).Data showed that there were significance difference in the mean score of physical functioning, role-physical, bodily pain, general health, and vitality before, during, and after Ramadan. There werealso significant correlations ($p < 0.05$) between calorie and general health, carbohydrate and physical

functioning, carbohydrate and vitality, protein and physical functioning, protein and general health, protein and vitality, as well as fat and vitality before Ramadan.

The only limitation in this study was the small sample size caused by theexemption of subjects due to redundant schedule and personal matters that have made them unable to complete all four continuous sessions throughout this study. Hence, these problems had caused restrictions towards their commitment in completing this study. Therefore, arrangements of additional sessions need to be done toreplace the missed slots.

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