Research Reach

Journal of Home Science

Vol.7, No.2 July, 2008

Research Centre,
College of Home Science,
Nirmala Niketan
49, New Marine lines,
Mumbai - 400 020.

RESEARCH REACH

JOURNAL OF HOME SCIENCE

Vol. 7, No.2 **July, 2008**

Research Centre,
College of Home Science,
Nirmala Niketan,
49, New Marine Lines,
Mumbai-400 020.

For Subscription to the journal and other particulars, kindly contact:

The Principal,
College of Home Science,
Nirmala Niketan,
49, New Marine Lines,
Mumbai-400 020,
India.
Email: journal@nirmalaniketan.com OR
nn_rc@rediffmail.com
Website: nirmalaniketan.com
Tel. No: 22076503 / 22007544

RESEARCH REACH

JOURNAL OF HOME SCIENCE

EDITORIAL

The July 08 issue of Research Reach comprises of research articles from three key areas of Home science, carried out by researchers from the universities in the south (Chennai, Bangalore, Coimbatore) and West (Baroda & Rajasthan) of India. The Indian health scenario is dominated by an outbreak of chronic degenerative diseases, and cardio vascular diseases are a major concern. The paper by Anandhi Narain and V.Shyamala examines the nutritional profile and the risk factors in adults with cardio vascular diseases. Breakfast, the first meal, that breaks the overnight fast has often been cited as "the most important meal of the day". It's impact on the performance of school children has been elucidated by Vidya Narasimhan and Shiela John. Two major social malpractices widely prevalent in India are food adulteration and substance abuse and these social issues are addressed in the papers by Nayak et al & Mathur et al. The paper by Harapriya Nayak, Kamal G. Nath and Kavita, S. discusses the use of non-permitted & permitted colors in beverages and confectionaries sold in the Bangalore Market. Meena Mathur, Shubha Dube, Karuna Sharma and Geetika Bhargava have identified the nature of substance abuse among male post-graduate students residing in hostels in Jaipur. Starting an enterprise has always been a challenging task and generation of finances for the same has been a key problem area for most entrepreneurs. The paper by Neena Jaju, Nidhi Jain and Priyanka Arora provides a comprehensive summary of the problems & the problem solving strategies of the entrepreneurs during the procurement and repayment of finances.

This issue also provides details of an on-coming National seminar (NAAC sponsored) on "innovative practices for excellence in higher education" being organized by college of Home Science, Nirmala niketan in the month of November. For details refer to page: 51

Chief Editor,
Dr. Malathi Sivaramakrishnan.

INSTRUCTIONS TO THE AUTHORS

Home Science Research Journal is devoted to original Research and Development in all branches of Home Science. It is a bi-annual publication from the Research Centre of College of Home Science, Nirmala Niketan, 49, New Marine Lines, Mumbai – 400020.

The format of the journal includes:

1. Review paper on specific topics of current trends pertaining to Home Science. It should be a mini review with around 12-16 typed pages.
2. Research papers with a maximum of 6-10 pages
3. Research notes limited to a maximum of 2-4 typed pages
4. Paper / Book Review of not more than 1 typed page each.

Font: Times New Roman 11

Submission of papers:

Kindly provide e-mail ids to speed up communication.
The paper can be sent by e-mail i.e. to **journal@nirmalaniketan.com or nn_rc@rediffmail.com** or on a CD. Along with the soft copy, also send 2 hard copies (printed on one side). Please follow the model from Research Reach. The article should cover:
Title page: Title of the paper, the names of authors and the name of the department should be given
Abstract: Give an abstract of about 100-150 words reporting concisely the objectives, approach and the principal findings.
Text: The text can follow the abstract in the same page with introduction, materials and methods, results, discussion, acknowledgement, if any and references.
References: should be cited at the appropriate point in the text by giving author's name and year. Follow a standard journal such as JFST for citing references.
Example: Machado P, and Prakash J (2006) Morbidity profile and prevalence of anemia in Indian Women From a rural coastal community J. Food Sci. Technol. Nepal, Vol 2, 53-56

The data reported should be authentic and original with clear objectives, materials used, methods employed and the results obtained. It should not have been published or offered for publication elsewhere. **The author should give an undertaking in writing to this effect.**

The editorial board deserves the right to edit the manuscripts in order to make them suitable for publication in the journal and the judgment of the reviewing expert regarding the quality of the paper is final.

Information / Views / Data published in the journal are of the authors only.

RESEARCH REACH
JOURNAL OF HOME SCIENCE

Volume 7 Number 2 July 2008

CONTENTS PAGE NOS.

RESEARCH PAPERS

Impact of Skipping Breakfast on the Performance of School Children

Vidya Narasimhan and Sheila John*
*S.G. Lecturer, Women's Christian College, Chennai, Tamil Nadu

A study on the breakfast patterns and its impact on the nutritional status, physical, cognitive and academic performance of school children (11-14 years) were done. Five hundred school children from three different schools were selected, and a sub sample of 50 breakfast consumers and skippers were chosen at random for the study. Demographic data, lifestyle, income and family history of the selected subjects were elicited. Anthropometric measurements, physical performance and cognitive performance of the samples were evaluated using appropriate tools. Food and nutrient intake of subjects was elicited using a three-day dietary recall method. The academic performance was evaluated using marks and attendance of subjects. School children who consumed breakfast had better nutritional profiles in comparison to their breakfast skipping peers. Results of the study also indicate that breakfast consumption enhances the body's capacity to perform various physical activities and also improves cognition and academic performance of school children.

KEY WORDS: School children, breakfast, nutritional status, anthropometry, physical activity, cognition, academic performance.

Schooling is a very important aspect in every child's life. Although many ways to promote greater student performance have been tried, not many realize the importance of healthy lifestyle habits, particularly eating breakfast. It is vital for providing a continuous source of energy for growth, play and work. The nutritional significance of breakfast can hardly be undermined. Breakfast eating helps children form healthy eating habits and supports nutritional intake and maintains healthy body weight.

A good breakfast provides complex carbohydrates, which are slow to release their energy into the body. It will keep one going until lunch providing energy needed for work or study. Breakfast consumption leads to proper food choices and reduces risk of obesity (Foryet and Goodrick, 1993). It also provides large amounts of Vitamin C, D and various B vitamins that have been implicated in the reduction of heart diseases and other health problems (Ludwig et al., 1999).

Children who skipped breakfast tend to under perform and also have behavioural problems such as fighting, stealing and not listening to their teachers (Klienman, 1998). Skipping breakfast also leads to impaired ability to concentrate, decreased ability to learn, increased stress hormones, emotional arousal, higher accident rate, fatigue and decreased performance (Boutelle et al., 2002).

MATERIALS AND METHODS

The present study was undertaken to elicit information on the breakfast consumption patterns of school children and to analyze the proportion of nutrients contributed by breakfast in meeting the Recommended Dietary Allowances for the day. The study also examines the association of breakfast intake with nutritional adequacy, body mass index, physical, cognitive and academic performance

STUDY DESIGN

The study was carried out in four different phases.

PHASE I

The study was carried out in three different schools in Chennai. The schools were selected based on the convenience and easy access of the investigator. The authorities of the institution were cooperative and permitted to conduct the study. A survey design was adopted to identify regular breakfast consumers (children who consumed breakfast everyday) and breakfast skippers (children who did not consume breakfast more than 4 days a week), from the 500 school children. From these 50 breakfast consumers and 50 breakfast skippers were selected at random for the study.

PHASE II

Demographic data, lifestyle, income and family history of subjects were elicited using a questionnaire. Anthropometric measurements of samples were ascertained. This included height and body weight measurements, waist and hip measurements, body mass index, waist-to-hip ratio, percent of body fat, and skin fold measurements.

Food and nutrient intake of subjects was elicited using a three day dietary recall method. The amount of food eaten by the participants was weighed using standard cup and spoon measures to ensure accuracy. Standard probes were used to respond to questions and to clarify incomplete responses. To minimize defaults, labels and label pictures were used to help describe foods. Food records were coded and analyzed for nutrients using food works / college software. Macronutrients like energy, carbohydrates, fat, sugar, fiber and micronutrients such as calcium, Zinc, Vitamin A, Vitamin C, riboflavin and iron were calculated from the nutrient compositional analysis of the three day food records and the intake was averaged for three days.

The nutrient intake of breakfast consumers and breakfast skippers was compared and a relationship between breakfast consumption and nutritional adequacy was established.

PHASE III

a. ASSESSMENT OF PHYSICAL ACITIVITY

Physical performance with regard to specific sports events and stamina was evaluated. The various activities that were performed by the subjects included

- **Endurance test** – Endurance includes aerobic energy and is the most important aspect of common fitness. Endurance was measured using Squat Thrust test. It is to measure the general muscular endurance of the body on the floor. (Egger et al., 1999).

- **Strength test**– Body strength was assessed using the push-ups test. The purpose of the push-up test is to assess upper body muscle strength. (Nieman, 1995).
- **Flexibility test**– Flexibility was measured using the floor touch test with regard to flexibility. It is to measure trunk flexibility or length of the back and hamstring muscles. (Margaret, 1986).
- **Speed test**– The speed of an individual was assessed using 50-yard dash test. It is used to measure speed of a person (Margaret, 1986).

The performance of subjects was then related to the consumption and skipping of breakfast and the two groups were compared.

b. **COGNITIVE AND ACADEMIC PERFORMANCE**:

The role of breakfast in enhancing cognitive, academic performance and school attendance was studied. This study focused on the differences in cognitive performance between breakfast consumers and breakfast skippers. The beneficial effects of breakfast consumption on academic and achievement test scores grades and school attendance was studied. Cognitive performance was assessed using a questionnaire for various variables such as memory of letters and pictures, problem solving, reading and listening comprehension. The academic performance was evaluated using terminal exam marks and terminal attendance of subjects (a term comprised of three months). These performances were compared between both the groups.

PHASE IV

Nutritional adequacy, body weight, cognitive and academic performance between breakfast consumers and breakfast skippers was compared. A nutrition education program was formulated and conducted to create awareness and highlight the importance of breakfast consumption among school children. The program consisted of an informative talk on nutrition accompanied with visual aids such as charts, posters and models which aimed to create awareness on importance of breakfast among school children, which in turn would help to create good eating practices and bring about an attitude change in young children.

The posters and charts used consisted of the food pyramid indicating basic five food groups, a balanced diet, daily food requirements, Recommended Dietary Allowances, importance of breakfast consumption, consequences of skipping breakfast and a few simple breakfast items.

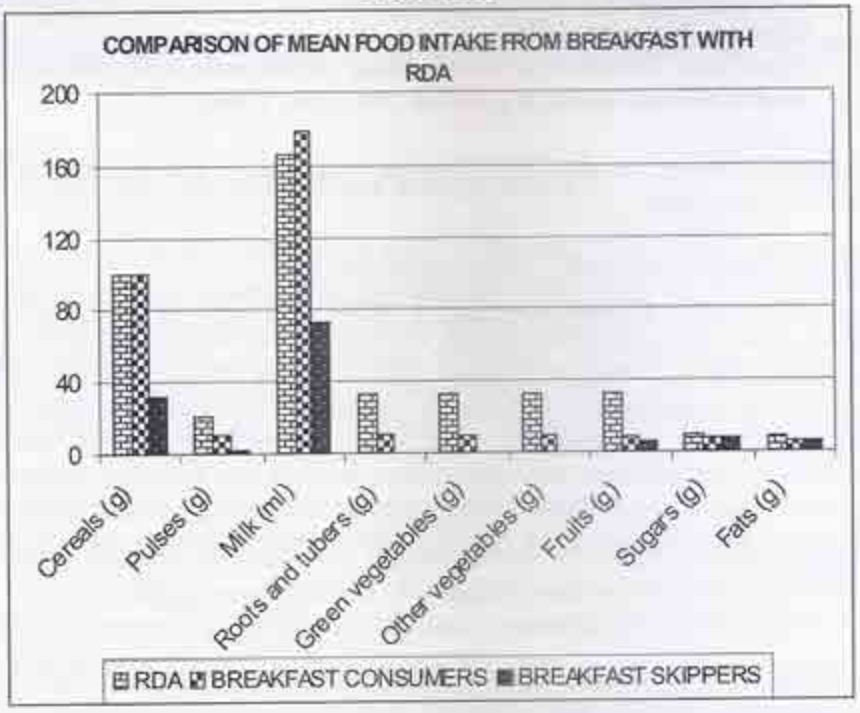
RESULTS AND DISCUSSION

The nutritional needs are adequately met through the RDA. The Recommended Dietary Allowance (RDA) represents the level of intake of the nutrients, which children in each age group require for optimal health ($1/3^{rd}$ RDA for Breakfast and Tea)

FOOD INTAKE – BREAKFAST

Comparison of mean food intake for breakfast between breakfast consumers and breakfast skippers is presented in figure 1

FIGURE 1



There was a significant difference in the consumption of cereals, pulses, milk and fruits of the breakfast skippers compared to the RDA, while for the breakfast consumers there was no significant difference in the consumption of cereals and pulses. This is because breakfast skippers generally tend to replace their morning meals by mere consumption of sweetened beverages instead of breakfast. Whereas breakfast consumers generally had a judicious combination of cereals and pulses during breakfast like idly, dosai or pongal combination of rice and dhal.

