International Journal of Food, Nutrition and Dietetics

International Journal of Food, Nutrition & Dietetics (IJFND) (ISSN 2322-0775), a broad-based peer-reviewed journal publish the most exciting researches with respect to the subjects of nutrition and food sciences. The journal covers current thinking on food and nutrition emphasizing the practical and social application of ideas. Special editions focusing on topics including micronutrients, special diets for management of health problems and cost sector catering provide readable content that is an invaluable resource for practitioners and academics wishing to inform themselves, their colleagues, or the public on modern thinking, research, and attitudes to food and nutrition.

Readership: Academics and researchers in the field, Dietitians, Food company managers, Food research institutes, Health care professionals, Nutritionists

Indexing Information: ProQuest, USA, Genamics Journal Seek.

For all other quiries Red Flower Publication Pvt. Ltd., 48/41-42, DSIDC, Pocket-II, Mayur Vihar Phase-I, Delhi - 110 091 (India), Phone: 91-11-22754205, Fax: 91-11-22754205, E-mail: redflowerppl@vsnl.net, Web:www.rfppl.com

Printed at Saujanya Printing Press, D-47, Okhla Industrial Area, Phase-1, New Delhi - 110 020.

International Journal of Food, Nutrition & Dietetics (IJFND) (ISSN 2322-0775), a broad-based peer-reviewed journal publish the most exciting researches with respect to the subjects of nutrition and food sciences. The journal covers current thinking on food and nutrition emphasizing the practical and social application of ideas. Special editions focusing on topics including micronutrients, special diets for management of health problems and cost sector catering provide readable content that is an invaluable resource for practitioners and academics wishing to inform themselves, their colleagues, or the public on modern thinking, research, and attitudes to food and nutrition.

Readership: Academics and researchers in the field, Dietitians, Food company managers, Food research institutes, Health care professionals, Nutritionists

Indexing Information: ProQuest, USA, Genamics Journal Seek.

Subscription Information

India

Individual	
1 year	Rs.1000
Life Subscription (Valid for 10 Years)	Rs.5000
Institutional (1 year)	Rs.3200

Rest of the World

Individual (1 year)	USD100
Insitutional (1 year)	USD900

PAYMENT METHOD

Bank draft / cashier's order / cheque / demand draft / money order should be in the name of **Red Flower Publication Pvt. Ltd**. payable at **Delhi**.

International Bank transfer / bank wire / electronic funds transfer / money remittance / money wire / telegraphic transfer / telex

1. **Complete Bank Account No.** 604320110000467
2. **Beneficiary Name (As per Bank Pass Book):** Red Flower Publication Pvt. Ltd.
3. **Beneficiary Address:** 48 / 41-42, DSIDC, Pocket-II, Mayur Vihar Phase-I, Delhi – 110 091(India)
4. **Bank & Branch Name:** Bank of India; Mayur Vihar
5. **Bank Address & Phone Number:** 13 / 14, Sri Balaji Shop,Pocket II, Mayur Vihar Phase- I, New Delhi - 110091 (India); Tel: 22750372, 22753401. **Email:** mayurvihar.newdelhi@bankofindia.co.in
6. **MICR Code:** 110013045
7. **Branch Code:** 6043
8. **IFSC Code:** BKID0006043 (used for RTGS and NEFT transactions)
9. **Swift Code:** BKIDINBBDOS
10. **Beneficiary Contact No. & E-mail ID:** 91-11-22754205, E-mail: redflowerppl@vsnl.net, redflowerppl@gmail.com
11. PAN No.AAECR7434A

Send all Orders to: **Red Flower Publication Pvt. Ltd.,** 48 / 41-42, DSIDC, Pocket-II, Mayur Vihar Phase-I, Delhi – 110 091, India, Phone: 91-11-22754205, 45796900, Fax: 91-11-22754205, E-mail: redflowerppl@vsnl.net, Website: www.rfppl.com.

International Journal of Food, Nutrition and Dietetics

Volume 2 Number 2
May - August 2014

Contents

BOOKS FOR SALE

CHILD INTELLIGENCE

By **Dr. Rajesh Shukla**

ISBN: 81-901846-1-X, Pb, vi+141 Pages

Price: Rs.150/-, US$50/-

Published by **World Informations Syndicate**

This century will be the century of the brain. Intelligence will define success of individuals; it remains the main ingredient of success. Developed and used properly, intelligence of an individual takes him to greater heights. Ask yourself, is your child intelligent! If yes, is he or she utilizing the capacity as well as he can? I believe majority of people, up to 80% may not be using their brain to best potential. Once a substantial part of life has passed, effective use of this human faculty cannot take one very far. So, parents need to know how does their child grow and how he becomes intelligent in due course of time. As the pressure for intelligence increases, the child is asked to perform in different aspects of life equally well. At times, it may be counter-productive. Facts about various facets of intelligence are given here. Other topics like emotional intelligence, delayed development, retardation, vaccines, advice to parents and attitude have also been discussed in a nutshell. The aim of this book is to help the child reach the best intellectual capacity. I think if the book turns even one individual into a user of his best intelligence potential, it is a success.

PEDIATRICS COMPANION

By Dr. Rajesh Shukla

ISBN: 81-901846-0-1, Hb, VIII+392 Pages

Price: Rs.250/-, US$50

Published by **World Informations Syndicate**

This book has been addressed to young doctors who take care of children, such as postgraduate students, junior doctors working in various capacities in Pediatrics and private practitioners. Standard Pediatric practices as well as diseases have been described in a nutshell. List of causes, differential diagnosis and tips for examination have been given to help examination-going students revise it quickly. Parent guidance techniques, vaccination and food have been included for private practitioners and family physicians that see a large child population in our country. Parents can have some understanding of how the doctors will try to manage a particular condition in a child systematically. A list of commonly used pediatric drugs and dosage is also given. Some views on controversies in Pediatrics have also been included. Few important techniques have been described which include procedures like endotracheal intubations, collecting blood samples and ventilation. I hope this book helps young doctors serve children better.

Order from

Red Flower Publication Pvt. Ltd.

48/41-42, DSIDC, Pocket-II, Mayur Vihar, Phase-I

Delhi - 110 091 (India)

Tel: 91-11-22754205, 45796900, Fax: 91-11-22754205

E-mail: redflowerppl@gmail.org, redflowerppl@vsnl.net

Original Article

International Journal of Food, Nutrition and Dietetics

Volume 2 Number 2, May-August 2014

Public Distribution System in Rajasthan

Shiv Dayal Singh*, Anant Phagna, Gulraj Kohli*****

Abstract

Public Distribution System (PDS) was established with the object to ensure food security primarily to the poor section of the society. The performance of PDS in Rajasthan reveal that it is performing well in terms of allocation and lifting but the other irregularities has reduce it's impact on poor. This needs to be checked.

Keywords: PDS; Distribution; BPL.

Introduction

The PDS in India has objective to provide essential consumer goods at cheap and subsidized price to the consumers so as to insulate them from the impact of rising prices of these commodities and maintain nutritional status of our population. To achieve the objective, government has established a network of Fair Price Shops (FPS) from where PDS items like rice, wheat, sugar, kerosene and certain Non-PDS items are distributed at prices determined by government.

PDS in Rajasthan

About quarter of Rajasthan population is Below Poverty Line (BPL), 29.4 percent, 2009-10, moreover due to it's demographic pattern and distinctive geographic terrain the population is scattered in far off places with only 10 – 15 families living in small hamlets and the PDS beneficiaries have to cover up to 30 km to reach a FPS. In the rural areas, due to drought and desert like conditions people lead a hard life. Their problems get accentuated in some area including desert and hilly terrain, particularly in southern Rajasthan which is deficient in rainfall and face frequent drought like conditions? This situation directly affects the production of crops at such places. The obvious result of this situation is increased dependency on PDS which is the only channel for providing food security to people, particularly, in such areas. The PDS commodities currently being distributed by the government of Rajasthan are Levy Sugar, Fortified Atta, Wheat, Rice and Kerosene Oil. In addition to these PDS items Non – PDS items like Iodized Wash Salt and Tea is also distributed through state PDS network. The state is using Above Poverty Line

Table 1: Monthly Allocation for BPL

	Commodity	Price (Rs.)	Quantity (Per Month)
BPL/State BPL	Wheat	2.00	25 Kg per ration card
	Rice	6.50	
	Levy Sugar	13.50	300 gm per ration card
	Kerosene	13.75	2.5 liters per ration card
	Atta	6.20	10 Kg per ration card

*Source: Rajasthan State Food & Civil Supplies Corporation Ltd. Government of Rajasthan.

Author's affiliation: *Associate Professor, **Research Scholar, Dept. of Economics, ***Professor, Dept. of Food Science and Nutrition, Maharishi Dayanand Saraswati University, Ajmer, Rajasthan, India.

Corresponding Author: Gulraj Kohli, Professor, Dept. of Food Science and Nutrition, Maharishi Dayanand Saraswati University, Ajmer, Rajasthan, India.

E-mail: gulrajkk@rediffmail.com

Table 2: Allotment and Listing of BPL Wheat and Rice in M. Tonnes

S. No.	Year	Wheat			Rice		
		Allotment	Raise	Percentage	Allotment	Raise	Percentage
1	2005-06	-	-	-	75574	19999	26.46
2	2006-07	434272	415671	95.72	200934	100952	50.24
3	2007-08	408640	385339	94.30	202392	146915	72.94
4	2008-09	595800	589606	96.96	33732	26963	79.93
5	2009-10	629532	618503	98.25	-	-	-

* Source: Rajasthan State Food & Civil Supplies Corporation Ltd. Government of Rajasthan.

Table 3: Allotment and Listing of APL Wheat and Rice in M. Tonnes

S. No.	Year	Wheat			Rice		
		Allotment	Lifting	Percentage	Allotment	Lifting	Percentage
1	2005-06	-	-	-	575212	190	0.03
2	2006-07	526954	153529	29.14	810936	9825	1.21
3	2007-08	290948	236554	81.30	0	0	0.00
4	2008-09	343114	287664	83.84	490	385	78.57
5	2009-10	772320	757473	98.08	-	-	-

*Source: Rajasthan State Food & Civil Supplies Corporation Ltd. Government of Rajasthan.

Table 4: Allotment and Listing of Antyodaya Ann Yojana Wheat and Rice in M. Tonnes

S. No.	Year	Wheat			Rice		
		Allotment	Lifting	Percentage	Allotment	Lifting	Percentage
1	2005-06	-	-	-	3823	2318	60.63
2	2006-07	374394	341639	91.25	11320	4518	39.91
3	2007-08	378600	357826	94.51	12888	6435	49.93
4	2008-09	389340	380565	97.75	2148	1180	54.90
5	2009-10	391488	383830	98.04	-	-	-

*Source: Rajasthan State Food & Civil Supplies Corporation Ltd. Government of Rajasthan.

Table 5: Allotment and Listing of Antyodaya Ann Yojana Wheat and Rice in M. Tonnes

S. No.	Year	Allotment	Lifting	Percentage
1	2006-07	12635	11626	92.01
2	2007-08	12635	11655	92.24
3	2008-09	12635	11536	91.30
4	2009-10	11521	10968	95.20

*Source: Rajasthan State Food & Civil Supplies Corporation Ltd. Government of Rajasthan.

(APL) and Below Poverty Line (BPL) criterion to confer greater advantage of PDS system to the latter. There are presently 16643485 BPL families in Rajasthan, the norms set by Rajasthan government is shown in Table 1.

The performance of state PDS system to APL, BPL, Annapurna and Antyodaya In terms of allotment and lifting is listed below in Table 2.

