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Relations between Skipping Breakfast, Academic Performance and Body Mass Index among Undergraduate University Nursing Students

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Abstract: *Breakfast meal is considered the most critical meal of the day. It is important to refuel the body after a long period of fasting at the night. Breakfast skipping incidence is more typical among young adults than older adults. Many nursing students have the habits of skipping meals, especially breakfast, in spite the significance of this meal.*

Aim of the study: *to evaluate the relations between skipping breakfast, academic performance and BMI among undergraduate university nursing students.*

Materials and Method: *A quantitative cross sectional descriptive design was utilized to carry out this study.* ***Setting:*** *The study was conducted at the Faculty of Nursing, Alexandria University, Egypt.* ***Subjects:*** *A convenient sample of 306 adult male and female nurse students from the first, second, third and four years of nursing bachelor program were included.*

Tool: *A developed structured questionnaire for data collection was used to collect the necessary data. It includes four parts. Part I: Sociodemographic data sheet. Part II: Skipping breakfast assessment sheet, Part III: Academic performance assessment sheet, which included two sections: Class assessment level and GPA (Grade Point Average). Part IV. Body mass index (BMI) measurement.*

Results: *the highest majority of the students age (98%) was found ranging from 18<25 years. More than half (57.8%) of students who skipped breakfast were females. the majority (87.6%) of the students were found skipping breakfast meals. Near half (47.0%) of the students who skipped breakfast meal were overweight. the highest majority (91.7 %) of the students who skipped breakfast had "C" grade while about two thirds of the students who were not skipping breakfast had grade "A". Nearly half of the students who were found skipping breakfast were overweight.*

Conclusion: *Majority of the undergraduate nursing students used to skip breakfast meal and more than half of them were females. The highest majority of the students who skipped breakfast had low educational performance and near half of the skipped breakfast, students were overweight.* ***Recommendation:*** *Academic programs should be included the importance and effect of breakfast*

Keywords: *Skipping breakfast, Academic performance, Body mass index and Undergraduate University Nursing Students.*

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I. Introduction

Breakfast meal is viewed as the most critical meal of the day [(1)]. Breakfast is important to refuel the body after significant a lot of fasting at the night; it keeps up to maintain a healthy weight, enhances the mood and improves the concentration. In addition, it is viewed as the foundation of a healthy diet [(2)]. Eating a breakfast meal can be fast, simple, and provide the basic nutrients needed for the day's activities [(3)]. Besides, breakfast is a great opportunity to eat nutritious foods, it gives the body basic components such as vitamins and minerals, which are considered a significant component of diet for proper growth and development, bone strength, as well as, a healthy immune system [(2,3)]. Furthermore, breakfast meal helps undergraduate nursing students to improve critical thinking abilities, innovativeness, academic performance, and attention span [(4-6)].

Several studies reported that, many undergraduate university nursing students have the habits of skipping meals, particularly breakfast, in spite the significance of this meal[(7)]. Skipping breakfast is defined as, not eating the early morning meal before undertaking the day's work at least four times each week [(3,8)]. Moreover, missed breakfast is considered a worldwide phenomenon among undergraduate students and usually associated with various health-compromising behaviors and unhealthy lifestyles, such as alcohol, tobacco, and substance use [(3,8,9)].

Skipping breakfast incidence is increasingly basic among young adult than older adult. Besides, it is generally common among adolescents and adult students in several countries [3,8-12]. Taha and Rashed (2017) mentioned that, numerous young adult students skip breakfast meal for several causes such as; they do not have enough time in the morning, they do not care for conventional breakfast foods, and they are ignoring the significance of breakfast meal. In addition, less appetite in the morning, financial constraints, worries about weight and body image as well as lower parental academic level have been considered others causes for skipping breakfast[13].

Eating breakfast has beneficial effects on the quality of the diet and prevents chronic diseases. Conversely, skipping breakfast meal increases risk of obesity, diabetes mellitus, osteoporosis as well as cardiovascular diseases. Additionally, skipping breakfast among nursing university students usually affect adversely on their academic performance as well as their body mass index [14].

