



Case report

Unlocking weight loss potential: Investigating the impact of personalized nutrigenetic-based diet in an Indian population

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Supplementary Table 1. List of SNP's used in this study to design the Nutrigenetic-based meal plan.

Trait	Gene	Chromosome	Position	rsID	Risk Genotype	Reference Allele	References
Impact of high protein nutrition on weight loss	FTO	16	53803574	rs1558902	TT	T	[3,20]
Impact of low carbohydrate nutrition on weight loss	FTO	16	53816275	rs8050136	AA	A	[21]
BMI and Body Fat Percentage	FTO	16	53809247	rs1121980	CC	G	[22–26]
	SH2B1	16	28883241	rs7498665	AA	A	[8,27–29]
	FTO	16	53800954	rs1421085	TT	T	[30–33]
	FTO	16	53830465	rs9930506	AA	A	[34,35]
	MC4R	18	57884750	rs12970134	AA	G	[36,37]
	KCTD15	19	34309532	rs29941	AA	A	[38–41]
	QPCTL	19	46202172	rs2287019	CC	C	[42,43]
	NEGR1	1	72812440	rs2815752	AA	G	[44,45]
	SEC16B	1	177889480	rs543874	GG	A	[46,47]
	TMEM18	2	644953	rs7561317	AA	A	[48,49]
	NUDT3	6	34302869	rs206936	GG	A	[46,50,51]
	TFAP2B	6	50803050	rs987237	AA	A	[46,52]
	ADRB3	8	37823798	rs4994	GG	A	[53–55]
	Impact of calorie restriction on weight loss	ADIPOQ	3	186571123	rs1501299	GG	G
Lactose Intolerance	MCM6	2	136608646	rs4988235	GG	G	[58–60]
Gluten Intolerance & Celiac	CCR3	3	46352384	rs6441961	TT	T	[61,62]
	IL21	4	123218313	rs13119723	AA	A	[63–65]
	IL21	4	123509421	rs6822844	GG	G	[66–69]
	DQ2.2	6	32413317	rs2395182	GG	G	[70–72]
	DQ2.5	6	32605884	rs2187668	CC	C	[72–75]
	DQ2.2	6	32658079	rs7775228	TT	T	[70–72,75]
	DQ2.2	6	32659582	rs4713586	AA	A	[71,72,75]
	DQ8	6	32681483	rs7454108	TT	T	[70–72,75]

Supplementary Table 2. Nutrigenetic-based meal plan designing protocol based on the genetic risk category.

	High-risk	Moderate risk	Low-risk
Impact of high protein on weight loss	low protein diet (8–12%) formulated for effective weight loss	Moderate protein diet (13–19%) formulated for effective weight loss	High protein diet (20–22%) formulated for effective weight loss
Impact of low carbohydrates on Weight loss	High Carbohydrate diet (55–65%) formulated for effective weight loss	Moderate Carbohydrate diet (45–54%) formulated for effective weight loss	Low carbohydrate diet (40–44%) formulated for effective weight loss
Body fat percentage	Low-Fat diet (15–24%) formulated for effective weight loss	Moderate fat diet (25–34%) formulated for effective weight loss	High-fat diet (35–45%) formulated for effective weight loss
Lactose Intolerance	Milk and milk products are removed from the diet. However, curd and buttermilk were provided	Less than 120 ml of milk is suggested. Curd and buttermilk are provided	No restrictions for incorporating milk and milk products into the diet
Gluten Intolerance	Gluten-rich grains such as wheat, barley, maida or refined wheat, and oats were restricted from the diet	Gluten-rich grains were restricted from the diet. 2–3 times gluten-rich grains were incorporated into the diet	No restrictions for incorporating gluten-rich grains into the diet
Calorie Restriction	No calorie deduction from Total Daily Energy Expenditure (TDEE)	Calorie deduction of 100–200 calories from TDEE	Basal Metabolic Rate calorie is provided

Supplementary Table 3. Bivariate analysis of the Baseline and the Post-test Nutrigenetic group characteristics.