Antyodaya Ann Yojana (AAY) was started in March-2001 with the aim of providing the help to the poorest people in rural and urban area. The targeted groups of families under the scheme are one who is poorer families among the BPL families. There is a provision of providing 35 Kg of wheat and rice per month at the rate of INR 2.00 per Kg and INR 3.00 per Kg respectively to the targeted families keeping in view there purchasing power.

According to National Social Assistance Programme (NSAP) person who are above 65 years of age are eligible to get old age pension, but they are neither feeling under National Old

Age Pension nor State Old Age Pension, for such eligible person there is a provision of giving 10 kg of per month wheat free of cost.

The above mentioned data reveal that state PDS is functioning well in terms of allocation and lifting of wheat and rice and more particularly wheat. The other aspects reveal that overall functioning of PDS is unsatisfactory in the state. This is largely due to large scale diversion of PDS food grain into black market abetted by inefficient government machinery, lack of accountability at different level, poor vigilance mechanism, proliferation of bogus ration cards, non – adherence to government guidelines on PDS, bottlenecks in transportation of food grain and irregularities of various kinds at FPS level. In the state of Rajasthan it is the wholesalers who lift food grain from FCI go downs. Co-operative societies which go by the name of wholesale Upbhokta Sahakari Bhandars and Kray Vikray Sahakari Samities (KYSSs) are given priority under rules for appointment as wholesalers. These cooperative societies do not discharge properly their assigned responsibilities of lifting food grains since the transportations rate fixed by the State Government do not cover the transportation cost incurred by them. This induces them to save cost by skipping weighment of food grains which requires engagement of labour or by sending consignment of food grains in one go by clubbing the requirement of two-three months instead of issuing food grains every month. Lifting of food grains on time and their timely delivery to FPSs also suffer in case of delayed payment made by the wholesalers to lift the food grains. The State BPL / APL list is full of errors which has let to discontentment among the people over non inclusion of needy and deserving people in BPL / AAY categories. Vigilance committees are either non functional or non-existent. The Gram Pradhan of the Chairman of Vigilance committee but does not generally visit any FPS. A large number of vacancies exist in the cadre of enforcement inspector with the result no surprise checks are carried out. Currently there is no separate enforcement wing for PDS. The complaints are not enquired properly. The complaints received in the DSOs office are marked to the enforcement inspector but these hardly receive any attention. The Government guidelines and orders are often violated in appointment of FPS Dealers. The documents submitted by the applicants are not being verified by the concerned officials by conducting field enquiry. Caste consideration and political pressure does play a role the appointment FPS Dealers. The FPS does not run on cost plus basis and that is one of the reasons for its poor viability. The income derived from commission by the FPS Dealers is not enough to meet the family basic needs. Since the number of cards attached to a FPS and allocation of food grains and kerosene oil is below the threshold for arriving at a cost plus figure, the dealers make extra money by resorting to malpractices, such as, selling PDS item at a higher price, short weighment of food grain and diversion of food grains and kerosene oil into black market. More over the functioning of FPS is full of inadequacies. There is no fix time schedule for opening and closing of FPS, display board are absent outside the shop nor is sample packets is displayed. The directions of Honorable Supreme Court given in 2003 and the various instructions issued by the Government are not being strictly followed by FPS dealers. The operation the coupon system leaves much to be desired. The coupons do not contained relevant details, such as, ration card number, number of beneficiaries etc. These details are filled by the FPS dealers which makes such details are suspect. The coupon submitted by the FPS dealers to the DSOs office are not verified and used as a basis of allocation of food grain to a FPS. Computerization of the PDS in the state is a far cry. Coarse grain, maize, jowar and bajra are grown in different regions of the state and in these regions they form the staple diet of the people are totally absent from PDS network.

All the anomalies which are surrounding the Rajasthan PDS can be removed by adopting a zero tolerance approach towards corruption. Steps should be taken to identify most vulnerable groups in tribal / rural areas

and strengthening PDS machineries in such areas. Deployment of mobile vans, particularly, in remote inaccessible and far flung area, lacking the facility of FPS in the near vicinity should be considered for distributing PDS food grains. Local food habits of the people and their staple diet should be taken into account for procurement and sale of food grain thorough FPSs operating in those areas. Wholesale distribution of food grain currently entrusted to cooperative societies should be streamlined by creating state level agency for facilitating procurement, lifting and distribution of PDS food grains. It should be made mandatory for the FPS dealers to lift the stock every month from the wholesalers and distribute it to beneficiaries on a regular basis. A fresh survey of BPL/ AAY families should be undertaken to identify genuine beneficiaries and weed out bogus ration cards. Steps should be taken to streamline procedure for issuing ration cards which should be done after meticulous verification. The scope of political influence should be eliminated. The procedure for distribution of coupons should be rationalized to ensure their timely delivery to beneficiaries. The coupons should contains all relevant details like the name of beneficiaries, year and date of printing, the ration card number, the name of FPS to which the beneficiary is attached as also the quantity of grain entitlement. Vigilance mechanism should be strengthened at all levels and vigilance committees membership be enlarged to include representative of non government organizations and self help groups as well as educated youth. A proper mechanism like ombudsman should be setup to attend to complaints of malpractice and take prompt steps towards redressal of complaints. Computerization of PDS operations would go a long way in revamping the PDS and restoring the confidence of the people in the system.

References

1. Economic Survey, Government of India, 2011-12.
2. Central Vigilance Committee on Public Distribution System Report on the State of Rajasthan, 2009.
3. Planning Commission of India.
4. Rajasthan State Food and Civil Supplies Corporation Ltd., Government of Rajasthan.
5. Reetika Khera. *Access to Targeted Public Distribution System: A Case Study in Rajasthan. Economic and Political Weekly.* 2008; 43(44).
6. *The Rot in PDS.* The Times of India. December 22, 2007, 12.
7. Quoted by S. Mahendra Dev. *Food Security PDS vs EGS. Economic and Political Weekly.* 1996; 1759.
8. PS George. *Some Aspects of Public Distribution System of Food Grains in India. Economic and Political Weekly.* 1984; A-108.

Original Article

International Journal of Food, Nutrition and Dietetics

Volume 2 Number 2, May-August 2014

Combating Micronutrient Deficiencies through Value Added Foods Using Underutilized Greens

Balwinder Sadana*, Poonam Bakhetia, Ravinder Dhaliwal*****

Abstract

Iron deficiency anaemia along with vitamin A deficiency continuously posing a significant challenge to public health all over India. Iron and β-carotene rich value added foods were developed to combat anaemia. Six *Prash* combinations were developed by using amla, fresh cauliflower leaves and cauliflower leaf powder, extracts of ginger, mint, lemon, mishri, spices and honey. Sensory evaluation revealed that *ginger prash* had the highest overall acceptability scores (8.7) while *amla prash* IV had the minimum scores as 7.2. Nutritionally energy and protein content ranged from 259 to 322 kcals and 2.7 to 6.1 % in fresh weight basis in various formulations. These were good source of calcium and iron ranging from 215 and 7.7 mg (*amla prash* I) to 413 and 20.1 (*mint prash*). Ascorbic acid ranged from 17.2 mg in *ginger prash* to 69.3 in *amla prash* IV. *Amla prash* I had the minimum b- carotene as 1551 µg where as *mint prash* had maximum value as 3359 µg. Taking 30 g as per day serving these formulated health foods can contribute 64.6 to 124.0 mg of calcium, 2.31 to 6.04 mg of iron, 5.12 to 20.80 mg of vitamin C and 465 to 1009 ìg of b-carotene in adult woman's diet.

Keywords: Value added foods, *Prash*, β-carotene, Sensory evaluation, Nutritional evaluation

Introduction

In India, the consumption of green leafy vegetables is very low and is much less than the recommended allowances. Therefore, majority of Indians do not get sufficient vitamins and minerals present in leafy vegetables. Iron and vitamin A deficiencies are two major nutritional health problems affecting vulnerable groups of population in many developing countries. Anaemia is estimated to affect 3.5 billion individuals in developing world and more than 320 million people in India with highest prevalence among women and children, 40-80% pregnant women, 60-70% children and 50% of adolescent girls (Devadas, 2001).

There are approximately 720 million preschool children with vitamin A deficiency and out of this 4.4 million have xeropthalmia (WHO, 2001). Vitamin A deficiency affects many tissues in the body; the most dramatic changes are seen in the eyes resulting in tragic consequences of total loss of vision in the early life. UNICEF (2004) estimates that VAD is public health concern in 72 countries in Asia and Africa and is known to cause blindness.

Average consumption of iron is 50% of RDA (ICMR, 2001). The bioavailability of dietary iron depends on quality of heam and non-heam iron in the diet and also on the balance between absorption enhancers and inhibitors which affect the absorption of non-heam iron. Ascorbic acid is a potent enhancer of non-heam iron absorption that can overcome the inhibiting effect of phytic acid which decreases bioavailability of iron (Davidsson, 2003).

It has been emphasized that most

Author's affiliation: *Sr. Nutritionist cum Head, Dept. of Food & Nutrition, College of Home Science, Punjab Agricultural University, Ludhiana, **Asstt. Professor (Food and Nutrition), Krishi Vigyan Kendra, Amritsar, ***Asstt. Scientist (AICRP on Home Science), Dept. of Food and Nutrition, College of Home Science, Punjab Agricultural University, Ludhiana, Punjab, India.

Corresponding Author: Balwinder Sadana, Sr. Nutritionist cum Head, Dept. of Food & Nutrition, College of Home Science, Punjab Agricultural University, Ludhiana, Punjab, India.

E-mail: sadana_pau@yahoo.com

appropriate and sustainable approach for correcting nutritional deficiencies is the dietary improvement through a better choice of foods, improved quality and greater variety (Scrimshaw,1994). The diverse agro-climatic conditions never blessed India with vast resources of greeneries, many of which are still under exploited whose nutrient potential have not yet been adequately studied.

Cauliflower leaves which are generally thrown away as waste are rich source of iron and b-carotene and can significantly contribute these nutrients to the diet. Kumar and Bhavani (2004) reported that anaemia can be prevented and blood haemoglobin levels can be successfully elevated in adolescent girls by incorporating cauliflower leaves in their dietaries.

Amla (*phyllanthus emblica*) commonly called Indian gooseberry is one of the indigenous fruit of India which is grown on a wide range of soils demanding little attention. The fruit is valued for its high ascorbic acid content (600-700 mg/100g) and its therapeutic uses. The fruit because of its high acidity and astringent taste is not palatable for direct consumption. Its excellent nutritional and therapeutic values offer enormous potentiality for its processing. It needs to be processed to make it palatable and available through out the year. It is commonly used in the preparation of chawan prash. The retention of ascorbic acid after heating and storage varies between 12-26%. Keeping in view the importance of nutrification of recipes, the present study was conducted to develop cheap and nutritious recipes mainly from amla pulp, dried cauliflower green powder and cauliflower green pulp providing significant amount of b-carotene, vitamin C and iron which help in reducing micronutrient deficiencies.

Materials and Methods

Value added foods were developed using locally available food combinations of amla (*phyllanthus emblica*), fresh cauliflower leaves (*Brassica oleracea*) and dry cauliflower leaf powder, ginger (*Zinziber officinale*) and mint (*Menta spicata*). The bulk samples of cauliflower leaves and amlas were procured from Vegetables department of Punjab Agricultural University, Ludhiana, Punjab. Various combinations of "*prash"* were developed using amla pulp, cauliflower green pulp, cauliflower leaf powder, ginger and mint extract as described below.

(Amla Prash (I to IV)

Ingredients: *Amla* pulp 100g , *Mishri* 110g , Cauliflower Leaf Powder (CLP) 7.5/10/12.5/15 g, Honey 5 g, Cinnamon, Clove, Cardamom 1g (each).

