International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2013): 6.14 | Impact Factor (2015): 6.391

Multiflour Baked Mini Puri for Diabetes Mellitus

Sonu Mishra[1], Rupali Sengupta[2]

*Student (MSc CND-2), Department of Clinical Nutrition and Dietetics, Dr. BMN College of Home Science ,NAAC-Re-Accredited „A" Grade with CGPA 3.64/4 (Affiliated to SNDT Women"s University Mumbai), 338, R.A. Kidwai Road, Matunga (E), Mumbai: 400019, Maharashtra, India

Abstract: ***Diabetes mellitus is a group of diseases characterized by high blood glucose concentrations resulting from defects in insulin secretion, insulin action, or both. There is a significant prevalence of diabetes and IRS (insulin resistance syndrome) in the urban Indian population. Subjects with diabetes as well as IRS have greater prevalence of obesity, central obesity, hypertension, hypertriglyceridemia and low HDL as compared with normal subjects. High protein diet produced a relative improvement in plasma insulin responses for the blood glucose levels for mild diabetic patients. A high intake of dietary fiber, particularly of the soluble type, improves glycemic control, and lowers plasma lipid concentrations in patients with type 2 diabetes. Individuals with low fat and high fiber intakes lost more weight compared with those consuming a high-fat, low-fiber diet. Dietary fat and fiber intake are significant predictors of sustained weight reduction and progression to type 2 diabetes. Themultiflour baked mini puri snacks are made from high protein flour, high fiber and low fat in contradiction to traditional puris which are deep fried and has no fiber and thus can be given to diabetes for better glycemic control.***

Keywords: diabetes, insulin, obesity, dietary fiber

1. Introduction

Diabetes Mellitus:
Diabetes mellitus is a group of diseases characterized by high blood glucose concentrations resulting from defects in insulin secretion, insulin action, or both. Glucose is an essential nutrient that provides energy for the proper functioning of the body cells and is found in the food. Carbohydrates are broken down in the small intestine and the glucose in digested food is then absorbed by the intestinal cells into the bloodstream, and is carried by the bloodstream to all the cells in the body where it is utilized. However glucose cannot enter the cells alone and needs insulin to aid in its transport into the cells.

Insulin is a hormone produced by the beta cells of the pancreas which is required in the transportation of the blood sugar into the cells.In patients with diabetes, the absence or insufficient production or lack of response to insulin causes hyperglycemia. As per the International Diabetes Federation (2013), approximately 50% of all people with diabetes live in just three countries: China (98.4 million), India (65.1 million) and the USA (24.4 million). While comprehensive data are not available, smaller studies have been performed in various states of India to study the prevalence of diabetes. Based on these studies, the highest prevalence reported is from Ernakulum in Kerala (19.5%) and the lowest from Kashmir valley (6.1%). Most other areas have prevalence above 10%.

2. Literature Survey

The American Diabetes Association lists five classes within the group of disorders that represent the diabetic syndrome. These include:
1) Type 1 diabetes
2) Type 2 diabetes
3) Diabetes associated with contributing clinical states, diseases, drugs, and/or chemicals
4) Gestational diabetes
5) Malnutrition associated diabetes

Patients with diabetes have an increased incidence of atherosclerotic cardiovascular, peripheral arterial and cerebrovascular disease. Hypertension and abnormalities of lipoprotein metabolism are often found in people with diabetes.

Pulses are foods with very low glycemic index values. Numerous studies have documented the health benefits that can be obtained by selecting foods of low glycemic index. These benefits are of crucial importance in the dietary treatment of diabetes mellitus: glycemic control is improved as well as several metabolic parameters, such as blood lipids. Diets with low glycemic index value improve the prevention of coronary heart disease in diabetic and healthy subjects.. Selecting low glycemic index foods has also demonstrated benefits for healthy persons in terms of post-prandial glucose and lipid metabolism.

3. Methodology

Developing the Food Product (Multiflour Baked Mini Puris):
- Refined flour of traditional puris was replaced by cereal pulse combination flour-green moon dal flour, bajra flour, jowar flour.
- Black pepper powder which had diabetic property, chilli powder were added to enhance the flavor. Salt was added for taste.
- The amount of oil used was as per the requirement of the baking.