Body mass index (BMI) is defined as a measure of weight adjusted for height, calculated as weight in kilograms divided by the square of height in meters (kg/m2)[15]. Regularly skipping breakfast is generally associated with greater BMI among college students in any age, this is due to that, skipping this meal causes students to be more hungry and eat more during lunch especially unhealthy foods such as soft drinks, foods high in saturated fat and high sugar snacks. In addition to, skipping breakfast leads to prompts decline the level of energy during the day. Therefore, the students began to take more calories than are required, and thus resulting in weight gain. Consequently, undergraduate nursing students who routinely have breakfast will in general have a lower BMI and are less likely to be overweight than those who eat breakfast less regularly [16,17].

In such manner, skipping breakfast was intently associated with annual changes in BMI and eating breakfast more than four times each week may prevent the excessive body weight gain associated with skipping this meal. Furthermore, skipping breakfast has turned out to be progressively basic in parallel with the rise of university student obesity [18,19]. For university students, breakfast utilization is related with a scope of positive results, including better academic performance, class participation, nutrient intake, fitness, and appropriate body weight. On the other hand, skipping breakfast among those students usually is associated with different adverse effects on their cognitive functions, including level of concentration, memory, class participation, psychosocial function, mood and educational performance [14,19,20].

In this specific circumstance, skipping breakfast and academic performance are connected. Furthermore, the university students who do not have breakfast or lower nutritional breakfast due to any causes are generally complaint from poor academic performance and lower level of alertness. Correspondingly, skipping breakfast creates a state of hunger, which prompts diminished students' ability to sustain attention and ability to learn from new experiences, this can decrease students' academic performance and academic achievements [7, 21, 22].

Despite the fact that, breakfast is viewed as the most significant meal during the day and helps to maintain a healthy weight as well as academic performance among young adult students, the prevalence rate of skipping breakfast among those students is still high [23,24]. Until today, very limited data is available on relations between skipping breakfast, academic performance and BMI among university nursing students in Egypt. Therefore, we endeavor to put forward a study to evaluate relation between skipping breakfast, academic performance and BMI among undergraduate university nursing students.

Aim of the study:

- The current study aimed to evaluate the relations between skipping breakfast, academic performance and BMI among undergraduate university nursing students.

Research questions:

- What is the relations between skipping breakfast, academic performance and body mass index among undergraduate university nursing students?
- What is the relation between skipping breakfast and undergraduate university nursing student's sociodemographic data?

II. Materials and Method

Materials

- **Research design:** A cross sectional descriptive research design was used to carry out this study.
- **Setting:** The study was conducted at the Faculty of Nursing, Alexandria University, Egypt.
- **Subjects:** A convenient sample of 306 adult nurse's students from the first, second, third and fourth years of the bachelor program were recruited from the previously mentioned setting. All studied students were selected according to the following criteria:

Inclusion criteria:

- Undergraduate male and female nursing students within the age group of 18-29 years.
- Able to communicate verbally.

Exclusion criteria: students were excluded from the study if they:
- Have any hormonal disorders.
- Are Pregnant.

- **Sample size calculation:** The Epi info program was used to find the sample size applying the following information:

1- Population size =1486
2- Estimated frequency=50%
3- Acceptable error=5%
4- Confidence coefficient =95%
5- Minimum sample size = 305

Using proportional allocation:
First year sample=305x441÷1486=91
Second year sample=305x345÷1486=71
Third year sample=305x384÷1486=79
Fourth year sample=305x316÷1486=65
Total =306

Tool of the study: based on a review of recent related literature, one tool was utilized for the purpose of the study. It was developed by the researchers in the form of structured questionnaire [7,8, 14,15,21-25]. It was written in English and included four parts:

Part I: Sociodemographic data sheet: This part aimed to obtain data about sociodemographic characteristics of nursing students as gender, age, marital status, program grade, monthly income, parent education, residence and living status.