There is a significant difference in the consumption of roots and tubers and vegetables compared to RDA among the breakfast skippers. This is because children as they grow up tend to go through a "fussy-eating phase" and begin to develop strong likes and dislikes towards particular food items especially that of fruits, green leafy vegetables and other vegetables. This deficit in roots and tubers and other vegetables could be made up by consuming a vegetable based preparation for tea, and also by incorporating vegetables into their favorite dishes.

Habitual breakfast skippers fail to consume adequate amounts of foods. This leads to a cumulative deficiency of the nutrients supplied by these foods. Recent literature supports the fact that nutrient losses in the morning cannot be compensated during the day. Breakfast consumption does make a significant contribution to the individuals mean daily nutrient intake.

NUTRIENT INTAKE - BREAKFAST

The mean daily intake of nutrients for breakfast calculated from the daily food intake for the subjects are presented figure 2, 3 and 4.

FIGURE 2

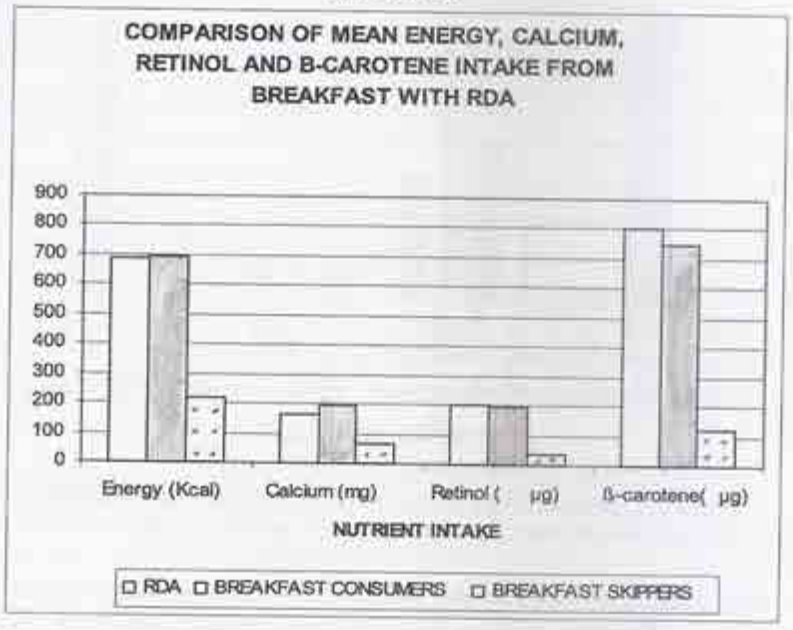


FIGURE 3

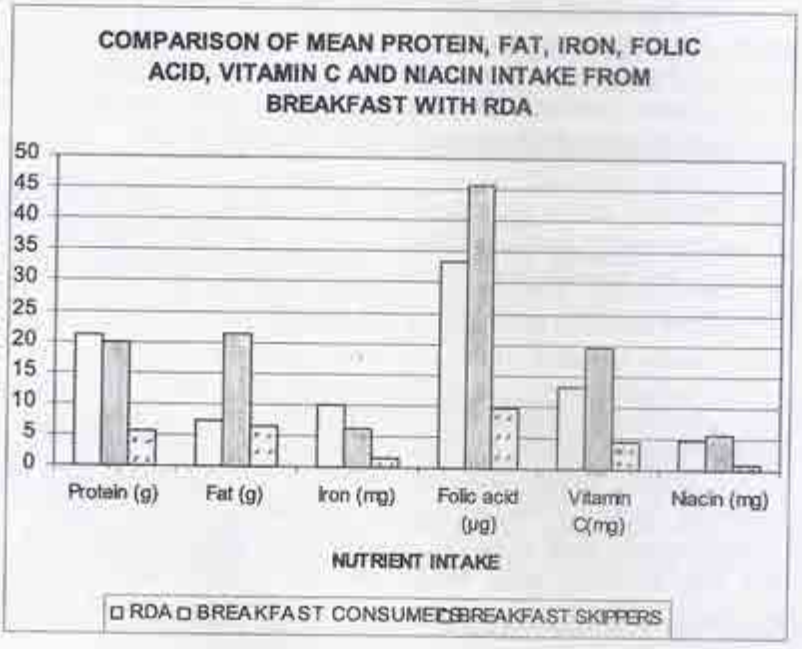
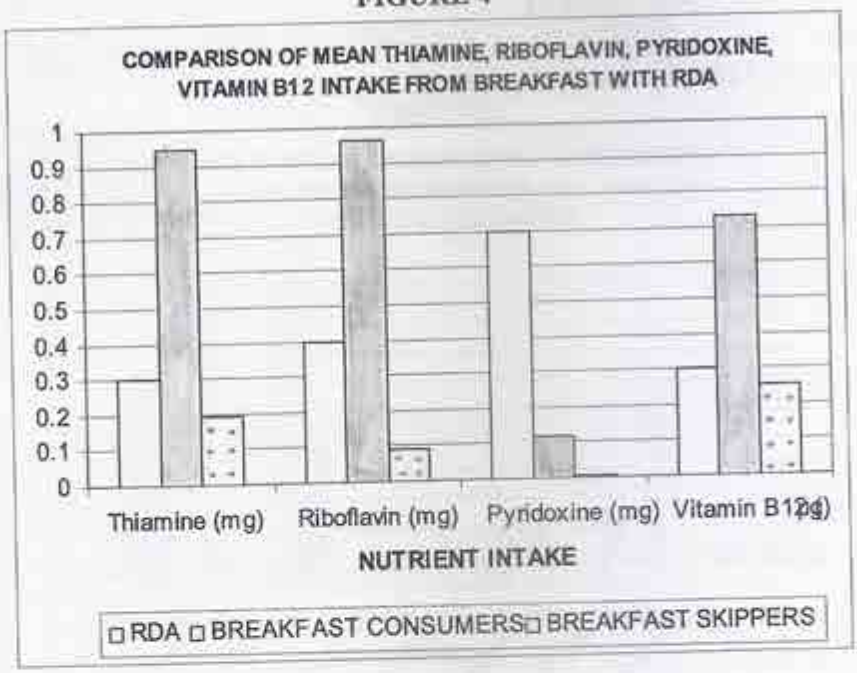


FIGURE 4



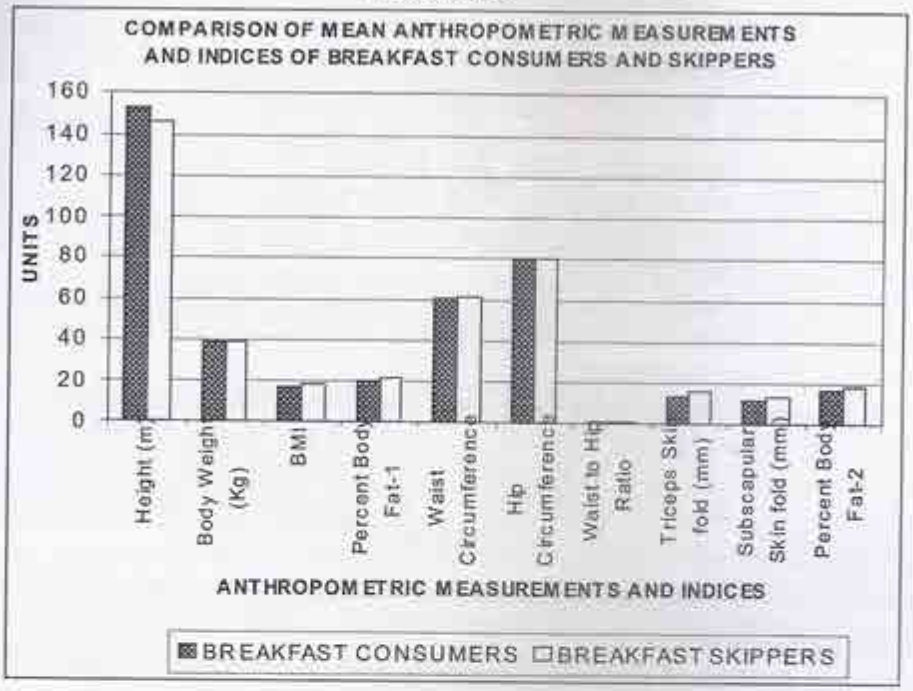
Results indicate that when compared to the RDA there was significant difference in intake of riboflavin at 5 percent and energy, protein, calcium, iron, retinol, ß-carotene, niacin, pyridoxine, folic acid and vitamin C at 1 percent level for the breakfast skippers. Whereas for the breakfast consumers there was no significant difference in the intake of calories, protein, calcium, retinol, ß-carotene, thiamine, riboflavin, niacin, folic acid, vitamin B12 and vitamin C. There was a significant difference in the intake of iron and fat at 5 percent and pyridoxine at 1 percent level for the breakfast consumers. Nutrients like iron are vital in providing proper nourishment and thereby prevent the onset of anaemia in young children and adolescents.

Studies reveal that breakfast eaters have higher daily intakes of micronutrients and are more likely to meet the nutrient intake recommendations compared to breakfast skippers (Hanes et al., 1984). Reported energy and micronutrient intakes were widely influenced by habitual breakfast consumption (Friedman and Hurd – Crixell 1999). The present findings are in line with these studies.

ANTHROPOMETRIC MEASUREMENTS AND INDICES

Anthropometric data are most valuable when they reflect accurate measurements and are recorded over a period of time. Height, weight, skin-fold measurements and other girth measurements are some of the common valuable measurements (Williams, 1994). Statistics pertaining to anthropometric measurements such as height, body weight, BMI, percent body fat-1 (calculated using BMI), waist, hip, waist-hip ratio, triceps and sub scapular skin fold measurements and percent body fat-2 (calculated using skin fold measurements) are presented in figure 5

FIGURE 5



- **Height** –It was observed that the mean height for breakfast consumers was 1.52m and breakfast skippers were 1.45m. The difference in height was significant at 1 percent level between the two groups. Breakfast consumers were found to be taller in comparison to the breakfast skippers. This is due to the higher intake of nutrients by breakfast consumers, and breakfast skippers having skipped breakfast did not make up for the nutritional losses during the rest of the day.
- **Body Weight** – The body weight observed for the breakfast consumers and breakfast skippers were 39.18kg and 39.00kg respectively. There was no significant difference in the mean values for weight between the two groups.
- **Body Mass Index** – On comparing the BMI of breakfast consumers and breakfast skippers, it was observed that breakfast consumers had a lower BMI, and it was significant at 5 percent level. Significant associations between breakfast consumption and body weight have been reported (Cho et al., 2003). A higher intake of energy at breakfast is associated with lower BMI (Summerbell et al., 1996). Findings of Wolfe et al (1994) indicate that the Body Mass Index (BMI's) or weights of children and adolescents are higher than those who consume breakfast on a regular basis. Body Mass Index of breakfast skippers tended to increase steadily compared to that of breakfast eaters (Berkey et al., 2003). Other studies also reveal that girls who ate breakfast more consistently had lower BMI. (Affenito et al., 2005). The present findings are in line with these studies.
- **Percent Body Fat** –It was observed that breakfast skippers had a consistently higher percent body fat than breakfast consumers. The difference in percent body fat was significant at 5 percent level between the two groups. Increased body fat seen in breakfast

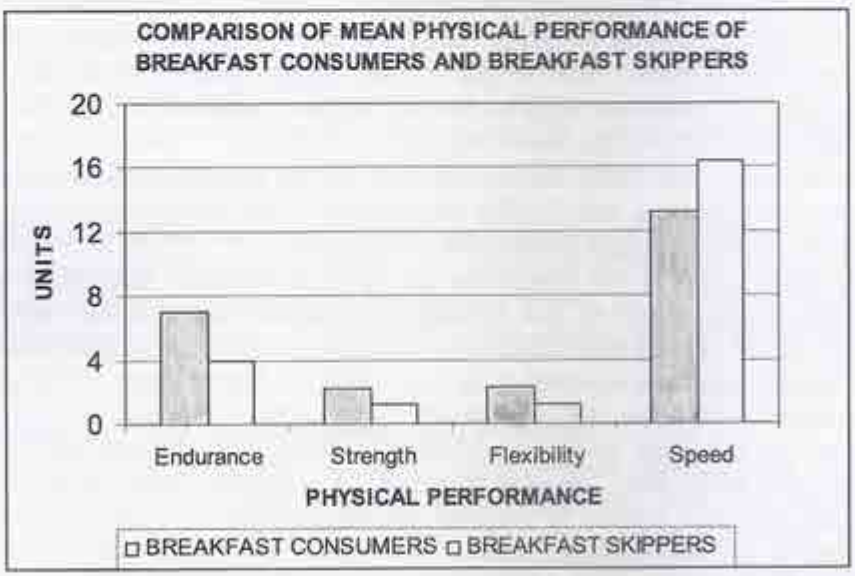
skippers is due to increased consumption of fats and sugars. Having skipped breakfast children become ravenously hungry during the later part of the day and this increases the frequency of consumption of fad foods, leading to poor food choices and improper dietary patterns like snacking between meals and binge eating.