Method: Steam *amla* for 3-4 minutes. After cooling deseed the *amlas*. Mash *amlas* to form pulp. Add *mishri* (big crystalline sugar) and cook on the fire. When whole of the moisture is removed and *prash* is having thick consistency add cauliflower leaf powder (at different levels) and spices. Mix well .Remove from fire and mix honey and store in sterilized bottles.

Ginger/Mint Prash

Ingredients: Cauliflower green pulp 100 g, Jaggery 100 g, Lemon juice 7 ml, Honey 5 g, ginger extract 2 ml/mint extract 5 ml.

Method: Boil cauliflower green leaves. Blend these in a blender. Sieve it to remove fiber. Add jaggery in the pulp and heat by stirring. When it attains jam consistency add ginger extract/mint extract and honey. Store in sterilized bottles.

Sensory Evaluation: Products were sensory evaluated thrice by a panel of 12 judges selected at random from the faculty of Food and Nutrition department, College of Home Science, Punjab Agricultural University, Ludhiana. The products were evaluated using 9 point hedonic scale for appearance, colour, texture, flavor, taste, and overall acceptability (Rangana, 1986).

Chemical Analysis: Three identical preparations of each food used for sensory

evaluations were pooled together into one sample, homogenized and nutritionally evaluated.

Developed health foods were nutritionally analyzed in triplicates for proximate composition, iron and calcium (AOAC, 1990), B-carotene (Rao, 1967) and ascorbic acid (AOVC, 1996). Total carbohydrates contents were calculated by difference and energy content was calculated by factorial method AOAC (1990).

Statistical Analysis: Statistical analysis of the data was done using analysis of variance using standard methods of analysis (Snedecor and Cochran, 1967). Critical differences (CD) at P<0.05 were also estimated.

Results and Discussion

The results of organoleptic characteristics of developed value added foods have been presented in Table 1.

The scores for colour of developed products varied from 8.1±0.96 in *amla prash* IV to 8.9±0.49 in ginger *prash* indicating non-significant differences among the colour of various formulations. Health foods when evaluated in terms of texture, ginger *prash* got the best scores as 8.4±0.61 followed by mint *prash* and *amla prash* I each as 8.3±0.47 while *amla prash* IV was found to have least scores as 6.7±0.68. *Amla prash* III and *amla prash* IV had statistically lower scores for their texture as compared to ginger, mint and *amla prash* I developed as iron rich health food. The scores for flavor ranged from 6.6±0.8 being minimum in *amla prash* IV to 8.5±0.49 as maximum in ginger *prash*. When statistically analyzed, it was found that *amla prash* IV obtained significantly (P<0.05) lower scores for flavour as compared to other developed foods. Regarding appearance no significant difference was observed among the scores of ginger, mint, *amla prash* I and *amla prash* II whereas *amla prash* III and IV obtained significantly lower scores when compared with above said formulations. Sensory evaluation for taste revealed that ginger *prash* obtained maximum scores as 8.5±0.49 followed by *amla prash* I as 8.4±0.69 and mint *prash* as 8.3±0.59. *Amla prash* IV obtained least scores for taste as 7.3±0.69. Least scores were due to the highest level of supplementation of CLP as 15%. Keeping in view the above mentioned individual parameters ginger *prash* had the highest overall acceptability scores as 8.7±0.49 followed by *amla prash* I as 8.6±0.49 and mint *prash* 8.5±0.49. When statistically analyzed *amla prash* III and *amla prash* IV had significantly (pd”0.05) lower

Table 1: Sensory Evaluation of Iron Rich Health Foods

Name of the product	Colour	Texture	Flavour	Appearance	Taste	Doneness	Overall acceptability
***Amla prash* I**	8.6 ± 0.8	8.3 ± 0.92	8.0 ± 0.63	8.4 ± 0.81	8.4 ± .69	8.5 ± 0.62	8.6 ± 0.49
***Amla prash* II**	8.5 ±0.81	8.1 ±0.62	8.1 ±0.77	8.5 ±0.81	8.2 ±0.54	8.3 ±0.68	8.3 ±0.69
***Amla prash* III**	8.3 ±0.94	7.2 ±1.64	7.5 ±1.02	7.7 ±0.69	7.8 ±0.98	7.3 ±0.77	7.7 ±0.59
***Amla prash* IV**	8.1 ±0.96	6.7 ±0.68	6.6 ±0.8	6.5 ±0.81	7.3 ±0.69	7.1 ±0.77	7.2 ±0.75
Ginger *prash*	8.9 ±0.49	8.4 ±0.61	8.5 ±0.49	8.6 ±0.49	8.5 ±0.49	8.7 ±0.47	8.7 ±0.44
Mint *prash*	8.6 ±0.71	8.3 ±0.47	8.2 ±0.65	8.3 ±0.44	8.3 ±0.59	8.4 ±0.61	8.5 ±0.49
CD (5%)	NS	0.633	0.796	0.856	0.693	0.508	0.587
F-Ratio	1.61	11.91	6.92	8.92	4.07	16.71	9.84

Table 2: Nutritive Value of Raw Ingredients

Raw ingredient	Moisture (g)	Fiber (g)	Ash (g)	Protein (g)	Fat (g)	CHO (g)	Energy (Kcal)	Calcium (mg)	Iron (mg)	Vit.C (mg)	β-carotene (µg)
Fresh *amla*	82	2.9	0.8	0.6	0.17	15	62	60	1.6	300	20
Cauliflower green leaf	80	2.16	3.11	5.34	1.37	8.5	66	728	26	34	6190
Mint leaves	84	1.75	1.7	4.5	0.4	5.2	45	190	15.4	25	1575
Ginger	80	1.4	2.7	2.5	0.8	14.3	60	25	3.8	8	32
Cauliflower Leaf powder	3.2	10.8	15.5	26.7	6.85	40.1	329	3640	130	170	30950

Table 3: Nutritive Value of Health Foods (As is Basis)

Product	Moisture (g)	Fiber (g)	Ash (g)	Protein (g)	Fat (g)	CHO (g)	Energy (Kcal)	Calcium (mg)	Iron (mg)	Vit.C (mg)	β-carotene (µg)
Amla prash I	22.2	1.7	0.13	2.7	3.7	69	322	215	7.7	60	1551
Amla prash II	24.4	1.8	0.16	3.1	3.0	67	309	268	13.4	64.7	2009
Amla prash III	24.5	2.2	0.18	4.1	3.8	65	311	325	13.7	66.4	2499
Amla prash IV	26.7	2.5	0.18	4.7	1.5	65	289	341	17.5	69.3	2909
Ginger *prash*	35.9	0.8	0.68	4.5	2.2	60	259	309	13.2	17.2	2550
Mint *prash*	36.5	1.37	1.04	6.1	1.6	61	277	413	20.1	25.2	3359
CD (5%)	0.07	0.43	NS	0.84	0.47	0.98	11.48	11.96	0.75	7.55	446.5
F-Ratio	322.5	35.1	0.84	4.75	68.76	4.49	70.46	299.5	299.9	87.9	22.07

Table 4: Nutritive Value of Health Foods (on 30 G Basis)

Product	Moisture (g)	Fiber (g)	Ash (g)	Protein (g)	Fat (g)	CHO (g)	Energy (Kcal)	Calcium (mg)	Iron (mg)	Vit.C (mg)	β-carotene (µg)
Amla prash I	6.66	0.51	0.04	0.81	1.11	20.7	97	64.6	2.31	18.00	465
Amla prash II	7.32	0.54	0.05	0.93	0.90	20.1	93	80.4	4.02	19.43	603
Amla prash III	7.35	0.66	0.05	1.20	1.14	19.5	93	97.6	3.93	19.93	750
Amla prash IV	8.01	0.75	0.05	1.41	0.45	19.5	87	102.4	3.78	20.80	873
Ginger *prash*	10.7	0.24	0.20	1.35	0.66	18.0	78	92.8	3.96	5.12	765
Mint *prash*	10.9	0.41	0.31	1.83	0.24	18.3	83	124.0	6.04	7.56	1009

scores for taste, flavor, texture and overall acceptability as compared to other developed formulations. Results revealed that supplementation of CLP were most acceptable at 7.5 and 10% levels whereas supplementation at 12.5 and 15% levels altered the various characteristics thereby lowering the overall acceptability scores. Results are in accordance with Kaur and Kochar (2005) who reported a decline in scores of texture, taste and overall acceptability with higher level of supplementation of cauliflower leaves in *parantha.* Ginger *prash* and mint *prash* prepared from fresh cauliflower leaves pulp obtained higher scores for organoleptic characteristics as compared to their counter parts of various *amla prash* formulations where dried cauliflower leaf powder was used. The results also revealed that supplementation of CLP at higher level are not as favorable as usage of fresh cauliflower green pulp.

Nutrient composition of fresh *amla*, cauliflower green and cauliflower leaf powder as raw ingredients and of developed products per 100 g as is basis is given in Table 2 and 3.

Fresh cauliflower greens and *amla* have high moisture content ranging from 80 to 82%. The values are in accordance with ICMR (2001). The cauliflower leaf powder contains 26.6, 6.85, 15.9, 10.8 and 40.1% respectively of protein, fat, ash, fiber and carbohydrates. Fresh *amla* was found to be rich source of vitamin C (300mg/100g) whereas cauliflower greens as fresh or dried form contained high amount of calcium and iron. Increase in the proximate composition values as compared to fresh greens was due to loss in moisture content during drying. Among raw ingredients used *amla* contained maximum vitamin C as 405 mg/100g whereas fresh green had this nutrient as 34.8mg. High content of b-carotene was observed in cauliflower greens as 6344 ìg while cauliflower leaf powder had this nutrient as 30950 ìg.

The moisture content of different formulations of *amla prash* varied from 22.2 to 26.7%.Wwhen compared with their counterpart as ginger (35.9%) and mint *prash* (36.5%), these *amla prash* formulations had lower moisture content. The reason being that in these preparations, CLP was used whereas in ginger and mint *prash* fresh cauliflower pulp was used which was having higher moisture content. The protein content of *amla prash* I was found to be minimum (2.7g) and maximum in *amla prash* IV (4.7g) per 100g as is basis (Table 3).

Maximum amount of protein in *amla prash* IV was due to the highest level of supplementation of CLP containing good amount of protein. Significant differences in protein content among various products were observed. Crude fat content of mint *prash* was lower as compared to other formulations. Ash content of developed products ranged from 0.13g in *amla prash* I to 0.19g in mint *prash*. Crude fiber content of mint and ginger *prash* was significantly lower when compared with their counterparts of *amla* preparations. Lower value of fiber was due to variation of raw ingredients being used. *Amla prash* formulations contained CLP which contain good amount of fiber whereas in mint/ginger *prash* were prepared from fresh cauliflower green pulp from which fiber was removed during the development process. Removal of fiber was also responsible for significant lowering of carbohydrates in ginger/mint *prash* preparations which ultimately lowered their energy content.