Part II: Skipping breakfast assessment sheet: this part aimed to assess skipping breakfast habit among nursing students**.** It included 7 questions such as "how many days of the week do you take breakfast", "reason for skipping breakfast", "effects of skipping breakfast meal on students", "students favorite food", "how often do you take tea or coffee or soft drink per a day". A question related to benefits of having breakfast was also included.

Part III: Academic performance assessment sheet: this part aimed to assess nursing students' academic performance level. It included two sections as follows:

1- Class assessment level: this section aimed to assess students' performance in class. It includes 27 questions related to class participation's, attendance, attention, problem-solving ability, level of concentration, capacity of creating new ideas, communication skills, time management, learning from new experiences, ability to motivate others as well as level of feeling apathy and laziness during class. Every question is rated on three point Likert scale and scored from one to three on a response scale. Answers of the studied students were recorded, scored, and then summed together. The total score was categorized into three levels as follows-:
(1) indicates low, (2) indicates moderate, while (3) indicates high class level.

2- GPA (Grade Point Average): this section aimed to assess GPA of the undergraduate university nursing students , which included the following score average:
- A (90% ≤ 100%).
- B (75 %< 90%).
- C (60 %< 75%).
- D (50 %< 60%).
- F (<50%).

Part IV: Body mass index (BMI) measurement: this part aimed to assess the undergraduate university nursing students BMI, It includes these categories
- If BMI below 18.5, weight status is underweight.
- If between 18.5 – 24.9, weight status is normal
- If between 25.0 – 29.9, weight status is overweight.
- The BMI if 30.0 and above, weight status is obese.

Method
1- Official Permission letters to carry out the study were obtained from Dean and the head divisions of specialty departments, of the four years of the Faculty of Nursing after explaining the aim of the study.
2- A tool was developed by the researchers after extensive review of relevant and recent literature.

3- Content and construct validity of the developed tool were ascertained by a jury of five experts in the field of Medical Surgical Nursing in the Faculty of Nursing at Alexandria University, Egypt. Comments and suggestions of the jury were considered and the tool was modified accordingly.
4- Tool reliability was tested by Cronbach's Alpha test; its result was 0.83, which indicated an accepted reliability level.
5- A pilot study was carried out on 10% of the subjects to test the clarity, feasibility and the applicability of the study tool accordingly, the necessary modifications were done. The students who included in the pilot study were excluded from the study sample.
6- **Data collection and implementation of the study**, after securing the administrative approval, data collection was started and continued for a period of six months from September of 2018 to February 2019. Every students were interviewed individually after a brief explanation aim of the study. The interview took about 20 minutes each.
7- **Ethical considerations**, The Ethical Committee of the Faculty of Nursing approved the research. An official permission and official letter were obtained from the above mentioned setting for data collection. Verbal informed student consents to participate in the study were obtained after explanation of the aim of the study, and they were assured about the confidentiality and freedom withdraws from the study.
8- **Statistical analysis:** Data were analyzed using IBM SPSS software package version 20.0 [(26)]. Qualitative data were described using number and percent. Chi-square test was used to study significant association between two categorical variables. Fisher's exact and Monte Carlo significance were used if more than 20% of the cells have expected count less than 5. Significance of the obtained results was judged at the 5% level .

III. Results

Table (1) shows distribution of the students according to socio demographic data. It was noticed that more than half of the students (55.2%) were females. Regarding age the highest majority of the students age (98%) ranged from 18<25 years. In addition, the majority of the students (81%) were single while only 18.3% were married. Nearly one quarter of the students (23.2%), (25.1%) and (21.3%) were in 2nd, 3rd, and 4th year of the bachelor program respectively, while first year student represented more than one quarter (30.4%). Moreover, more than half of the students (60.1%) had enough monthly income. Regarding students' parent education, it was found that 43.5% of the student's parents were university graduate. More than two thirds (70.9%) and (77.5%) of the students were city residents and were living with their family respectively.