- **Waist and Hip Circumference** – The waist circumference measurements of breakfast skippers was consistently higher than breakfast consumers. The difference in waist circumference was not significant. With regard to hip circumference, it was observed that there was a slight difference between breakfast consumers and breakfast skippers. The difference was not significant.
- **Waist to Hip Ratio** – The mean values of waist to hip ratio was similar to both the groups. The difference in waist to hip ratio between breakfast consumers and breakfast skippers was not significant.
- **Triceps and Sub Scapular Skin Fold Measurements** - In the present study, all the breakfast consumers and breakfast skippers had the triceps and sub scapular skin fold measurements less than 30 percent in terms of percent body fat calculation, indicating reduced body fat. Body composition is the proportion of muscle, bone, fat and other tissue that make up a person's total body weight

PHYSICAL PERFORMANCE

Data in relation to physical performance such as tests for endurance, strength, flexibility and speed are discussed in this section. The comparison of mean physical performance of breakfast consumers and breakfast skippers is presented in figure 6

FIGURE 6



Consumption of breakfast enhances the body's capacity to perform various physical activities through out the day (Staci and Nix, 2005). Eating breakfast may be associated with healthful behaviours, such as physical activity, which assist in control of body weight (Affenito et al.,

2005). Physical performance of an individual is commonly measured by endurance, strength, flexibility and speed.

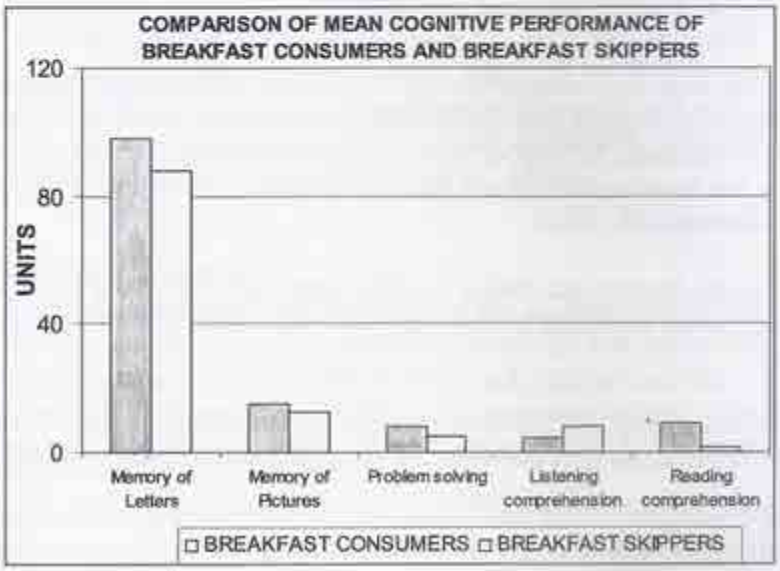
- **Endurance** – The mean endurance value of breakfast skippers was 3.98±1.61; this value was lower compared to the mean endurance value of breakfast consumers (7.00±1.59). The difference was significant at 1 percent level.
- **Strength** –Breakfast consumers have higher mean value for strength (2.24±1.70) compared to breakfast skippers, the value was 1.16±1.43. The difference between breakfast consumers and breakfast skippers was significant at 1 percent level.
- **Flexibility** –It was observed that breakfast consumers had significantly greater flexibility (2.32±3.35) compared to breakfast skippers (1.22±2.16). The difference was significant at 5 percent level.
- **Speed** –Breakfast consumers have a lower mean value (13.20±2.03) indicating less time taken to complete the test, whereas breakfast skippers have a higher mean value of 16.41±2.28. The difference between breakfast consumers and breakfast skippers was significant at 1 percent level. Breakfast consumption in school aged children reported benefits of sustaining perceived energy level throughout the morning, enhancing physical activity, and improving both energy expenditure and capacity for self control. (Vermorel et al., 2003). Breakfast skipping also has been associated with lower levels of physical activity in adolescents, which could affect energy balance and contribute to excess body weight (Aarino et al., 2002).

COGNITIVE PERFORMANCE

Findings with regard to cognitive performance such as memory of letters, memory of pictures, problem solving, listening and reading comprehension are presented and interpreted in figure 7.

Cognition is a field of thought process by which an individual processes information through skills of perception, thinking, memory, learning and attention. (Bhatnagar and Taneja 2001)

FIGURE 7



- **Memory of Letters** –A higher mean value of 97.6±4.29 for breakfast consumers when compared with breakfast skippers who have a lower mean value of 88.05±20.00 was noticed. There is a significant difference of 1 percent between breakfast consumers and breakfast skippers. This indicated the ability of the subjects to remember facts necessary in learning.
- **Memory of Pictures** –Results indicated that there is a higher mean value of 14.86±2.71 for breakfast consumers while compared with breakfast skippers 12.66±3.03. A significant difference of 1 percent was also observed. This finding indicated the ability of the subjects to remember pictorial representations presented in their regular classes
- **Problem Solving** –It is evident from figure 5 that there is a high mean value of 7.84±1.92 for breakfast consumers compared to breakfast skippers with a mean value of 5.14±1.95. A difference of 1 percent level was observed between the breakfast consumers and breakfast skippers. This showed the ability of the subjects in problem solving.
- **Listening Comprehension** –It can be seen that a low mean value of 4.52±2.64 is indicated for breakfast consumers whereas breakfast skippers have a higher mean value of 7.82±1.58 showing a significant difference of 1 percent. This was done to evaluate the ability of listening.
- **Reading Comprehension** –. A high mean value of 8.98±1.16 was observed for breakfast consumers when compared to the mean value of only 1.26±1.27 among the breakfast skippers, showing a significant difference of 1 percent.

Positive effects of breakfast have been reported on several aspects of memory function including recall (Vaisman et al., 1996), episodic memory (Wesnes et al., 2003), and both short term (Michaud et al., 1991) and long-term memory (Chandler et al., 1995). Hunger during school may prevent children in developing countries from benefiting from education (Powell et al., 1998). Findings suggest that the brain is sensitive to decreases in the short-term availability of nutrients, and that an overnight and morning fast produces a physiological state accompanied by changes in brain function, especially working memory, particularly among nutritionally at-risk children (Pollitt et al., 1996).

Breakfast is the most important meal of the day. It enhances cognitive performance and academic performance. Evidences suggest that consumption of breakfast has a short term effect on the nutritional status of children, on school attendance and probably drop out rates (Cueto, 2001). Lack of breakfast has been implicated as a factor contributing to children's poor diets and school performance (Belderson et al., 2003).

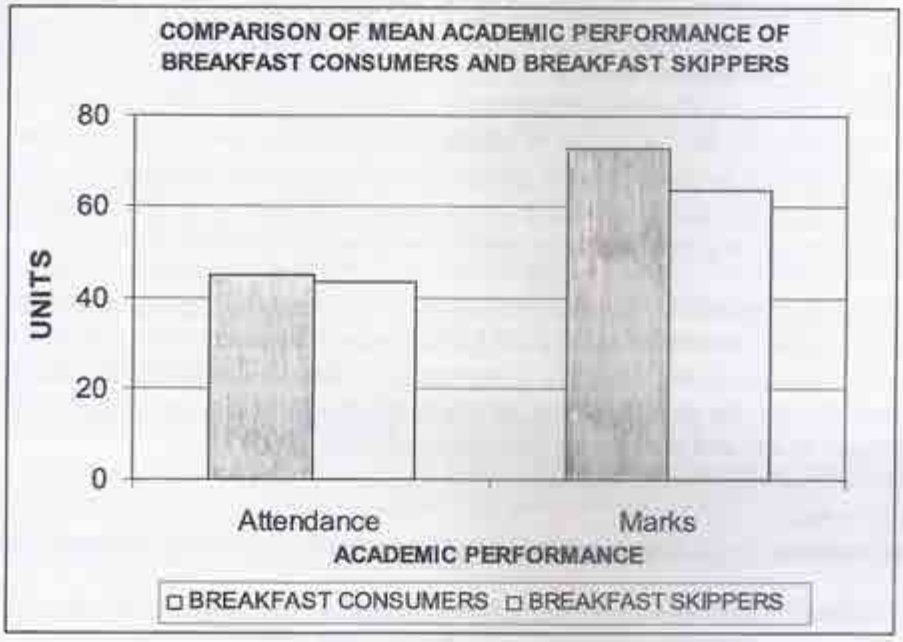
A study carried out by Benton and Parker in 1998 found that adults who ate breakfast tended to work faster, made fewer mistakes in logic test and had better memory recall compared with breakfast skippers.

The overall data and studies are highly supportive for the effects of breakfast consumption on various cognitive variables such as attention, memory, problem solving, and reading and listening comprehension.

ACADEMIC PERFORMANCE

Results pertaining to academic performance, which includes attendance and marks of the students, are presented in this section. The comparison of mean academic performance and the test of significance of breakfast consumers and breakfast skippers are presented in figure 8.

FIGURE 8



From figure 8, it is evident that there is a significant difference at 1 percent level between the breakfast consumers and breakfast skippers in terms of attendance and marks. Breakfast skippers tended to be absent more frequently in school and also did not perform as well as breakfast consumers in exams as indicated by their marks. Studies reveal a beneficial effect of breakfast consumption on academic performance and achievement test scores (Boey et al., 2003), grades (Hung et al., 2003), school attendance (Meyers et al., 1989 and Klienman et al., 2002)) and tardiness rates (Murphy et al., 1998).

SUMMARY AND CONCLUSION

Among the breakfast skippers it was found that most of the students skipped breakfast due to lack of time, getting up late, not being used to consuming breakfast and eating late night and heavy dinners. A greater percentage of the breakfast skippers had a higher incidence of symptoms such as headache, tiredness, tremors, acidity, inability to concentrate, cheilosis, glossitis, mouth sores, irritability and increased frequency of colds when compared to the breakfast consumers.

Breakfast consumers had adequate food and nutrient intake when compared with RDA whereas the food and nutrient intake of the breakfast skippers was very less when compared with the

RDA. Results of the study indicate that the breakfast skippers do not compensate on the nutrients lost by not consuming breakfast, which includes energy, protein, calcium, iron, retinol, β-carotene, thiamine, riboflavin, niacin, pyridoxine, folic acid, vitamin B_{12} and vitamin C. There was a significant difference in the nutrient intake between breakfast consumers and breakfast skippers. There was an increased intake of all foods and nutrients by the breakfast consumers compared to breakfast skippers.

A significant difference between the two groups in terms of height, Body Mass Index, triceps skin fold and sub scapular skin fold measurement showing greater obesity among the breakfast skippers was observed. Results show a significant difference between the breakfast consumers and breakfast skippers in physical performance with increased performance of the breakfast consumers compared to the breakfast skippers. The cognitive performance of the breakfast consumers was found to be much greater compared to the breakfast skippers. The attendance and the marks of the breakfast consumers were found to be higher compared to the breakfast skippers thus showing increased and good academic performance of the breakfast consumers.

Breakfast has been labeled the most important meal of the day, a good breakfast is vital for providing a continuous source of energy for growth, play and work. Eating breakfast is vital to control what is eaten all through the day. Surprisingly, what is eaten in the morning affects how full one feels at the end the day. Breakfast, as a part of a healthful diet and lifestyle, can positively impact childrens' health and well-being. (Rampersaud et al., 2005)

Definition of terms:

Breakfast consumers: Those who consume breakfast regularly (everyday) between 7.00 AM – 9.30 AM.

Breakfast Skippers: Those who do not consume breakfast in the morning everyday

Breakfast: First meal of the day had between 7:00AM - 9:30 AM

REFERENCES

Aarino. M., Winter. T., Kujala. U. and Kaprio. J. (2002). Associations of health related behaviour, social relationships and health status with persistent physical activity and inactivity. A study of Finnish adolescent twins. British Journal of Sports Medicine. 36: 360 –4.

Affenito, S.G., Thompson, D.R., Barton, B.A., Franko, D.L., Daniels, S.R., Obarzanek. E., Schreiber, G.B. and Moore, S.R.H. (2005). Breakfast consumption by African-American and white adolescent girls correlates positively with calcium and fiber intake and negatively with body mass index. Journal of the American Dietetic Association. 105(6): 938-45

Belderson. P., Harvey. I., Kimbell. R., O' Neil. J., Russell. J and Barker M.E. (2003). Does breakfast-club attendance affect school children's nutrient intake?: a study of dietary intake at three schools. British Journal of Nutrition 90(6): 1003 – 6.

Benton, D. and Parker, P. Y. (1998) Breakfast, blood glucose, and cognition. American Journal of Clinical Nutrition, Vol 67, 772S-778S

Berkey, C.S., Rockett, H.R., Gillman, M.W., Field, A.E., and Colditz. G.A. (2003). Longitudinal study of skipping breakfast and weight change in adolescents. International journal of Obstetric Related Metabolic Disorder. 27(10) : 1258 – 66

Bhatnagar, S. and Taneja, S. (2001) Zinc and Cognitive Development, British Journal of Nutrition, 85(2): S139 – S145.

Boey CC, Omar A, Phillips AJ. Correlation among academic performance, recurrent abdominal pain and other factors in Year 6 urban primary school children in Malaysia. J Pediatr Child Hlth 2003;39:352–7.

Boutelle, K. et.al. (2002). Weight control behaviour among obese, overweight and non-overweight adolescents. Journal of Pediatrics Psychology 27(6): 531-540

Chandler, A.M., Walker, S.P., Connolly, K., McGregor, S.M. (1995) School breakfast improves verbal fluency in undernourished Jamaican children. Journal of Nutrition. 125: 894 – 900.

Cho. S., Dietrich. M., Brown, C.J., Clark, C.A. and Block. G. (2003). The effect of breakfast type on total daily energy intake and body mass index: results from the Third National Health and Nutrition Examination Survey (NHANES III) Journal of American College of Nutrition 22(4): 296 – 302.

Cueto, S. (2001). Breakfast and performance. Public Health Nutrition. 4(6A): 1429 – 31.