Table 1: Recipes of multiflour baked mini puris and traditional farsi puris. (30g)

Ingredients For Multiflour Baked Mini Puri :		Ingredients For Traditional Farsi Puri:	
Split moong dal flour	10gms	maida	30gms
Jowar flour	10gms	Oil for frying and making the dough	50ml
Bajra flour	10gms	water	20ml
Chilli powder	5gms		
Cumin powder	5gms		
Turmeric powder	2.5gms		
asafoetida	1.5gms		
Grounded black pepper	5gms		
salt	5gms		
Oil	5ml		

Table 2: Nutritive Value Table for Traditional Farsi Puris.

SR.NO.	INGREDIENTS	AMOUNTS (GMS)	ENERGY (KCAL)	CHO (GMS)	PROTEINS (GMS)	FATS (GMS)	FIBER (GMS)
1.	Maida	30	100	22	2.7	0.4	-
2.	Oil	50	450	-	-	50	-
		TOTAL:	550Kcal	22gms	2.7gms	50.4gms	-

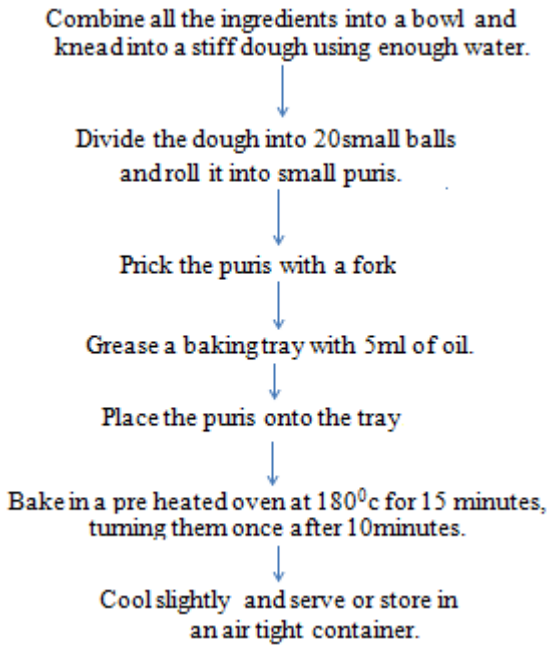
Table 3: Nutritive Value Table For Multiflour Baked Mini Puris

SR.NO.	Ingredients	Amounts (GMS)	Energy (KCAL)	CHO (GMS)	Proteins (GMS)	Fats (GMS)	Fiber (GMS)
1.	Split moong dal flour	10	33	5.8	2.2	0.2	0.8
2.	Jowar flour	10	33	7.3	0.9	0.1	0.9
3.	Bajra flour	10	33	7.3	0.9	0.1	1.1
4.	Oil	5	45	-	-	5	-
			144kcal	20.4gms	4.0gms	5.4gms	2.8gms

Table 4: Comparison between Traditional farsi Puri And Multiflour Baked Puri

SR.NO.		UNIT	Multiflour Baked Puri	Traditional Puri	RDA For Men	RDA for Women
1.	Energy	Kcal	144	550	2425	1875
2.	Carbohydrate	Gms	20.4	22	-	-
3.	Proteins	Gms	4.0	2.7	60	50
4.	Fats	Gms	5.4	50.4	20	20
5.	Fiber	gms	2.8	0	-	-

4. Method of Preparation



Developing the Yogurt Dip:

- Refined flour, cow milk and cheese of the cheesy dip were replaced by low fat yogurt.
- Butter was removed and no fat was used in the modified dip.
- Dil leaves and cucumber were added to enhance the flavor and garlic was added as a functional food.

Table 5: Recipes of Traditional Cheesy Dip and Yogurt Dip

Traditional Cheesy Dip		Yogurt Dip	
butter	15gms	yogurt	100gms
Maida	5gms	cucumber	50gms
Cow milk	100ml	garlic	5 cloves
cheese	30gms	Fresh dill minced	10gms
Salt-	5gms	Lemon juice	5ml
		Salt	5gms
		Black pepper	5gms

Table 6: Nutritive Value Table For Yogurt Dip.

