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Nutritional status associated with metabolic syndrome

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Abstract---Aim: The purpose of this study was to determine the prevalence of metabolic syndrome in patients of different diet habits, life style. **Method:** 260 participants age ranging from 17 to 80 years(180 control and 180 cases) were included in this study. From questionnaire we took the diet chart of respondents like what they had in breakfast, lunch and dinner. Blood samples were taken for the routine parameters i.e., FBS and Lipid profile. Metabolic syndrome patients were identified according to the criteria of National Cholesterol Education Program's Adult Treatment Panel III(ATP III). Paired t-test was performed to evaluate the association between various parameters. **Result:** According to the National Cholesterol Education Program's Adult Treatment Panel III (ATP III) guidelines people who regularly consume high-calorie, high-fat foods like samosas, badas, aloo paranthas, puri, pakoda, and jalebi were more prone to metabolic syndrome. The waist circumference in 89.4% cases was above >90cm. The amount of cholesterol was also high in 90% cases (>150 mg/dl) as compared to control. The rate of developing metabolic syndrome was found to be higher in migrated population from coastal areas having high junk food habits and less physical activity where as surprisingly it has been seen in all tribal population of local area are less prone to

metabolic syndrome after having three times high carbohydrate meals per day like rice and local alcohol prepared by them on daily basis. Conclusion: The research concluded that the diet and lifestyle has very important role in developing metabolic syndrome.

Keywords---Diet, Metabolic Syndrome, Nutrition, Lifestyle.

Introduction

An individual with the metabolic syndrome has a number of symptoms, including high blood pressure, high cholesterol, poor glucose tolerance, compensatory hyperinsulinemia, and a tendency to gain weight around the midsection. Atherosclerosis and cardiovascular disease may occur in people with the metabolic syndrome. People with the metabolic syndrome may benefit from lifestyle changes such as dietary adjustments and increased physical activity, according to various epidemiological research and clinical trials. Diet and physical activity have been shown to influence the onset of the metabolic syndrome, as summarized in this article. Cardiovascular disease (CVD), type 2 diabetes (T2D), and death are all linked to metabolic disorders as insulin resistance, high blood pressure, dyslipidemia and aberrant glucose metabolism (Phillips et.al. 1978, Reaven, G. M. 2005, Grundy, S. M. 2004). Obesity is often linked to metabolic abnormalities like these (Ford, E. S. et.al. 2002), while some obese people (between 10% and 25%) have a normal metabolic profile (Das et.al. 2004, Alberti et.al. 1998). The phrase "metabolically healthy and obese" is used to describe these people. Furthermore, some people who are not fat but have an aberrant metabolic profile are referred to as "metabolically unwell, not obese." Depending on the phenotypic, illness and mortality risk might vary (Grundy et.al. 2005). In this study, we examine the incidence of metabolic syndrome in patients who consume fast food compared to healthy individuals.

Material and Method

Material required

This research conducted in SLN MCH Koraput a southern part of Odisha where most populations are tribal. We only take the patients coming to medicine OPD SLN MCH for routine investigations. Individuals aged 18 to 70 years old were recruited for the study. Patient consent forms are signed by patients. From questionnaire we take the details of their diet chart (breakfast, lunch and dinner) of everyday. Life style and occupation were noted. We also take non-veg intake per week and smoking and alcohol history were also noted. Blood samples withdrawn with consent for routine investigations (FBS, LIPID Profile) which has been done at Regional diagnostic center, Biochemistry lab of SLN MCH Koraput by EM 360 auto analyzer. Waist circumference noted and from weight and height, we measured BMI of each patient. SBP and DBP were measured by sphygmomanometer.

Case and control group

Patients diagnosed with metabolic syndrome are included in case group and others as controls. A total of 260 (180 control & 80 case) patients attending

Medicine OPD of SLN MCH, Koraput are recruited in this study. Patients with extremes of ages and any chronic disorder are excluded from the study.

Diagnostic Criteria

Metabolic syndrome patients were diagnosed from the widely accepted guidelines of National Cholesterol Education Program's Adult Treatment Panel III (ATP III), the American Heart Association/ National Heart Lung and Blood Institute (Harmonization) and the International Diabetes Federation (IDF). Patients presenting to the medicine OPD were questioned about their history of lifestyle and diet they were currently taking. Presence of any three of the following five conditions is essential as shown below.