Table (1): Distribution of the students according to sociodemographic data (n = 306)

Sociodemographic data	No.	%
Gender		
Male	137	44.8
Female	169	55.2
Age		
18 < 25	300	98.0
25 < 30	6	2.0
Marital status		
Married	56	18.3
Single	248	81.0
Divorced	2	0.7
Widow	0	0.0
Program grade		
1st year nursing	93	30.4
2nd year nursing	71	23.2
3rd year nursing	77	25.1
4th year nursing	65	21.3
Monthly income (according students point of view)		
Enough	184	60.1
Not enough	93	30.4
Enough and more	29	9.5
Parent education		
Primary	60	19.6
Secondary	86	28.1
University Graduate	133	43.5
Postgraduate	27	8.8
Residence		
Village	89	29.1
City	217	70.9
Living status		
University house	69	22.5
With family	237	77.5

Table (2) shows student's frequency distribution regarding skipping breakfast assessment. It was found that the majority (87.6%) of the students were skipping breakfast meal.

Regarding reasons for skipping breakfast meal, it was noticed that, about two thirds (67%) of the students skipped breakfast because they had no enough time, followed by nearly half (41.8%) of students who skipped breakfast feeling not hungry. Regarding effect of skipping breakfast , more than half (52%) and (62.1%) of the students stated that, skipping breakfast increases feeling of hungry and headache respectively, while nearly one quarter (19.6%) of the students mentioned that ,skipping breakfast decreases attention in class.

Concerning benefits of eating breakfast, more than two thirds (70.3%) and nearly half (47.1%) of the students mentioned that, eating breakfast increase energy and attention respectively.

In addition, more than half of the students (61.1%) and (53.9%) like fast food and drink soft drinks from three to four times per day, respectively. Also, more than one third (38.9%) of the students take tea or coffee from three to four times per day.

Table (2): Student's frequency distribution regarding skipping breakfast assessment (n = 306)

Items	No.	%
Students skipping breakfast		
Skip (4 times or more per week)	268	87.6
Not skip(less than 4times per week)	38	12.4
Reasons for skipping breakfast meal #		
Haven't time	205	67.0
Not hungry	128	41.8
Fear of increase weight	52	17.0
Don't like breakfast foods	47	15.4
Students family skip breakfast	43	14.1
Students friends skip breakfast	16	5.2
Breakfast not available	20	6.5
Lack of appetite	62	20.3
Effect of skipping breakfast meal on students #		
Feel hungry	159	52.0
A headache	190	62.1
Stomachache	68	22.2
Feel tired	86	28.1
Not have energy	92	30.1
Feel grumpy	9	2.9
Have trouble paying	18	5.9
Decrease attention in class	60	19.6
Benefits of eating breakfast #		
Increase energy	215	70.3
Wakes up	81	26.5
Increase attention	144	47.1
Gaining good grades	39	12.7
Have a better mood	56	18.3
Improve health	84	27.5
Helps in try new foods	26	8.5
Increase activity	15	4.9
Students favorite food		
Fast food	187	61.1
Traditional food	119	38.9
How often do students take tea or coffee per a day?		
Never	26	8.5
1-2 times	44	14.4
3 - 4 times	119	38.9
5- 6 times	66	21.5
Above	51	16.7
How often do students drink soft drinks per day?		
Never	26	8.5
1-2 times	49	16.0
3 - 4 times	165	53.9
5- 6 times	48	15.7
Above	18	5.9

 # =the students response more than one answer

Table (3) displays student's frequency distribution regarding academic performance level. Regarding class assessment level it was revealed that, more than half (51%) of the students had low academic performance in class. On the other hand, regarding Grade Point Average, it was found that near half (47.4%) of the students had "C" degree.

Table (3): Students frequency distribution regarding academic performance level. (n = 306)

Academic performance level	No.	%
Class assessment level		
Low	156	51.0
Moderate	134	43.8
High	16	5.2
Grade Point Average 'GPA '		
A	15	4.9
B	129	42.1
C	145	47.4
D	6	2.0
F	11	3.6

Table (4) shows student's frequency distribution regarding BMI. It was noticed that near half (41.8%) of the students were overweight while only 7.5% of the students were under weight.