SR.NO.	INGREDIENTS	AMOUNTS (GMS)	ENERGY (KCAL)	CHO (GMS)	PROTEINS (GMS)	FATS (GMS)	FIBER (GMS)
1.	Yogurt	100	58	3	3	4	-
2.	Cucumber	50	12	2.5	0.6	0.1	1.3
3.	Garlic	5cloves	7	1.4	0.3	0	0.2
4.	Fresh dil	10	4	0.4	0.3	0.05	-
		TOTAL:	81kcal	7.3gms	4.2gms	4.1gms	1.5gms

Table 7: Nutritive Value Table for Traditional Cheesy Dip.

SR NO.	INGREDIENTS	AMOUNTS (GMS)	ENERGY (KCAL)	CHO (GMS)	PROTEINS (GMS)	FATS (GMS)	FIBER (GMS)
1.	Butter	15	100	-	-	12.2	-
2.	Maida	5	17	3.6	0.4	0.06	-
3.	Cow"s milk	100	67	4.4	3.2	4.1	-
4.	Cheese	30	100	1.9	7.2	7.5	-
		TOTAL:	284kcal	9.9gms	10.8gms	23.8gms	0

Table 4: Comparison Between Traditional Cheesy Dip and Yogurt Dip.

SR. NO		UNIT	YOGURT DIP	TRADITIONAL CHEESY DIP	RDA FOR MEN	RDA FOR WOMEN
1.	Energy	Kcal	81	284	2425	1875
2.	Carbohydrate	Gms	7.3	9.9	-	-
3.	Proteins	Gms	4.2	10.8	60	50
4.	Fats	Gms	4.1	23.8	20	20
5.	fiber	gms	1.5	0	-	-

Evaluation of the Product

Multiflour baked mini puris were subjected to sensory evaluation based on 5 point scale for Appearance, Color, Texture, Taste, and Presentation. The score was based on the criteria, 5-very good, 4-good, 3-average, and 2-poor, 1-very poor. This test was done by 30 naïve panel members and 3 expert panel members. The product showed a gradual improvement from week after week.

5. Results and Discussion

Certainly modified food product has lowered the total energy and carbohydrates as compared to traditional recipe. In addition the modified food product also contains high protein and total dietary fiber (TDF). In comparison to the traditional product. The frying method used for the traditional recipe was replaced by baking with minimum usage of oil thereby reducing the total fat content of the recipe. In sensory evaluation the modified product was ranked "very good" by both the panel members. The product was acceptable.

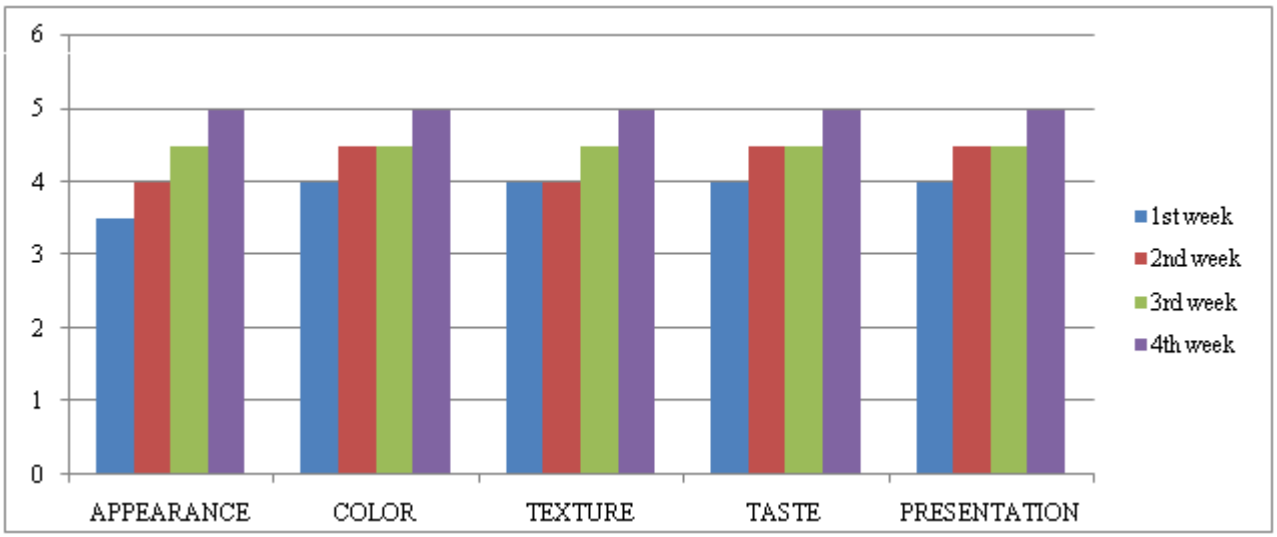
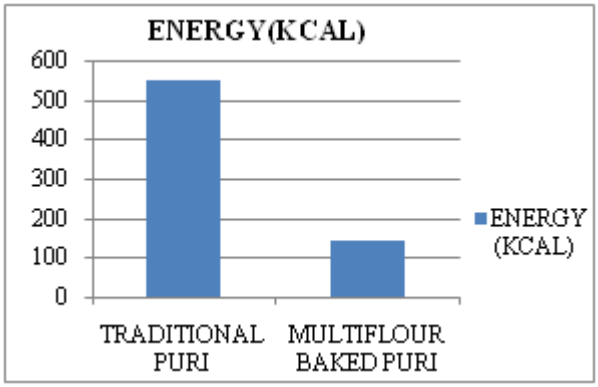