1. Increased waist circumference (males: ≥ 90 cm and for females: ≥ 80 cm).
2. Hypertriglyceridemia ≥ 150 mg/dl (1.7 mmol/l).
3. Low HDL (Males < 40 mg/dl (1 mmol/l) and for females < 50 mg/dl (1.3 mmol/l).
4. Elevated blood pressure (systolic blood pressure ≥ 130 mmHg and/or diastolic blood pressure ≥ 85 mmHg or drug treatment for hypertension).
5. Elevated blood sugar (fasting blood sugar ≥ 100 mg/dl (5.6 mmol/l) or drug treatment for diabetes mellitus).

Result

A total of 260 participants were included in the study (180 cases and 180 control) carried out in SLN MCH Koraput's RDC Biochemistry department. National Cholesterol Education Program's Adult Treatment Panel III (ATP III) guidelines were used to evaluate these results. Participants were asked about their diet preferences what they taken in breakfast, lunch and dinner both control and experimental. Most of the participants used to consume high calorie and high fat food. Only 2 % in the urban areas did not consume fatty and oily food like jalebi, bada, samosa, pakoda, non veg, alcohol, cigarette on daily basis and other 80% people consumed junk food in their three time meal. However, butter was used even more widely as their fat source. In the urban areas, 40% used butter as their source of fat, while in the rural areas, 47% did the same. About 50% people consume alcohol and cigarette both which affected their liver and lungs respectively.

In experimental group about 98% people suffering from metabolic syndrome due to their unhealthy diet preferences. 90% people had high cholesterol level and 35% had high sugar level and 25% have high triglyceride level as compared to control group. Among the experimental group we saw that 89.4% people have high BMI which means that they were obese/overweight. In control group people don't consume such high calorie food but they also consume alcohol and cigarette like experimental but they don't develop any metabolic syndrome this may be due to the intense physical activities and healthy diet.

Experimental group

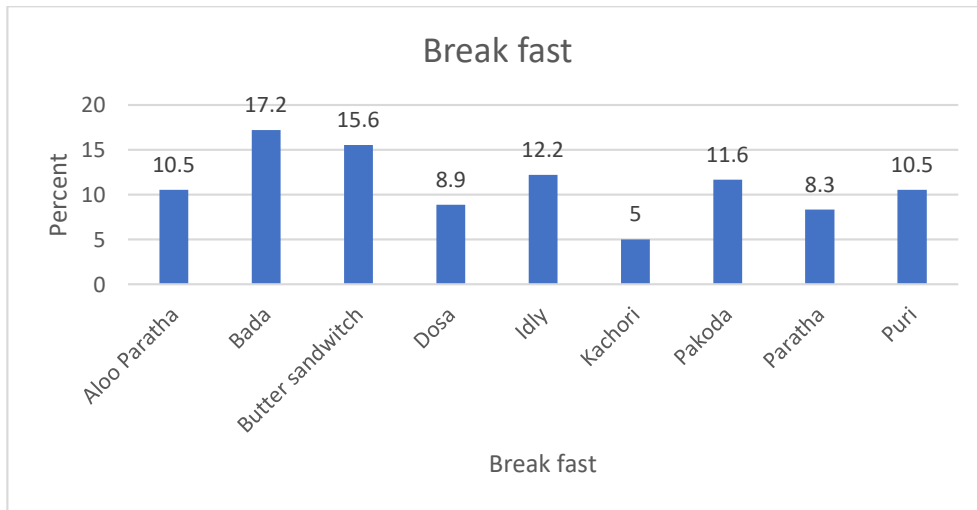


Figure 1. Consumption of various food items in breakfast

Figure 1 depicts the consumption of various food items in breakfast. Among 180 participants in the experimental group, 10.5% (19) were taking aloo paratha, 17.2% (31) were taking bada, butter sandwich was consumed by 15.6% (28), 8.9% (16) were consuming dosa, 12.2% (22) were taking idly, 5% (9) kachori, 11.7% (21) were consuming pakoda, 8.3% (15) paratha and 10.6% (19) were taking puri in their breakfast.