Table (4): Students frequency distribution regarding BMI. (n = 306)

BMI	No.	%
Underweight (less than 18.50)	23	7.5
Normal weight (18.50-24.99)	91	29.7
Overweight (25-29.99)	128	41.8
Obese (30 or more)	64	20.9

Table (5) reveals the relationship between skipping breakfast and academic performance of the students. Regarding students grade point average, there was statistical significant relationship between students grade point average and skipping breakfast ($^{MC}p<0.001^{*}$). Moreover, it was observed that the highest majority (91.7 %) of the students who skipped breakfast had "C"grade while about two thirds (66.7 %) of the students who did not skip breakfast had grade "A".

Concerning class level assessment, a high statistical significant relationship was detected between students class assessment level and skipping breakfast ($p<0.001^{*}$). In addition, it was noticed that the highest majority (91.7%) of the students who skipped breakfast had low level in class assessment, while more than half (62.5%) of those who students did not skip breakfast, had high level of class assessment.

Table (5): Relationship between skipping breakfast and academic performance of the students

Academic performance level	Student skipping breakfast				χ^2	p
	Skip breakfast (n = 268)		Not skip breakfast (n = 38)			
Grade Point Average(GPA)	**No.**	**%**	**No.**	**%**		
A (n = 15)	5	33.3	10	66.7	28.340*	$^{MC}p < 0.001^{*}$
B (n = 129)	114	88.4	15	11.6		
C (n = 145)	133	91.7	12	8.3		
D (n = 6)	5	83.3	1	16.7		
F (n = 11)	11	100	0	0.0		
Class assessment level	**No.**	**%**	**No.**	**%**	39.476*	$p <0.001^{*}$
Low (n = 156)	143	91.7	13	8.3		
Moderate (n = 134)	119	88.8	15	11.2		
High(n = 16)	6	37.5	10	62.5		

χ^2: Chi square test **^{MC}p: p value for Monte Carlo for Chi square test**
***: Statistically significant at p ≤ 0.05**

Table (6) shows the relationship between skipping breakfast and BMI of the students. It was observed that there was high statistical significant relationship between students skipping breakfast and body mass index ($p<0.001^{*}$). Near half (47.0%) of the students who skipped breakfast meal was overweight while more than two thirds (78.9%) of the students who did not skip breakfast meal, were normal weight.

Table (6): Relationship between skipping breakfast and BMI of the students

BMI	Students skipping breakfast				χ^2	p
	Skip breakfast (n = 268)		Not skip breakfast (n = 38)			
	No.	%	No.	%		
Underweight (less than 18.50)	17	6.3	6	15.8	62.224*	<0.001*
Normal weight (18.50-24.99)	61	22.8	30	78.9		
Overweight (25-29.99)	126	47.0	2	5.3		
Obese (30 or more)	64	23.9	0	0.0		

χ^2: **Chi square test*: Statistically significant at p ≤ 0.05**

Table (7) displays the relationships between skipping breakfast and socio demographic data of the students**.** There was statistical significant relationship between students gender and skipping breakfast ($p < 0.015^*$) where more than half (57.8%) of students who skipped breakfast were females. In addition, there was statistical significant relationship between students skipping breakfast and marital status ($^{MC}p < 0.005^*$)**,** the majority (80.2%) of students who skipped breakfast were singles. Also, there was statistical significant relationship between students who skipped breakfast and program year ($p < 0.044^*$), where nearly half (44.7%) of students who did not skip breakfast were in the first year. No statistical significant relationship was elicited between skipping breakfast with student's monthly income ($p < 0.121$).However, there was a statistical significant relationship between parent education and skipping breakfast ($p < 0.017^*$) as near two thirds (65.8%) of students who did not skip breakfast, had university graduate parents.

Table (7): Relationships between skipping breakfast and socio demographic data of the students.