Variables	Baseline Nutrigenetic Diet	Post-treatment Nutrigenetic Diet	P-value	Effect size (r-statistic)
Body measurements, median (IQR)				
Weight (kg)	84.0 (73.5–79.5)	80.0 (70.8–90.0)	<0.001**	0.96
BMI	29.2 (27.4–31.2)	27.9 (25.1–29.7)	<0.001*	0.84
Body Fat Percentage	31.4 (25.5–37.3)	29.0 (24.7–34.5)	<0.001*	0.68
Fat mass (kg)	25.3 (21.1–31.9)	22.3 (19.3–26.7)	<0.001*	0.71
Lean mass (kg)	61.0 (44.8–69.1)	57.9 (50.7–63.5)	0.442**	0.09
Exercising habits				
Sedentary lifestyle	5 (18.5%)	0 (0.0%)	0.001	
Slightly active	17 (63.0%)	9 (47.4%)		
Moderately active	3 (11.1%)	3 (15.8%)		
Very active	2 (7.4%)	7 (36.8%)		
Laboratory results, median (IQR)				
HbA1C	5.60 (5.50–6.10)	5.70 (5.50–6.00)	0.664**	0.04
Fasting Blood Sugar	95.30 (89.30–103.65)	87.90 (81.65–96.05)	0.019**	0.44
Fasting Insulin	8.98 (6.53–12.49)	7.50 (5.90–11.75)	0.367*	0.18
Total cholesterol	202.00 (169.50–220.00)	198.00 (165.00–221.50)	0.337*	0.19
Triglycerides	123.00 (83.50–181.50)	118.00 (94.00–163.50)	0.424**	0.23
Iron	85.25 (64.10–94.70)	84.30 (54.45–95.05)	0.960*	0.01
Uric acid	6.00 (4.95–7.00)	5.80 (4.70–6.75)	0.042*	0.39
TSH	2.00 (1.76–3.88)	2.36 (1.71–3.37)	1.000**	0.00
T3	1.15 (1.02–1.26)	1.07 (0.96–1.19)	0.845**	0.04
T4	8.66 (7.50–9.93)	8.94 (7.97–10.08)	0.370*	0.18

*: The p-value was computed using the Wilcoxon signed-rank test.

** : The p-value was computed using the sign test.

Supplementary Table 4. Bivariate analysis of the baseline characteristics between the Generic and the Nutrigenetic groups.

Variables	Generic Diet Group (N = 23)	Nutrigenetic Diet Group (N = 27)	P-value
Body measurements, median (IQR)			
Weight (kg)	81.0 (72.0–90.5)	84.0 (73.5–79.5)	0.502
BMI	29.0 (27.7–33.0)	29.2 (27.4–31.2)	0.579
Body Fat Percentage	35.7 (30.6–40.6)	31.4 (25.5–37.3)	0.106
Fat mass (kg)	27.0 (23.9–34.7)	25.3 (21.1–31.9)	0.276
Lean mass (kg)	52.4 (46.3–61.8)	61.0 (44.8–69.1)	0.235
Basal Metabolic Rate (calorie)	1434.0 (1280.0–1611.5)	1650.0 (1300.0–1775.0)	0.105
Recommended calories (TDEE)	1600.0 (1486.5–1750.0)	1700.0 (1525.0–1895.0)	0.323
Exercising habits			
Sedentary lifestyle	4 (17.4%)	5 (18.5%)	0.838
Slightly active	15 (65.2%)	17 (63.0%)	
Moderately active	1 (4.3%)	3 (11.1%)	
Very active	3 (13.0%)	2 (7.4%)	
Laboratory results, median (IQR)			
HbA1C	5.80 (5.65–5.95)	5.60 (5.50–6.10)	0.266
Fasting Blood Sugar	98.10 (89.00–101.74)	95.30 (89.30–103.65)	0.927
Fasting Insulin	11.82 (8.36–18.04)	8.98 (6.53–12.49)	0.079
Total cholesterol	200.00 (179.00–216.50)	202.00 (169.50–220.00)	0.783
Triglycerides	118.00 (93.21–144.00)	123.00 (83.50–181.50)	0.754
Iron	83.75 (63.50–107.90)	85.25 (64.10–94.70)	0.770
Uric acid	5.60 (4.25–7.15)	6.00 (4.95–7.00)	0.478
TSH	2.94 (2.12–4.79)	2.00 (1.76–3.88)	0.082
T3	1.07 (0.97–1.15)	1.15 (1.02–1.26)	0.136
T4	8.80 (8.51–9.46)	8.66 (7.50–9.93)	0.579

Supplementary Table 5. Bivariate analysis of the Post-test characteristics between the Generic and the Nutrigenetic groups.