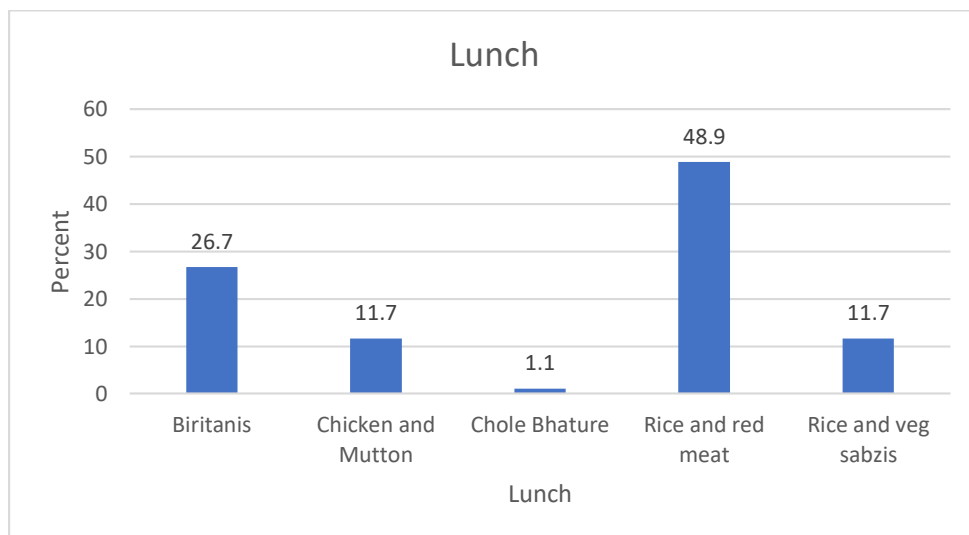


Figure 2. Consumption of food items in Lunch

Figure 2 depicts the consumption of food items in lunch. The data depicts that 26.7% (48) were taking biryani, 11.7% (21) were consuming chicken and mutton, chole bhature was consumed by only 1.1% (2) of the total, 11.7% (21) were

consuming rice and vegetables and most of the participants, about 48.9% (88) were consuming rice and red meat in their lunch.

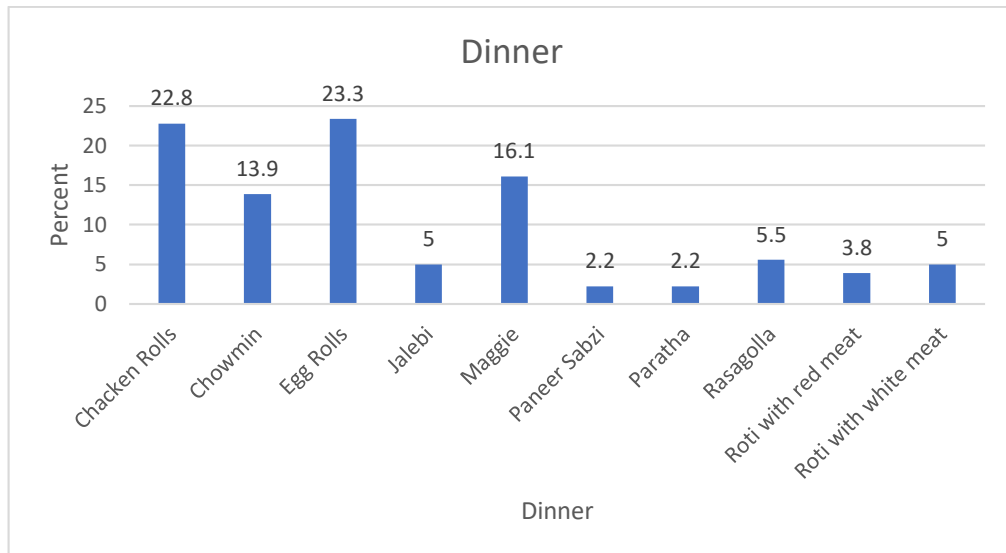


Figure 3. Consumption of food items in Dinner

The food items that were consumed in dinner were depicted in figure 3. The data indicated that most of the participants, about 22.8% (42) and 23.3% (41) were consuming chicken rolls and egg rolls in their dinner, 13.9% (25) were taking chowmin, 5% (9) were consuming jalebi, Maggie was consumed by 16.1% (29), paneer sabzi and paratha by 2.2% (4) each, rasagolla by 5.6% (10), roti and red meat by 3.9% (7) and roti and white meat by 5% (9) of the total participants.