The data on mineral content revealed that total calcium and iron content was maximum in *amla prash* IV and minimum in *amla prash* I. The differences were primarily due to the level of supplementation of CLP in *amla* formulations. *Amla prash* I had the least level of supplementation as 7.5% whereas in *amla prash* IV 15% of CLP was incorporated. Results are in accordance with Reema *et al* (2004) who reported an increment in mineral content of supplementary foods prepared from germinated cereals and pulses incorporated with cauliflower leaf powder. When compared with raw *amla*, the vitamin C content of the formulations was found to be significantly lower. Obtained values of vitamin C ranged from 17.2 mg (ginger *prash*) to 69.3 (*amla prash* IV) mg/100 as is basis. Cooking resulted in a tremendous reduction of ascorbic acid which may be due to leaching and oxidation to dl keto gluconic acid (Sood and Bhat, 1974 and IFT expert panel, 1980). β-carotene content varied from 1551 ìg to 3359 ìg/100 basis. The minimum value was observed in *amla prash* I while maximum was in mint *prash.* Higher b-carotene content of mint *prash* was due to cauliflower greens and mint leaves both being rich source of β-carotene. Further with increased level of supplementation of CLP, the b-carotene of *amla prash* formulations also increased. The results are in accordance with that of Singh *et al* (2005) who reported an enhancement in β-carotene content of products when supplemented with dried cauliflower leaf powder.

Developed health foods when standardized in terms of serving, 30g amount was found to be appropriate serving. Nutrient contribution per serving basis has been presented in Table 4. Per serving supplied 64.6 to 124.0 mg of calcium, 2.31 to 6.04 mg of iron, 5.12 to 20.80 mg of vitamin C and 465 to 1009 ìg of β-

carotene. Among all the developed formulations *amla prash* IV was found to be the best product which provided maximum nutrients as compared to other formulations.

The persisting economics recession in a developing country like India, where the unrelenting problem of micronutrient malnutrition still persist, there is an urgent need to meet nutrient requirement through increased use of cheap and easily available food with good nutritive potentials. It may be concluded from the study that cauliflower leaves which are normally wasted can be used as a valuable source of micronutrients. The results of present study revealed that *amla* being excellent source of vitamin C and cauliflower leaves as sources of β-carotene, vitamin C and iron can be used for preparing b-carotene and iron rich health foods. These products if supplemented in the diet can help to meet the RDA for β-carotene, iron and vitamin C and also help in combating iron and vitamin A deficiency thereby improving health conditions.

References

1. AOAC. Official Methods of Analysis. 15th edn. Washington, DC: Association of Official Analytical Chemists; 1990.
2. AOVC. Methods of vitamin assay. Association of Vitamin Chemists Inc. (Ed.). Interscience Publishers; 1996: 306-12.
3. Devadas RP. Poverty and adolescent girl health. *Yojana.* 2001; 45: 30-32.
4. Davidson L. Approaches to improve iron bioavailability from complementary foods. *J Nutr*. 2003; 133: 1560-1562.
5. ICMR. Micronutrient deficiency disorders in 16 districts of India. Part 1 report of ICMR task force study. District Nutrition Project: 2001; 18.
6. IFT Expert Panel on food safety and nutrition effect of processing on nutritive value. *Food Tech*. 1986; 40(12): 109-116.
7. Kaur TJ and Kochar GK. Orgenoleptic evaluation and retention of vitamin C in commonly consumed food preparations using under exploited greens. *Ind J Nutr Dietet*. 2005; 42: 425-31.
8. Kumar JBM and Bhavani K. The efficacy of cauliflower greens (Brassica olercea) var Botrytis) preparation in improving blood hemoglobin in selected adolescent girls. *Ind J Nutr Dietet*. 2004; 41: 63-67.
9. Rangana S. Handbook of analysis and quality control for fruit and vegetable products. New Delhi: Tata Mc Graw Hill Publishing Company Limited; 1995.
10. Rao CN. True Vitamin A value of some vegetables. *J Nutr Dietet*. 1967; 4: 10-16.
11. Reema, CK Hira and Balwinder Sadana. Nutritional evaluation of supplementary foods prepared from germinated cereals and legumes. *J Food Sci Technol*. 2004; 41(6): 627-629.
12. Scrimshaw NS. Complementaries among interventions in the prevention of malnutrition in developing countries. *Proc Nutr Soc India*. 1994; 41: 49-84.
13. Singh G, Kawatra A and Sehgal S. Developments and nutritional evaluation of products prepared from dried powder of cauliflower leaves. *J Food Sci Tech.* 2005; 42(2): 137-139.
14. Snedecor GW, Cochran WG. Statistical Methods. Ames: Iowa State University Press; 1967.
15. Sood R and Bhat CM. Changes in ascorbic acid and carotene content of green leafy vegetable on cooking. 1974.
16. UNICEF (2004) Delivering essential micronutrients: Iron. Available at: http: / / www.Unicef.org / nutrition / index-iron.html (Accessed on August 1).
17. WHO (2001) Iron deficiency anaemia: Assessment, prevention and control. A guide for programme managers. World Health Organization. WHO / NHD / 01.3.

Original Article

International Journal of Food, Nutrition and Dietetics

Volume 2 Number 2, May-August 2014

Nutrition Knowledge of Football Players and Formulation of an Effective Nutrition Communication Package

Priyam Ahuja*, Vandana Bharti**

Abstract

Background: Football is a sport characterized by periods of moderate intensity activity interspersed by short periods of high intensity sprinting activity. A high level of energy expenditure, coupled with fluid loss owing to the hot and humid climate, and injuries, means sound nutritional and hydration strategies are required to optimize performance. Although the players and the coaches usually understand the principles of physical training, they often neglect the equally well developed Principles of Nutrition. **Aim**: To assess the Nutrition Knowledge of Football Players and formulate an effective Nutrition Communication Package for Indian Football team. **Methods and Materials**: Two Hundred Football players from all over India were selected and their Knowledge about nutrition and health were elicited using a pretested validated questionnaire which included questions on various aspects of nutrition including healthy balanced diet, macronutrients, micronutrients, fluid and electrolyte, pre competition, during and post competition meals and nutrition labeling, at baseline and based on their knowledge and extensive literature review on sports nutrition, the nutrition education program was formulated. The Nutrition Knowledge questionnaire was scored, each correct answer was given a score of one and each wrong answer, a score of zero. Statistical analysis was done using Mean, Standard deviation and Percentages. **Results:** The mean nutrition knowledge of football players was observed to be low. Based on the gaps of knowledge after analysis of the data a Nutrition Communication Package was formulated. The "benchmark principles to victory" included healthy balanced diet-selecting carbohydrates the healthy way, proteins for healthy muscles, Good fat-omega 3, immunity enhancers, pre event fuelling, competition drinks and post competition recovery food and rehydration solutions. This Nutrition communication package was transformed into power point presentations, leaflets and fact sheets and can be delivered through Individual Counseling and focus group discussions. **Conclusion:** This comprehensive Nutrition Communication Package including "Benchmark principles to victory" can be an ideal training material for our Football team and can be modified based on the requirement of individual sport in India.

Keywords: Nutrition communication package; Football; Football players; Nutrition knowledge.

Introduction

Football is one of the world's oldest known, widely played and enjoyed team sports. The contemporary history of the world's favourite game spans more than 100 years. Football is played in almost all schools of India. Indian football was largely neglected in preference to Cricket in which the national team is among the top three teams in the world however, with the Under-17 Football FIFA championship scheduled to be played in India in 2017 and with the fresh approach of Indian super league championship, Football is gaining momentum in India. Yet, the standard of Indian football, when compared globally, is poor. Part of this has been put down to the lack of opportunities for proper training and development of players in the country.The requirements of a sports player are very different from rest of the population, hours of

Author's affiliation: *Research Scholar, **Assistant Professor, Dept. of Foods and Nutrition, Maharani Lakshmi Bai Government Girls Post Graduate College, D.A.V.V. University, Indore, M.P., India.

Corresponding Author: Priyam Ahuja, Research Scholar, Dept. of Foods and Nutrition, Maharani Lakshmi Bai Government Girls Post Graduate College, D.A.V.V. University, Indore, M.P., India.

E-maiL: priyamahuja@yahoo.com

practice and discipline towards their goal undoubtedly assures 90% success but to make it 100% there has to be some extra effort added to it, adequate nutrition ensures this extra boost of energy. It's the combination of right kind of food at the right time in right amounts that ensures Victory.

Football is a sport characterised by periods of moderate intensity activity interspersed by short periods of high intensity (sprinting) activity. The game is played at a fast pace with short bursts of high intensity sprints, with many changes in direction, sprinting, accelerating, decelerating, tackling, dribbling and passing interspersed. Energy expenditure can be 60 – 80 kilojoules / min, with the higher end of the range for midfield positions. Injuries often occur from ball accidents, or joint and muscular damage. A high level of energy expenditure, coupled with fluid loss owing to the hot and humid climate, and injuries, means sound nutritional and hydration strategies are required to optimize performance. The sports players often lack the nutrition knowledge to make wise dietary choices and rely on other sources like friends, magazines, doctors for advice on diet and nutrition related issues. Current research indicates that the nutritional knowledge of athletes is minimal. Dietary behaviors may hinder health status and athletic performance. As the athlete's knowledge increases, nutritional quality of food choices improves. *Elliot (2006)* suggests the need for effective tools and interventions, such as sport-specific nutrition workshops and instructional materials, to educate athletes, coaches and trainers and to encourage them to consult qualified professionals to provide team members with accurate guidelines on sports nutrition fundamentals. Several Nutrition Education Programmes are being conducted worldwide for increasing the efficiency of the Sports players. Australia has a vast panel of sports nutritionists who ensure proper nutrition of the players, providing them with guidelines on nutrition especially competition meals. Sports Nutrition Association of Canada in association with the Gatorade Sports Science Institute too provides the most up to date information on nutrition and physical performance to the coaches and the sports players of Canada. Adequate and Authentic Nutrition Education is very essential to provide the young Sports players with the correct fuel for having the winning edge. Hence, Nutrition Education is essential for Indian Football players to enhance their nutritional knowledge and help them select healthier and nutritious dietary choices to enhance their abilities and improve their match performance.

Aims

To assess the Nutrition Knowledge of Football Players and formulate an effective Nutrition Communication Package for Indian Football team.

Methods and Materials

Two Hundred Football players from all over India were selected during an all India Youth Football tournament, Under-17 category. Their Knowledge about nutrition and health were elicited using a pretested validated 32 -item questionnaire, based on scientific literature and knowledge in sport nutrition. The questionnaire was divided into six parts that included sport nutritional knowledge and need for nutrition education. The first part sought information about the knowledge on healthy balanced diet, the second part included knowledge about macronutrients; carbohydrates, proteins and fats and its sources. The third part elicited information on micronutrients and antioxidants. The fourth part included sports specific questions pertaining to pre, during and post competition meal knowledge, fifth part had questions on nutrition labeling,and lastly the sixth part elicited information on their perception towards nutrition.The questionnaire had multiple choice questions, "yes, no, can't say" checklist options, true or false, and open ended questions. A score key was developed and

used by the investigator to assign score; each correct answer was given a score of one and each wrong answer, a score of zero. Statistical analysis was done using Mean, Standard deviation and Percentages. Based on their knowledge and extensive literature review on sports nutrition, the nutrition communication package was formulated.

Results

The mean age of twohundred Football players from all over India, selected during an all India Youth Football tournament, Under-17 categorywas 15±1 years and had an experience of playing a minimum of two tournaments at a national level. Based on the gaps of knowledge after analysis of the data on the knowledge of the team players a Nutrition Communication Package was formulated. The "benchmark principles to victory" included healthy balanced diet-selecting carbohydrates the healthy way, proteins for healthy muscles, Good fat-omega 3, immunity enhancers, pre event fuelling, competition drinks and post competition recovery food. The last sessions of the program included muscle relaxation and rehydration solutions. This Nutrition communication package was transformed into power point presentations, activities, leaflets and fact sheets and was delivered through Individual Counseling and focus group discussions. The program was conducted in English as well as Hindi to ensure effectiveness.