Sociodemographic data	Students skipping breakfast				χ^2	p
	Skip breakfast (n = 268)		Not skip breakfast (n = 38)			
	No.	%	No.	%		
Sex						
Male	113	42.2	24	63.2	5.932*	0.015*
Female	155	57.8	14	36.8		
Age						
18 < 25	264	98.5	36	94.7	2.461	$^{FE}p < 0.163$
25 < 30	4	1.5	2	5.3		
Marital status						
Married	53	19.8	3	7.9	10.734*	$^{MC}p < 0.005^*$
Single	215	80.2	33	86.8		
Divorced	0	0.0	2	5.3		
Widow	0	0.0	0	0.0		
Program						
1st year nursing	76	28.3	17	44.7	8.092*	0.044*
2nd year nursing	65	24.3	6	15.8		
3rd year nursing	65	24.3	12	31.6		
4th year nursing	62	23.1	3	7.9		
Household monthly Income						
Enough	166	61.9	18	47.4	4.227	0.121
Not enough	76	28.4	17	44.7		
Enough and more	26	9.7	3	7.9		
parent education						
Primary	57	21.3	3	7.9	10.198*	0.017*
Secondary	77	28.7	9	23.7		
University Graduate	108	40.3	25	65.8		
Postgraduate	26	9.7	1	2.6		
Residence						
Village	82	30.6	7	18.4	2.392	0.122
City	186	69.4	31	81.6		
Living status						
University house	65	24.3	4	10.5	3.591	0.058
With family	203	75.7	34	89.5		

χ^2: Chi square test FE: Fisher Exact
MC: Monte Carlo *: Statistically significant at p ≤ 0.05

IV. Discussion

During recent decades, almost all the Arab countries have witnessed dramatic life style changes including meal patterns [27]. Egypt has been experiencing nutrition transition in the context of abundant dietary energy availability, and moderate fat intake. Adulthood is important times for establishing healthy dietary habits. Young people are taking responsibility for their own eating habits [28]. The provision of energy and nutrition throughout the day is extremely important and breakfast has been considered an important dietary factor for energy regulation. In addition, for university students, breakfast consumption is associated with range of positive outcomes as when breakfast is skipped it can be difficult to properly compensate for it later in the day [20].Therefore, this study aimed to evaluate the relations between skipping breakfast, academic performance and BMI among undergraduate university nursing students.

Regarding skipping breakfast assessment:

The present study revealed that the majority of the students were skipping breakfast meal. In this context, El Gilany and Elkhawaga (2012) mentioned that more than half of the students in Mansoura, Egypt skipped breakfast [29]. Youssef et al., (2010) reported higher incidence of skipping breakfast among Egyptian adolescent female students [30].In addition, recent data from national health and nutrition, surveys (2014) in Japan showed that skipping breakfast is more common in younger adult [31]. El Sayed, El-Shafei and Toprak (2015) carried out comparative study among Egyptian, Saudi Arabian and Turkish students about the influence of dietary habits on university students and revealed that nearly half of the Turkish students were having breakfast daily whereas more than half of Egyptians and Saudi Arabian students were skipping breakfast [32].

Regarding reasons for skipping breakfast meals, it was noticed that, about two thirds of students skipped breakfast because they had no enough time, followed by nearly half of them skipped breakfast because they feeling not hungry. This result is congruent with Garg et al., (2014) and Liyanage et al., (2017) who mentioned that the most common reason for skipping breakfast was lack of time[33,34]. In addition, Alexy (2010) and El Gilany and Elkhawaga (2012) emphasized that reasons for skipping breakfast include lack of time, poor appetite early in the morning and being not hungry enough to eat [35,29].

Regarding effect of skipping breakfast, the present study revealed that more than half of the students stated that, skipping breakfast increases feeling of hungry and headache. Interestingly, Romos (2014) mentioned that majority of student emphasized that not eating breakfast lead to feeling of hunger; headache and lack of focus or interest [36].This may be attributed to that, breakfast is 'breaking the fast' from the time of sleep throughout the night. Eating in the morning help to restore glycogen and stabilize the levels of insulin. By ignoring and not replenishing glucose levels in the morning, individual will end up feeling overly hungry, irritable, fatigue and headache. These symptoms are the first thing experienced in the morning especially if morning meal skipped [37].