Variables	Post-treatment Generic diet Group (N = 23)	Post-treatment Nutrigenetic diet Group (N = 27)	P-value	Effect size (r-statistic)
Body measurements, median (IQR)				
Weight (kg)	85.0 (77.5–93.8)	80.0 (70.8–90.0)	0.250	0.34
BMI	30.7 (28.2–33.4)	27.9 (25.1–29.7)	0.009	0.81
Body Fat Percentage	35.6 (26.3–40.9)	29.0 (24.7–34.5)	0.168	0.40
Fat mass (kg)	23.2 (20.0–30.0)	22.3 (19.3–26.7)	0.406	0.24
Lean mass (kg)	58.7 (51.4–62.3)	57.9 (50.7–63.5)	0.700	0.06
Exercising habits				
Sedentary lifestyle	3 (13.0%)	0 (0.0%)	0.013	
Slightly active	12 (52.2%)	9 (47.4%)		
Moderately active	8 (34.8%)	3 (15.8%)		
Very active	0 (0.0%)	7 (36.8%)		
Laboratory results, median (IQR)				
HbA1C	5.90 (5.70–6.50)	5.70 (5.50–6.00)	0.137	0.43
Fasting Blood Sugar	93.02 (89.70–98.90)	87.90 (81.65–96.05)	0.038	0.62
Fasting Insulin	10.67 (7.03–16.13)	7.50 (5.90–11.75)	0.047	0.59
Total cholesterol	198.00 (176.00–214.50)	198.00 (165.00–221.50)	0.828	0.06
Triglycerides	139.00 (113.00–180.00)	118.00 (94.00–163.50)	0.170	0.40
Iron	76.45 (65.00–98.60)	84.30 (54.45–95.05)	0.724	0.10
Uric acid	5.70 (4.35–6.85)	5.80 (4.70–6.75)	0.783	0.08
TSH	3.22 (2.03–4.38)	2.36 (1.71–3.37)	0.213	0.37
T3	1.02 (0.96–1.18)	1.07 (0.96–1.19)	0.507	0.19
T4	8.65 (8.25–9.58)	8.94 (7.97–10.08)	0.739	0.10

Supplementary Table 6. Bivariate analysis of the changes in body measurements and laboratory results between the Generic and the Nutrigenetic groups (Baseline–Post-test).

Variables	Generic Diet Group (N = 23)	Nutrigenetic Group (N = 27)	Diet	P-value	Effect size (r-statistic)
Changes in Body measurements, median (IQR)					
Weight (kg)	0.00 (−0.25–0.00)	5.00 (3.25–6.00)		<0.001	0.86
BMI	0.00 (0.00–0.04)	1.58 (1.06–2.19)		<0.001	0.76
Body Fat	−0.23 (−1.19–2.22)	1.34 (0.48–3.68)		0.020	0.33
Percentage					
Fat mass (kg)	5.13 (−0.87–8.55)	4.37 (0.32–8.60)		0.950	0.01
Lean mass (kg)	−2.84 (−7.29–2.21)	2.63 (−4.47–5.08)		0.134	0.21
Changes in Laboratory results, median (IQR)					
HbA1C	−0.10 (−0.20–0.00)	0.00 (−0.10–0.10)		0.231	0.16
Fasting Blood Sugar	0.50 (−2.54–8.40)	5.10 (−0.35–13.00)		0.195	0.19
Sugar					
Fasting Insulin	0.24 (−3.13–3.20)	0.58 (−1.41–3.58)		0.626	0.07
Total cholesterol	0.00 (−11.38–8.50)	5.00 (−13.00–20.00)		0.612	0.07
LDL	10.20 (−5.95–82.30)	2.10 (−11.10–12.95)		0.147	0.21
Triglycerides	−11.00 (−40.50–0.00)	4.00 (−13.00–33.00)		0.008	0.37
Iron	0.00 (−12.90–18.00)	0.45 (−22.00–23.70)		0.755	0.05
Uric acid	0.00 (−0.45–0.30)	0.40 (−0.20–0.80)		0.047	0.28
TSH	0.04 (−0.40–0.41)	−0.01 (−0.35–0.33)		0.665	0.06
T3	0.00 (−0.09–0.13)	0.06 (−0.07–0.11)		0.694	0.05
T4	0.57 (−0.79–1.05)	0.57 (−0.79–1.05)		0.261	0.16

Supplementary Table 7. Bivariate analysis of the Baseline and the Post-test Non-obese group characteristics.