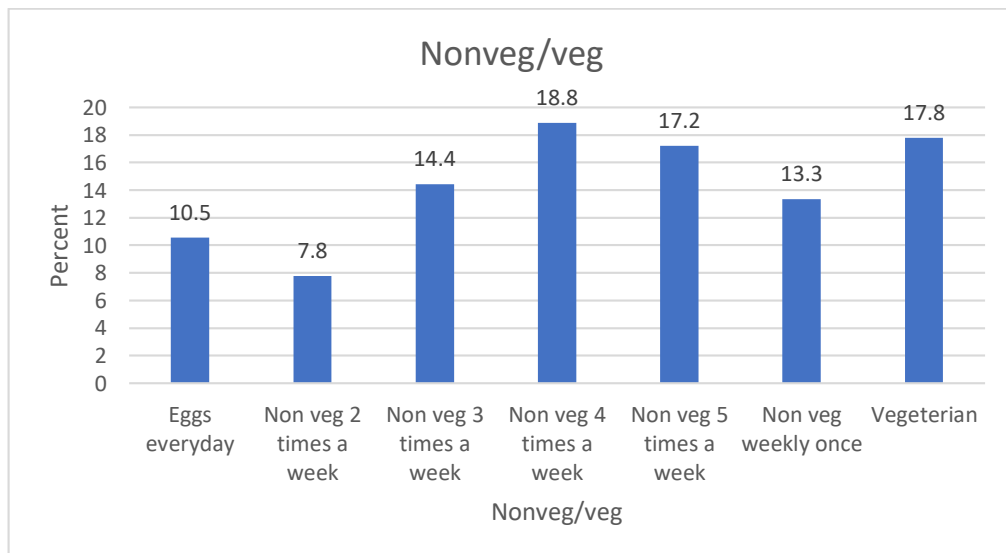


Figure 4. Consumption of veg/non-veg percentage in experimental group

Figure 4 depicts the number of respondents based on their type of food (veg/nonveg). As per data, 10.5% (19) consume egg every day, 13.3% (24) were taking nonveg once in a week while 7.8% (14), 14.4% (26), 18.9% (34), and 17.2% (31) were consuming nonveg 2, 3, 4, and 5 times a week respectively.

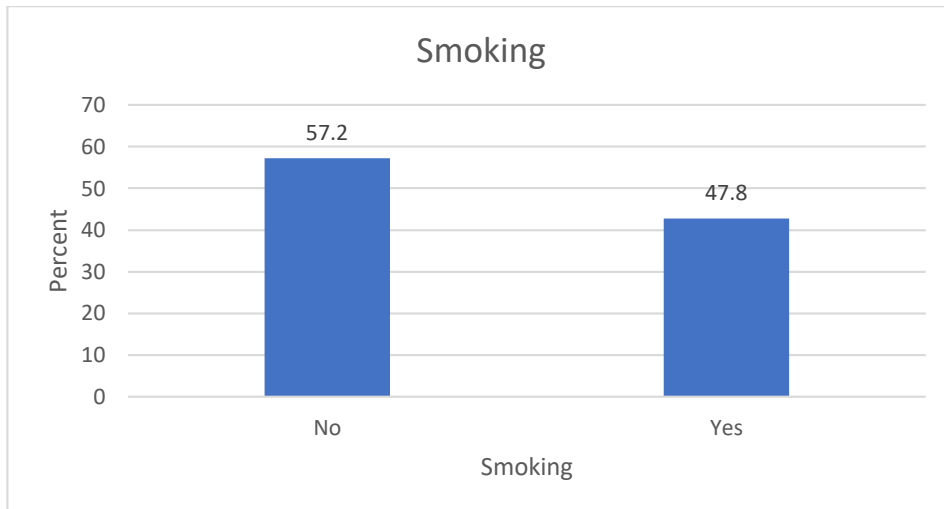


Figure 5. Smoking percentage

Figure 5 represents the percentage of the respondents who were smoking. Out of 180 respondents, 57.2% (103) were smoking cigarettes whereas 27.8% (77) were not smoking.