The overall nutrition knowledge of the football players was 37%. The nutrition knowledge score of the football players was observed to be 9.7 ±2.74 . Though the concept of healthy balanced diet was fairly understood by 65% of the players, their knowledge on macronutrients was low. 80% of the players could not differentiate the sources of fibre and starch, 30% of the team players felt non vegetarian foods are a better source of proteins compared to vegetarian food options. 85% of the players were seen to be ignorant about fats especially Trans fat. Only a minority, 12% of the team players have well understood principles of fluid and electrolyte consumption. 20% of the players could correctly list the preference for match day competition meal: pre competition, during competition and post competition. The players revealed coaches and parents as their source of knowledge along with magazines, internet and newspaper articles. Players agreed that they require specialized nutrition strategies and supported the need for nutrition communication package to help them achieve success.

Similar results were suggested by Wali (2013), Supriya and Ramasawami (2013), Torres-McGehee *et al* (2012). The overall mean nutrition knowledge score was 7.63± 1.69 (Wali, 2013). The subjects lacked basic knowledge regarding the role of macro nutrients and micro-nutrients in the body and efficacy of supplements, but had adequate information regarding strategies for detecting thirst, fluid replenishment, and the negative effect of dehydration on performance at baseline. Lack of basic nutritional knowledge may have profound implications on food choices, performance, and overall health ofathletes. Overall, the change in nutrition knowledge scores indicated that nutrition education delivered in a small group setting and reinforced at the training table meal significantly increased the nutrition knowledge scores of collegiate football players (Wali, 2013). Supriya and Ramasawami (2013) suggested the main source of nutrition information was from coaches (56%) and magazines (30%). Carbohydrate loading was under reported by the athletes (22%). KAP score demands nutrition education to be implemented for the athletes to have a better physical performance. In a study by Torres-McGehee *et al*, 2012. The participants were asked to answer questions on basic nutrition knowledge, supplements and their relationship to performance, weight management, and hydration. To have adequate nutrition knowledge, the participants needed to score at least a 75% in all domains (with the highest possible score being 100%). This study found that the participants had an

average score of 68.5% in all domains. football players did not have complete knowledge regarding the role of macro-nutrientsfor performance and that nutrition education improved their understanding.

Adequate Nutrition Education is very essential to provide the young Indian football players with the correct fuel for having the winning edge. Hence, certain key considerations were made for *improving the overall performance*:Awareness about nutrition needs to be created, Authority should organize nutrition education workshops for football players on regular intervals, nutrition camps can be organized along with tournaments when all the teams of different regions participate, a sports nutritionist should be appointed as a consultant for all nutrition related queries, players should be asked to frequently visit and get their individualized dietary meal pattern from the nutritionist, a canteen with healthy foods for pre competition, during the competition and post competition should be made available to avoid junk food consumption, a provision of sports drink or water should be done to make sure there is no drop in the level of performance of the players when they practice or compete in hot and humid climate.We perceive that on prioritizing the implementation of these suggestions the football players will give the finest performance.

Conclusion

This comprehensive Nutrition Communication Package including "Benchmark principles to victory" can be an ideal training material for Football team and can be modified based on the requirement of individual sport in India.

References

1. Elliot DL, Moe EL, Goldberg L, DeFrancesco CA, Durham MB, Hix-Small H. Definition and Outcome of a Curriculum to Prevent Disordered Eating and Body-Shaping Drug Use. *J School Health. 2006; 76: 67-73.*
2. Wali Rida. A Pilot Program To Evaluate the Effect of Training Table-Based Nutrition Education and Menu Modification on the Nutrition Knowledge and Dietary Intake of Collegiate Football Players at a NCAA Division I University. *Proc SNAC Sports Nutrition Conference; 2013: 78-79.*
3. Supriya V and Ramaswami L. Knowledge, Attitude And Dietary Practices Of Track And Field Athletic Men And Women Aged 18-22 Years. *International Journal of Innovative Research & Development.* 2013; 2(11): 399-404. *ISSN: 2278 – 0211.*
4. Torres-McGehee TM, Pritchett KL, Zippel D, Minton DM, Cellamare A, & Sibilia M. Sports Nutrition Knowledge Among Collegiate Athletes, Coaches, Athletic Trainers, and Strength and Conditioning Specialists. *Journal of Athletic Training*. 2012; 47(2): 205-211.

Review Article

International Journal of Food, Nutrition and Dietetics

Volume 2 Number 2, May-August 2014

A Study on Anthropometry and Dietary Habits of Female Employees Working in Call Centre

Shivani Sharma*, Vandana Bharti**

Abstract

Women working in IT sector are reported to have various health issues, due to shift hours they are unable to cope up with stress, tend to eat wrong kind of food without following a improper dietary regime and therefore suffer from obesity and other related problems at an early age. In this study 150 call centre female employees were selected randomly for the purpose through medical assistance in the form of physical health check up camp in the vicinity of call centre. The demographic information and dietary habits details were collected through a questionnaire and employees were screened for anthropometry assessment. Standard measures were used for taking measurements (Ht., Wt., BMI, Waist & Hip mts. and WHR (Waist Hip ratio). Descriptive statistics such as mea , frequencies and % were used to describe the association of the variables. The study found that the employees were aged between (18-35yrs), out of which 45 (30%) females were found doing morning duty and 42 evening shifts (28%) and 35(23%) doing night shifts and 28(19%) day duty. (30%) females had one year experience with the company and 80(53.3%) females worked for five days a week and rest six to seven days i.e. 50 (33.3% & 13.3%) respectively . The data revealed that there are no fixed timings of taking their meals while on shift as well as on off days. Consumption of alcohol and smoking found to be 20-30% for those consuming daily. The dietary practices showed uncertain meal timings followed by no meal pattern fixed, intake of fried food, bakery products and beverages found to be significant (including alcoholic and non alcoholic beverages) along with smoking habit . The anthropometric measurements revealed that the mean height and weight observed was 159.7 cms and 55.5kgs . The mean BMI was 22.81kg / m^2. whereas the average of WHR was found to be 0.90 cms. This indicated that most of the females fall under normal weight category but the WHR value indicates the prevalence of unacceptable ratio of WHR . 80 (53.3%) females belonged to normal weight category, whereas (12.6% & 5.3%) i.e. 43 and 19 females belonged to Grade I obesity and underweight category respectively. Only 8 (5.3%) belonged to Grade II obesity respectively .

Keywords: Call centre; Dietary habits; BMI; WHR.

Introduction

With the help of technology, activities are no longer confined to a particular place or time, a phenomenon that is clearly illustrated by call centres (Ccs). The use of call centres by the business community has already become a common phenomenon in both developed and developing countries. In recent years, the call centre industry has experienced a phenomenal growth worldwide (AS Saber, *et al*, 2004).[3] The call centre industry is one of the most rapidly growing in the developed world today (Staples, Dalrymple & Phipps, 2001).[9] Business processing outsourcing organizations commonly known as call centre-work when rest of the India sleeps. There is a graveyard shift starting at 4 am. Working in such shifts having odd timings have started showing hazardous results on the health of Indian youth (K Tamizharasi *et al,* 2012).[10] According to a survey of 100 women, the average age group of women working in call centre is 18-30 yrs, which include those who

Author's affiliation: *Research Scholar, **Asstt. Professor, Dept. of Home Science, Govt. Maharani Laxmi Bai Girls PG College, Fort Indore, MP, India.

Corresponding Author: Shivani Sharma, Research Scholar, Dept. of Home Science, Govt. Maharani Laxmi Bai Girls PG College, Fort Indore, MP, India.

E-mail: ssharma319@rediffmail.com

are just school pass, graduates and even housewives. Hence, call centers have emerged as the most sought after workplace for Indian women in recent times. Due to intensive work pressure, requiring high levels of concentration, the performance of employees deteriorates, also performing one type of activity throughout the day. Long hours of work, permanent night shifts, incredibly high targets, health problems have become a major issue. 75% of women working in call centers have a direct effect on their health as working night shifts was upsetting their biological clock. Lack of physical activity, sedentary life style and irregular working hours leads to skipping of meal and eating wrong kind of food available in the cafeteria of the call centre is a common practice of employees further leading weight gain most of the times or loss of weight leading to malnutrition due to irregular schedules. Binging on junk food is a common practice in call centers. According to a study by Boyce *et al,(*2007)[8] on relationship between physical activity, weight gain and occupational health among call centre employees, The study revealed that 68% of the employees gained weight at an average of 7.3 kg in only eight months. Weight gain as of 2.3 kg has been shown to contribute to worsening health status and to increase risk of diabetes regardless of BMI.Similarly 18% of obesity have been reported by ASSOCHAM amongst the corporate employees (Ahmed *et al,2009).*[2] The ASSOCHAM (2012) interacted with over 3000 employees in the age group of 22 to 30 years representing various business process outsourcing (BPO) companies. Over half of respondents said that due to 24X7 working environment and irregular food timings they directly place orders to fast food outlets, street food vendors and roadside eateries, serving ready to eat high calorie processed food items like noodle,burgers, pizza, bhelpuri, chaat, potato chips, wafers, vada pav, sev puri, golgappa's and fried stuff like samosas, pakoras, along with carbonated, aerated drinks, coffee and masala tea. All this leading to health problems like obesity, diabetes, HTN, depression, anxiety and CVD (www.newswala.com/.../Chronic-lifestyle-hits-Indias-IT-workforce-ASSOCHAM). Hunt's research over four years found some evidence of concern from management about healthy food snacks because staff tended to be overweight which could be attributable to stress and the sedentary nature of the work (Hunt, 2008).[4] One more study on beverages it was found that highly caffeinated drinks are a staple of BPO workers diets, the UP study revealed.In all, 2/3rd of young workers drink coffee daily, but call centre workers drink more coffee than their non – call centre counterparts (2-3 cups a day for call centre workers vs 1-7 cups for the latter). More call centre workers also consume tea (¼ of respondents compared to non-call centre workers (only 1/5). The study also revealed that half of young workers drink soda daily, at an average of 1.5 bottles/ cans a day, regardless of group.However, energy drinks are not as popular. Only 15% of young workers drink energy drinks daily. The study showed that 24% of the call center agents studied were either overweight or obese. This lends support to the findings of Tunajeck *et al,* (2007) that night shift work can lead to weight gain and obesity. Most of the call centre agents said they engaged in physical activity but described their level of physical activity every day. The study revealed that most of the call centre agents did not have regular time in taking their meals. Majority of them did not take breakfast, lunch and dinner on time due to their erratic schedule, although half (51%) of them work 3 or more meals a day. Results showed that frequently consumed food by the call centre agents were meal/ poultry/followed by cereal/ cereal products then sweets/desserts. Similarly, in a study by Marcos and Mariano *et al, (*2008)[6] on eating habits and health of call centre employees assigned on graveyard shift, no serious health risks have been found to be relate to the employees eating habits.

Materials and methods

The study was conducted on young female employees working in a call centre of

Table 1.1: BMI Classification by WHO

BMI	VALUE (Kgs/ m^2)
Underweight	< 18.5
Normal weight	18.5- 24.9
Overweight	25.0- 29.9
Obese I	30.0- 34.9
Obese II	35- 39.9
Obese III	= >40.0

Source: Adapted from WHO, 1995, WHO, 2000 and WHO 2004.

Gurgaon. The sample of 150 females was collected randomly through Medical assistances in the form of routine Health Check up camp. The employees were screened for anthropometric measurements (Ht., Wt., BMI, Waist and Hip mts. and WHR). The anthropometric measurements were made through standard procedures. The information related to dietary practices and food habits was collected through questionnaire method. Body mass index of subject was determined by using formula:

BMI = Weight in kgs / Height in m^2

Waist to Hip Ratio

The predominant distribution of fat in an obese person, whether in upper part or the lower part of the body may determine the disease pattern, but with upper body obesity the ratio is 0.85 in women and greater than 1.0 in males. Abdominal obesity does not always go hand with overweight or obesity.