Egger, G., Champion. N., and Bolton. A. (1999). The Fitness Leader's Handbook. 4th Ed. London: A and C Black (Publishers) Ltd., pp 30–2, 49–51, 126–7

Foryet, J. and Goodrick. K. (1993). Weight management without dieting, Nutrition Today. 28:4

Friedman, B.J., Hurd – Crixell, S.L., (1999) Nutrient intake of children eating school breakfast. Journal of American Dietetic Association. 99: 219 – 221.

Hanes, S., Vermeersch, J., Gale, S., (1984) The National Evaluation of School Nutrition Programs: Program impact on dietary intake. American Journal Clinical Nutrition: 40(2)(Suppl) : 390 – 413.

Hung HC, Merchant A, Willett W, Ascherio A, Rosner BA, Rimm E, Joshipura KJ. (2003). The association between fruit and vegetable consumption and peripheral arterial disease. Epidemiology. 14(6): 659-665.

Kleinman, R.E. (1998). Hunger in children in the United States: Potential behaviour and emotional correlates. Pediatrics. 101(1): E3

Klienman, R.E., Hall. S., Green. H., Korzec-Ramirez. D., Patton, K., Pagano, M.E., Murphy. J.M. (2002). Diet, breakfast and academic performance in children; Ann Nutr Metab, 46(Suppl) 1: 24 – 30.

Ludwig, D. S., Pereira, M. A., Kroenke, C. H., Hilner, J. E., Van Horn, L., Slattery, M. L., Jacobs, D. R. Jr (1999). Dietary Fiber, Weight Gain, and Cardiovascular Disease Risk Factors in Young Adults. JAMA 282: 1539-1546

Meyer, A.F., Sampson, A.E., Weitzman, M., Rogers B.L. and Kayne. H. (1989) School breakfast program and school performance. American Journal of Disabled Children. 143 : 1234–1239

Michaud, C., et.al. (1991). Effects of breakfast size on short term memory, concentration, mood and blood glucose. Journal of Adolescence Health.12(1): 53–57

Murphy, M., Pagano, M., Nachmani, J. Sperling, P., Kane, S. (1998). The relationship of school breakfast to psychological and academic functioning. Achieves of Pediatric Adolescent medicine.152: 897 – 909.

Neiman, D.C. (1995). Fitness and Sports Medicine-A Health Related Approach 3rd ed. California: Mayfield Publishing Company, pp 159-50, 255, 267.

Pollitt, E., Jacoby, E., Cueto. S. (1996). School breakfast and cognition among nutritionally at risk children in the Peruvian Ands. Nutritional Reviews 54:S22-S26

Powell, C.A., Walker, S.P., Chang, S.M., and McGregor. G.S.M. (1998). Nutrition and Education: a randomized trial of the effects of breakfast in the rural primary school children. American Journal of Clinical Nutrition. 68(4): 873–9

Rampersaud, G.C., Pereira, M.A., Girard, B.L., Adams, J. and Metzl, J.D. (2005). Breakfast habits, nutritional status, body weight and academic performance in children and adolescents. Journal of the American Dietetic Association.105(5) : 743 – 60

Safrit, J. Margaret. (1986). Introduction to Measurement in Physical Education and Exercise Science. USA: Mosby College Publishing, pp 281–2, 319–20, 336–7.

Staci and Nix (2005) Williams Basic Nutrition and Diet Therapy. 12th Ed. Missouri. Mosby Publications.

Summerbell, C., Moody, R., Shanks, J., Stock, M., Geissler, C. (1996). Relationship between feeding pattern and body mass index in 220 free living people in four age groups. European Journal of Clinical Nutrition. 50:513–519.

Vaisman, N. et.al. (1996). Effect of breakfast timing on the cognitive functions of school students. Archives of Pediatrics and Adolescence Medicine 150 (10): 1089–92.

Vermorel, M., Bitar, A., Vernet, J., Verdier, E., Coudert, J. (2003). The extent to which breakfast covers the morning energy expenditure of adolescence with varying levels of physical activity. European Journal of Clinical Nutrition.57: 310 – 315

Wesnes, K.A., Pincock, C., Richardson, D., Helm, G. and Hails, G. (2003). Breakfast reduces declines in attention and memory over the morning in school children. Appetite. 41(3): 329 – 31.

Williams. B.R., (1994) Essentials of Nutrition and Diet therapy, Sixth Ed., pg. 309 – 311, 95.

Wolfe WS, Campbell CC, Frongillo Jr EA, Haas JD & Melnik TA (1994): Overweight schoolchildren in New York State: prevalence and characteristcs. Am. J. Public Health 84, 807–813.

A STUDY ON THE NUTRITIONAL PROFILE AND CARDIOVASCULAR DISEASE RISKS AMONG THE ADULT POPULATION

Anandhi Narain* and Ms.V.Shyamala**
**Reader, Department of Nutrition and Dietetics,*
PSG College of Arts and Science, Coimbatore -14
***Practicing Dietitian*

A study on the "Nutritional Profile and Cardiovascular Disease Risks Among the Adult Population" was undertaken. Out of the total 200 individuals selected 119 male and 81 female were found to be having CVD risks. Seventy eight per cent of the selected male and 58 per cent of female were in high-risk group. Men below 40 years and women above 51 years exhibited higher risk. Mean calorie and fat intake of all the risk groups exceeded RDA. The LDL Cholesterol of male was >190mg/dl and female was>100mg/dl. Total cholesterol was > 250 mg/dl in seventy five per cent of male with high risk and 46 per cent of moderate risk. Females had cholesterol >240 mg/dl. HDL cholesterol was < 40 mg/dl in 50 per cent of male under different risk category. The females had >40 mg/dl HDL level, thus putting them under low or borderline category. Sixty eight per cent of high risk male had triglyceride ranging from 200-499 mg/dl which was high and seventy five to eighty nine per cent of women in all the risk group had triglyceride ranging from 200-499 mg/dl. A significant positive correlation between intensity of risk and total cholesterol, LDL cholesterol, triglyceride, fat intake and body weight and significant negative correlation between HDL cholesterol and risk intensity in male and incase of female, significant positive correlation between risk intensity and triglyceride and negative non significant correlation with HDL cholesterol were seen. A significant positives correlation between WHR, fiber intake and tea consumption and serum ferritin in male and positive correlation between BMI, WHR, cholesterol, triglyceride and serum ferritin in female were observed.

KEY WORDS: VLDL, LDL, HDL, Cholesterol, Triglyceride, Dyslipidemics, Very Low, Low, Medium and High Risk Level,

Good health is a major resource and an important dimension of the quality of life. But in present time, changes in life style and dietary pattern arising from rapid modernization, have favored an increase in the occurrence of non-communicable, yet chronic degenerative diet related diseases, among which cardio vascular diseases occupy a primary place (Hakajima, 2000). CVD cause 12 million deaths in the world each year. They cause half of all the deaths in several developed countries and are one of the main cause of death in many developing countries and the major cause of death in adults *(European Heart Journal* 2000). In India 2.4 to 2.5 million people die each year from CVD (Gupta et al., 2001).

Major risk factors include elevated levels of LDL cholesterol, family history, age, life style changes which include lack of physical exercise, cigarette smoking, hypertension, diabetes, hyperlipidemia, obesity, stress and personality type (Spencer, 1995). Other factors that can lead to premature heart disease include, a high level of LP(a) (Sluzer et al., 1996). Homocysteine (Frolich, 1995) Serum fibrinogen (Rosengren, 1996), and Ferritin (Berge,1994).

In this pretext the present study was undertaken with the following objectives to.

- Select possible risk factors of CVD
- Categorize the individuals suffering from CVD according to the intensity of risk
- Relate risk factors with risk intensity and
- Correlate serum ferritin with established risk factors

METHODOLOGY

a. Selection of the area and subjects

Two reputed hospitals having a well-equipped cardiology unit, situated at Coimbatore were selected for the study. A total of 200 dyslipidemic individuals were selected from those attending the outpatient department over a period of three months.

b. Formulation and execution of the schedules

Interview schedules were used to collect information regarding their socio economic background, dietary habits, possible risk factors to which the CVD patients were exposed to and personal habits of these individuals.

c. Anthropometric measurements

Height and Weight were taken and body mass index was computed using the formula.

$$\mathbf{BMI} = \frac{Wt\,in\,(kg)}{Ht\,in\,(m^2)}$$

The ratio of waist to hip measurement was determined using the formula.

$$\mathbf{WHR} = \frac{Waist\,Circumference\,(cm)}{Hip\,\,Circumference\,(cm)}$$

d. Lipid profile

The levels of serum cholesterol, LDL, HDL and triglyceride were estimated using the standard procedures.

e. Classification of individuals based on risk levels

A number of cardio vascular risk factors were identified and a risk assessment scale was developed based on the scale adopted by Gupta (2000) Gupta, M.K., (2000), and Eswaran, et al (2001). This scale was administered to all the 200 individuals and on the basis of the total scores obtained they were classified under very low, low, moderate and high-risk groups.

f. Assessment of stress

A stress susceptibility chart was developed and administered to assess stress levels, based on the scores obtained they were classified under different risk levels.

g. Serum ferritin level

Serum ferritin levels of the selected individuals were analysed using ELISA technique and the results were correlated with established CVD risk factors, since higher serum ferritin concentration has been found to be associated with higher plasma triglycerides, glucose, total cholesterol and fibrinogen concentrations, systolic or diastolic blood pressure, body mass index and waist to hip ratio.

The data obtained from the study were analysed statistically using 't' tests.

RESULTS AND DISCUSSION

Grouping the Individual According to Risk Levels

The selected subjects were classified into different groups, as high risk (HR) group whose total score was more than 45, moderate risk (MR) group whose total score ranged from 31-45 and low risk (LR) group with a score between 16 -30 and very low risk (VLR) group with score between 5 to 15. The categorization is presented in Table 1.

Table 1: Categorization of the Subjects According to their Risk Levels

Gender	Risk Levels				
	VLR	LR	MR	HR	Total
Male	-	30 (41.7)	61 (67.8)	28 (77.8)	119
Female	2 (100)	42 (58.3)	29 (32.2)	8 (22.2)	81
Total	**2**	**72**	**90**	**36**	**200**

Numbers in parenthesis indicate percentage

Out of the total number of 200 members selected, 119 were males and 81 were females. More number of selected individuals were found to be in moderate risk group.

Higher percentages of male (77.8) were in high-risk group and next majority in moderate risk group, whereas more females were in low risk group.

Age and Sex

The selected persons were distributed under each category of the risk level relating to their age and sex as presented in table 2.

Table 2:Distribution of the selected subjects according to their age and sex related to risk levels

Age in years	Risk levels			
	VLR	LR	MR	HR
Male				
< 40	-	11 (36.6)	21 (34.4)	6 (21.4)
41 – 50	-	8 (26.7)	16 (26.2)	8 (28.6)
51 – 60	-	3 (10)	15 (24.6)	7 (25)
> 60	-	8 (26.7)	9 (14.8)	7 (25)
Total	-	**30**	**61**	**28**
Female				
< 40	1 (50)	6 (14.3)	2 (6.9)	2 (25)
41 – 50	-	12 (28.6)	5 (17.2)	1 (12.5)
51 – 60	1 (50)	13 (30.9)	7 (24.2)	4 (50)
> 60	-	11 (26.2)	15 (51.7)	1 (12.5)
Total	**2**	**42**	**29**	**8**

Numbers in parenthesis indicate percentage

There were more number of males below 40 years who were affected by CVD which could be due to a strong hereditary predisposition.

Fifty per cent of the selected females of the high-risk group belonged to the age group of 51 to 60 years. This could be due to the postmenopausal effect. Similarly 50 per cent of moderate risk group females' age was > 60 years.

Locality and Occupation

A predominant distribution of cardiovascular disease risks were found in urban areas compared to rural areas. Majority of the members of all the risk categories (>60 per cent) come under the sedentary working pattern, whereas only 35 to 40 per cent of those who were in moderate working category were in either low or moderate risk group. Only one percent of male heavy worker had moderate risk

Dietary Practices

Majority of the non-vegetarians were found among the different degrees of risk levels compared to vegetarians. Consumption of sweets and deep fried snacks were found to be more in high-risk group. Thirty six per cent of the high risk and 41 per cent of the moderate risk group were consuming egg daily. Thirty to thirty five percent of individuals belonging to the three risk groups were consuming butter once a week. Fifty eight per cent of high risk and sixty one per cent of moderate risk group members were consuming whole milk daily.

a. Mean Energy Intake

Mean energy intake of the selected subjects according to their risk level is given in the table-3

Table-3: Mean energy intake (kcal) of the selected subjects according to their risk levels

Risk Group	Male			Female		
	RDA *	Mean ± SD	% Deficit / excess	RDA *	Mean ± SD	% Deficit / excess
Very low risk						
Sedentary worker	2425	-	-	1875	2400 ± 400	+27.8
Moderate worker	2875	-	-	2225	-	-
Low risk						
Sedentary worker	2425	2970±593	+ 22.5	1875	2976±545	+ 58.7
Moderate worker	2875	2980±78	+ 3.9	2225	2947±474	+ 32.5
Moderate risk						
Sedentary worker	2425	3010±612	+24.1	1875	2800 ±511	+ 49.4
Moderate worker	2875	3024±626	+5.2	2225	2967±511	+ 33.3
Heavy worker	3800	1852 ± 0	-51.3	-	-	-
High risk						
Sedentary worker	2425	2955 ±578	+21.9	1875	2944±546	+ 57.0
Moderate worker	2875	2994±608	+4.1	2225	2967±584	+ 33.4

(*ICMR 1985),

The mean energy intake of males showed that except the heavy workers in the moderate risk group all the others were consuming energy more than RDA. The energy intake of the heavy workers of moderate risk groups' shows 51 per cent deficit. The energy intake of the other sedentary workers, exceed RDA by around 20 -24 per cent.

