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Habit of Breakfast Skipping is Associated with a Higher Risk of Hypertension and Increased Level of LDL

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Abstract

Background: The link between breakfast skipping and cardio-metabolic disorder is well studied. Though, there are very rare studies describing the association between habit of eating breakfast and hypertension. The existing study aimed to assess the association among the habit of breakfast skipping and hypertension along with low density lipoprotein (LDL) level in university going adults.Methods: Two hundred university going adults were enrolled for this study. The habit of breakfast skipping was assessed from self-reported questionnaires and categorized into three groups: (rare, often and regular breakfast eaters). Three days' dietary consumption over one weekend day and two week days were gathered from each participant using a 2-day daily record and a 24-hour recall.Results: For the occurrence of hypertension the crude odds ratio of skipping breakfast was 0.359. Though, after adjusting for all substantial confounding aspects (sex, age, current smoking, regular exercise, diastolic and systolic blood pressure, waist circumference, body mass index, and red blood cell counts), not intake breakfast was linked with a higher risk of HTN (OR=1.045; 95

Index terms— breakfast skipping, LDL, systolic and diastolic blood pressure, hypertension.

1 I. Introduction

reakfast consumption is a well-studied topic. The initial documented researches were from a cereal companies and producers of pork in the 1800s and 1920s respectively [1] . Latest studies provide data connecting the habit of breakfast consumption with a reduced risk of obesity, weight gain and metabolic syndrome [2,3] . Furthermore, various studies showed that the habit of breakfast intake was linked with reduced cardio-metabolic risk, comprising lower risk of hypertension and type 2 diabetes mellitus [4,5] . However, few studies have inspected the connection between the habit of eating breakfast and cardio-metabolic syndrome among university going adults. In 2014, Yoo et al. reported that eating a dairy-cereal breakfast or a high energy and fiber breakfast was linked with a decreased risk of metabolic syndrome, although they did not find a substantial association among breakfast eating and hypertension [6] .

Skipping breakfast can have unhealthy consequence on quality of diet and enhance in metabolic ailment risks. People who took breakfast rarely, have deprived nutritive values throughout the day. They get most of their energy through unhealthy food source (fat containing foods) which can lead to different metabolic syndrome [7] . Every day diet quality greatly reflects the type of breakfast eaten. If breakfast comprises mostly of cereals can be linked with reduced fats and higher concentration of carbohydrates, proteins and fibers. And if anyone skipped his all breakfast frequently displayed J-shaped association with enhancement in BMI. Skipping breakfast because of late night dinner can consequences in substandard diet quality and customary skipping can lead to metabolic disorder [8] .

We hypothesized that there is an association between hypertension and the habit of breakfast eating, Current study was planned to assess the effects of skipping breakfast on risk of hypertension and LDL level. The objective

of this study was to determine the relationship of skipping breakfast in Pakistani population on various metabolic measures especially hypertension as there is lot of variance in diet quality and eating pattern.

2 II. Study Population and Design

Two hundred students of University of Veterinary and Animal Sciences Lahore Pakistan from diverse departments and their acquaintances were involved in this study. The current study was a crosssectional study. Data were directly collected by interviews and study staff performed standardized physical examinations [9] . Nutritional status, including dietary information and medical history, was measured using a 24-hour recall method. Regular exercise was indicated as "yes" when the subject exercised for more than 20 minutes at a time, more than three times per week. We disqualified subjects for the following reasons: incomplete answers about medical and social histories, or missing waist circumference, height, weight, blood The participants were between 20 and 25 years of age, were not taking any medicines recurrently and did not have any family history of hypertension, diabetes and heart attack (Table 1). All participants provided written informed consent, and the data provided were anonymous. Ethical standards of the Helsinki declaration were followed to conduct study.

3 III. Measurements

Blood pressure, anthropometric measurements and biochemical analysis were carried out at University of Veterinary and Animal Sciences Lahore lab. After eight hours fasting blood samples were collected. Biochemistry analyzer (Micro lab 300, Merck; Darmstadt, Germany) was used to determine serum LDL-C and liver enzyme profile along with serum fasting glucose. Sphygmomanometer was used to measure systolic and diastolic blood pressure. Height and height were analyzed by using extensometer. At the tapered portion of torso (i.e., a location amid the hipbone crest and lower rib) waist circumference was calculated twice. Measurement of body weight and height (nearest to 0.01kg and 0.1cm respectively) was done in fasting condition. Body weight was divided by height square to determine BMI.

