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ARTICLE New Paradigm in Nutrition Practice – Initial Findings From Ntuitive Software

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ARTICLE INFO	ABSTRACT
Article history Received: 4 March 2019 Accepted: 10 April 2019 Published Online: 31 October 2019	Objective: Nutrition practice in India has generally been confined to pen and paper with little use of algorithms and technology. Nutritionists in prac- tice find it difficult to go beyond macronutrient analysis for dietary intake or diet plans. Since nutrition practice requires lot of data processing, we de- cided to develop software to aid in these calculations and to empower nutri- tionist with technology enabled scientific practice using software. Method:
Keywords: Ntuitive software IFCT WHO and IAP growth charts RDA ASPEN NIN Nutrition Technology Diet plans	Ntuitive software was developed by a team of nutrition experts and tech- nologists over a period of 18 months. Data for nutrition experts and tech- nologists over a period of 18 months. Data for nutrition experts and tech- nologists over a period of 18 months. Data for nutrition values was sources from IFCT 2017 [6], RDA's were taken from ICMR guidelines and growth charts from IAP publications [7]. Design and coding of the software was done inhouse. Ntuitive database has over 8500 recipes and packed foods and has most of the national and international cuisine items. The software module enables client / patient management, detailed profiling, recording anthropometric data and plotting on WHO and IAP growth charts, record- ing food allergies and medical condition. The dietary recall be it one day, three day or seven day can be easily recorded and analysis of nutrients can be obtained for the same. The software is hosted on Amazon Web Server and applied as SAAS platform for practice. Result: 800 children and adults underwent analysis and consultation using Ntuitive software. All 189 mi- cronutrients could be calculated using the software and deficiency or excess quantified when compared with RDA. Conclusion: Nutrition practice can
	be made easy and technology enabled keeping in mind scientific standards. This helps in data collection not just in macro nutrients, but also in micro- nutrients.

1. Introduction

utrition sector is a continuously emerging sector and in today's world technology is rapidly making its way into dietetics practice. It is a fact that technology can radically alter the way nutritionists connect with their clients, discover new clients, and contribute to positive nutrition care. Technology can be a crucial asset in nutrition care if utilised to practice effectively in clinical or hospital settings either at an OPD, IPD or even at a private clinic level.

In many foreign countries like USA, Australia, UK, New Zealand, Canada etc nutritionists have aid to softwares which enhances their skill and are able to deliver better guidance. Nutrition practise in India is majorly limited to calculations using paper and pen. Appointments

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of clients are generally managed either through mail or phones or by maintaining diaries and it becomes difficult to keep a record of them. Even, medical records and follow up of patients at large are maintained on papers. Nutritionists utilise a major portion of their time maintaining and tracking data of their clients. Also, keeping a track of this huge amount of data becomes difficult when practice increases multiple fold.

With diverse flow of patients and clients, it becomes tedious and time consuming to calculate all the nutrient requirements, infact, even macro nutrients for each patient. The dietitian has to be all over google and refer different sources for obtaining authentic information with regards to specific nutrients found in food or nutrient rich specific foods. Easing out the calculations, hassle-free management of clients as well as finding authentic information under one roof will definitely be a boon to the nutritionists as that will save lots of time and resources and help them channelise their energy in providing efficient nutrition care to their clients.

Keeping this in mind, Ntuitive software was created by an expert team of nutritionists and technologists. After reviewing softwares like ESHA^[2], Nutrium^[1], and NutritIO^[3]; it helped the team to develop the software strategically. Taking the international software ESHA^[2] as a base, the team could start off with the basic designing of the software keeping the Indian scenario in mind. Nutrium helped in further developing the design which enhanced the way a nutritionist could function on the software^[1]. NutritIO, as well became useful to bridge the gap between patient and nutritionist by helping to understand how to converse with each other^[3].

Ntuitive is a perfect combination of nutrition and technology simplifying the work of multi-tasking nutritionists. Though similar softwares are present in foreign countries, with diverse culture, eating habits and food found all over India, there was a need to create a software catering to Indian data.

This software serves the purpose of practicing complete nutrition care at a click. Apart from processing a lot of saved data for providing nutrition care, the nutritionist is also able to utilise the same data in doing advanced researches.

2. Methodology

Looking at the urge of creating an all-rounder tool for the nutritionists, a meticulously planned and fully functional software was developed by a team of nutrition experts and technologists over a period of 18 months. Coding language used by technology department were HTML, CSS, Angular JS, Ruby on Rails, PosGres, Java Script, GitHub and AWS Cloud. Data was derived from authentic sources like IFCT (Indian Food Composition Tables) 2017 (for nutrient values) ^[6], Recommended Dietary Allowance's were taken from ICMR (Indian Council of Medical Research) guidelines and growth charts from IAP (Indian Academy of Pediatrics) publications ^[7] and World Health Organization ^[8].

The module of the software was designed to work in perfect coordination with the process of nutrition consultation .The various sections which were designed included:

2.1 Appointment Calendar

The software ensures smooth tracking of upcoming appointments as well as follow-ups and helps in managing clients easily across multiple clinics. The nutritionist can keep a track of patients or clients consulted in different clinics by creating multiple clinics. The patients can be classified into different clinics based on their medical condition.

It ensures that the nutritionist never misses any of the scheduled clients. Through the appointment calendar, it becomes a matter of seconds to handle appointments efficiently.

2.2 Client Management

This shoots out an easy accessible list of clients. Also, helps to segregate clients as per clinics. This functionality is quite useful in searching for a specific client from a huge list.

2.3 Detailed Profiling

Basic Information like Gender, Date of Birth, Height, Weight, BMI (Body Mass Index), Plotting on growth charts, Preferences, Allergies and Medical conditions can be recorded using this feature of the software. Specific Questionnaires can be prepared as per the client or the medical condition handled and utilized accordingly. This information could include fluid requirement, biochemical parameters, temperature, etc. and would be saved in the profile of the client. Multiple such questionnaires can be created which eventually can be very well utilized for analyzing data or could prove beneficial during consultation.

2.4 Recording Food Intake

There is an easy to use calendar interface to maintain food, water and activity records of the client as per date and time. This recall can be for one or multiple days. The clinical or other observations can also be recorded in the notes section for additional information to be associated with the client.

2.5 Configuring Recommended Allowances (RDA) of Nutrients

There is an option to choose appropriate and patient specific recommended requirements from the pre-listed formulae for both macro nutrients as well as micronutrients. Nutrition Atlas was referred to understand the range, sources and deficiency of each nutrient ^[5]. Disease specific nutrient requirement formulae can also be configured easily. The software allows the nutritionist to change the requirement as and when required. The default requirement adheres to Indian Council of Medical Research (ICMR) recommendations.