Concerning benefits of eating breakfast the present study revealed that, more than two thirds and nearly half of the students mentioned that, eating breakfast increase energy and attention respectively. This result is similar to Romos (2014) who emphasized that although the number of students who skipped breakfast was high, all of them gave the same reason that taking breakfast can provide energy in the morning and increase attention [36].

The present result revealed that more than one third of students take coffee or tea from 3- 4 times per day. This result is congruent to El Sayed, El-Shafei and Toprak (2015) who mentioned that the most favorite drink for the majority of student in Egypt and Turkey were tea and in Saudi Arabia was coffee [32].

Concerning soft drinks and type of favorite foods it was noticed more than half of the students like fast foods and take soft drinks from three to four times per day. This result is in line with El Sayed, El-Shafei and Toprak (2015) who mentioned that most of the students in Egypt and Saudi Arabia consumed fast food daily. In addition, more than half of undergraduate university students in the three countries Egypt, Saudi Arabia and turkey consumed soft drinks daily respectively[32].

Regarding skipping breakfast and its relation with student academic performance:

As regard grade point average, the present result revealed there was statistical significant relationship between student's grade point average and skipping breakfast where, the highest majority of the students who skipped breakfast had grade "C" while about two thirds of the students who did not skip breakfast had grade "A". This result is in line with Kawafha (2013) who found significant and positive relation between skipping breakfast and academic achievement, where, students who usually did not skip breakfast had higher score of academic achievement than those who skip [22].

In this regard, Garg et al., (2014) mentioned that there is high statistical significant relation between breakfast skipping and student's grade, in which more number of breakfast skippers, scored "C" grade than breakfast non-skippers and more number of breakfast non-skippers scored "A" degree than breakfast skippers did [33]. No doubt, it is widely accepted that eating healthy food improves student concentration, attendance,

cognitive functioning and academic performance [38]. Moreover, Cascales et al., (2018) clarified that after eating breakfast, carbohydrates are converted into glucose producing changes in levels of acetylcholine, insulin, serotonin, glutamate and cortisol. Ingestion of carbohydrates is particularly beneficial for the brain after night fasting as it reduces levels of cortisol production. In addition, conversion of carbohydrates into glucose is essential for the formation of tryptophan, a precursor protein for the synthesis of serotonin, which regulates irritable mood and improve cognitive functioning [39].

As regard class assessment, the present study revealed statistically significant relationship between student's class assessment level and skipping breakfast. In which, the highest majority of the students who skipped breakfast had low level in class assessment, while more than half of the students who did not skip breakfast had high level of class assessment. This result is congruent with Baschloo et al., (2012) who claimed that there was significant relation between class attention and breakfast skipping which then affect students' academic performance [40]. Garg et al., (2014) indicated that there was high statistical significant relation between class assessment and breakfast skipping [33]. Also, Arshad and Ahmed (2014) revealed that there was high relation between skipping breakfast and class assessment where, student who skipped breakfast felt apathy , lazy, lacking interest and focus in class and their problem solving capacity was low which affected student academic performance as these elements are very important to absorb knowledge efficiency in class. Moreover, students who take breakfast before studying are likely to score higher in class assessment as compared to students who start learning on empty stomach [21].

Regarding skipping breakfast and its relation with body mass index:

The present study revealed that there was high statistical significant relationship between students skipping breakfast and body mass index. Near half of the students who skipped breakfast meal were overweight while more than two thirds of the students who did not skip breakfast meal were normal weight. This result is congruent with Bian (2012) and Deshmukh- Taskar et al., (2013) who argued that students who skip breakfast were more likely to be obese compared to those who take breakfast regularly[41,42].