4 IV. Estimation of Eating Breakfast a) Breakfast Definition and Assessment

Breakfast was defined as the meal consumed in the morning, and any beverages or food taken in the morning were categorized as breakfast. Participants were alienated into three subgroups deliberating to the occurrence of breakfast skipping over the three-days dietary intake data collecting period. Group one encompassed subjects who skipped breakfast on two or more of the three days were characterized as a rare breakfast eater as breakfast was skipped on more than 50% of the days assessed. Group 2 were encompassing subjects who skipped breakfast on one of the three days were placed in the often breakfast eater group, and group 3 comprise those who did not skip breakfast on any of the three days of the test period and characterized in the regular breakfast eater group. Similar trials have been conducted in some other researches and provided base line for present research [10] .

5 V. Statistics

The Statistical Package for the Social Sciences (SPSS) version 21.0.0 (SPSS Inc., IBM) was used to examine the data. Variations in continuous variables like laboratory biomarkers, blood pressure and age were determined by the students t-test. Adjusted odds ratios of the habit of breakfast eating were analyzed by using multiple logistic regression analysis for hypertension. All statistical outcomes with a p value of less than 0.05 were reflected as statistically significant. The values were demonstrated as Mean ± standard deviation.

6 VI. Results

7 a) Patient Characteristics

The demographic and clinical characteristics of the patients were classified into three groups according to the habit of skipping breakfast, as shown in Table 1. Out of the two hundred studied participants one hundred nine (51.9%) were male and most of them fall in the class of rare breakfast eaters (68%). Frequency of male in regular (56%) and often (44%) breakfast eaters were almost equivalent to women. It was also noted that young males are regular breakfast eaters as related to other groups. While, rate of females was higher in the often (58%) breakfast eaters. Distribution of females in regular (31%) and rare (10) breakfast eaters was less as related to the male (Figure **??**). There was no significant variance in engagement in regular exercise between the breakfast eating group and the not breakfast eating group (Table 1).

8 b) Prevalence of Hypertension According to Habit of Skipping Breakfast

The crude odds ratio of skipping breakfast for the prevalence of hypertension was 0.366, which specified a negative linkage among hypertension and breakfast eating. Though, after adjusting for confounding factors, such as age and sex, the odds ratio (OR) reversed (Table 2; OR = 1.125; 95% confidence interval [CI] = 1.121_1.129;

p-value ? 0.001). Furthermore, after amending for all measured confounding factors (regular exercise, sex, current smoking, age, systolic and diastolic blood pressure, red blood cell counts, body mass index, and waist circumference), breakfast skipping was connected with a higher risk of hypertension (Table 2; OR = 1.065; 95% CI = 1.057_1.073; p-value ? 0.001).

9 VII. Discussion

In the present study, we found that the habit of eating breakfast was independently linked with a reduced risk of hypertension. To the best of our knowledge, this is the first university going adults-based study in Pakistan investigating the association between hypertension and breakfast. Few studies acknowledged a relationship between eating breakfast and the occurrence of some ailments. Smith et al. stated that breakfast skipping for long time may be linked with cardio-metabolic health [11] . Similarly, another researcher exposed that the habit of breakfast intake regularly contributed to the preclusion of weight gain, unlike breakfast skipping [12] . Moreover, Yoo et al. showed that breakfast intake on regular basis was linked with a decreased risk of metabolic syndrome in a Korean population when categorizing the Korean breakfast into two kinds, a customary Korean breakfast pattern a dairy-cereal breakfast pattern. However, outcomes of their trial did not show an association between breakfast intake and the prevalence of hypertension [6] . In our study the level of LDL reduced in group of regular breakfast eaters as related to other groups. Similarly, Smith et al. showed that the higher LDL and total cholesterol values were observed in breakfast skipping group [11] . These outcomes might be due to a higher consumption of saturated fat in the breakfast skipping group. Another potential description is a higher insulin stimulus of hydroxyl methyl glutaryl Co-A (HMG-CoA) reductase. Compared with university going adults who take breakfast regularly, those who skipped breakfast had higher concentrations of fasting insulin and, thus, might have higher HMG-CoA reductase [11] . Through these conceivable mechanisms, breakfast skipping might persuade higher LDL cholesterol and, consequently, atherosclerosis. Likewise, latest studies showed that breakfast skipping clusters were linked with risk factors of hypertension, such as reduced levels of physical activity and smoking [13] .