In the case of females all the risk group individuals were consuming around 32 to 58 percent excess energy compared to RDA. The excess energy intake may increase the intensity of risk levels of females

b. Mean Fat Intake

Mean fat intake of the selected subjects according to their risk level is given in the table-4

Table 4: Mean fat intake of the selected subjects according to their risk levels

Risk groups	Fat (g)			
	Male		Female	
	Mean ± SD	% Deficit/ excess	Mean ± SD	% Deficit / excess
Very low risk	-	-	30.5 ±5.5	+ 52.5
Low risk	32.91± 5.41	+64.55	26.7±5.58	+ 33.76
Moderate risk	29.87± 6.11	+49.35	27.99±4.67	+ 39.96
Higher risk	29.16±6.08	+ 45.8	33.9±5.8	+ 69.5

(*ICMR, 1995)

Both male and female members of all the risk groups showed an excess fat intake to the extent of 45 to 65 percent in males and 33 to 69 percent in females, which included the visible fat.

Hereditary Predisposition and Personal Habits

Fifty three per cent of the high risk group individuals were having family history of CVD problems wherein both the parents were involved, 50 per cent of low risk group had single parent with CVD and 41 per cent of moderate risk group had second degree relative with CVD. Brisk walking was the only type of exercise followed by moderate and low risk individuals. Only 33 per cent of high-risk group were going for walk. Hence no other physical exercises were being done. Smoking was prevalent in 67 per cent of the high-risk group. Alcohol consumption was found to be prevalent in 50 percent of all the risk groups.

Stress Susceptibility of the Individuals

Stress Susceptibility of the Individuals is given in table 5

Table 5: Classification of the subjects according to stress scores

Stress score	Risk levels			
	VLR	LR	MR	HR
<6	1(50)	12 (16.7)	11 (12.2)	1 (2.8)
6-12	-	31 (43.1)	32 (35.6)	13(36.1)
13- 19	1(50)	26 (36.1)	46(51.1)	19(52.8)
>20	-	3 (4.1)	1(1.1)	3 (8.3)
Total	**2**	**72**	**90**	**36**

Numbers in parenthesis represent percentage

Fifty three per cent of the high risk individuals had stress score ranging from 13-19, 43 per cent of the low risk individuals had stress score ranging from 6-12. This shows that a higher stress score has been associated with either high or moderate cardiovascular risk.

Body Mass Index and Waist Hip Ratio

The BMI of the selected males of high risk group showed that nearly 57 percent of them were in grade II obesity (BMI > 30) , 25 percent were in grade I obesity (BMI:25 to 30). Fifty percent of moderate risk and 40 percent of low risk group males were in grade I obesity. In females, 31 percent of high risk, were in grade I or grade II obesity and 25 percent of moderate risk and 45 percent of low risk group were in grade I obesity. The WHR of the selected males showed that 68 percent of high risk. 46 percent of moderate risk and 33 percent of low risk males were under the category of WHR ranging from 0.9 to 1.0. In females 75 percent of high risk group had waist hip ratio between 0.96 – 1.0. Hence majority of both the selected males and females had higher than the desirable WHR for Indians which is less than 0.88 for males and < 0.85 for females (Indian consensus group 1995).

Lipid Profile

The lipid profile of the selected individuals are given in Table 6

Table 6: Categorization of the individuals according to their risk level lipid classification

Categorization of lipid levels	Male				Female			
	VLR	LR	MR	HR	VLR	LR	MR	HR
LDL Cholesterol								
< 100mg/dl	-	9(30)	7(11.5)	2(7.1)	-	18(56.25)	3(10.3)	3 (37.5)
100-129mg/dl	-	11 (36.7)	16(26.2)	5(17.8)	2(100)	13(40.6)	14(48.3)	2(25)
130-159 mg/dl	-	8 (26.7)	16(26.2)	5(17.8)	-	9(28.1)	7 (24.2)	2(25)
160-189 mg/dl	-	2 (6.6)	17(28.8)	10(35.7)	-	2 (6.25)	4(23.8)	1 (12.5)
≥ 190 mg /dl	-		5 (8.2)	6(21.4)	-	-	1 (3.4)	-
Total Cholesterol								
< 200 mg /dl	-	20 (66.7	13(21.3)	1 (3.6)	1(50)	19(59.4)	4(13.8)	-
200 - 239 mg / dl	-	10(33.3)	20 (32.8)	6(21.4)	1(50)	12(37.5)	10(34.5)	2(25)
≥ 240 mg / dl	-	-	28 (45.9	21 (75)	-	11 (34.1)	15(51.7)	6(75)
HDL Cholesterol								
< 40 mg/dl	-	12(40)	31 (50.8)	16(57.1)	0	10(31.2)	18(62.1)	4(50)
40 - 60 mg / dl	-	16(53.3)	28 (45.9)	12(42.9)	2(100)	27 (84.4)	10(34.5)	4(50)
≥ 60 mg / dl	-	2 (6.7)	2(3.3)	-	-	5(15.6)	1 (3.4)	-
Triglycerides								
< 150 mg/dl	-	13(43.3)	10(16.4)	3(10.7)	1(50)	9 (28.0)	4(13.8)	-
150-199 mg/dl	-	9(30)	13(21.3)	5(17.9)	-	9 (28.0)	1 (3.4)	1 (12.5)
200 - 499 mg / dl	-	8 (26.7)	37 (60.6)	19(67.8)	1 (50)	24(75)	24 (82.8)	7(87.5)
≥ 500 mg/dl	-	-	1(1.7)	1 (3.6)	-	-	-	-

Standard values – cholesterol guidelines (National Cholesterol Education Programme, 2001).
Numbers in parenthesis indicate percentage.

Thirty five per cent of the high risk group males had LDL cholesterol ranging from 160 -189 mg/ dl, which is considered to be a high level and 21 per cent had very high LDL (≥190mg /dl).These individuals carry a risk for major coronary events. Most of the females had LDL cholesterol above 100 mg/dl and the next majority had LDL cholesterol ranging from 100-129 mg/dl, which indicated that the levels were near optimal or borderline high. Seventy five per cent of males with

high risk and 46 per cent of moderate risk were having total cholesterol above 240 mg/dl, which was high. Seventy five per cent of high risk group females, 52 per cent of moderate risk group and 34 per cent of low risk group were having total cholesterol greater than 240 mg /dl which was high. Hence the male members of the selected group showed more risk than the females. Seventy five per cent of males with high risk and 46 per cent with moderate risk were having total cholesterol greater than 250 mg/dl, which was high as quoted, by cholesterol Guidelines (2001). The females of high risk group (75 per cent) and moderate risk group(52 per cent) and low risk group(34 per cent)were having total cholesterol >240 mg/dl which is high[13]. Majority of female members under different risk groups were found to be having a higher total cholesterol level compared to the male members. The concentration of HDL cholesterol of 48 to 50 per cent of male members under the different risk category was found to be low i.e. less than 40mg/dl. Majority of the female members of the different risk groups were either having greater than 40 mg /dl HDL cholesterol or 40 to 60 mg/dl, thus putting them under low or borderline level category. Sixty eight per cent of high-risk group males and 6 per cent of moderate risk group males were having triglyceride ranging from 200 to 499 mg/dl, which is indicative of a high level. Majority (75 to 89 per cent) of the women in all the risk groups had triglyceride level ranging from 200 to 499 mg /dl.

Correlation between Risk Levels and Anthropometric Parameters, Blood Lipid Levels and Nutrient Factors

A strong relationship has been documented between CVD risk and dietary intake, lipoprotein lipid concentration and body weight. Hence an attempt was made to relate these factors with CVD risk levels as presented in table 7

Table 7:

Correlation between the Risk Levels and Certain Anthropometric Parameters, Blood Lipid Levels and Nutrient Factors

S. No	Variables studied	Male		Female	
		r	't'	r	't'
1	Height	- 0.0275	- 0.2973	0.1292	1.1580
2	Weight	0.3125	3.5562*	0.0744	0.6631
3	BMI	0.1422	1.5530	-0.0234	-0.2081
4	WHR	- 0.0533	0.5779	-.1152	-1.0308
5	Total cholesterol	0.9798	52.59*	-0.1093	-0.9773
6	HDL cholesterol	-0.2142	2.3704*	-0.2385	0.2455
7	LDL cholesterol	0.3927	4.6162*	-0.0593	-0.5280
8	Triglycerides	0.2308	2.564*	0.2431	2.2275*
9	Energy	0.1237	1.347	0.1216	1.0969
10	Fat	0.2603	3.018*	-0.1426	-1.2806
11	Carbohydrate	-0.1047	-1.1380	0.2573	2.3666*

*Significant at 5% level

A significant (5% level) positive correlation (r=0.9798) between the intensity of risk and total cholesterol, LDL cholesterol (r = 0.3927), triglyceride (r = 0.2308) and fat intake (r =0.2603) were observed in male members. A significant (5% level, t= 2.3704) negative correlation (r = -0.2142) existed between the HDL cholesterol and the risk intensity. Body weight of the males was positively correlated (r =0.3125) with risk of CVD, which was significant at 5 per cent level (t = 3.5562). In female members, triglyceride level was positively related (r = 0.2431) which was significant at 5 per cent level (t=2.2275) and HDL cholesterol exhibited a negative correlation (r=-0.2385), which was non-significant. Also, a positive correlation (r=0.2574) which was significant at 5% level (t=2.3666) existed between carbohydrate intake and risk intensity.

Correlation between Serum Ferritin and Related Risk Levels

A positive correlation between serum ferritin and BMI, WHR, exercise, LDL Cholesterol, Systolic blood pressure, fat intake, iron intake, fibre and coffee intake were got in males. However the correlations were significant at (5% level), only for WHR ($r = 0.739$, $p<0.05$) fibre intake ($r = 0.697$, $p<0.05$) and consumption of tea ($r = -0.655$; $p<0.05$). In case of females there existed a positive correlation between serum ferritin and BMI, WHR, serum cholesterol, triglyceride, systolic blood pressure, blood glucose, energy, fat, iron, coffee and sugar intake. However the correlations were found to be insignificant.

Further r^2 values were calculated to find out the extent of influence of the related variables on serum ferritin levels. There existed a maximum influence of waist-hip ratio (54 per cent) iron intake (31 per cent) fibre intake (48 per cent) and consumption of tea (42 per cent) on serum ferritin. In males these were considered to be the most influential factors in causing alterations in serum ferritin levels and therefore a higher risk for CVD.

In case of females there existed a positive correlation between serum ferritin and age, BMI, WHR, serum cholesterol, triglyceride, systolic blood pressure, blood glucose, energy, fat, iron, coffee and sugar intake. However no significant correlations were found between any of these factors and serum ferritin.

In female populations, serum cholesterol level, systolic blood pressure and iron intake influences the serum ferritin level to a higher extent and causes a risk for CVD.

The analysis results proved the possibility of a weak association between serum ferritin concentration and cardiovascular risk factor.

CONCLUSION

The present study results showed an alarming increase in CVD. The disease was found to be more prevalent among young males and in females after menopause. A regular health check-up starting at an early age has to be advocated. The risk factors of general public were hypertension, improper diet, stress, inactivity, uncontrolled diabetes mellitus, hyperlipidemia and obesity. Hence awareness has to be created among the young adults regarding the risk factors and regular health check-up has to be ensured to lighten the burden.

REFERENCES

Hakajima, (2000), "Health promotion - New challenges for the future", Published by IUHPE-SEARB, Vol.15, p. 19.

European Heart Journal (2000), "Declining mortality in coronary heart disease, 1, 312-325.

Gupta, R., Cooper, R., and Stanford, W., (2001), "Meeting of International working group on coronary artery disease in South Asians", *Indian Heart Journal,* 48, 727-732.

Spencer, H.C., (1995), "Perspectives of public health and prevention", *American Journal of Medical Science,* 310, 583-5.

Sluzer, S., Ulutin, T., Slonmez, H., Klokolglu, E and Baymam, C, (1996), "Plasma L(a) and t-PA-PAI-I complex levels in coronary heart disease", *Thrombus Research,* 83, (1); 77-85.

Frolich, J.J., (1995), 'Lipoproteins and homocysteine as risk factors for atherosclerosis:Assessment and treatment",*Canadian Journal of Cardiology*11,18-23.

Rosengren, A,.(1996), "Fibrinogen, coronary heart disease and mortality from all causes in smokers and non smokers, the study of men born in 1933", *Journal of International Medicine,* 239, 499-507.

Berge, L.N., (1994), "Serum ferritin, sex hormones, and cardiovascular risk factors in healthy women", *Arteriosclerosis Thrombus,* 14, 857-61.

Gupta, M.K., (2000), "A Test of the Healthy Heart" Layman's guide for health care, Pusthak Mahal, Delhi, 1st edition, 12-13.

Easwaran, P.P., Remya, R. and Maheswari, S.U., (2001) "Formulation of risk assessment index to predict cardiovascular disease among young adults'", *The Indian Journal of Nutrition and Dietetics",* 38, (1), 1-9.

ICMR (1985), "Nutritive value of Indian foods, National Institute of Nutrition, Hyderabad, 47-76.