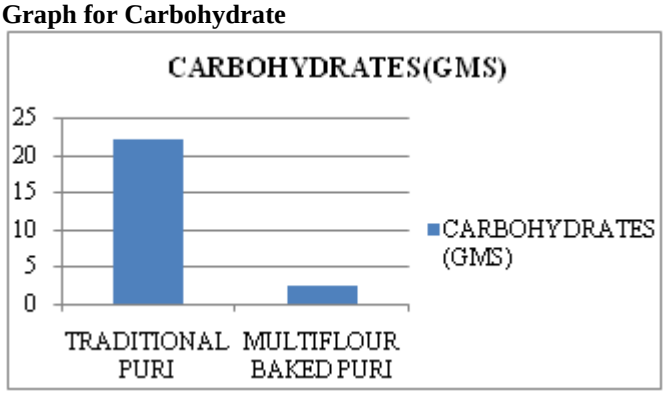
Figure 2: Nutrients Present in the Puri

Improvements were done every week on the product and on the fourth week the product was ranked "very good" by both the panel members

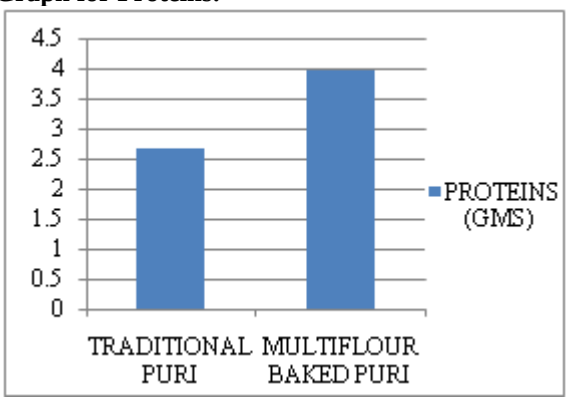
Graph for Energy



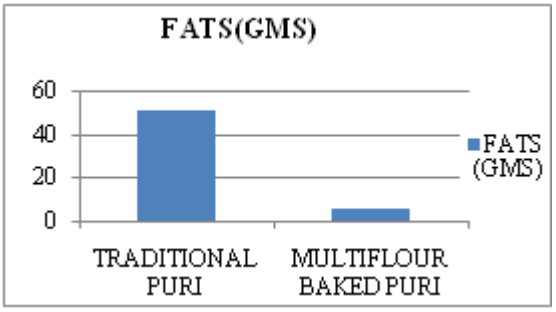
Graph for Carbohydrate



Graph for Proteins:



Graph for Fats



Graph for Fiber

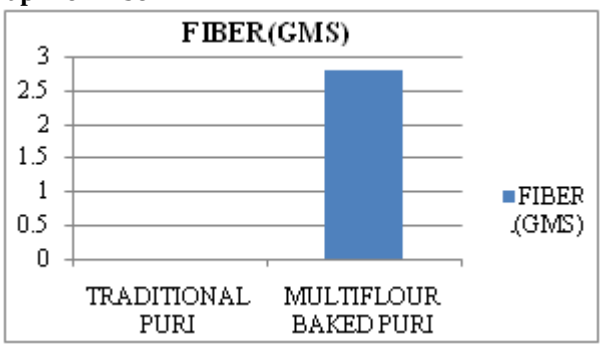
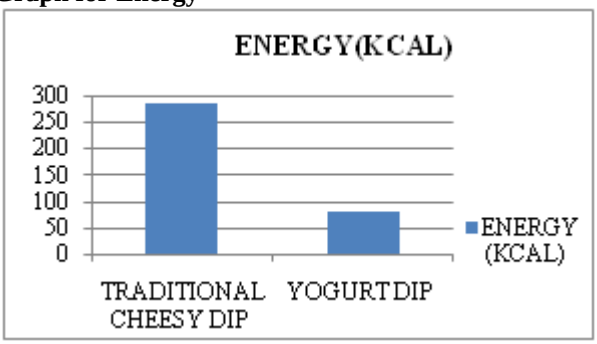
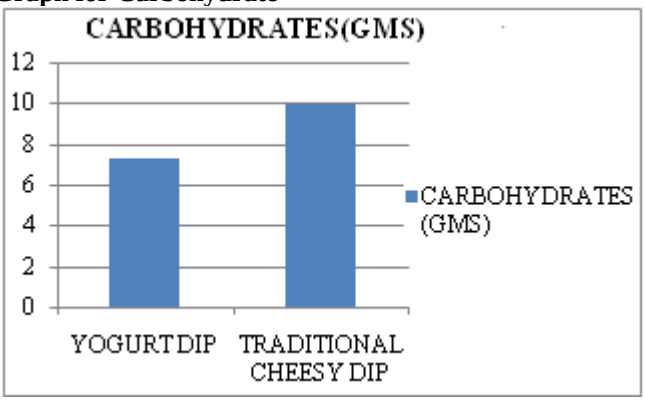


Figure 2: Nutrients Present In The Dip

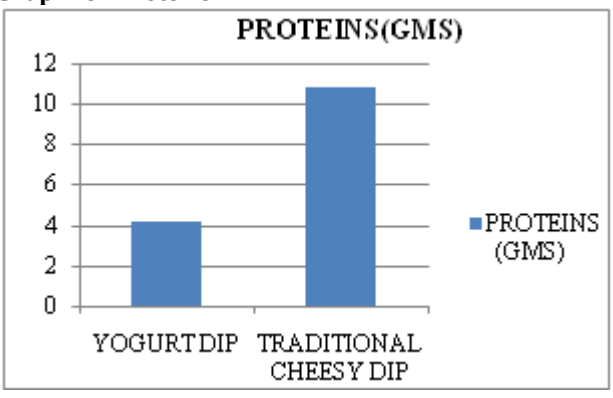
Graph for Energy



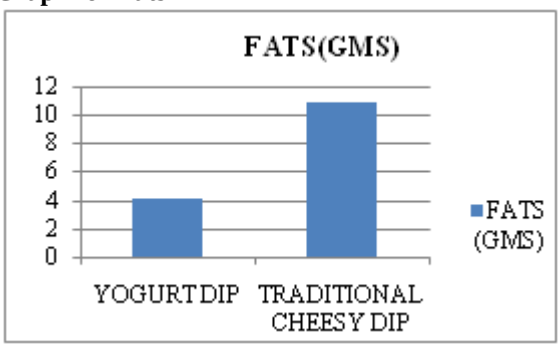
Graph for Carbohydrate



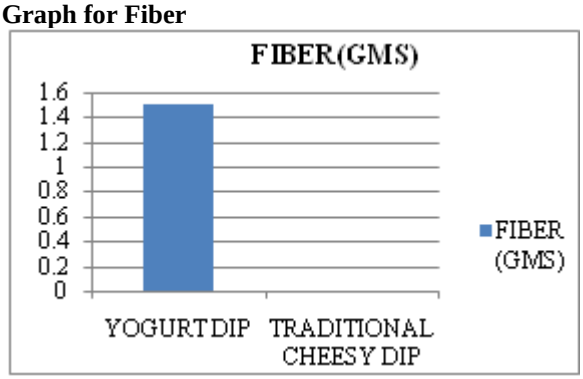
Graph for Proteins



Graph for Fats



Graph for Fiber



6. Discussion

In a study, High carbohydrate diets rich in dietary fiber were fed to 13 hyperglycemic diabetic men; five men required 15 to 28 units of insulin per day, five men required sulfonylureas, and three men required 40 to 55 units of insulin. All 13 men were fed weight maintaining American Diabetic Association diets containing 43% of calories as carbohydrate for 1 week and then were fed 75% carbohydrate diets with 15 g of crude dietary fiber for approximately 2 weeks.. Fasting serum cholesterol values were significantly (P less than 0.001) lower and mean fasting serum triglyceride values were 15% lower on the high carbohydrate diet than on the American Diabetic Association diet in these 13 men. Thus, a high carbohydrate diet with generous amounts of dietary fiber may be the treatment of choice of diabetic patients requiring sulfonylurea‟s or less than 30 units of insulin per day.*(T G Kiehm, et al,2014)*