The present study was the first evidence based study in Pakistan among university going adults to observe the association between the habit of breakfast eating and the occurrence of hypertension. Our research included approximately 200 participants, so it might reflect considerable number of Pakistani university going adults. Our study has several limitations. First, since the current study was cross-sectional rather than longitudinal, a causal association among breakfast eating and hypertension could not be conclusively established. Moreover, we did not evaluate all confounding aspects, though we endeavored to embrace as many as possible, including, medication, exercise, smoking, age and alcohol consumption.

Conclusively, the habit of breakfast eating was linked with a reduced risk of hypertension between Pakistani university going adults. Further large-scale prospective experiments are required to confirm the possible effect of regular breakfast intake on hypertension and identify the physiologic mechanisms underlying this association.

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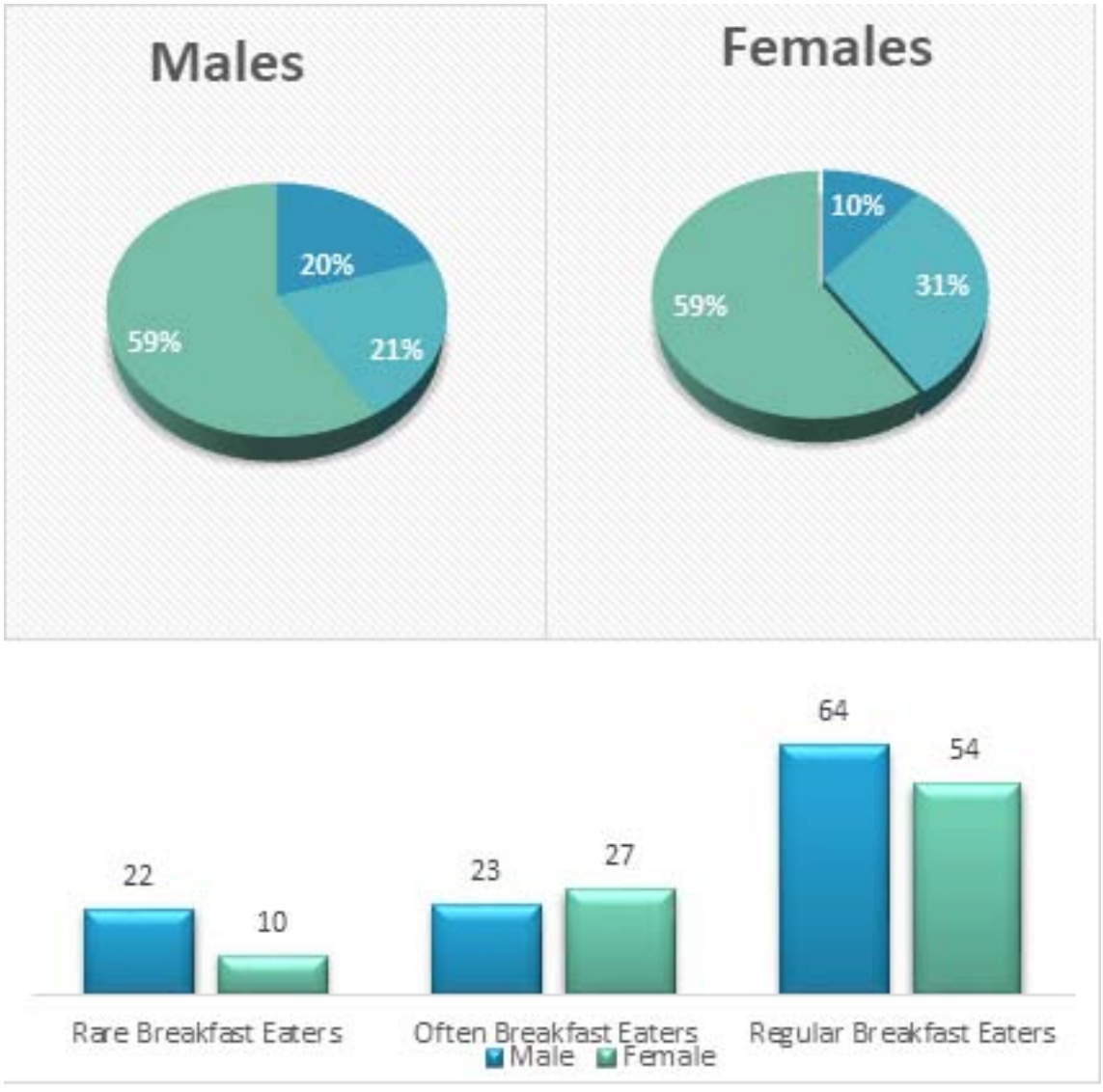
Males
20%
21%
59%
Females
10%
31%
59%
64
54
22
10
23
27
Rare Breakfast Eaters
Often Breakfast Eaters
Regular Breakfast Eaters
Male
Female