2.6 Analysis- Day-wise/Meal-wise of the Food Intake

Nutritionists spend most of their time in calculating micronutrients and disease specific nutrients. All 189 nutrients mentioned in IFCT 2017^[6] and NIN (National Institute of Nutrition)^[4] is calculated within seconds in Ntuitive. Multiple day recalls can be saved in Ntuitive and analysis can be obtained in a click. In the analysis section, the nutritionist is not only able to understand how much requirements are being met, but the nutritionist can also check the specific food sources from which the nutrients are derived. Detailed nutrient intake analysis across months, weeks, days, meal-times and food items is possible through this section. One can also view aggregated energy distribution charts for all or selected days. There is an option to create custom templates of nutrients for targeted specific analysis. The analysis can also be shared with the client through a shareable link.

2.7 Advanced Diet Planner

It is an experience to create diet plans adhering to RDA by adding foods or nutrient dense ingredients with real time charts. The nutritionist can make multiple menu plans (day-wise) and also meal-wise plans and save it as templates. These could be easily re-used in different combinations and permutations to create unique plan for each client without spending time on calculations. While creating these plans, the nutritionist gets a visual display of how much recommended requirements are met. The nutritionist have an option to provide 7 days diet plan to the clients or generic plans keeping in mind the convenience of the client.

2.8 Curating Specific Guidelines

Nutritionist can make guideline templates using this

feature of the software and save it for future use. These guidelines can be based on specific medical condition or some general instructions which need to be given to clients can be generated. Creating multiple templates for guidelines make the consultation speedy. These guidelines could be integrated directly in Client Consultation Interface.

2.9 Client Consultation

For consultation, a special interface is linked which can be utilized by the nutritionist to explain how much recommended requirements are being met. The nutritionist can also show client or patient the sources from where the nutrients are being consumed. This gives the clients a visual representation of their food and nutrient pattern and helps the nutritionist to self-educate the clients.

2.10 Sharing Reports with the Client

Nutrient reports can be generated based on the food intake documented and can be shared to the clients either by sending a message link or on email.

2.11 Information Centre

The most time consuming task is finding which nutrient is present in particular food ingredient or what are the richest sources of a particular nutrient. Ntuitive is a pool of such vital information and it's just a matter of few fractions to browse for the required data. This information is taken from IFCT 2017^[6] and NIN^[4]. The nutritionist can find the rich food sources of a particular nutrient or all nutrients present in a particular food ingredient.

2.12 Recipe Database

Ntuitive database has over 8500 recipes and packed foods and has most of the national and international cuisine items. The ntuitive database has recipes which are all standardized recipes created using nutrient values from ICFT 2017^[6] and NIN^[4]. With diversity in eating habits, recipes from all over India are found and are being added on day to day basis. The nutritionist can also create new recipes as per their need and share them with others. The software consists of many international ingredients and recipes which are sourced from USDA (United States Department of Agriculture)^[9].

The software is cloud based, meaning all the data entered in the software is stored in Amazon Web Server and applied as Software as a Service (SaaS) platform for practice. Hence, there is no limit in saving or creating the data and the data remains safe.

Also, each nutritionist can have their own account.

Each account information remains confidential and is not shared without the permission of concerned nutritionist.

The software can be used in multi-speciality hospital, with multiple nutritionists functioning and using the software. In this scenario, the chief dietitian can have all the rights to assign the clients to other nutritionist of the team.

After creating the software, we decided to check the functionality and feasibility of the software by conducting nutrition consultation for a sample size of 500 adults and children. The sample populations were residents of Mumbai, Thane and Navi Mumbai. The software was fruitfully utilized right from booking appointments to maintaining the patient profile, to feeding in the food intake as well as for doing final nutrient analysis and final consultation with the clients.

3. Results and Discussion

Nutrition consultation was conducted for a sample size of 500 children and adults using Ntutive Software.

Listed below are the detailed set of observations that we made about how the software was utilized step-wise to manage the entire process of consultation for the sample size mentioned.

3.1 Managing Appointments

The software was first used to manage appointments and first visit of the client. 500 clients could be easily managed using the 'manage appointment feature' of this software. Segregating the clients as per the schools or the clinics was quite easy. One could also search for a specific client easily either by putting up a contact number or search could be even performed by entering the first/last name of the client for locating the client account. Appointments could be added for current date as well as future dates. It thus, proved to be an easy tool to manage the appointments in a systematic manner. Listed below in Figure 1 is the appointment screen wherein all clients could be seen under a respective activity/clinic.





Once an appointment was booked, they were seen as



Figure 2. Scheduled appointments view

With client management as shown in figure 3, it was convenient to visualise the total number of clients. It even gave details of the last appointment and had a tab to schedule new appointment if follow-up was advised for the same client/patient.

Ø	Clients							+ Add Client
۲	125 Clients 🔳 🔳						Q. Swith	by name
۵ ۲	Asrachay Agrawal 4 yes 2 months, Boy tealse 8860087127 2014 Fates Appendent	9	Aarav Obsit 4 yrs 5 months, Boy Mole 9702284651 03 Sep 2013 Last Approximate	8	Aarohi Bhasker 2 yrs 6 months, Garl Maday 8452843910	Entration 19 Sep 2015	Aarush Ghule 4 yis 8 months, Boy Mobile 8097962806	Entri Dess 25 AM 2013
63 Ø	ABC XYZ 6 yrs 2 months, Ciri 1234567891 82 der 102 8 der 1234567891	۵	Abhinav Karkera 11 yrs 5 months, Boy Malie 9921015682 24 Oct 2006	8	Abhishek Chavar 12 yrs 1 month, Boy Mobie 8779465480	101 Tes 00 File 2005	Adhvíka Shiva Ku 30 yrs 10 months, Girl Muhle 9769900899	mar D
	Add Appointment		Future Appointment Invalid date		Future Appointment Invialid date		Future Appointment Invalid date	
8. G	Advait Agarwal 2 yrs 3 months, Boy Mobile Birth Daw 2335406827 Mit Daw 2015	8	Advit R 12 yrs 4 months, Boy Moble Birth Gase Settorhadds7 Birth Gase	2	Aillish Garg 7 yrs 7 months, Girl Mublie 7506/37141	C.	AISHANI SINCH 4 yrs 7 months, Girl Mobile 9744455600	Entri Data

Figure 3. Current data (personal details of the clients/patients)

3.2 Client Profiling

Diet Information			Child Information	
æ Veg - æ Egg	Chicken	🗷 Fish	First Name	Last Name
Dairy Products	Mutton	🗎 Beef	Jamshed	Anis
Cuisines Preference 1	Cuisines Preference 2	Cuisines Preference 3	Gender	DOB
Middle Eastern II	Kashmiri I	Indian III	Male Female	06-02-2000
Other Information			Parent Information	
Bowels	Water Intake	Numbers of meal	First Name	Last Name
1-2 times a day normal	2-3 litres	4-5 meals	Urmila	Bhise
Work / School Timings	Number of members at home	Oil used per month	Mobile Number	Email ID
9 am to 2 pm	4 adults + 2 kids	Rice bran oil- 2 to 3 litri	9769633037	udhaybhise76@gmail.com
Butter Used per month	Ghee Used per month	Sugar Used per month		
500 gms per monthh	2 kgs per month	2 kgs per month	Update	
	Biscults stocked at home	Outside food		

Figure 4. Basic Profiling

Basic profiling information like food and cuisine preferences was recorded. General details like bowel movements, water intake, and monthly consumption of oil, ghee, sugar and butter were also listed. Regular schedule of the clients were recorded along with eating habits.