Variables	Baseline Non-obese Group	Post-treatment Non-obese Group	P-value	Effect size (r-statistic)
Body measurements, median (IQR)				
Weight (kg)	63.0 (54.0–67.0)	58.5 (54.0–68.0)	1.000**	0.00
BMI	22.5 (22.0–23.3)	22.3 (21.7–23.4)	0.774**	0.10
Body Fat Percentage	25.0 (19.6–28.4)	25.4 (17.2–27.7)	0.332**	0.24
Fat mass (kg)	14.6 (13.1–16.3)	13.0 (11.1–15.3)	0.167**	0.40
Lean mass (kg)	46.4 (39.7–54.6)	44.3 (40.7–52.9)	0.648**	0.15
Exercising habits				
Sedentary lifestyle	0 (0.0%)	0 (0.0%)	0.013	
Slightly active	11 (61.1%)	9 (33.3%)		
Moderately active	7 (38.9%)	12 (44.4%)		
Very active	0 (0.0%)	6 (22.2%)		
Laboratory results, median (IQR)				
HbA1C	5.40 (5.30–5.65)	5.70 (5.50–5.75)	0.092**	0.39
Fasting Blood Sugar	93.50 (87.15–96.68)	89.90 (83.60–94.10)	0.910*	0.03
Fasting Insulin	6.24 (4.50 – 8.75)	6.63 (5.13–9.60)	0.115*	0.34
Total cholesterol	189.00 (173.00–213.50)	189.00 (182.50–218.50)	0.156*	0.33
Triglycerides	93.00 (71.00–121.50)	126.00 (88.50–151.00)	0.004*	0.64
Iron	88.80 (64.95–119.10)	96.10 (78.31–113.35)	0.900*	0.04
Uric acid	5.20 (4.50–6.25)	5.40 (4.59–6.05)	0.733*	0.08
TSH	2.55 (1.69–3.14)	2.84 (2.09–3.63)	0.021**	0.52
T3	1.06 (0.93–1.23)	1.10 (0.99–1.54)	1.000**	0.00
T4	8.00 (7.29–8.87)	8.01 (7.15–8.82)	0.963*	0.02

*: p-value was computed using the Wilcoxon signed-rank test.

** : he p-value was computed using the sign test.

Supplementary Table 8. Bivariate analysis of the Baseline and the Post-test Generic group characteristics.

Variables	Baseline Generic Diet	Post-treatment Generic Diet Group	P-value	Effect size (r-statistic)
Body measurements, median (IQR)				
Weight (kg)	81.0 (72.0–90.5)	85.0 (77.5–93.8)	0.063**	0.45
BMI	29.0 (27.7–33.0)	30.7 (28.2–33.4)	0.754**	0.13
Body Fat Percentage	35.7 (30.6–40.6)	35.6 (26.3–40.9)	0.093**	0.30
Fat mass (kg)	27.0 (23.9–34.7)	23.2 (20.0–30.0)	0.002*	0.61
Lean mass (kg)	52.4 (46.3–61.8)	58.7 (51.4–62.3)	0.405**	0.24
Exercising habits				
Sedentary lifestyle	4 (17.4%)	3 (13.0%)	0.076	
Slightly active	15 (65.2%)	12 (52.2%)		
Moderately active	1 (4.3%)	8 (34.8%)		
Very active	3 (13.0%)	0 (0.0%)		
Laboratory results, median (IQR)				
HbA1C	5.80 (5.65–5.95)	5.90 (5.70–6.50)	0.096**	0.35
Fasting Blood Sugar	98.10 (89.00–101.74)	93.02 (89.70–98.90)	0.648**	0.22
Fasting Insulin	11.82 (8.36–18.04)	10.67 (7.03–16.13)	0.824**	0.10
Total cholesterol	200.00 (179.00–216.50)	198.00 (176.00–214.50)	0.995*	0.01
Triglycerides	118.00 (93.21–144.00)	139.00 (113.00–180.00)	0.009*	0.53
Iron	83.75 (63.50–107.90)	76.45 (65.00–98.60)	1.000**	0.00
Uric acid	5.60 (4.25–7.15)	5.70 (4.35–6.85)	0.501*	0.15
TSH	2.94 (2.12–4.79)	3.22 (2.03–4.38)	0.824**	0.13
T3	1.07 (0.97–1.15)	1.02 (0.96–1.18)	0.850*	0.04
T4	8.80 (8.51–9.46)	8.65 (8.25–9.58)	0.167**	0.30

*: The p-value was computed using the Wilcoxon signed-rank test.

** : The p-value was computed using the sign test.



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