Indian consensus group (1995), "Indian consensus for prevention of hypertension and coronary artery disease", Report of a consensus development workshop conducted by the Indians society of hypertension and the international college of nutrition, *Indian Journal of Cardiology,* 57-63.

National Cholesterol Education programme, (2001), *"Cholesterol guidelines",* Current Medical Science, 16, (3); 1-8.

DETERMINATION OF SYNTHETIC COLOURS IN BEVERAGES AND CONFECTIONERIES USING UV-VIS SPECTROPHOTOMETRY

Harapriya, Nayak, Kamal G. Nath* and Kavita, S.**
**Department of Food Science and Nutrition*
UAS, GKVK, Bangalore-65
***IADFAC, Bangalore*

Simple and rapid methods for the determination of synthetic colours from the food products are required for the confirmation of proper use and levels of use in confectioneries and beverages, because these are most widely consumed by the children. A total of 33 samples of confectioneries (18) and beverages (15) were analyzed for the presence of permitted and non-permitted colours using UV-VIS spectrophotometry. The beverages contained permitted colours in the range of 3.6-324.1 ppm. Among the beverages, orange squash contained non-permitted colour methyl orange (36.2 ppm). Of the analyzed samples, 33.3 per cent (n = 5) samples exceeded the permissible limit of <100 ppm. Tartrazine GR was the predominant colour used in beverages in the range of 3.6-324.1 ppm. The concentration of non-permitted colour was high in the range of 2.8-337.9 ppm in confectioneries. Of the analyzed samples 38.8 per cent (n = 7) sugar candies contained colours above the permissible limit (i.e.>100ppm). Cheaper candies sold by the street vendors contained a higher amount of non-permitted colours. Non-permitted colours are mutagenic and toxic for human health, so a constant vigilance is required for the existing food quality monitoring as well as food safety.

KEY WORDS: Synthetic colours, beverages, confectioneries, spectrophotometry, calibration, recovery percentage.

Colours have been used since ancient times to make the foods look more attractive to the consumer. Colours are added to foods to make them appealing and appetizing, to achieve a uniform product colour and to compensate colour loss due to manufacturing processes. The cost and lack of availability of natural colouring material might have resulted in the shift to using synthetic food dyes. Synthetic food colourants are widely used because of their low price, effectiveness and stability. Synthetic colors are derived from coal tar and are called as coal-tar dyes. Most synthetic dyes are made from an amino benzene compound. Azo group food colourants are especially harmful to human beings. Non-permitted colours are mutagenic and are potential carcinogens (Rao & Bhat, 2003). So the analytical control of food colours is of considerable importance in the food industry because of their toxic and carcinogenic potential. Simple and rapid methods for the determination of synthetic colourants are required for the confirmation of proper use and levels of use. The use of colours in confectioneries is indispensable. Therefore, there is a need for information on the determination of colourant in beverages and confectioneries such as *sugar candies, sugar toys, lolly pop, jujups, sugar jelley*, etc. which are consumed more frequently by the children. They are more prone to chemical insults than adults, due to lower immune and nutritional status.

Spectrophotometric methods have traditionally been the most widely employed method. So in the present study, the synthetic colours in beverages and confectioneries were analyzed by using UV-

VIS spectrophotometer. However, there is a need to develop a more simple and also a rapid method for the determination of colours as the spectrophotometric method is very elaborate.

MATERIALS AND METHODS

Selection of food samples for analysis

A survey was undertaken to assess the qualitative and quantitative consumption of foods with added colours by the school children. It was observed that majority of the school children were in the habit of consuming foods with added colours which were available in different food out lets. The frequency of consumption of foods with added colours among the school children was studied using a food frequency questionnaire. Frequency of consumption was recorded as daily, once a week, twice a week, thrice a week, fort nightly, monthly, occasionally and never. The consumption pattern of added food colors by the school children varied according to their socio economic groups.

Food samples with added food colours were selected both from shops and street vendors because the LIG children consumed coloured foods most frequently from the street vendors, whereas, MIG and HIG children consumed from the sweet meat shops, darshinis, restaurants etc. There was a variation in the concentration and types of colours among the street foods and regular shops. Hence, the samples were collected both from street vendors and regular shops. A total of 33 samples of confectioneries (18) and beverages (15) were collected from Bangalore market and were analyzed for the presence of permitted and non-permitted colours.

Selection of standards for food colours

Twelve standard synthetic food colours were used for analysis, out of which five were permitted and eight were non-permitted colours. The permitted synthetic food colours Carmoisine A, Tartrazine GR, Erythrosine B, Fast green FCF and indigo carmine GR were purchased from Loba Chemie Pvt.Ltd., Mumbai. The non-permitted colours like Auramine O, Rhodamine B GR and Metanil yellow GR were purchased from the same company. Brilliant green was purchased from Hi Media Laboratories Ltd, Mumbai, Congo red was purchased from Thomas Baker chemicals Ltd, Mumbai and Sudan-III and Methyl orange powder were purchased from Reachem laboratory chemicals Pvt.Ltd, Chennai.

Calibration of the instrument

A chemito spectascan UV 2600 double beam UV-VIS spectrophotometer was used for analysis of coloured food samples. The colours were determined using absorption spectrophometric method in the range of 300-750 nm. The UV-spectrophotometer was calibrated for photometric accuracy, wavelength accuracy, stray light and toluene spectrum (Table 1). $K_2Cr_2O_7$ solution prepared by dissolving 5.7 to 6.3 mg of potassium dichromate previously dried at constant weight at 130 °C, in sufficient 0.005M H_2SO_4 to produce 1000 ml solution, was used for calibration of the instrument.

Table 1: Spectrophotometer calibration

No.	Parameter	Results	Acceptable limits
1	Photometric accuracy	At 350nm, A is 106.13	Tolerance range 104.9-108.2
		At 313nm, A is 48.87	Tolerance range 47.0-50.3
		At 257nm, A is 144.52	Tolerance range 142.4-145.7
2	Wavelength accuracy at 656.1 nm	Max energy @656.0nm	Wavelength variation should be ±0.5nm
3	Wavelength accu±acy at 486 nm	Max ene±gy @486.0nm	Wavelength va±iation should be±0.5nm
4	St±ay light	Abso±bance 2.035	Abso±bance > 2.0
5	Toluene s↓ect±um	Ratio = 1.58	Ratio of Abs of 269 nm to that of 266 should be g±eate± than 1.5

Preparation of standard colors

The permitted colours were prepared according to BIS method. (IS: 1994). All the non-permitted colours were dissolved in distilled water except sudan III. Sudan III is the fat soluble dye which was dissolved in ethanol. For the preparation of the standard, 100 mg of the dye sample was dissolved with the solvent (distilled water/ethanol) and the volume was made up to 100 ml. Five different concentrations (i.e. 2, 4, 6, 8, 10 ppm) were made and the optical density was read.

Preparation of the sample for analysis

The Wool dye technique (Rangann,1996) was used for extraction of colours from the food samples (fig.1)

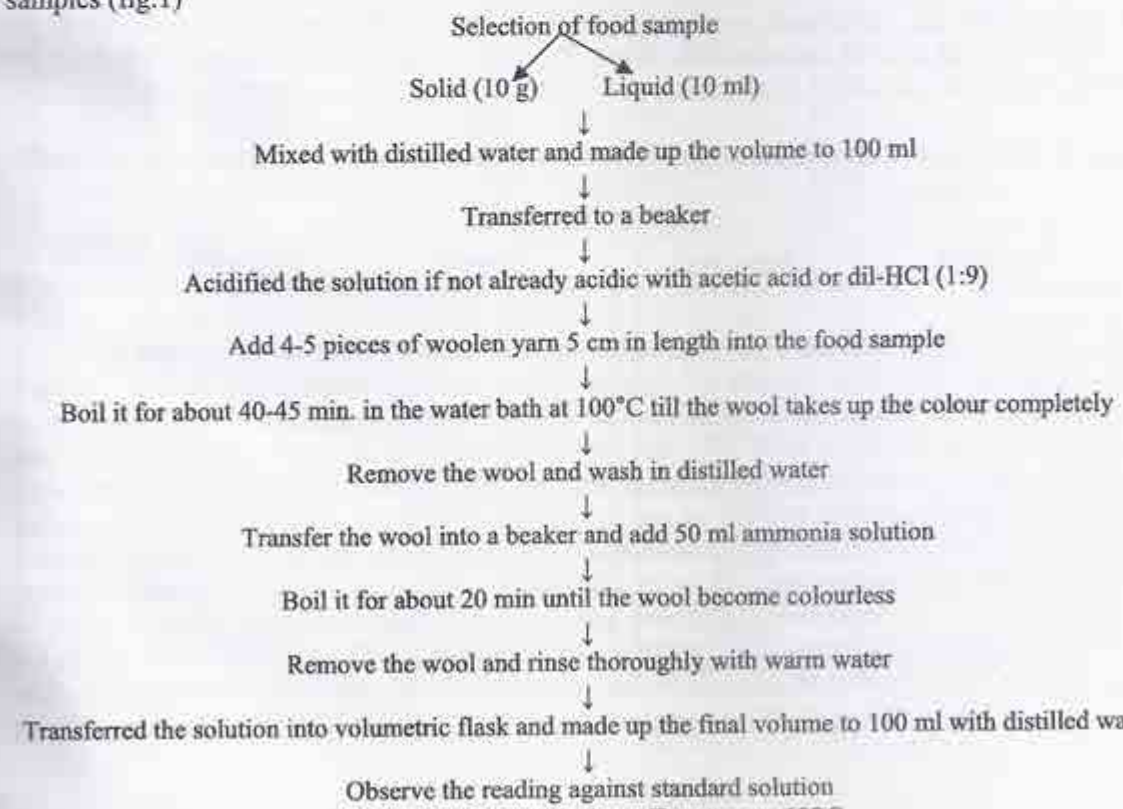


Fig-1: Wool-dye technique (Ranganna, 1986)

[Note: In solid samples grind the sample and make into powder form and mix thoroughly with distilled water]

Procedure for spiking and percent recovery

The spiking was done before extraction of the sample. Ten g of food sample was taken. A known quantity of the standard (0.5-2.0 ml) was spiked in to the sample and the volume was made up to 100ml with distilled water. This was done in replicates (5 times) with the sample as blank. Then 20 cm woolen yarn was added to it and extraction was followed according to wool dye method. After extraction the solution was transferred in to volumetric flask and the volume was made up to 100ml with distilled water. The reading was taken against the standard solution. The percent recovery was calculated as follows

Y=mx+c, where y=absorbance, x=concentration of the standard

A range of spike recoveries was established at the onset of the study. This range was established by analyzing blank - matrix spike samples in replicates (3 to 5 times) and repeatability was done in both blank and spiked samples. At the end, linearity graph was drawn to determine the mean results, percent recovery, standard deviation and relative standard deviation (RSTD)

Final reading and calculations

Standard graphs for all colours were drawn and readings of the samples were taken in the spectrophotometer against the standard colors for each. The concentrations of colour in the samples were then calculated (Table.2)

Table 2: Data for the spectrophotometric determination of colourants studied in the visible range

Colourants	λ max. (nm)	Equation	Regression coefficient
Tartrazine GR	428	Y = 0.399x + 0.0016	0.9995
Erythrosine B	527	Y = 0.0892x + 0.0003	0.9996
Carmoisine A	516	Y = 0.0428x + 0.0086	0.9985
Fast green FCF	625	Y = 0.3057x + 0.0089	0.9972
Indigocarmine GR	610	Y = 0.034x – 0.0005	1.0000
Congo red	498.0	Y = 0.0377x – 0.0028	0.9996
Brilliant green	625.5	Y = 0.1567x – 0.0121	0.9928
Metanil yellow GR	433.5	Y = 0.054x + 0.0028	0.9999
Rhodamine BGR	554.0	Y = 0.2177x + 0.0406	0.9964
Methyl orange	464.0	Y = 0.0707x + 0.0019	0.9996
Auramin O	431.5	Y = 0.0997x + 0.0014	0.9996
Sudan III	505.0	Y = 0.0568x + 0.0116	0.9979

X = Concentration of the standard Y = Absorbance

RESULTS AND DISCUSSION

The mean recovery percentage of permitted colour was 80.56 per cent (Table 3), whereas that of non-permitted colour was 85.09 per cent (Table 4). The average recovery percentage of 14 synthetic colours spiked into soft drinks and confectionery was better than 82 per cent (Chou *et al.*, 2002).