Weight	Height	BMI <i>(as on 27 Jul 2018)</i>	Ideal Weight
59 kg	170 cm	20.42 Healthy Weight ~	62.72 kg

BMI Height Weight	Date	Height (cm)	Weight $\langle kg \rangle$	BMI	
29	dd-mm-39397				Add
28 27 26	27 Jul 2018	170 cm	59 kg	20.42	08
25 24	28 Jan 2018	168 cm	58 kg	20.55	0 11
22	28 Jan 2017	158 cm	50 kg	20.03	08
N 19	25 Jan 2016	146 cm	42 kg	19.7	0
	24 Jan 2015	139 cm	37 kg	19.15	0 11
15	23 Jan 2014	130 cm	31 kg	18.34	0 8
12	26 Jan 2013	126 cm	28 kg	17.64	0 11
5 6 7 8 9 10 11 12 13 14 15 16 17	19 Jan 2012	123 cm	25 kg	16.52	08
Age in Years					

Figure 5. Growth charts

Height, weight and BMI of the client or patient were recorded. For pediatric age group, 0-5 years, the height, weight and weight for height were plotted on the World Health Organization (WHO)^[8] growth charts and clients between 5-18 years were plotted on Indian Academy of Pediatrics (IAP)^[7]. These formulas were in the database which helped achieve easy calculation of the same. Ideal weight of the child was obtained by back calculation of Body Mass Index (BMI) on the system itself and the ideal weight of adults, was obtained by Broca's Index formula. There was a provision to enter height and weight for multiple visits.

Allergies						
Kiwi \times	Food Colors \times	Brinjal \times Coconut \times	Walnut X Pean	its \times		
Search by	name					
Cheese	Chickpea Flour	CMP Allergy Coc	onut Water Corn	Cucumber	Egg Fish	n
Food Addi	itives Gluten (Wheat, Oats, Rye, Barley)	Hazelnut Lactos	e Litchee	Milk & Milk p	roducts
Monosodi	ium Glutamate (MS	G) Mushrooms M	Iutton Pineapple	Pine nut	Pistachio	Poppy Seeds
Sago Khic	hdi Sea Foods	Sesame Soy	Strawberry Tree	nut		
Undate	e No know	n Alleroic				

Figure 6. Selection of allergies

Food related allergies also could be selected. This allergies were highlighted as red alerts in the diet plan, which indicated the nutritionist to avoid the recipe having the allergic ingredient while making the diet plans.

Search by name						
Acute Gastroenteritis (AGE) Acute Resp	ratory Distress Syndr	ome (ARDS)	Anemia (Low hen	noglobin) A	rthritis
Asthma Atopic D	ermatitis Atrial Se	eptal Defect (ASD)	Attention Defic	it Hyperactivity Syr	ndrome (ADHD)	Autism
Calcium Oxalate Calcu	li Cancer Ca	roli's Disease C	eliac Disease	Cerebral Palsy		
Chronic Kidney Diseas	e (CKD) Chronic I	iver Disease Cle	eft Palate Cr	ohn's Disease	Cystic Fibrosis	
Delayed Development	Dengue Shock Sy	ndrome Diabete	Down Syn	drome Dyslip	edemia Epi	lepsy
FTT G6PD Deficie	ency Galactosem	a Gastro-esoph	ageal Reflux Disea	ise (GERD) G	eneralised Weak	ness
Gestational Diabetes (3DM) Heart Dise	ise Hodgekin's L	.ymphoma H	lypertension	Hyperthyroidism	
Hypothyroidism H	Hypovalemic Shock	Inflammatory Bow	el Disease (IBD)	Irritable Bowel	Syndrome (IBS)	

Figure 7. Selection of medical condition

Medical condition can be selected and added as a part of basic profiling.

Add New Question from Questionnaire		
Fever	Obesity	- Underweight
Food Allergy	Food Intolerance	Lactose Intererance
Celiac Disease		

Figure 8. Selection of questionnaire

Questionnaires could be created and saved with reference of disease or medical condition name. The questionnaire could have biochemical parameters, intake and output questions etc. Below is the image of questionnaire created for fever template.

Temperature :	Water Intake :	Symptoms :
		Nausea Vomitting Heaviness in the head Loose motions Constipation Sore throat Throat dryness Nasal congestion
Which medications have you or your child taken to lower the temperature? :	How frequently is the child eating? :	What medications is the child on? :
	Does she/he feel nauseous after eating? :	How well is she/he esting? :
How many days she/he has been ill? :	Any blood test done recently? :	
	CBC Malaria Dengue	

Figure 9. Condition specific questionnaire

Multiple sentences, paragraph, multiple choice can be added while making the questionnaire. This feature assisted us with collecting more information about the client.

3.3 Maintaining Client Food Diary and Notes

The software was quite user-friendly in terms of entering the food recalls for the sample size chosen for multiple days. We took recalls majorly for 7 days, however depending upon the data received, some clients even chose to give data only for 3 days or 5 days. Day-wise meal entries, water intake and activity data for the clients was added using this interface section of the software. There was an option to enter a date, time as well as select a specific recipe from the list of recipes found in the master database. One could choose the quantity and the portion size of the food consumed.

Figure 10 shows steps on selection of a date and selecting from the option of adding meal, water or adding activity for the client.

ଜ	23 Feb 20 (Another Clin	18.14.14.PM × c	alendar Sugg	ested RDA Analysis	Diet Plans Consultation Guideli	tes Reports		End Visit
-	<	FEB 21		FEB 22 THU	FEB 23 FRI	FEB 24 sat	FEB 25 SUN	>
8		Add Entry		Add Drifty	Add Entry	Add Entry	Add Entry	
	WATER INTAKE			ن Meal				
	06 AM- 09 AM			👌 Water Intake				
ណ៍	09 AM - 12 PM			e-e Activity				
ß	12 PM - 03 PM							
ø	03 PM - 06 PM		5:25.pm Del Tadk	a - 1.0 Medium Katori	3:20 pm Chole Poeri - 1.0 Serving			
8 0			5:00 pm Moongdi Alino Par	al Idli - 1.0 Large				
&			4.22.pm Vegetabl	e Cutlet - 1.0 Small				
G	05 /94-							

Figure 10. Food diary calendar view

Further clicking on the meal option, another pop-up box (as shown in Figure 11) to fill the details of the timings, food consumed and the portion size was available. The steps were repeated to add the intake for a full day/ multiple days (as shown in Figure 12)

05-Mar-2018									
Name	Serving Unit	QTY		Energy	Carbohydrate	Protein	Total Fat	Calcium	Phosphorus (P)
9 am 0	Kanda Poha		otv:	1	Plate -	Small (4	5.0 am)		Add

Figure 11. Selection of food item to fill food diary

	Name		Serving Unit	QTY			Energy	Carbohydrate	Protein	Total Fat	Calcium	Phi
00 am	Milk (Cow) - With Sugar Small Glass		Small Glass	1.0	R		88.9	8.94	3.26	4.48	94.4	57.
00 am	Kanda Poha		Small Plate	1.0	8	•	134.11	17.6	1.7	5.75	15.58	33
1:00 am	Musk Melon		Regular Cup	1.0	8		23.18	4.24	0.42	0.35	7.84	8.6
-												
hh	am Ø	Enter food iter	70	(aty:			Select Unit		~	Add	1

Figure 12. Recording food data

This is how a calendar looked (as in Figure 13) after filling in meal details for 4 days. One could go back and edit meal/water/activity options as per need.