Control group

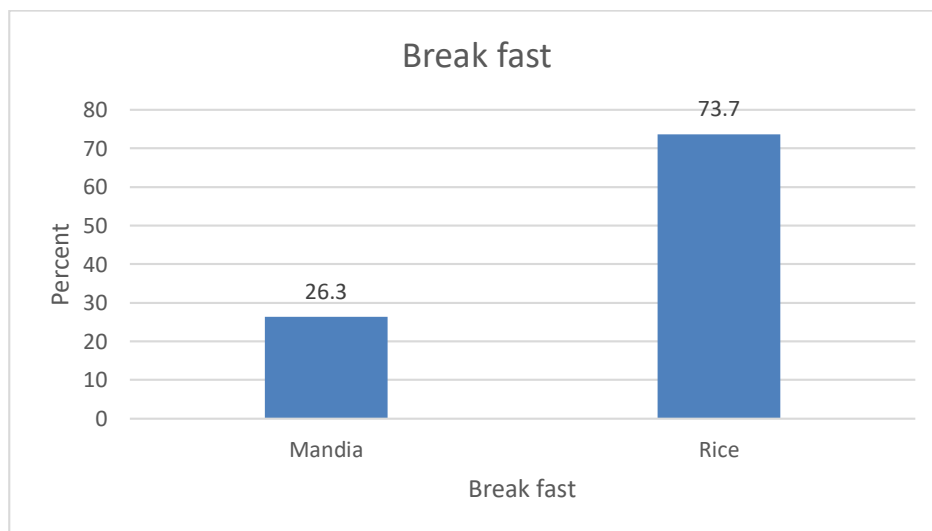


Figure 6. Consumption of food in breakfast in control group

Figure 6 depicts the consumption of various food items in breakfast by control group. Among 180 participants in the control group, 73.7% (137) used to consume rice and 26.3% (49) mandia in their breakfast.

All of the participants were taking rice in their lunch whereas in dinner, roti was the priority as all of them were consuming roti in their dinner.

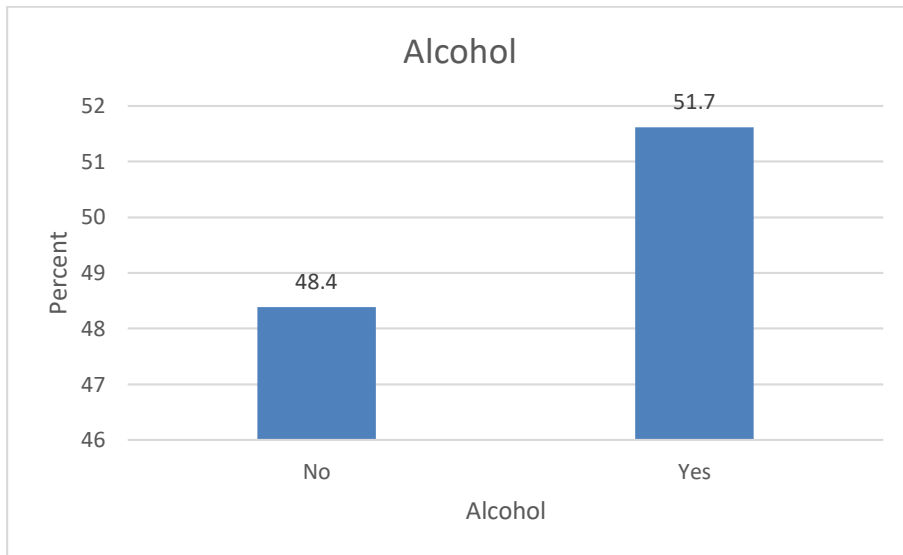


Figure 7. Alcohol percentage in control group

Figure 7 depicts the percentage of participants who were consuming alcohol in control group. It was observed that 48.4% (98) of them were not taking alcohol whereas only 51.6% (96) consume alcohol on daily basis.