Table 3: Percent recovery of permitted synthetic colours

Sr.No	Standard colours	Samples	Percent recovery	
A	**Permitted colors**			
1.	Tartrazine GR	Orange squash	80.91	
2.	Erythrosine B	Fruit syrup	75.00	Mean 80.56%
3.	Carmosine A	Flavoured milk	79.95	*STDV=6.45
4.	Indigo Carmine GR	Candy	91.14	**RSDV=8.00
5.	Fast Green FCF	Candy	75.78	

Table 4: Percent recovery of non-permitted synthetic colours

Sr.No	Standard colours	Samples	Percent recovery	
B	**Non-permitted colors**			Mean 85.09 %
1.	Auramine O	Jelabi	84.28	*STDV=3.33
2.	Rhodamine B GR	Fryums	83.42	**RSDV=3.92
3.	Methyl Orange	Kaduri Mithai	84.08	
4.	Metanil Yellow	Turmeric powder	89.26	
5.	Brilliant Green	Green peas (fresh)	89.50	
6.	Congo Red	Gobi Manchurian	85.02	
7.	Sudan III	Chilly powder	80.05	

*STDV= Standard Deviation
**RSDV= Relative standard deviation

A total of 15 beverage samples were analyzed. All were branded products. Only orange squash contained non-permitted colour methyl orange (36.2 ppm) along with permitted colour tartrazine GR. Four different varieties of *flavoured milk* samples were analyzed. Two samples of *flavoured milk* exceeded the limit recommended by PFA (234.6 -324.1 ppm). The colour concentration was high in *flavoured milk*, because the solution was not clear; due to milk it was turbid, so the results varied. So, nothing conclusive can be derived from the results on milk. The authors from South Australia reported that the addition of colours exceeded more than 63 percent in *flavoured milk*. A total of 80 percent of beverages (n = 12) contained tartrazine GR in the range of 3.6-324.1 ppm. In the carbonated beverages, the concentration of tartrazine was very low (3.6-5.4 ppm). *Pista flavoured milk* contained fast green FCF (151.60 ppm). One sample of *flavoured milk* contained both tartrazine GR (279.50 ppm) and erythrosine B (189.60 ppm) whereas apple punch contained erythrosine B (27.34 ppm) and carmoisine A (24.48 ppm) (Table 5).

Table 5: Permitted and non-permitted colours in beverages.

No.	Name of the product	Source	Permitted colour		Non-permitted colour		Total conc. of colour (ppm)
			Name of the colour	Conc. (ppm)	Name of the colour	Conc. (ppm)	
1	Pepsi	B	Tartrazine-GR	4.18	-	-	4.18
2	Cococola	B	Tartrazine-GR	3.58	-	-	3.58
3	Fanta	B	Tartrazine-GR	5.58	-	-	5.58
4	Thums up	B	Tartrazine-GR	5.38	-	-	5.38
5	Mazza	B	Tartrazine-GR	11.74	-	-	11.74
6	Mango frooti (Parle Agro)	B	Tartrazine-GR	57.52	-	-	57.52
7	Tang	B	Tartrazine-GR	8.68	-	-	8.68
8	Rasna juc-up	B	Tartrazine-GR	83.00	-	-	83.00
9	Orange squash	SM	Tartrazine-GR	82.50	Methyl orange	36.20	118.70
10	Mango punch (Sukumar soft drinks)	SM	Tartrazine-GR	75.00	-	-	75.00
11	Apple punch (Sukumar soft drinks)	SM	Erythrosine-B Carmoisine-A	27.34 24.48	-	-	51.82
12	Flavoured milk (Shakti)	MP	Carmoisine-A	190.90	-	-	190.90
13	Flavoured milk (Aamolyaa)	MP	Tartrazine-GR	324.09	-	-	324.09
14	Flavoured milk (Nandini)	MP	Fast green-FCF	151.60	-	-	151.60
15	Flavoured milk (Nandini)	MP	Tartrazine-GR Erythrosine-B	279.50 189.60	-	-	234.55

B – Bakery shops ; SM – Super market; MP – Milk parlour; - Absence of colours

Eighteen different confectionery samples were analyzed which consisted of *sugar candies, sugar jelly, jujups, mouth freshners, jam, ketchup* and *sauces*, etc. The concentrations of colours in the confectionery samples have been presented in Table 6. Of the samples analyzed, 38.88 per cent (n = 7) 33.33 per cent (n = 6) and 83.33 per cent contained non-permitted colours, permitted colours and both permitted and non-permitted colours respectively. According to the PFA act, the maximum permissible limit for the presence of colour in the confectionery samples is 100 ppm in the case of candies. Among the samples analyzed, 38.88 per cent (n = 7) *sugar candies* contained colours above the permissible limit. Guler (2005) observed that 46.7 per cent of confectioneries in Turkey had exceeded the permissible limit. *Cotton candy* was found to contain the highest amount of non-permitted colour, rhodamine B GR (337.89 ppm). The cheaper candies sold by the street vendors contained non-permitted colours in the range of 4.72-139.22 ppm and exceeded the limit of >100 ppm. The samples of *tomato sauce* and *tomato ketchup* were found to contain permitted colours erythrosine B and carmoisine A in the concentration of 110.62 ppm to 116.71 ppm. One sample of *lolly pop* contained permitted colours carmoisine A but the concentration was 192.92 ppm, more than the permissible limit (Table-6).

Table 6: Permitted and non permitted colours in confectioneries.

No	Name of the product	Source	Permitted colour		Non-permitted colour		Total conc. of colour (ppm)
			Name of the colour	Conc. (ppm)	Name of the colour	Conc. (ppm)	
1	Raj candy	S	Tartrazine-GR	45.24	Auramin O	23.46	68.70
2	Mango mood	S	Tartrazine-GR	86.78	Auramin O	42.39	129.17
3	Chewing gum	S			Rhodamine BGR	4.72	4.72
4	Boomer	S	Tartrazine-GR	15.77	Methyl orange	7.44	23.21
5	Cotton candy	S			Rhodamine BGR	337.89	337.89
6	Chloromint	S	Fast green FCF	32.40		-	32.40
7	Jam (Kisan)	B	Erythrosine B	21.07	Rhodamine BGR	10.17	77.92
			Carmoisine A	46.68		-	110.62
8	Tomato ketchup	SM	Erythrosine B	60.62		-	-
			Carmoisine A	50.00		-	116.71
9	Tomato sauces	R	Erythrosine B	38.69		-	-
			Carmoisine A	78.02		-	-
10	Sugar candy						
	a.	S	Fast green FCF	58.97	Brilliant green	16.97	75.94
	b.	S	Indigo carmine	63.23			63.23
	c.	S			Rhodamine BGR	11.62	11.62
	d.	S	Tartrazine-GR	63.48	Auramin O	28.15	91.63
	e.	S			Congo red	139.22	139.22
11	Sugar jelly	S			Congo red	17.67	17.67
12	Sugar jelly	S	Fast green FCF	10.71	Brilliant green	2.79	13.50
13	Lolly pops						
	a. Strawberry (alpen lebe)	RS	Carmoisine A	192.92			192.92
	b. Lolly pops	S	Tartrazine GR	40.67	Auramin O	22.70	63.37
	c.	S	Tartrazine GR	36.39	Auramin O	19.89	56.28
	d.	S			Brilliant green	3.15	3.15
	e.	S	Tartrazine GR	49.35	Methyl orange	22.39	71.74
14	Ravalgon sugar boiled confectionery						
	a.	S	Tartrazine GR	88.54	Auramin O	49.70	
	b.	S	-	-	Rhodamine BGR	4.80	
	c.	S	-	-	-	-	
	d.	S	Tartrazine GR	63.85	Auramin O	32.16	
15	Poppins	RS	Tartrazine GR	150.62	Auramin O	76.80	-
			Indigo carmine GR	55.47	Brilliant green	12.23	102.14*
			Erythrosine B	97.55	-	-	-
			Carmoisine A	86.28	-	-	-
			Fast green FCF	44.90	-	-	-
16	Jujups (nilgiri)	SM	Erythrosine B	17.27	Methyl orange	30.21	-
			Fast green FCF	23.79	Brilliant green	7.47	66.30*
			Carmoisine A	37.74	Auramin O	46.27	-
			Tartrazine GR	74.49	-	-	-
17	Jelly cubes (niligiris)	SM	Erythrosine B	30.86	Methyl orange	49.18	-
			Fast green FCF	42.27	Brilliant green	13.25	138.81*
			Tartrazine GR	144.99	Aruamine O	92.61	-
			Indigo carmine GR	106.91	-	-	-
			Erythrosine B	111.12	-	-	-
18	Sugar candy (niligiris)	SM	Fast green FCF	46.54	-	-	-
			Carmoisine A	65.52	-	-	-
			Tartrazine GR	122.90	-	-	-
			Erythrosine B	31.94	-	-	138.81
			Indigo carmine GR	74.75	-	-	-

Key: S – Street vendor B – Bakery; SM – Super market RS – Retail shop R – Restaurant * - Average of permitted and non-permitted colours; a, b, c, d, e - Varieties; - Absence of colours

Large variations in the addition of colours to food products have been observed from different regions compared to the present study, which could be due to regional differences and also because the addition of colours by the food processors varies from place to place.

Tartrazine GR was the predominant colour used in the beverage samples in the range of (3.58-324.09 ppm). Chou *et al.* (2002) detected 14 permitted synthetic colours in soft drinks and confectioneries. Their results indicated that among the synthetic colours, tartrazine was in the range of 4-154.8 mg/g, which was commonly used. In the beverages such as *synthetic syrups* and *sherbets*, the concentration of tartrazine was 9,450 µg/ml (Rao and Bhat, 2003).

The total concentration of colour (both permitted colour and non-permitted colour) in beverages was in the range of 3.58-324.09 ppm and confectioneries 3.15-337.89 ppm. Rao *et al.* (2004) observed that beverages contained colour as high as 9.4 mg/ml while confectioneries in the range of 0.11-0.5 mg/g of food items.

The non permitted colours are mutagenic and toxic for human health. Despite the ban of non-permitted colours by the PFA Act, these are still being used in the confectionery samples, which were consumed widely by the children. So it is necessary to educate the street vendors and small-scale food manufacturers about the toxicity of using non-permitted colours in the food products. Education and awareness programmes are needed especially for children to avoid health risks due to consumption of coloured foods. A constant vigilance is required for the existing food quality monitoring as well as food safety.

REFERENCES

Chou SS, Lin YH, Cheng CC and Hwang DF 2002. Determination of synthetic colours in soft drinks and confectioneries by micellar electrokinetic capillary chromatography. J. Food Sci., 67(4): 1314-1318.

food@health.sa.gov.au, 2005. A survey of artificial colours in foods and beverages, Government of South Australia, Department of health.

Guler Z 2005. Determination of synthetic colourants in confectionery and instant drink powders consumed in Turkey using UV/VIS spectrophotometry. J. Food Quality, 28: 98-108.

IS 1694: 1994. tartrazine; IS 1697 : 1994 erythrosine; IS 2923 : 1995 carmoisine; IS 1698 : 1994, Indigo carmine; IS 6022 : 1994, Fast green FCF, Indian Standard, Food grade specification (Second Revision), Bureau of Indian Standards.

Ranganna S 1986. Chemical additives. Hand book of analysis and quality control for fruit and vegetable products. Tata Mc Graw Hill Publishing Company Ltd., Second Edition. Pp. 287-288.

Rao P and Bhat RV 2003. A comparative study on the synthetic food colours usage in foods procured from urban and rural areas on Hyderabad. Nutrition and Food Science, 33(4): 230-234.

Rao P, Bhat RV and Naidu N 2004. Availability and type of coloured foods consumed by preschoolers and school age children. Proc. National Symposium on Child Health and Nutrition, Ed. Toteja, G.S. and Singh Padam, Borada, pp. 169-173.

KNOWLEDGE, INCIDENCE AND TYPE OF SUBSTANCE ABUSE AMONG MALE POST-GRADUATE STUDENTS RESIDING IN HOSTELS IN JAIPUR

Meena Mathur, Shubha Dube, Karuna Sharma and Geetika Bhargava
Human Development, P.G. Department of Home Science,
University of Rajasthan, Jaipur - 302 004

The present investigation aimed to study the knowledge, incidence and type of substance abuse among male post -graduate students residing in the hostels of University of Rajasthan, Jaipur. One hundred and fourteen (114) male post- graduate students were selected based on purposive sampling from the boy's hostels of University of Rajasthan, Jaipur. A detailed questionnaire having 33 items, based on personal information, knowledge regarding substance abuse, and the student's use of different types of addictions was administered to gather the information. Results of the study reported that 47 percent of the boys were using addictive substances like cigarette, alcohol, pan masala, bhang/ marijuana and opium. A large percentage of the users (89%) belonged to the age group of 20 to 23 years. Substance abuse was almost equally prevalent in the youth belonging to joint families and nuclear families. Majority of the subjects were occasional users and 43%of them had taken some or the other form of substance for the first time when they were entering college. Media was the most important source of information for substance-use. Peer influence and general curiosity were the main reasons for indulging in addictions.

KEY WORDS: substance abuse, peer influence, media, occasional users, boy's hostel,

In recent years, especially in India, due to rapid industrialization, westernization and modernization, there has been a break down of the joint family system and a reduction in the role of family and neighborhood in providing direction and counseling, thus serving as a safety valve against deviant behavior. The family has gradually ceased to be a central storehouse for meeting the requirements of the individual (Srivastava, 1986). As a result, age old inhibitions; taboos and traditional social control mechanisms have gradually weakened, rendering an individual vulnerable to the strains of modern life (Prashant, 1993).

The stress of life has an important role in initiating the use of drugs. It is a fact that the more complicated the society becomes, the more stresses it induces in its citizens, the less people are able to cope with it, and the more anxiety and depression they are going to face (Singh, 1999). One of the worst aspects of the drug problem is that it affects primarily those who are most vulnerable like the youth, from whom leadership in all walks of life will eventually emerge (Khan, 1985). Drugs have a strong appeal to young people who are beginning their struggle for independence and search for identity. They have an innate curiosity and thirst for new experiences. This transition phase of life is a crucial period in which experimentation with illicit drugs in many cases begins (Commission on Narcotics, 1999).