<	04 50	05 805	06	07	08
	And Damy	Add Drop	AM Dray	Ant Dravy	Ambrey
all a					
9.68°-					
9.408- 2.794		13.3E.att Pg. 1.3 Norther 16.3B att Pediamer - 3.3 Scherpton Note an Simply Seed Owan Dackar(Park): 1.0 Norther	1100.en Pg. 13%onter	12.02 am Pagaya -5 4 Small Cop 33.03 am Palitanara -3 Folderquise 34.04 am Atmande -3 5 Touritor	1102 an Pig-2-3 Norder Almands -4.3 Number
2 MA- 0 MA		1.88 pm Rev - 2.8 Motion Book Re Bel - 19 Motion Sout Cautione Reg - 1.5 Smither Cautione Reg - 1.5 Smither Cautor 1.0 Smith	5.00 pm Rice - 2.0 Small Bowl Degeti-1.0 Medium	3.88 pm Chaptel: -10.5 mult Public Parater -(3.95 Small Road Road: 9 Small Road Moong Dat Curry - 2.8 Small Road	3.00 gan Diagoni - 1.0 Smith Mis Vegetable (otheat accend): 1.0 Smat Book Diganet Rober - 3.0 Smith Rober Vegetable Pulae - 3.0 Smith Rober
to Par- to Par		8.28.am Chapati 1.0 Miclum	620 am Mult Melon - 1.9 Texplor Cop	ABLassi Chapati -1.0 Medium Olice -1.0 Tablequeri Bagar -1.0 Tablequeri	Allian Muthi Soul - 10 Large Root
11.794 - 17.794		730 pm Groundrut Childi - 13 Piece	6.00 pm Reseted Charse: 1.0 Minister Store	2.00 pm Regins Later - 1.2 Number	
0.7M- 2.4M		9.30 pm Genet Paralles - 1.0 Smull	32.00 pm Chapeli 1.0 Lorge Mage: 1.0 fabrication Ofee: 2.0 fabrication 520.00 Regins Lates: 1.0 humber	1000 pm Figs Online (Without Toggins) - 1.0 Westwork Obspatil - 1.0 Large X00 pm Reserved Alternated - 1.0 Yearsteer	1007 pm Tur Dali 1.15 Small Kateri Kaping doma Bingli - 3.15 Small Kowi Chapati - 1.0 Large 2005 pm Kao Parti - 1.0 Kening
2.48					

Figure 13. Food diary overview

We could also add different notes about client, their meal patterns and specific requirements in notes as shown in figure 14 below. These notes were quite helpful to add on more information about the client that was utilized appropriately during the diet planning as well as the consultation process.

0	Disha Bagadia muyo Syn Louidh, Gol Bow Pusta v 20 kg	Trops 200 (non-24.67.2018) tour Brogst. Attempt to 150 cm 15,54 (second) 4 = 31 kg. Not extend yet v	Medical Condition Dispeties ~	Outreformation 0.718 Nove Add Neve	3
ŵ	O 19 Jan 2010 23 23 PM Collevia	Notes			End Ved.
	Dat Plans Denaric Plan (18 Day Plan	Biasting- 5-6 pm and she gets a timeli of 5 mins to have water to Physiketers 19 Jun 2010 2014 PM		Add Note	0 0
	Day 1 / E				
	IT Builde				
				C Add as Action	

Figure 14. Notes section

3.4 Working on Formulae/Suggested RDA

The default formula set in the database was as per RDA. Suggested RDA is seen in the analysis while comparing client's meal intake. However, formulas/ RDA could be changed/edited as per client case/medical condition by clicking on edit as shown in Figure 15. Being easy to edit the formulae made it ever more easier to generate the analysis at the click of a button.

SUGGESTED RDA			
Degr ()	rda,eroliejenergij-300	5#	
Putein ()	weight * 1	ter .	
Insifter 0	weight + 8	ter	
Catolydate ©	(suggested_rds_writies[energs] * 0.55) / 4	5A	
Tealfie ©	(supported_rds_entries(energy) + 0.25) / 0	ter .	
Soluble Fiber 💿	(supported_role_entries(total_fiber) + 0.06)	ter	
Insoluble Fiber 💿	weight + 5	Ext.	
Wanie K	67.5	ter .	
Retired ()	0.008	ter	
Tranine(R1) ©	14	5at	
Rodain (82 0	1.6	ter	
Nacio (82) O	16.0	ter	

Figure 15. Suggested RDA

3.5 Analysis of the Food recall

Once a multiple day recall of the client is taken, the analysis per day was calculated under Analysis tab. The calculations were based on food items entered during recall. The percentage shown in figure 16, next to the intake, indicated the deficit or excess quantity of the specific nutrient. This analysis was shown for all the 189 nutrients listed in IFCT 2017^[6]. This section could help us keep a tab on the range of nutrients coming from the diet on a daily basis.

AWALYSIS BY	Day 4	Herarchy				 Healthy & Fe 	Need Improvement	Health Risk	DEFAULT	~
		Protein	Total Fat	Total Fiber	Carbohydrafe	Energy	Calcium	Phosphorus (P) Iron (Fe)	Vitam
> Wet, 00 Jan 18	h.	35.02 4395	29.78 4.29%	5.91 4.80%	55.71 4.74%	651.31 4 .55%	291.27 4.51%	289.89 4455	2.98 4425	508.9
> Thu, 04 Jan 18	la.	50.80 47%	87,87 +1184	19:07 4:225	112.94 4 475	1503.37 🕐	432.21 4-285	635.30 +44	6.71 4.67%	829.9
> FI(05Jan18	b.	10.12 1474	112.68 +1805	21.20 4 29%	503.08 +1014	343438 +137%	728.75 +21%	574.03 44%	6.50 4 614	294,5
> Sat, 06 Jan 18	h.	54.08 41%	123.45 +2576	30.05 🕈 7%	214.32 🖕 1%	2502.34 +75%	37625 4376	421.66 433%	7.35 45%	819.7
> Sun, 07 Jan 18	la.	41.22 4244	55.45 + 38%	19:57 4:225	203.51 👍 🗛	1584.02 +95	358.96 440%	377.47 4375	5.02 \$706	517,82
> Mon, OE Jan 18	b.	2150 4414	42,70 105	23.55 4274	142.09 4.09%	1139.82 4275	177.83 470%	421.21 4.30%	4.35 4.74%	775.80
> Tue, 09 Jan 18	la.	39.80 4274	65.41 +62%	1907 4395	155.79 4 2P	141426 42%	367.72 4 29%	362.96 440%	621 4474	734.2
> Wet, 10 Jan 18	b.	22.44 45%	25.54 4 34%	12.13 4 .6%	14192 4344	974.48 4395	654.39 +9%	520.31 4135	5.70 4 66%	62,80
> Sun, 14 Jan 18	le.	3.42 4.945	4.53 4.8%	0.45 4.99%	15.90 4.90%	118.07 4425	100.45 4874	60.05 4 90%	0.32 4 98%	10.94

Figure 16. Food diary analysis

Further this could be divided also into meal wise and food wise calculation on clicking the drop-down arrow. as shown in figure 17. That helps the nutritionist to study meal wise and food wise distribution of nutrients.