Similarly, Odegaard et al., (2013) found that skipping breakfast is associated with higher risk of body weight gain and incidence of obesity in the United States [43]. In Egypt, El Sayed, El-Shafei and Toprak (2015) indicated that half of the studied students were overweight [32]. Tin et al., (2011) mentioned that skipping breakfast may increase weight as a result of missing the chance for intake of specific nutrients from common breakfast foods that may reduce like hood of weight gain as fibers and calcium [44]. Moreover, Sakuria et al., (2017) reported that skipping breakfast has been associated with lack of feeding satiety, postprandial hyperinsulinemia, and circadian rhythm of glucose metabolism, which may lead to weight gain [18]. Astonishingly, more than half of the students in the current study consumed fast foods and soft drinks, which are leading causes for overweight and possible role in the pathogenesis of obesity [32].

Skipping breakfast and its relation with sociodemographic characteristics

It was found that the age of most of the studied students ranged between 18<25 years. This result is in line with Priya et al., (2017) who mentioned that age of their study participants ranged from 20 < 25. There was no significant relationship between age and skipping breakfast [45]. This result is in line with Boschloo et al., (2012) who emphasized that there was no relationship with age, indicating that breakfast skipping were not related to years of age [40]. While this result contradicts with Tin et al., (2011) who mentioned that breakfast skippers were significantly older [44].

Concerning gender, the present study revealed that there was statistical significant relationship between student's gender and skipping breakfast as more than half of the students who skipped breakfast were females. Probably, younger adult females perceived themselves to be overweight as compared to ideal weight status and hence more females adopted weight loss measures, like skipping meals. This result is congruent with Tin et al., (2011) who mentioned that many females omitted breakfast than male did [44]. However, the result contradicts with Sun et al., (2013) and Garg et al., (2014) who mentioned that more male students skipped breakfast than females [20,33].

The present study revealed that there was no statistical significant relationship between skipping breakfast with student's monthly income. This result contradict with Sun et al., (2013) and Garg et al., (2014) who mentioned that monthly expenses were negatively associated with breakfast consumption habits [20, 33]. This result may be related to around half of students who skipped and did not skip breakfast had enough income.

Regarding program year there was a statistical significant relationship between students who skipped breakfast and program year, since around half of students not skipping breakfast were in first year. This result is congruent with Sun et al., (2013) who mentioned that program years of education is significantly associated with breakfast consumption habits. In other words, prevalence of regular breakfast consumption in the first year

was significantly higher than other years [20]. Possibly, students in their first year might still be adhering to good family breakfast eating habits they learned prior to entering university.

The present study denoted that there was a statistical significant relationship between parent education and skipping breakfast, as nearly two thirds of students who did not skip breakfast had university graduated parent. This result is consistent with Tin et al., (2011) who emphasized that higher percentage of breakfast eaters had parents with higher education [44]. In addition, Gikas (2003) mentioned that the proportion of breakfast skippers was statistically higher among students with parents of low academic level compared to students with parents of higher academic level [46].

Finally, the findings of current study support the belief that breakfast skippers are more likely to have poor academic achievement and increased body weight, therefore emphasize should focus on enhancing students breakfast consumption. Nurse educator should be aware that skipping breakfast needs solid education and preventive programs to enhance student's health nutritional status.

V. Conclusion

According to the findings of the current study, it can be concluded that, the majority of the undergraduate university nursing students were skipping breakfast meals and more than half of them were females. Most of the student's skipping breakfast had low level of educational performance and nearly half of the skipped breakfast students were overweight. High statistical significant relationships were found between skipping breakfast and educational performance level as well as BMI.

VI. Recommendation

In the light of the present study findings the following recommendation are suggested:

- Arrange different seminars and workshops regarding importance of breakfast.
- Academic programs should be planned that elucidate the importance and effect of breakfast to undergraduate students.
- Further studies to determine relationships between functional activity level and skipping breakfast among nursing students and staff.
- Further study to compare relation between skipping breakfast, educational performance level and BMI in other community setting.

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