In other study it was concluded that , increased fiber intake through diets rich in high fiber or supplements containing soluble fiber , improved glycemic control, indicating it should be considered as an adjunctive tool in the treatment of patients with type 2 diabetes.*(Flávia M Silva et al, 2013)*

An increase in the intake of dietary fiber, predominantly of the soluble type, by patients with type 2 diabetes mellitus improved glycemic control and decreased hyperinsulinemia in addition to the expected lowering of plasma lipid concentrations.*(Manisha Chandalia, et al 2000)*

Results of the meta-analysis by Tong et al showed low-fat dairy intake was associated with a larger magnitude of a decreased risk in type 2 diabetes (combined RR: 0.82 [95% CI 0.74, 0.90] in a comparison of the highest and lowest intake categories) compared with total dairy (combined RR 0.86 [95% CI 0.79, 0.92]) (*Tong X etal ,2013).* The beneficial effects of garlic are mainly attributed to the presence of volatile sulfur compounds like alliin, allicin, diallyl disulfide, diallyltrisulfide, diallyl sulfide. These shows to be effective in reducing insulin resistance*(Padiya, , et al ,2013.)*

7. Conclusion

Multiflour baked mini puris thus with its cereal pulse combination flour is beneficial for diabetes patients. It is further supplemented with a low fat dip using yogurt , which have made this product also a good source of probiotic. Thus this product which is a amalgamation of all these ingredients is widely suitable for people who are suffering from lifestyle disease.

References

[1] Nutritive value of indian foods – C. Gopalan, B.V. Rama Sastri and S.C. Balasubramanium Indian Recommended Dietary Allowances ,2010(NIN-ICMR)
[2] Padiya, Raju; K. Banerjee, Sanjay, Recent Patents on Food, Nutrition & Agriculture, Volume 5, Number 2, August 2013, pp. 105-127(23), Bentham Science Publishers- Garlic as an Anti-diabetic Agent: Recent Progress and Patent Reviews
[3] Tong X, Dong JY, Wu ZW, Li W, Qin LQ (2011) Dairy consumption and risk of type 2 diabetes mellitus: a meta-analysis of cohort studies. Eur J Clin Nutr 65:1027–1031
[4] Flávia M Silva, Caroline K Kramer, Jussara C de Almeida, Thais Steemburgo, Jorge Luiz Gross, Mirela J Azevedo, DOI: http://dx.doi.org/10.1111/nure.12076 790-801, 1December 2013- Fiber intake and glycemic control in patients with type 2 diabetes mellitus: a systematic review with meta-analysis of randomized controlled trials
[5] Manisha Chandalia, M.D., Abhimanyu Garg, M.D., Dieter Lutjohann, Ph.D., Klaus von Bergmann, M.D., Scott M. Grundy, M.D., Ph.D., and Linda J. Brinkley, R.D.
[6] N Engl J Med 2000; 342:1392-1398May 11, 2000- Beneficial Effects of High Dietary Fiber Intake in Patients with Type 2 Diabetes Mellitus
[7] Krause‟s Food & the Nutrition Care Process – L. Kathleen Mahan.
[8] Ronald A.Codario, Md; Type 2 diabetes, pre- diabetes and the metabolic syndrome
[9] V. Mohan, S. Sandeep, R. Deepa, B. Shah & C. Varghese Epidemiology of type 2 diabetes: Indian scenario Indian J Med Res 125, March 2007, pg 217-230

Author Profile

Sonu Mishra is a post graduate in Msc in clinical nutrition and dietetics, Dr. BMN college of home science, SNDT university.

Dr. Rupali Sengupta is the HOD of Clinical Nutrition And Dietetics department, Dr. BMN college of home science, SNDT university