ANALYSIS BY Day	Hierarchy				 Healthy & Fit 	 Need Improvement 	Health Risk DEF	AULT	~
	Protein	Total Fat	Total Fiber	Carbohydrate	Energy	Calcium	Phosphorus (P)	Iron (Fe)	Vita
- Wed, 03 Jan 18 📗	35.02 \$36%	29.78 4-265	5.91 4.80%	55.71 4.74%	651.21 4 55%	291.27 4.51%	289.89 4 52%	2.98 4.82%	508
9.00 am	10.68	4.64		4.94	104,55	98.27	68.98	0.24	10.9
Boiled Egg white	7.42	0.16			31.58	3.87	11.04	0.09	
Milk (Cows) - Without Sugar	3.26	4.48		4.94	72.97	94.40	57.94	0.15	10.1
12:00 pm	3.25	4.41	0.66	9.75	94.08	52.01	32.05	0.27	15.3
3:00 pm	2.47	5.14	3.01	19.71	144.26	18.20	41.71	0.62	18.4
7.00 pm	4.86	9.29		15.43	171.29	92.80	44.57	0.36	12.0
9:00 pm	13.76	6.30	2.24	5.88	127.13	29.99	102.58	1.49	450

Figure 17. Meal wise analysis

The nutritionist could also select the number of days and find out how much requirement the client is meeting. Only specific days could also be selected from a whole lot entered to analyze nutrient ranges in a particular period.

ANALYSIS BY Day 4	Hierarchy				 Healthy & Fit 	 Need impr 	overneet • Heal	n Rok	DEFAULT	
	Protein	Total Fat	Total Fiber	Carbohydrate	1 4 Days Select	4				
Wed, 03 Jan 18 🗶	35.02 + 36%	29.78 4.25%	5.91 4.80%	55.71 4 .74%	Energy D	stribution				
Thu, 04 Jan 18 🗮	50.00 47%	87.87 +118%	19.97 4325	113.94 4485		45.60%		1.58%	41.82%	
Fri, 05 Jan 18 🖿	80.62 +45%	112.68 +180%	21.20 4 29%	503.00 +131%		Carbs		Protein	Fats	
Sat, 06 Jan 18 🖿	54.08 41%	123.46 + 207%	30.05 +0%	214.32 +1%	Nutrition 7	iane RD	Com	uned	Revel 1	
5un, 07 Jan 18 Im	41.22 + 24%	55.45 + 38%	19.97 4.325	203.51 445		otein 54.3	6 55.13 NT	4.15		
Mon. 08 Jan 18 Jan	29.50 4.45%	42.70 + 6%	23.56 4.215	142.09 4.39%	14	1 Fut 40.3	88.45 220	+ 120%		-
Top (1) inc 10 has	10.00 4.775	15.0 4.03	10.07 4.945	155.70 4.705	Total	'ber 30.0	0 79.28 64	4.36%	_	
				10075	Catoly	trate 217.5	0 221.76 M2	+ 7N		
Wed, 10 Jan 18	23.44 4 57%	26.54 4.34%	12.13 4.00%	143.92 4345		ergy 1450.0	0 2022.97 140	+ 405	_	

Figure 18 Analysis in comparison with RDA

The graphical representation can be obtained for one or more days. Figure 18 shows graphical representation for 4 days.

3.6 Diet Planning

Effective diet Plans could be created quite easily for the clients along with real time correlation with RDA using Ntuitive.

Meal wise diet plan entries could be done with suggested individual food item along with serving size and simultaneously nutrient's value could be checked for individual food item compared to RDA value as shown in figure 19.



Figure 19. Creating Day wise diet plans

Diet plan could also be customised based on disease specific nutrient calculations by clicking on 'Default' (shown in figure 20).

+ Add New Meal	Done	inp	ort day p	slan from list									
IREAKFAST - 09:00 AM				Remove Meal 5		Template	ANALYSIS				DEFAU	ur	Ŷ
							Energy Distribut	tion					
igg Omlette	-	1	+	Medium (50.0 gm)	~	0		47.23%		34.49%		38.18%	
duttionain Chanati	-	2	+	Small (45.0 gm)	~			Certra		Protein		Fars	
						-	Nutrition Name	RDA	Con	uned		Neval	
itilk (Cow) - With Sugar	-	1	+	Medium Glass (200 m	0 ¥		Protein	54.38	16.51 30	+ 795	-		
Type food item name			crame	Add Meel Plan			Total Fat	40.28	29.34 48	+ 525	-		
							Total Fiber	30.00	6.51 22	+ 78%	-		
							Carbohydrate	217.50	\$3.94.25	+ 755	-		
							Energy	1450.00	411.22.33	4.6%	-		
							Calcium	600.00	182.90 30	4.75%	-		
							Phosphorus (P)	600.00	201.87 44	4.98N	-		
								17.00			-		

Figure 20. Entering meals in the diet plan (Left) and nutrients values (right)

Meal plan templates could be saved by making a meal plan and then saving it as 'Save as Template' along with adding a name to the meal plan. Examples of template name can be Protein Rich Breakfast, Low Carbohydrate Snack, etc. List of saved meal plans could also be viewed as shown in figure 21.

Ø	Meal Plans	MERL PLANS DAY PLANS
ଜ	Meal Plans	(G. Brunh. + Add Med Plan
ro.	New	
8	Title	🗅 Configure 📾 Enlinte
E	Breakfast	D Configure @ Delete
	Bruskfast-Protein	Configure @Debrie
	Colour Rob Spark	Configure @Delete
80	Templates	Contigure @Delete
ø	Med Plans	Dionitare @Serve
\$E	Day Plans	Configure @Denne
	ack Nutrients	Configure @billine
	ark .	Configure @Delete
	Ouidelines	() Configure @ Delete
	Questionnaire # Meal	Configure @Seletie
	High Protein Meat	C Contigure @ Devene
	Vitarisin C Rich Drok	Configure @Swinter
	Omega 3 Fata Rich Snacks	D Configure @ Subrie
	Polassium Rich Bracks	Configure @Seletie
4	Omega 3 Fata Rich Mid meal	D Configure @ Dates
~	Colores Table Testant	O Conference & Debute

Figure 21. Sample Meal Plans

Entire Day Plans could be created and saved as templates too. To make a new day plan, click on 'Add Day Plan' and give the desired name of the template as shown in figure 22. Example- Lactose Free Diet, Ketogenic Diet, Low Carbohydrate Diet, etc.