The normal Waist / Hip Ratio = 0.7

BMI criteria used to screen for weight categories given by WHO was used.

Results and Discussion

In this study the response rate was 100%. The results and analysis of the subjects is as follows:

A. Demographic Profile

The ages of respondents ranged from 18-35 years.The mean age was 24 yrs.Wherein 81 (54%) of the employees belonged to age group (20-25 yrs), 49 (32.7%) within the range of 25-30yrs,14 in the age group 18-20yrs (9.3%) and 6 (4%)within 30-35 yrs age group. Most of the females were single / unmarried (67.3%) and rest married. The maximum strength of the employees possess masters degree 40% and rest were graduates (15.3%), under graduates (8%) and high schoo l 7.3%.

B. Work Related Profile

In this study 50 females (33.4%) had work experience of minimum six months and 45 (30%) females had experience of an year, 35 (23.3%) reported to be working with the company for about two to three years and 20 (13.3%) with an experience of an year or two. The total duration of breaks was around 2 to 3 for a span of twenty minutes. 80 (53.3%) females worked for five days a week and rest six to seven days i.e. 50 (33.3% & 13.3%) respectively. The study found that 45 (30%) females were on morning duty and 42 evening shifts (28%) and 35 (23%) doing night shifts and 28 (19%) day duty.

Table 1.2: The Waist to Hip Ratio Table Gives General Guidelines for Acceptable Levels for Hip to Waist Ratio

	Acceptable		Unacceptable		
	Excellent	Good	Average	High	Extreme
Male	<o.85	0.85-0.90	0.90-0.95	0.95-1.00	>1.00
Female	<0.75	0.775-0.80	0.80-0.85	0.85-0.90	>0.90

Fig 1.1: Showing Anthropometric Measurements of Employees

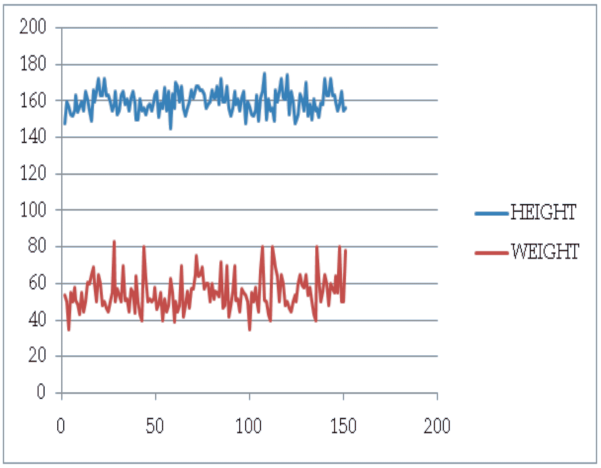


Fig 1.2: Showing BMI Status of Female Employees

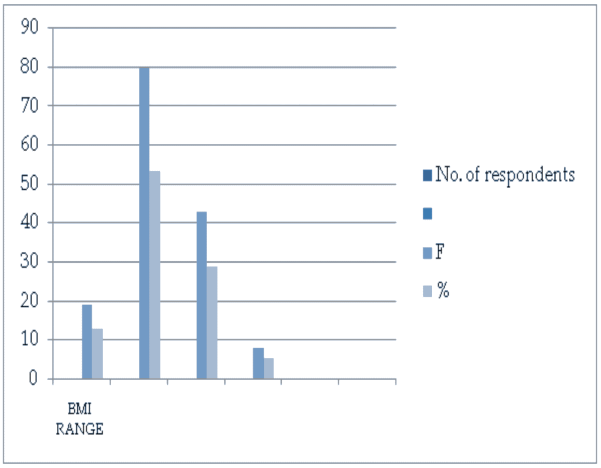


Fig 1.3: Showing Hip and Waist Measurements along with WHR

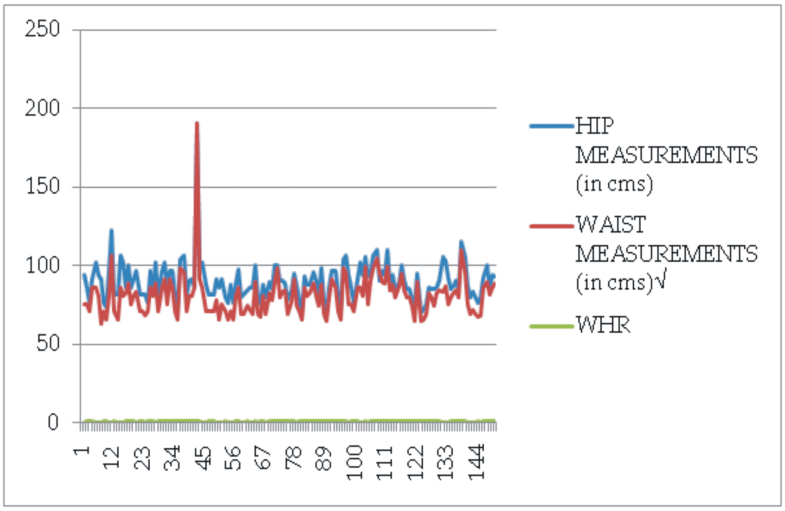


Table 1.3: Dietary Habits of Female Employees

Variables	Intake							
Items	0-1 times/d	2-3 times/d	5 times /d	more than 5 times /d	Once a day	5-7 times/wk	2-4 times/wk	once a wk
Cold Drinks	117	28	3	2				
%	78%	18.65	2%	1.30%				
Fried Foods	82	51	9	8				
%	54.60%	34%	6%	5.30%				
Tea/ Coffee	66	63	13	8				
%	44%	42%	8.60%	5.30%				
Bakery Products					39	39	13	59
%					26%	26%	8.60%	39.30%

Table 1.4 (a) & (b): Meal Intake Pattern

Variables	No. of respondents	one meal	two meals	three meals	four meals
No. of meals on week days	Frequency	11	34	56	49
	%	7.30%	22.60%	37.30%	32.60%
No.of meals on off days	F	26	44	36	44
	%	17.30%	29.30%	24%	29.30%

Variables		No. of respondents	%
Time gap between two meals	4hrs	49	32.66667
	6hrs	56	37.33333
	8hrs	34	22.66667
	10hrs	11	7.333333
Meal timings	Certain	47	31.33333
	Uncertain	103	68.66667
Habits – a)Alcohol	Once a wk	10	6.65
	Daily	30	20%
	Never	110	73.3%
b) Smoking	Once/d	20	13.3%
	Twice/d	15	10%
	Never	115	76.6%

C. Anthropometry Assessment

The mean height and weight observed was 159.7 cms and 55.5kgs. The mean BMI was 22.81kg/m² which means majority of the females belonged to normal weight category. Whereas the average of WHR was found to be 0.90 cms. This indicated that most of the females fall under normal weight category but the WHR value indicates the prevalence of unacceptable ratio of WHR. The data revealed that out of 150 females 80 of them were normal weight category (i.e.53.3%), 43 belonged to Grade I Obesity and rest 19 females (12.6% & 5.3%) and 8 females belonged to underweight and grade II obesity respectively. The % of females having normal WHR was found very less (i.e. 0.6% & 2.6%) with the ratio of <0.75 to 0.775-0.80 and rest falling within the range of 0.80 to more than 0.90**.** Similar, kind of results were found by Adala *et al*, (2007)[1] in a selected contact centre found that 75% of its employees have normal BMI while the rest are either overweight, obese or underweight based on the BMI classification for adults.

D. Dietary Habits

A lot of difference was found in there meal intake pattern during working days as well as on off days. It was found that maximum meals were consumed during weekdays i.e. three to four meals (37.3% and 32.6%) respectively, where as the percentage was less (i.e. 24% & 29.30%) respectively, on off days. Where one or two meals are concerned the % was higher in off days (i.e. 17.30% & 29.30%) respectively and vice versa during weekends (7.30% and 22.60%) respectively.

Whereas the meal timings are concerned, it was found that the gap between the two meals was around 6hrs and % of females falling under this category reported to be higher i.e. 37.3%. Rest said that the gap varies from 4 hrs to 10 hrs. (32.6%, 22.6% and 7.3%) respectively. because of their erratic schedule meal timings were not fixed. 68% said three meals are uncertain and 31.3 % said o have fixed meal timings. According to an article in Philippines newspaper (2010) Less regular

meal timings and high consumption of caffeinated drinks and fast food characterize the diet of workers in the business process outsourcing (BPO) industry, revealed that less than half of call centre workers (47%) regularly eat 3 meals a day. The study also revealed that compared to other workers, more female call centre workers skip meals – 40% skip breakfast, 20% skip lunch, and 16 % skip dinner. The study also found out that there is a " high level of consumption of chips, burgers, fries and fried chicken " among the workers, but there was a fewer number of them who consume instant noodles and street food regularly.

Excessive work pressure and odd work timings led many females indulge into smoking and alcoholism. 20% females consumed alcohol on daily basis and 10% on weekly basis. smoking habit was found to be 13.3% for those who did smoking once a day and 10% for those doing it twice week. Rest remained away from the two bad habits and the ratio was comparatively higher i.e. 73,3% (non – alcoholic) and 76.6% (non smoking).

The dietary habits of females included the intake of hot and cold beverages, alcohol and smoking habit along with intake of junk foods. It was found that 96.65% of females were in the habit of drinking cold drinks out of which 78% consumed only once a day and 18.6% consumed 2-3 times / day. Rest 2% consumed 5 times a day and 1.30% more than 5 times a day. The intake of tea coffee was also found higher. 44% consumed tea / coffee once a day and 42% 2-3 times / day. Only 6% and 5.30% were found drinking tea / coffee 5 times / day or more than 5 times / d, respectively.

The consumption of fried food was also high in these employees. 82 (54.6%) females said they consume fried foods 0-1 times daily, 54 (34%) females reported to consume 2-3 times a day and 9(6%) said they take five times a day and 5.3% consumes more than five times / daily. Bakery products consumption was found to be 26% regular eaters, 25% had baked items such as pastries etc. 5-7 times a week, 8.6% had 2-4 times a week and 39.3% consumes only once a week or less. Similar kind of study conducted by choudhry *et al*, (2009), on food habits and nutritional assessment among computer professionals, reveal skipping of breakfast (36%), skipping of meals (28%), changed food habits (48%), vegetarian food habits (45%), consumption of alcohol of more than 150 ml / day (1%) intake (185).

Acknowledgement

The authors are thankful to the hospital and the call centre for providing us the opportunity to conduct the research in their organization.

References

1. Adala KB, Bolinguit EAB, Echon MAP, Vinluan KCJ. Nutritional status of call centre agents aged 20 -35 years at a selected company. Manila: University of the Philippines; 2007.
2. Ahmed, Nusrat. ASSOCHAM E co Pulse Study: Corporate Social Responsibility 2008- 09. SASSOCHAM Research Bureau; 2009.
3. As-Saber SN, Holland P & Teicher J. Call Centres in India : An Eclectic Phenomenon in Global Human Resource Management. ***Labour and Industry.*** 2004; 14(3).
4. Hunt V. Call Centre Work Careers for Women Exploring the Work Experience of Women Working In New Zealand call centres. Auckland: University of Auckland; 2008.
5. Kesavachandran C, Rastogi SK, Das M, Khan AM. Working conditions and health among employees at information technology - enabled services: A review of current evidence. *Indian J Med Sci [serial online].* 2006 [cited 2014 Jun 6]*;* 60: 300-7.
6. Marcos EB, Mariano MR. Dig n the graveyard shift: a study on eating habits of call centre agents. University of Philippine. *Journal of Philippine Science Letters.* 2008.
7. NASSCOM-McKinsey Report 2005. Extending India's Leadership of the Global IT and BPO IndustriesAvailablefrom:http: / / www.mckinsey.com / locations / india / mckinseyonindia / pdf / nasscom_mckinsey_report_2005.pdf(accessed

2012-03-31).