Figure 1: B

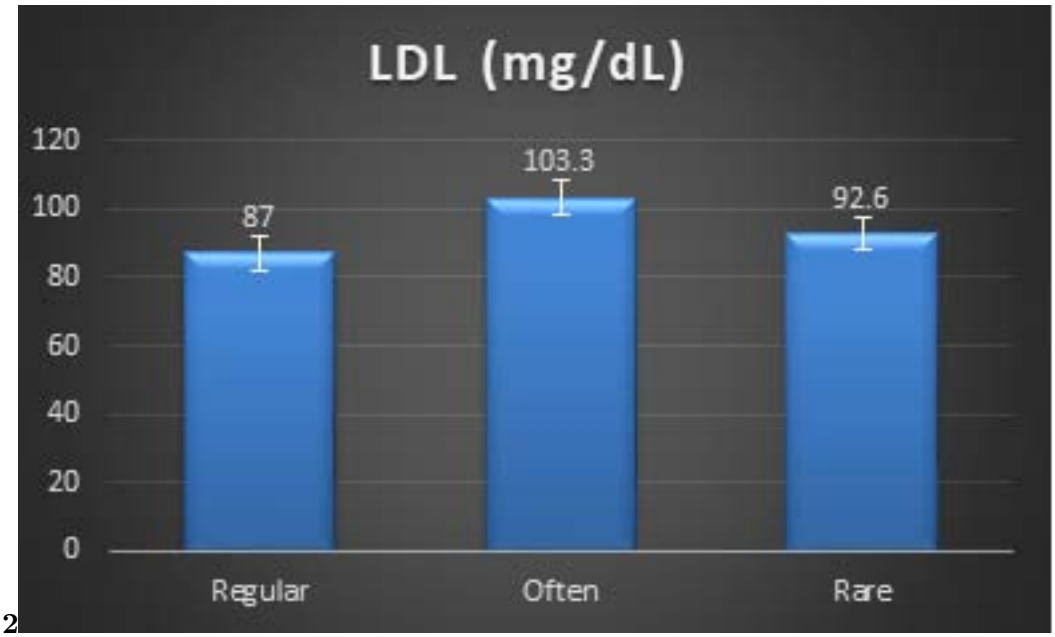

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Figure 2: Fig. 2 :

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Figure 3: Table 1 :

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*[Note: *Crude odds ratio of skipping breakfast for hypertension. **Adjusted by Model 1+, sex, age and hypercholesterolemia. ***Adjusted by Model 2+ systolic blood pressure, diastolic blood pressure, regular exercise, body mass index, waist circumference, current smoking CI: confidence interval.Fig. 1: 12 Volume XVIII Issue I Version I]*

Figure 4: Table 2 :

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