Ð	Day Plans	NEAL PLANS DAY PLANS
	Day Plans	(Q. Sourch + Add Day Pla
	New	
	Gluten Free Det	D Configure (D Delete
	Low Carbolydrate Meal	D Configure (D Dente
	Lactone Free Dat	D Configure D Deinte
	Service San Flat	() Configure () Delete
	Templates	D Configure D Defete
	Med Plana	D Configure D Detrie
	Day Plans y Plan-1	D Configure D Delete
	Mart	D Configure D Detete
		D Configure D Deter
	Outdrives	D Configure D Deter
	Questonnaire	D Configure D Seine
	Ketingenis breakfaut	D Configure D Belate
	Day! Case Study 1	D Configure D Delete
	heth	D Guildgure D Dente
	Keto-Carl – 4:1, 790 kcal, 14 kg, 2 year old	D Configure D Deleter
	culture	() Configure () Evide

Figure 22. Sample Day Plans

The option to save Meal Plans and Day Plans as template was a boon as one could easily replicate individual client based diet plans extracting these saved templates. Diet plans made could be saved in .pdf format and mailed to the client or could be printed and given to the client as a hard copy.

3.7 Curating Consultation Guidelines

This section helped the nutritionist to prepare structured guidelines based on individual nutrients. These could be tailor-made for the specific client based on the food diary analysis, food habits, activity level, food allergies/intolerances and medical conditions, if any (collated during basic profiling).

Guidelines could be created either by creating templates and saving them to edit later and utilise specific to case of the client (as displayed in figure 23)

_	Guideline I	mpates		
	2 Guideline Ten	splates		+ Add Template
	-	Germanite	has	
	Znc (21)	Have adequate water Have more protein less carbs	water, hydration	2.0
	Protein	Include first class protein is your dist. They are an follows: egg, milk and relk products, poultry and fish.	First class proteins	P . B .
	Templates			
	Mediliana			
	Day Plans			
	Nutrients			
	Guidelines			
	Questornaire			
	Outletimes Questionnaire			
	Questionnaire			
	Questionnaire			
	Questionnaire			

Figure 23. Guidelines templates

or they could be directly written in the client profile after analysing the report (as in figure 24)

PhysiCations (Arother Disc) Calendar Buggenhed RDA Analysis Diet Plans	Consultation Guidelines	legorla	
SUDCLINES	Edit Position	ADD GUIDELINE	
Probation Proceeding of the experiment in source dust. They are an follower, any, mills and milk products, analysy and fait.	1.1	Salad Fran Templates Scarch by Izge	
		Or add new	
		Rudwid	
		bled v	

Figure 24. Final Guidelines

These saved guidelines can be referred to during one-to one consultations as they are integrated directly in client consultation interface or could also be shared with the client by clicking on 'Print icon' option at the top of the tab as seen in the figure 24.

One could also select individual nutrient and write guidelines pertaining to that nutrient by clicking on 'Nutrient' option to create nutrient specific guidelines as shown in figure 25 and figure 26.

Thus, a lot of time was invested in creating templates and later quickly editing them to make them more client specific.

Add Template	×
Page 194	Num
Type outrient name	
Compriseda	
Tags	
Add comma() separated tags.	
	Save

Figure 25. Nutrient wise guidelines

Add Template	×
Notest	Name
P	
Protein	
Phosphorus (P)	
Potassium (K)	
Copper (Cu)	
Sulphur	
Total Poly Unsaturated Fatty Acids (TPUEA)	
Alpha Tocopherol	
Beta Tocopherol	
Gamma Tocopherol	
Delta Tocolpherol	See.
Partotheric Acid (85)	
Capric Acid (C10.0)	

Figure 26. Nutrient wise guidelines

3.8 Generating Reports and Client Consultation Interface

Reports tab (refer figure 27) was one of the most important tabs since it showed the total nutrient analysis of a client's recall. This tab helped to understand which macronutrient or micronutrient the client is deficient or excess with. On the basis of these findings, one could create guidelines or new diet plans for the client.

NUTRITION REPORT OF	Macronutrients
age height weight 18.0 yrs 168 cm 58 kg bmi (body mass index scale)	Energy Recommended Energy Consumed 1450 kCal 2352.8 kCal ↑ 42% Excess ENERGY FROM Carbohydrate Protein Total Fat 322.91gm 58.9gm 82.55gm
ZU.55 C143 H3-724 24-24 - 25 Under Normal Over Cheve	↑ 25% BDA- Excess 54.38 gm ↑ 25% Normal 50% - 60% of Energy of Energy Recommended per day per day
Calcium RDA 600 MG (1 4% Exces) Very Low Low Normal High Very High Sources Recommendation	Vitamin 812 RDA 1 MCG 152000 [1 57% 5008] Very Low Low Normal High Very High Sources Recommendation
Phosphorus (P) RDA 600 MG (11123/g (1 8% Exces)) - Very Low Low Normal High Very High Sources Recommendation	Zinc (Zn) RDA 12 MG Sking 2 55% Detail Very Low Normal High Very High Sources Recommendation
Total Fiber RDA 30 GM 37,21gm (* 24% faces) Very Low Low Normal High Sources Recommendation	Total Folates (B9) RDA 100 MCG 102,972ng [Homd] Very Low Normal High Very High Sources Recommendation
Iron (Fe) RDA 17 MG 1275mg (J.25% Mefat) Very Low Normal High Very High Sources Recommendation	Omega - 3 Fats RDA 1600 MG 33272mg (47% belick) Very Low Normal High Very High Sources Recommendation
Vitamin C RDA 40 MG (4.94mg (* 22% Excess) Very Low Low Normal High Very High Sources Recommendation	Sodium (Na) BDA 1500 MG 245131g (155% Excess) Very Low Low Nomal High Very High Sources Recommendation
Vitamin A RDA 4500 MCG Very Low Low Normal High Very High Sources Recommendation	Potassium (K) RDA 4700 MG 711 Ang (3-4% before) Very Low Normal High Very High Sources Recommendation

Figure 27. Mobile report

If any of the nutrients displays deficit/excess, one may choose to view the sources of food from the individual's diet which contribute to that nutrient. The values or percentage of excess and deficit of each nutrient are set by referring values given by ASPEN guidelines. These nutrient values are derived from the food consumed by the client, taking into consideration the absorption of each nutrient in different food groups.

To view the individual nutrient sources, click on the right side of the report which opens up a consultation interface as seen in figure 28 and 29 to check which foods contribute to which amount of the selected nutrient.