8. Robert W Boyce, Edward L Boone, Brian W Cioci, Albert H Lee. Physical activity, weight gain and occupational health among call centre employees. *Occupational Medicine.* 2008; 58(4): 238. Academic Journal.
9. Staples WJS, Dalrymple JF & Phipps K. Excellence in Call Centres: access is corporate responsibility. Paper presented at the *6th International Conference on ISO 9000 and TQM.* 2001. School of Business – HKBU (ISBN 962-86107-2-4).
10. Uma Rani R, Tamizharasi K, & Saravanan M. Management of stress among employees in BPO using clustering algorithm. *CIIT International Journal.* 2012.
11. http://www.mckinsey.com/locations/india/mckinseyonindia/pdf/nasscom_mckinsey_report_2005.pdf(accessed 2012-03-31).
12. www.newswala.com/.../Chronic-lifestyle-hits-Indias-IT-workforce-ASSOCHAM.
13. http://apps.who.int/bmi/index.jsp?introPage=intro_3.html.

Guidelines for Authors

Manuscripts must be prepared in accordance with "Uniform requirements for Manuscripts submitted to Biomedical Journal" developed by international committee of medical Journal Editors.

Types of Manuscripts and Limits

Original articles: Up to 3000 words excluding references and abstract and up to 10 references.

Original articles: Up to 2500 words excluding references and abstract and up to 10 references.

Case reports: Up to 1000 words excluding references and abstract and up to 10 references.

Online Submission of the Manuscripts

Articles can also be submitted online from http://www.rfppl.com (currently send your articles through e-mail attachments)

I) First Page File: Prepare the title page, covering letter, acknowledgement, etc. using a word processor program. All information which can reveal your identity should be here. use text/rtf/doc/PDF files. Do not zip the files.

2) Article file: The main text of the article, beginning from Abstract till References (including tables) should be in this file. Do not include any information (such as acknowledgement, your name in page headers, etc.) in this file. Use text/rtf/doc/PDF files. Do not zip the files. Limit the file size to 400 kb. Do not incorporate images in the file. If file size is large, graphs can be submitted as images separately without incorporating them in the article file to reduce the size of the file.

3) Images: Submit good quality color images. Each image should be less than 100 kb in size. Size of the image can be reduced by decreasing the actual height and width of the images (keep up to 400 pixels or 3 inches). All image formats (jpeg, tiff, gif, bmp, png, eps etc.) are acceptable; jpeg is most suitable.

Legends: Legends for the figures/images should be included at the end of the article file.

If the manuscript is submitted online, the contributors' form and copyright transfer form has to be submitted in original with the signatures of all the contributors within two weeks from submission. Hard copies of the images (3 sets), for articles submitted online, should be sent to the journal office at the time of submission of a revised manuscript. Editorial office: **Red Flower Publication Pvt. Ltd., 48/41-42, DSIDC, Pocket-II, Mayur Vihar Phase-I, Delhi – 110 091, India, Phone: 91-11-22754205, 45796900, Fax: 91-11-22754205, E-mail: redflowerppl@vsnl.net.**

Preparation of the Manuscript

The text of observational and experimental articles should be divided into sections with the headings: Introduction, Methods, Results, Discussion, References, Tables, Figures, Figure legends, and Acknowledgment. Do not make subheadings in these sections.

Title Page

The title page should carry

1) Type of manuscript (e.g. Original article, Review article, Case Report)
2) The title of the article, which should be concise, but informative;
3) Running title or short title not more than 50 characters;
4) The name by which each contributor is known (Last name, First name and initials of middle name), with his or her highest academic degree(s) and institutional affiliation;
5) The name of the department(s) and institution(s) to which the work should be attributed;
6) The name, address, phone numbers, facsimile numbers and e-mail address of the contributor responsible for correspondence about the manuscript;
7) The total number of pages, total number of photographs and word counts separately for abstract and for the text (excluding the references and abstract);
8) Source(s) of support in the form of grants, equipment, drugs, or all of these;
9) Acknowledgement, if any; and
I0) If the manuscript was presented as part at a meeting, the organization, place, and exact date on which it was read.

Abstract Page

The second page should carry the full title of the manuscript and an abstract (of no more than 150 words for case reports, brief reports and 250 words for original articles). The abstract should be structured and state the Context (Background), Aims, Settings and Design, Methods and Material, Statistical analysis used, Results and Conclusions. Below the abstract should provide 3 to 10 keywords.

Introduction

State the background of the study and purpose of thestudy and summarize the rationale for the study or observation.

Methods

The methods section should include only information that was available at the time the plan or protocol for the study was written such as study approach, design, type of sample, sample size, sampling technique, setting of the study, description of data collection tools and methods; all information obtained during the conduct of the study belongs in the Results section.

Reports of randomized clinical trials should be based on the CONSORT Statement (http://www.consort-statement.org). When reporting experiments on human subjects, indicate whether the procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional or regional) and with the Helsinki Declaration of 1975, as revised in 2000 (available at http://www.wma.net/e/policy/17-c_e.html).

Results

Present your results in logical sequence in the text, tables, and illustrations, giving the main or most important findings first. Do not repeat in the text all the data in the tables or illustrations; emphasize or summarize only important observations. Extra or supplementary materials and technical details can be placed in an appendix where it will be accessible but will not interrupt the flow of the text; alternatively, it can be published only in the electronic version of the journal.

Discussion

Include summary of key findings (primary outcome measures, secondary outcome measures, results as they relate to a prior hypothesis); Strengths and limitations of the study (study question, study design, data collection, analysis and interpretation); Interpretation and implications in the context of the totality of evidence (is there a systematic review to refer to, if not, could one be reasonably done here and now?, what this study adds to the available evidence, effects on patient care and health policy, possible mechanisms); Controversies raised by this study; and Future research directions (for this particular research collaboration, underlying mechanisms, clinical research). Do not repeat in detail data or other material given in the Introduction or the Results section.

References

List references in alphabetical order. Each listed reference should be cited in text (not in alphabetic order), and each text citation should be listed in the References section. Identify references in text, tables, and legends by Arabic numerals in square bracket (e.g. [10]). Please refer to ICMJE Guidelines (http://www.nlm.nih.gov/bsd/uniform_requirements.html) for more examples.

Standard journal article

[1] Flink H, Tegelberg Å, Thörn M, Lagerlöf F. Effect of oral iron supplementation on unstimulated salivary flow rate: A randomized, double-blind, placebo-controlled trial. J Oral Pathol Med 2006;35:540-7.

[2] Twetman S, Axelsson S, Dahlgren H, Holm AK, Källestål C, Lagerlöf F, et al. Caries-preventive effect of fluoride toothpaste: A systematic review. Acta Odontol Scand 2003;61:347-55.

Article in supplement or special issue

[3] Fleischer W, Reimer K. Povidone iodine antisepsis. State of the art. Dermatology 1997;195 Suppl 2:3-9.

Corporate (collective) author

[4] American Academy of Periodontology. Sonic and ultrasonic scalers in periodontics. J Periodontol 2000;71:1792-801.

Unpublished article

[5] Garoushi S, Lassila LV, Tezvergil A, Vallittu PK. Static and fatigue compression test for particulate filler composite resin with fiber-reinforced composite substructure. Dent Mater 2006.

Personal author(s)

[6] Hosmer D, Lemeshow S. Applied logistic regression, 2nd edn. New York: Wiley-Interscience; 2000.

Chapter in book

[7] Nauntofte B, Tenovuo J, Lagerlöf F. Secretion and composition of saliva. In: Fejerskov O, Kidd EAM, editors. Dental caries: The disease and its clinical management. Oxford: Blackwell Munksgaard; 2003. p. 7-27.

No author given

[8] World Health Organization. Oral health surveys - basic methods, 4th edn. Geneva: World Health Organization; 1997.

Reference from electronic media

[9] National Statistics Online—Trends in suicide by method in England and Wales, 1979-2001. www.statistics.gov.uk/downloads/theme_health/HSQ20.pdf (accessed Jan 24, 2005): 7-18. Only verified references against the original documents should be cited. Authors are responsible for the accuracy and completeness of their references and for correct text citation. The number of reference should be kept limited to 20 in case of major communications and 10 for short communications.

More information about other reference types is available at www.nlm.nih.gov/bsd/uniform_requirements.html, but observes some minor deviations (no full stop after journal title, no issue or date after volume, etc).

Tables

Tables should be self-explanatory and should not duplicate textual material.

Tables with more than 10 columns and 25 rows are not acceptable.

Number tables, in Arabic numerals, consecutively in the order of their first citation in the text and supply a brief title for each.

Explain in footnotes all non-standard abbreviations that are used in each table.

For footnotes use the following symbols, in this sequence: *, ¶, †, ‡‡,

Illustrations (Figures)

Graphics files are welcome if supplied as Tiff, EPS, or PowerPoint files of minimum 1200x1600 pixel size. The minimum line weight for line art is 0.5 point for optimal printing.

When possible, please place symbol legends below the figure instead of to the side.

Original color figures can be printed in color at the editor's and publisher's discretion provided the author agrees to pay

Type or print out legends (maximum 40 words, excluding the credit line) for illustrations using double spacing, with Arabic numerals corresponding to the illustrations.

Sending a revised manuscript

While submitting a revised manuscript, contributors are requested to include, along with single copy of the final revised manuscript, a photocopy of the revised manuscript with the changes underlined in red and copy of the comments with the point to point clarification to each comment. The manuscript number should be written on each of these documents. If the manuscript is submitted online, the contributors' form and copyright transfer form has to be submitted in original with the signatures of all the contributors within two weeks of submission. Hard copies of images should be sent to the office of the journal. There is no need to send printed manuscript for articles submitted online.

Reprints

Journal provides no free printed reprints, however a author copy is sent to the main author and additional copies are available on payment (ask to the journal office).

Copyrights

The whole of the literary matter in the journal is copyright and cannot be reproduced without the written permission.

Declaration

A declaration should be submitted stating that the manuscript represents valid work and that neither this manuscript nor one with substantially similar content under the present authorship has been published or is being considered for publication elsewhere and the authorship of this article will not be contested by any one whose name (s) is/are not listed here, and that the order of authorship as placed in the manuscript is final and accepted by the co-authors. Declarations should be signed by all the authors in the order in which they are mentioned in the original manuscript. Matters appearing in the Journal are covered by copyright but no objection will be made to their reproduction provided permission is obtained from the Editor prior to publication and due acknowledgment of the source is made.

Abbreviations

Standard abbreviations should be used and be spelt out when first used in the text. Abbreviations should not be used in the title or abstract.