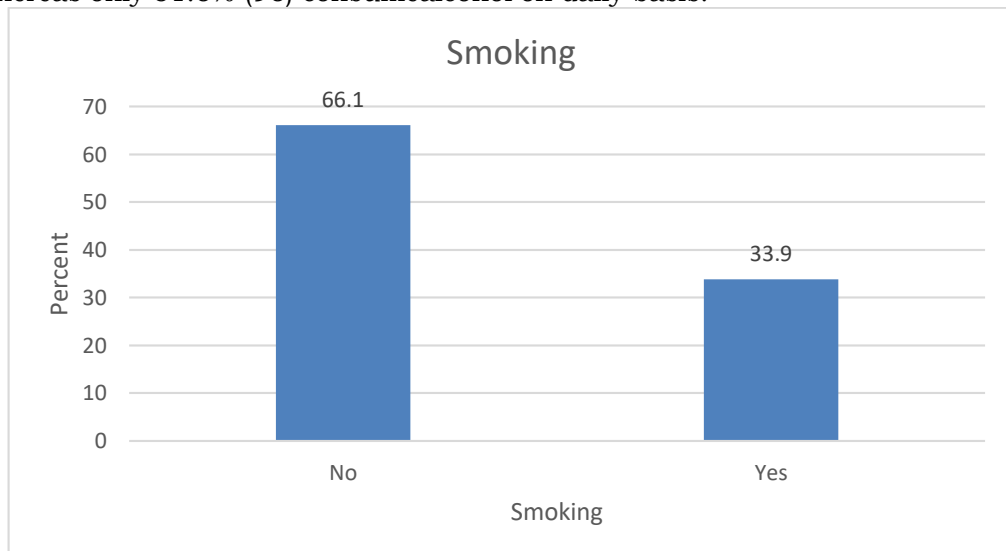


Figure 8. Smoking percentage in control group

Figure 8 depicts the percentage of participants who smoke in control group. 66.1% (123) of them do not smoke whereas only 33.9% (63) used to smoke cigarette.

Discussion

The control group reported eating a rice-based diet on a regular basis, with most homes eating two to three major meals each day. Rice, mandia, and desi alcohol are the most common meals. The tribe seldom consumes milk or milk products. The community engages in smallholder subsistence agriculture and obtains food from cultivated (agricultural lands, backyard gardens, and livestock raising), wild (wastelands, surrounding forests, pastures, roadsides, and local water bodies). The majority of the agroforestry and livestock product is consumed by the family, with the excess being sold in local markets to generate revenue.

According to the findings, the majority of individuals continued to follow their usual eating habits. The region's nutrition shift could not be explained by the advent of Western cuisine, since the research population consumed a lot of junk food. Despite the prevalence of foreign cuisine franchises in major cities like Delhi, Dehradun, Chandigarh, and Bangalore, Western foods were seen as a convenience meal that was eaten for pleasure and convenience.

A significant incidence of metabolic syndrome was found in the experimental group, which did not alter its eating habits, however in the control group there was no such variation in eating habits, and as a result, no one in the control group developed the metabolic syndrome. Maybe it's because they're so active. Traditional Korean meal patterns were discovered to have a similar pattern of preservation. Traditional eateries in South Korea have recently seen a surge in demand, according to Kim, Popkin, and Lee et al (Kim and Popkin et.al.2000, Lee, Popkin and Kim et.al.2002).

Popkin and coworkers found that many developing nations have seen major alterations in food consumption as a result of the nutrition revolution (Popkin et.al.2001, Popkin et.al. 2012). Increases in the percentage of people eating a high-fat diet and consuming more animal products are two of the most notable effects of these dietary changes. Different culinary choices are made by those living in urban settings compared to their rural counterparts.

Obesity rates in the area have skyrocketed as a consequence of a shift in the region's diet from traditionally low to high-fat and high-carbohydrate. According to Drewnowski and Popkin, palm oil and coconut oil in Malaysia and Indonesia may have had an impact, as well. Like in many other developing nations, China's population is increasingly turning to fats and processed carbs as a source of nutrition. Commercial advertising has also altered cultural ideas of diet quality, resulting in increased consumption of sugar-sweetened beverages and other packaged goods (Monteiro et.al.2004).

Conclusion

According to NCIP reports, persons who eat junk food are more likely to develop metabolic syndrome symptoms such as type 2 diabetes, high cholesterol, and obesity, while those who engage in vigorous physical activity and eat a healthy diet are less likely to develop metabolic syndrome symptoms. This study can set importance of physical activities in achieving healthy life. Further studies should be conducted to identify more causes apart from dietary habits linked with occurrence of metabolic syndrome.

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