Figure 28. Nutrient wise consumed sources

tergilate View DEFAULT	¥		Malty17: Mail reported.
RectEN	Total AT	total FBER	CabboHIBAITE
Normal		24% ↑ Down	Normal
Reconnected Consume		Meconemote Domaned	Reconvector Concared
5438pm 5438pm		28ge 37.23ge	2113gen 2013gen
EVERUY	CALDIAN	Receivers (P)	E RON (FE)
62% tourns	66% + Exemi	85% tower	25% 4 Data
Inconnected Consumed	Nacimitation Circuited	Necessaria	Reconvect Constant
1488wal 2002.Wool	400mg Mick20mg	Stating 1112.23mg	17mg 11274mg
VITAMIN A	TOTAL POLATES (04)	VTANKC	SCOLUN (NA)

Figure 29. Nutrientwise Food Sources

One can also choose the nutrient whose sources want to be viewed by clicking on the nutrient. Figure 30 shows the sources of nutrient. This can be easily transmitted to the client during consultation. This gives the client a reality check of the food sources and their exact nutrients being consumed which further assists in smooth consultation process and making the client understand where the diet should be exactly worked on.

Normal	Recommended 54.38gm	Consumed 58.9gm
Source		Recommendations
Margherita Pizza	43.9% / 25.83gr	1
Tur Dal	8.6% / 5.04gr	
Rice	7.6% / 4.45gn	•
Milk (Cows) - Without Sugar	6.9% / 4.08pr	•
Chapati	6.3% / 3.70gn	
Aloo Paratha	6% / 3.54gr	
Alu Dhaji	5.6% / 3.30pr	•
Acced Kinel Strawbarry Milkebak	5 15 / 2.00m	

Figure 30. Food sources

Disease specific nutrients and nutrient related sources could also be viewed using the 'Template View 'option shown in figure 31 on top of the sources screen to select a specific disease and view only the disease specific nutrient and nutrient related sources. This certainly took off a burden off our shoulders to easily concentrate on more case-specific nutrients specially for certain disease related clients from the huge sample size



Figure 31. Condition Specific Nutrients

3.9 Knowledge Centre

This section could also be referred to as information pool since it includes sources and RDA of definite nutrients as well as specific ingredients all at one junction. Select a specific ingredient or nutrient to find more about it at the click of a button.

(1) Nutrient Knowledge Centre:

Total 189 nutrients are listed in knowledge centre as seen in figure 32

0	Nutrients			
8	Q. Seat by same			
	Energy	Carbohydrate	Protein	Total Pat
	Calcium	Phosphorus (P)	iron (Fe)	Vitamin 0 - (00)
	Vitamin 812	Total Fiber	Soluble Fiber	Insolutile Fiber
	Omega - 3 Fats	Sodium (Na)	Potassium (K)	Zime (Zn)
	Total Folates (BTI)	Witamin C	Vitamin A	Cholesterol
	Otromium (Dr)	Magnesium (Mg)	Copper (Cu)	Cystine
	DHA	Polic Acid (Pree)	Fructooe	Glucose
	Glycine	Holdne	todine	Isoleucine
	Leucine	Linoleic Acid (C18:2n6)	Lysine	Mahooe
	Manganese (Mn)	Methiosine	Moisture	Nacin (83)
	Pherylalanine	Proline	Ribofavin (82)	Succese
	Thiamine (B1)	Threenine	Total Free Sugars	Total Mono Unsaturated Fatty Acids (TMUFR)
	Total Poly Unsaturated Fatty Acids (TPUFA)	Total Saturated Fatty Acids (TSFA)	Trans Fat	Tryptophan
	Tyrosine	Value	Vitamin 86	Vitamin (
	Vitamin K	Total Qualate	Phytate	Alanine
	Arginine	Beta Carotene	Glupernic Index	Glacewic Load
	L-Camitine	Ondere	Chilorine	Econadianois Acid (C20.2)
	Crebalt .	Cadroken (Crit	(a) Capachin	() Maliocater his salists

Figure 32. Knowledge Center

Each nutrient has information listed about its chemical nature, functions, rich food sources, cause of deficiency, treatment, toxicity, digestion and absorption, signs and symptoms, RDA for different age groups and ingredients with grammage of that specific nutrient as seen in figure 33.

monopolen - anteres - tensolear Energy						
Decymunate assessed regularly streagh float to reset the results for the body source is it is of prime in described as the resp. reliais assessed from the dimension for the source resp. Source is a heady measure late type reserves assessmed on the dimension of floatess in the second or MAN. The results are write the result source of the source is required as the second or MAN. The results are write the result of the results of the source is a source of the results of the results are write the result of the resp. and the additional heady of resp. Also measurements energy is a the source of the results of the results are write the results of the dimension of the results (of the results of the results of the (body + 104 (floates(b))).	portance for nest activity and provers. Animalia and hu- person of a softnet age, geneer, weight height, and its asi metabolism for a given age and sex is taken as the citized for minimal activities like sitting, studying, walk mesaurement which mesaures energy in terms of me	mans procure energy by consumi real of physical activity in onlowen attaining point for calculating their ing etc. Quantitative food require chanical work. Food energy in kilo	g plants and the fles and pregnant or lact ctal energy requirem rents are usually exp oules (ku) can be cor	in of other an etting women, erc of individ resised in ten rverted using	imais, brergi energy requir uals, Activity i ms of energy, phe formula	requirement is ements are notuding (a. Calories One Kilocalorie
BETALS	INGREDIENTS Q. Search by same		REA ENTRIES			~
Chemical Nature						
The three macrounders fauld in find which provide aways to the long are calcularlystem. Bittings for earny sind, and and nation to be some parating units for finds and in our of anyon paramities of of a angle-nation. How sciences for the centers are sind and in the finds and in our dot angles to a sind find of earny and the sind RN-many pointer about anyon of SN-DN of the dott and in anyon RN- many in the disk bosons. At a similar bound anyon anyon of SN-DN of the dott and the DN of the similar angles in the SN-DN one of the angle for these anotypersons may simple that is disk to disk the similar and similar and similar and similar and similar and similar and the similar and the similar angle and the similar and similar and similar and the similar and the similar and the similar angle and the similar and similar and similar and the similar and the similar and the similar angle and the similar and similar and similar and the similar angle and the similar and the similar angle and the similar and similar and similar and the similar and the similar and the similar angle and the similar and similar and similar and the similar and the similar and the similar angle and the similar and similar and similar and the similar and the similar and the similar and the similar angle and the similar and similar and similar and the similar and the similar and the similar angle and the similar and the similar angle and the similar and	Ingradients Name	Walker (Friday)	Garalar	App (r)	TEAps (in web)	Value
	Mutjella, dried	7240.0	Boy	12	36	1000.0
when food a metabolized.	Stvimp(small dried)	4204.0				1100.0
Functions	Parsey dried	2291.0			78	11111
Every is needed for all the adjusting outprocesses in the body which include manteneous of hody times and body temperature, by growth and dark to be playred and meta-activity as well as reproduction. Decays is sequelated for the playrest anxiety of the infoldant which dependent approx for the type of an infoldant's comparison information dependent playrest anxiety of the infoldant which dependent approx for the type of an infoldant's comparison information dependent playrest anxiety and the second	Terrildint	1887.0	Bey	72	108	1990.0
	(approximate)	1201.0	Boy	108	144	2190.0
readed for involuntary actions such as body maintenance (Basal Metabolism) which includes expansion and compation of hear, requirator, blood circulation, absorption and excretion, digestion and chemical reactions that	Tartoor	1072.0		144	140	1782.4
accomplain synthesis and maintenance of body tissues, electrical conduction of nerve activity and heat production to maintain body temperature.	(bee(Buffalo)	900.0				
Rich Foods	Conking of	400.0	Boy	180	264	3028.0
Carbohydrama, Promina and far in the data are the prime energy yielding components. Hence the foods rish in these macronuments provide good around of energy which include "Careal gains and their products/Rise. Wheat, Jover,	the second difference of		Boy	204	216	9020.0
Ray, Baya, Roo Fales, Hheat Face, etc) 2) Pulses and legarnes (Bergal pain, Black grain, Green pain, Red grain, Raynah, Scyalesans, etc). 2) Sugar, Jaggery 2) Fales Red Surtar, gheat and other scoking usis, etc.	rivarigenance os(fortified)	400.0				
Causes Of Deficiency	(tee(cow)	900.0				