Checklist

- Manuscript Title
- Covering letter: Signed by all contributors
- Previous publication/ presentations mentioned Source of funding mentioned
- Conflicts of interest disclosed

Authors

- Middle name initials provided.
- Author for correspondence, with e-mail address provided.
- Number of contributors restricted as per the instructions
- Identity not revealed in paper except title page (e.g. name of the institute in Methods, citing previous study as 'our study')

Presentation and Format

- Double spacing
- Margins 2.5 cm from all four sides
- Title page contains all the desired information. Running title provided (not more than 50 characters)
- Abstract page contains the full title of the manuscript
- Abstract provided: Structured abstract provided for an original article.
- Key words provided (three or more)
- Introduction of 75-100 words

- Headings in title case (not ALL CAPITALS). References cited in square brackets
- References according to the journal's instructions

Language and grammar

- Uniformly American English
- Abbreviations spelt out in full for the first time. Numerals from 1 to l0 spelt out
- Numerals at the beginning of the sentence spelt out

Tables and figures

- No repetition of data in tables and graphs and in text.
- Actual numbers from which graphs drawn, provided.
- Figures necessary and of good quality (color)
- Table and figure numbers in Arabic letters (not Roman).
- Labels pasted on back of the photographs (no names written)
- Figure legends provided (not more than 40 words)
- Patients' privacy maintained, (if not permission taken)
- Credit note for borrowed figures/tables provided
- Manuscript provided on a CDROM (with double spacing)

Submitting the Manuscript

- Is the journal editor's contact information current?
- Is a cover letter included with the manuscript? Does the letter

1. Include the author's postal address, e-mail address, telephone number, and fax number for future correspondence?
2. State that the manuscript is original, not previously published, and not under concurrent consideration elsewhere?
3. Inform the journal editor of the existence of any similar published manuscripts written by the author?
4. Mention any supplemental material you are submitting for the online version of your article?

Contributors' Form (to be modified as applicable and one signed copy attached with the manuscript)

Revised Rates for 2014 (Institutional)

Title	Freequency	Rate (Rs): India	Rate ($):ROW
Dermatology International	2	2500	280
Gastroenterology International	2	3500	360
Indian Journal of Agriculture Business	2	4500	300
Indian Journal of Anatomy	2	3200	260
Indian Journal of Ancient Medicine and Yoga	4	6600	330
Indian Journal of Anesthesia and Analgesia	2	4000	600
Indian Journal of Anthropology	2	8000	500
Indian Journal of Applied Physics	2	3500	400
Indian Journal of Biology	2	1500	170
Indian Journal of Cancer Education and Research	2	4500	500
Indian Journal of Communicable Diseases	2	1000	58
Indian Journal of Dental Education	4	3200	288
Indian Journal of Forensic Medicine and Pathology	4	12500	576
Indian Journal of Forensic Odontology	4	3200	288
Indian Journal of Genetics and Molecular Research	2	5000	262
Indian Journal of Law and Human Behavior	2	5000	500
Indian Journal of Library and Information Science	3	7500	600
Indian Journal of Maternal-Fetal & Neonatal Medicine	2	4500	400
Indian Journal of Mathematics and Statistics	2	3000	200
Indian Journal of Medical & Health Sciences	2	1800	120
Indian Journal of Obstetrics and Gynecology	2	2000	200
Indian Journal of Pathology: Research and Practice	2	3000	915
Indian Journal of Plant and Soil	2	5000	1700
Indian Journal of Preventive Medicine	2	3200	270
Indian Journal of Reproductive Science and Medicine	4	3000	180
Indian Journal of Scientific Computing and Engineering	2	3300	280
Indian Journal of Surgical Nursing	3	1800	70
Indian Journal of Trauma & Emergency Pediatrics	4	6500	302
International Journal of Agricultural & Forest Meteorology	2	8000	800
International Journal of Food, Nutrition & Dietetics	2	3200	900
International Journal of History	2	6000	500
International Journal of Neurology and Neurosurgery	2	7500	276
International Journal of Political Science	2	5000	400
International Journal of Practical Nursing	3	1500	70
International Physiology	2	4000	240
Journal of Animal Feed Science and Technology	2	3500	280
Journal of Cardiovascular Medicine and Surgery	2	5500	238
Journal of Orthopaedic Education	2	2500	190
Journal of Pharmaceutical and Medicinal Chemistry	2	3000	350
Journal of Psychiatric Nursing	3	1800	70
Journal of Social Welfare and Management	4	6600	276
Meat Science International	2	5000	500
Microbiology and Related Research	2	3800	150
New Indian Journal of Surgery	4	6500	360
Ophthalmology and Allied Sciences	2	3000	150
Otolaryngology International	2	2000	300
Pediatric Education and Research	4	3200	150
Physiotherapy and Occupational Therapy Journal	4	7000	360
Urology, Nephrology and Andrology International	2	2200	350

Terms of Supply:

1. Advance payment required by Demand Draft payable to Red Flower Publicaion Pvt. Ltd. payable at Delhi.
2. Cancellation not allowed except for duplicate payment.
3. Agents allowed 10% discount.
4. Claim must be made within six months from issue date.

Order from

Red Flower Publication Pvt. Ltd., 48/41-42, DSIDC, Pocket-II, Mayur Vihar Phase-I, Delhi - 110 091 (India), Tel: 91-11-22754205, 45796900, Fax: 91-11-22754205. E-mail: redflowerppl@vsnl.net, redflowerppl@gmail.com, Website: www.rfppl.org

International Journal fo Food, Nutrition and Dietetics

Library Recommendation Form

If you would like to recommend this journal to your library, simply complete the form below and return it to us. Please type or print the information clearly. We will forward a sample copy to your library, along with this recommendation card.

Please send a sample copy to:

Name of Librarian

Library

Address of Library

Recommended by:

Your Name/ Title

Department

Address

Dear Librarian,

I would like to recommend that your library subscribe to the **International Journal of Food, Nutrition and Dietetics**. I believe the major future uses of the journal for your library would be:

1. As useful information for members of my specialty.
2. As an excellent research aid.
3. As an invaluable student resource.
4. **I have a personal subscription and understand and appreciate the value an institutional subscription would mean to our staff.**
5. Other

Should the journal you're reading right now be a part of your University or institution's library? To have a free sample sent to your librarian, simply fill out and mail this today!

Stock Manager

Red Flower Publication Pvt. Ltd.

48/41-42, DSIDC, Pocket-II, Mayur Vihar, Phase-I

Delhi - 110 091 (India)

Tel: 91-11-22754205, 45796900, Fax: 91-11-22754205

E-mail: redflowerppl@gmail.com, redflowerppl@vsnl.net

Website: www.rfppl.org

Subscription Form

I want to renew / subscribe to international class journal **"International Journal of Food, Nutrition and Dietetics"** of Red Flower Publication Pvt. Ltd.

Subscription Rates:

• India: Institutional: Rs.3200, Individual: Rs.1000, Life membership (10 years only for individulas) Rs.5000.
• All other countries: $900

Name and complete address (in capitals):

Payment detail:
Demand Draft No.
Date of DD
Amount paid Rs. / USD

1. Advance payment required by Demand Draft payable to Red Flower Publicaion Pvt. Ltd. payable at Delhi.
2. Cancellation not allowed except for duplicate payment.
3. Agents allowed 10% discount.
4. Claim must be made within six months from issue date.

Mail all orders to

Red Flower Publication Pvt. Ltd.
48 / 41-42, DSIDC, Pocket-II, Mayur Vihar Phase-I, Delhi - 110 091 (India)
Tel: 91-11-22754205, 45796900, Fax: 91-11-22754205
E-mail: redflowerppl@vsnl.net, redflowerppl@gmail.com
Website: www.rfppl.org

Instructions to Authors

Submission to the journal must comply with the Guidelines for Authors.

Non-compliant submission will be returned to the author for correction.

To access the online submission system and for the most up-to-date version of the Guide for Authors please visit:

http://www.rfppl.org

Technical problems or general questions on publishing with IJFND are supported by Red Flower Publication Pvt. Ltd's Author Support team (http://ww.rfppl.org)

Alternatively, please contact the Journal's Editorial Office for further assistance.

A Lal

Publication -in-Charge

International Journal of Food Nutrition adn Dietetics

Red Flower Publication Pvt. Ltd.

48/41-42, DSIDC, Pocket-II

Mayur Vihar Phase-I

Delhi – 110 091

India

Phone: 91-11-22754205, 45796900, Fax: 91-11-22754205

E-mail: redflowerppl@gmail.com, redflowerppl@vsnl.net

Website: www.rfppl.org

Call for Reviewers

International Journal of Food, Nutrition & Dietetics (IJFND) (ISSN 2322-0775), a broad-based peer-reviewed journal publish the most exciting researches with respect to the subjects of nutrition and food sciences. The journal covers current thinking on food and nutrition emphasizing the practical and social application of ideas. Special editions focusing on topics including micronutrients, special diets for management of health problems and cost sector catering provide readable content that is an invaluable resource for practitioners and academics wishing to inform themselves, their colleagues, or the public on modern thinking, research, and attitudes to food and nutrition.

Readership: Academics and researchers in the field, Dietitians, Food company managers, Food research institutes, Health care professionals, Nutritionists

Indexing Information: ProQuest, USA, Genamics JournalSeek.

One must have at least five years of experience in the field after completion of the education in that field and at least five original research papers in journal(s).

Please note that the acceptance of your application will be at the sole discretion of the editors.

Please provide your complete information and affiliation in brief through e-mail or you can register your self on our website www.rfppl.org.

For more information, please contact:

Publication–in-charge

Red Flower Publication Pvt. Ltd.

48/41-42, DSIDC, Pocket-II

Mayur Vihar Phase-I

Delhi – 110 091

India

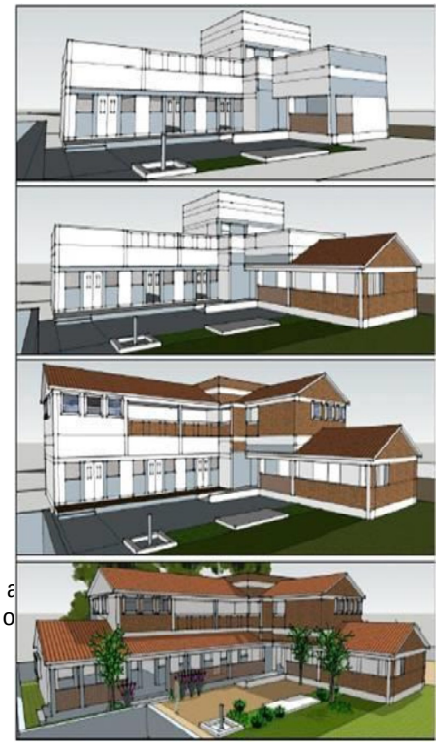
Phone: 91-11-22754205, 45796900, Fax: 91-11-22754205

E-mail: redflowerppl@vsnl.net, redflowerppl@gmail.com

Website: www.rfppl.org

HELP THESE INDIAN CHILDREN TO BUILD THEIR OWN FUTURE!

Over 250 children in Belsar village in India, in the backwards rural District of Gonda in Uttar Pradesh (see map) will be without a school building by the end of this school year… unless we help them to pay for building materials for a new school building. Parents who are masons, carpenters and others are committed to give their free time to help and construct the building. World Without Obstacles – a registered NGO – with support of friends and family enabled this initiative.



For many years WWO already works together with a small primary school called Gurukul Children Academy. The school is financially independent from the NGO in its day-to-day operations. WWO helps to increase quality of education and health of children and their families. We already designed a future vision together with an architect and the school Principal. During school hours the new building will be used to educate 300 children and after hours WWO will give health info-sessions and vocational skill trainings to adults from the village. The multi-functional building will also be used as a regional office and accommodation for volunteers of the NGO. This will allow WWO to reach out to even more people in Belsar and Gonda District.

In total we need about INR 52 lakh to realise the complete multi-functional school building with 10 class rooms. One class room on average costs around INR 4 lakh. Phase 1 was partly financed via a global online crowd funding campaign. To allow the children continuity of education in the next school year we need to complete construction

of phase 1 before monsoon. This includes the foundation, five class rooms, a
concerns the sanitation facilities for which we hope to receive a contributio

Your support is much appreciated!

For more information: www.worldwithoutobstacles.org