Figure 33. Knowledge center

(2) Ingredient Knowledge Centre:

Around 800 ingredients from IFCT ^[6], NIN ^[4] and USDA ^[9] are present in the ingredient sheet. A gist of ingredients can be seen in figure 34.

Ø	Ingredients				
	(Q, depend by name				
	Agathileaves	Allami	Almond	Alexa	1
	Amaranth leaves, green	Amaranth leaves, red	Amaranth leaves, red and green mis	Amaranth seed, black	
	Amaranth seed, pale brown	Amaranth spinosus, leaves, green	Amaranth spinosus, leaves, red and green mix	Amaranth stern	
	Amaranth tender	Ambada	Ambat chuka	Arria	
	Androny	Apple, big	Apple, gream	Apple, small	
	Apple, small, Kashmir	Apricot, dried	Apricet Bresh	Apricut, processed	
	Arecanut, dried, brown	Amcanut, dried, red color	Arecanut, fresh	Ari fish	
	Arisittippili	Amow root flour	Artichoke	Asafoetida	
	Ash-gourd	Asparagus	Avocado fruit	Avocadopear(nut)	
	Bacha	Bael Fruit	Baya	Barn.	
	Bamboo fruit	Bamboo shoot, tender	Banana Ithizome	Benana, ripe, monthem	
	Banana, ripe, poovam	Banana, ripe, red	Banana, ripe, robusta	Baryan tree figs	
	Barbecue sauce	Barley	Bacella leaves	Basil leaves	
	Bespeta Machi	Bata small varieties	Bathus leaves	Bay Leaf	
	Bean scafet, tender	Beef, brain	Beef, chops	Beef, heart	
	Beef, kidneys	Beet, iver	Beef, lungs	Beef meal	
	Beef muscle	Beef, round (leg)	Beef, shoulder	Beef, spieen	
	Beef, tongue	Beef tripe	Beet growing	Beet mot	

Figure 34. Knowledge center

Each ingredient as shown in figure 35 displays information about the nutrient content, summary, benefits, caution, recommended in and not recommended in. Along with it, a list of recipes present from the master recipe database which has the ingredient is displayed.

Ø	Almond			
	DETALS	NUTRENTS	NUTRIENTS	
	Summary Almord (Purus emploited) is a member of the lendy Rosacean. The award culturated almord originated from Inter-encoded species that evolved in the deserts and hoshils of carried and explorate tasks. Almords have been	-	Quantity	Fued Name
	cultivated for over 4,000 years, and maning about 400 BC wave sufficiented around the fitted terraneer coastine from Tankey to Turnina.	Minerals	2.0	Soaked Almonds Without Skin
	Benefits	Moisture	4.37	Soaked Almonds With Skin
	-strend (Prune amgelicity) is a member of the family Reasonan. The assess obtained almost argument from tome anaded agains that and oracle in the learnest and founditial of assesses and an advancement learnes. Among have been realizated for some 4300 years, and intering about 450 BC ware submand amond the Madhamanaan constitute from Technical Actions and the second se	Protein	16.41	Salted Almonds
	Caution	An	2.42	Almonds
	Economistation of admonths corr course atomical-active and GJ speed. If Unknown Allangs may develop readies on consumption of name	Total Fat	36.49	Almond Barfi
	Reconstanded in	Total Fiber	12.06	Badam Halwa
	Nut Reconvended in	Insoluble Fiber	10.55	Doda Barli
	As dep	Soluble Fiber	2.52	Macaroon
		Carbohydrate	8.04	Dry Fruit Ladoo
		Thiamine (81)	0.15	Thandai
		Ritoflavis (82)	0.26	
		Niecin (83)	8.71	
		Partobesic Acid (85)	0.79	

Figure 35. Knowledge Center

We could calculate all 189 micronutrients for 500 children and adults who underwent analysis and consultation using the functionalities of these Ntuitive software and deficiency or excess could be quantified when compared with RDA.

With the help of the functionalities of the software, the data could be accessed at any point of time and the nutritionist got a chance to view the entire case. The most tedious and time consuming tasks saved on quite an amount of time with the help of the software, especially the calculations for the diet plan and the client consultation interface which enhanced the consultation quality.

4. Summary and Conclusion

Nutrition practice can be made easy and technology enabled keeping in mind scientific standards. A walkthrough of the entire software makes one realise how dietetics practice can become much easier. Quality amount of time can be devoted by the nutritionist in providing nutrition care to the clients rather than spending time on calculations or maintaining records. This not only helps in easy data collection of macro nutrients, but also of micronutrients. Managing a huge chunk of clients and maintaining accessibility to their information is much easier with this software coming in practice.

Loaded with information, the functionalities of this software definitely makes it a ready-reckoner for every working nutritionist in the dietetic fraternity as it can be used to enhance the knowledge and skills of the nutritionist. With the practical difficulties faced by the practising nutritionist, this software is like a boon saving time, enhancing the skills as well as taking the dietetic practice to a different level.

With the help of the software, the Ntuitive was successful in testing the nutritional assessment of 800 children and adults. The time spent on taking recall and getting the nutrition analysis was merely few minutes. All 189 nutrients were calculated with statistics of how requirements are being achieved. Based on their analysis weekly plans were provided to clients which were specific to their needs and customized. As the nutritionist can view the requirements achieved while planning, it became very easy to create multiple plans for them. Lastly, during consultation, with technological appeal, it became easy for client to understand where are they lacking and where they need to improve.

Thus the goal of improving the lifestyle and medical condition was achieved with easy, innovative and scientific aid of Ntuitive software.

Acknowledgement

The need of technology for nutrition was always there, but it would not have been possible without the vision of CEO Dr Arbinder Singal, Fitterfly technologies and Mr. Shailesh Gupta. A heartwarming thank you to Mr. Jayesh Sawant, Technology head and his team for leading the technology development. With the help of Nutrition team, the software could be tested and launched for mass practice.

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