Young people sometimes experiment with substance abuse for the sheer thrill of doing something not approved by society or as resistance to authority (Ahuja, 1992, 2000). Peer pressure is a very crucial factor in initiation of drugs. Youth seeks the approval of society in general and peer group in particular. But when they fall prey to drug abuse, social disapproval occurs and they then seek

the approval of members of their peer group by persuading them to join the drug subculture (Prashant, 1993).

Those who do not drink (alcohol) are labelled as 'backward' and 'outdated'. Alcohol, in recent times has emerged as an important factor for friendship and prestige (Gandhi, 1999). Also in our modern society, the drive to succeed at any rate and self-fulfillment by any means is being emphasized, which has put immense pressure on the younger lot (Ahuja, 1992, 2000). This study was undertaken to explore substance abuse in young post-graduate students (all males), living in the hostels at the University of Rajasthan, Jaipur, Rajasthan, India.

MATERIALS AND METHODS

Sample

A total of 114 boys were selected, based on purposive sampling, from two boy's hostels of the University of Rajasthan, Jaipur. For the sample, a criterion was set, that is, only those students pursuing their post-graduation studies as college students in the University of Rajasthan, Jaipur were selected. The age group of the students was from 20-25 years and they were from the arts, science, commerce and law faculties. The mean age of the subjects was 22.4 years with a S.D. of $\pm$1.7.

Tool

In order to assess the knowledge, incidence and type of substance abuse among the participants, a questionnaire was developed by the investigators, which was reviewed by five experts from professional fields, who were from the Departments of Psychology, Sociology, Home-Science, Medicine and Social Welfare at Jaipur. After the modification of the tool, a pilot study was carried out on 20% of the sample to check the applicability of the tool. The questionnaire was mainly close ended with multiple choice items. The questionnaire consisted of 33 items. The language used was Hindi and questions formed were simple to understand.

The tool comprised of 3 major areas of inquiry which were:

1. Personal information
2. Knowledge regarding substance abuse
3. The student's use of different types of addictions

The queries in the tool revolved around the subject of substance abuse in young people. Statements were included which stated questions like "From where do you get the information on addictive substances?', "When do you need to consume addictive substances?", "Who influenced you in developing your interest in using addictive substances?", "How many times do you use these addictive substances?", "Where do you get these substances from?" and "Do you use these substances for peer identification?".

After seeking permission from the hostel's authority, the participants from the hostels were contacted. A period of 20 days was taken for the task of data collection. Initially, a good rapport was established with the boys to ease and overcome hesitation. They were briefed about the aims and objectives of the study. The participants were convinced that the information obtained from them will not be misused and that the confidentiality of their identity will be maintained. They were asked not to disclose their identity on the questionnaire. Students were requested to provide correct information in the proforma. On completion of data collection, responses were tabulated

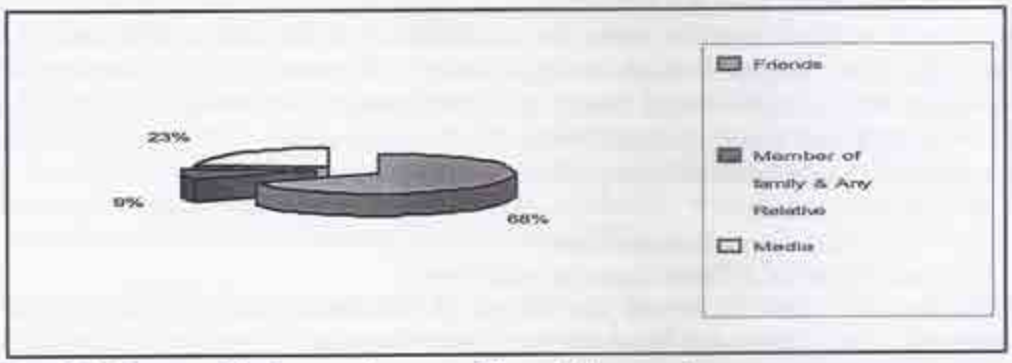
and percentage of users and non-users were computed. The consumption pattern of users was further analyzed.

RESULTS AND DISCUSSION:

The present research aimed to study the knowledge regarding substance abuse, incidence of substance abuse and kind of substance abuse among male youth residing in hostels of University of Rajasthan, Jaipur. Results of the study revealed that 47 percent of the boys were engaged in some kind of substances abuse while 53 percent boys were not into any type of substance abuse.

To the query "From where do you get the information on addictive substances?" the respondents indicated that the media (48%) was the most important source of information of substance-use. Friends and books (24% each) also had a strong impact. Few of the respondents (4%) felt that they got the information of these substances only after using them in parties and gatherings.

When asked, "Who influenced you in initiating the use of addictive substances?" the results indicated that a large section of users (68%) were influenced by their friends for taking these substances; 23% of users got influenced by the media followed by 9% of users who were influenced by relatives and family (Graph 1). The findings have been supported by the studies conducted by Bauman and Ennett (1994) and Jessor and Jessor (1977) who found that peers play an important part in adolescent drug abuse and one of the best predictors of whether a young person will use a drug, is the use of the drugs by his friends, especially the young person's best friend



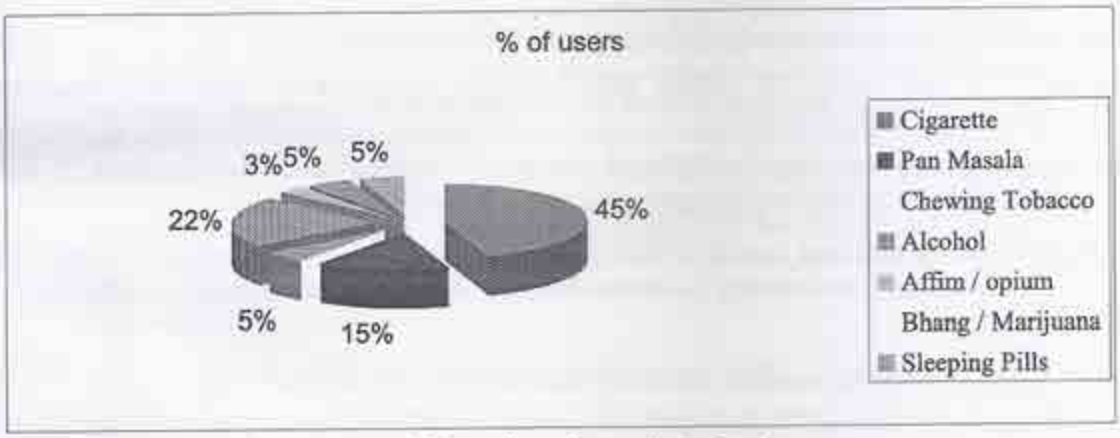
Graph 1. Source of influence for prevailing substance abuse

The age distribution of user respondents was studied. The results suggest that a large percentage of boys (89%) using substances fell in the age group of 20 to 23 years; followed by 11% respondents who were in the age group of 23 -25 years. Prashant, (1993) in his study found that most of the substance abusers belonged to 20 to 35 years age group. The most productive period of an individual's life is being withered away in drugs and other substance abuse.

The familial background of the "users" were also studied in which 53% of the respondents using some or the other form of substance abuse belonged to nuclear families and 45% were from the joint family and 2% came from broken families. Broken families indicate a family where the

parents are either divorced or separated. Although, research points towards greater stress in nuclear and broken families (Correrata et al., 1983), this study highlights that substance abuse is almost equally prevalent in the youth belonging to joint families and nuclear families.

Graph 2 gives the type of addictive substance used by university male students. Forty-five percent of the 'users' were smoking cigarettes. The use of alcohol was indicated by 22% of the students while 15% and 5% were addicted to chewing pan masala and tobacco respectively. Five percent users were taking bhang/marijuana and 5%, were having an addiction to sleeping pills. Three percent students used *affim* /opium for addiction. Cigarette smoking may be highly prevalent as youth consider smoking as fashionable and trendy. Nayar's (1996) findings suggest that youth are actively establishing regular cigarette smoking habits. The consumption of alcohol in the young has increased both in quantity and frequency. Active use of marijuana and opium were also seen in comparatively lesser numbers of young people in this study.



Graph: 2. Type of substances used by university male students

To the question "How many times do you use these addictive substances?"; the results indicated that majority of the users (30%) were occasional users who used it on occasions like festivals, big family gatherings or social functions, 25% used substances once or twice in a week and 19% of the respondents used these substances 4-5 times in a week. 26% of the students were the ones who admitted that they could not live without these substances and used these substances daily. A substance abuser rarely becomes a habitual user immediately; rather experimentation, perhaps under peer pressure is followed by occasional, social or recreational use for social and recreation experience. Often youth indulges in addictions to relax after a stressful event to stay awake to perform a demanding task or to sleep. Situational use may be intensive and become part of daily routine. Eventually the substance can become the individual's central focus (Kauffman, 1989)

The age of initiation of substance abuse was also studied. Data revealed that most of the users (43%) had taken some or the other form of substance for the first time when they were entering college, followed by 30% of students who indicated that they started using addictive substances when they entered their post graduation years. 10% of the youth reported that they had started consuming addictive substances when they were in their middle school and 17% when they were

in high school. Perhaps the youth face new challenges of becoming "grown-up" and acting like an adult at the time when they enter college.

CONCLUSION

This study on the youth residing in the hostels in the University Of Rajasthan, Jaipur indicates the use of addictive substances. Smoking and drinking are commonly practiced by boys. Traces of drug use are also seen. Youth is influenced by peer and media in the direction of substance abuse. Smoking and drinking perhaps are seen as enhancing the modern image of the boys; adding to the status symbol of being 'macho'; there by developing a new "high" in their identity development. Youth counselling can help to inform the young of the damages and risks involved in falling prey to permanent addictions of different forms of substance abuse.

REFERENCES

Ahuja, R (1992) Sociology of youth subculture, Rawat Publications, Jaipur.

Ahuja, R (2000) Social problems (II Ed), Rawat Publications, Jaipur.

Bauman K E and Ennett ST (1994) Peer influence on adolescent drug use, American Psychologist, 49(9): 820-822.

Commission on Narcotic drugs (1999) Youth and Drugs : a global overview, (On-line), 21 Jan. 2005, WWW.unodac.org/pdf/document-2001-12-21-1.pdf.

Correrata L, Bernstein J and Amy R (1983) Family Roles, structure and stressors in relation to sex differences in obtaining psychotropic drugs, Journal of Health and Social Behaviour, 24: 132.

Gandhi M (1999, February 11) Elite encouraging drug abuse, The Hindu, 9.

Jessor R and Jessor S.L. (1977) Problem behavior and psychosocial development: A longitudinal study of youth, Academic Press, New York.

Khan M Z (1985) Drug use amongst the college youth, Somaiya Publications Pvt. Ltd, Bombay.

Kauffman M J (1989) Characteristics of Emotional and Behavioural Disorders of Children and Youth, Macmillan Publishing Company, Jersey.

Nayar U S (1996) Tobacco, alcohol and substances abuse amongst youth: The Indian Scenario. In U S Nayar and L Narayan (Eds), Involvement of youth in health education and health promotion: Tobacco, alcohol and substances abuse. Tata Institute of Social Sciences, Mumbai, 19-27

Prashant S (1993) Drug abuse and society, Ashish Publishing House, New Delhi.

Singh M N (1999) Drugs and modern society, Vivek Prakashan, New Delhi.

Srivastava SP (1986) Preventive aspects of drug abuse control : A social defense perspective, In D Mohan, Prabhakar A K, Mohan M and Chitkara B (Eds.), Current Research in Drug abuse in India, Gemini Printers, New Delhi, 261-267.

Research Reach, J.H.Sci. Vol.7. No.2, 39-46

PROBLEMS AND PROBLEM SOLVING STRATEGIES OF ENTREPRENEURS DURING PROCUREMENT AND REPAYMENT OF FINANCES

***** Neena Jaju, **Ms. Nidhi Jain,*Ms. Priyanka Arora**
**** Sr Lecturer, **Ex-masters student, * Ph.D Scholar,*
Department of Home-Management,
Faculty of Home-Science,
The M.S.U. of Baroda

The present paper is an attempt to gain an insight into the problems and problem solving strategies of the entrepreneurs during procurement and repayment of finances and their interrelationship with selected personal, family and situational variables. The descriptive research design was adopted, wherein a survey of 120 entrepreneurs, selected through purposive sampling technique was carried out. A questionnaire schedule was used as a tool for data collection. Major findings of the study revealed that entrepreneurs of the present study encountered relatively higher number of problems related to his/ her managerial competence and those related to the financial institution during procurement and repayment of finances as compared to rapport building and technical competence. A little less than one-half of the entrepreneurs of the study adopted moderate number of strategies to solve their problems related to the same. No significant association was found between problems and problem solving strategies of the entrepreneurs and their personal, family and situational profile. However, a positive relationship was found between the problems related to financial institution and the technical competence strategies.

KEY WORDS: entrepreneurs, procurement of finances, repayment of finances, rapport building, managerial competence, technical competence

Entrepreneurship is a purposeful activity indulged in initiating, promoting and maintaining economic activities for the production and distribution of wealth. An entrepreneur is a critical factor in economic development and transformation. Say (2000) defined an entrepreneur as an economic agent who unites all means of production, wherein he is an organizer and speculator of business enterprise.

Entrepreneurship cannot have its effectiveness, if an urge to take risk, uncertainties and leadership i.e. capacity of showing things in a way, which afterwards proves to be true, is not there. As per Cole (1999) an entrepreneur should be clear of his business objectives and change these objectives as market demand changes, have a strong determination to overcome every barrier and to earn maximum profit. While going through the journey of enterprise development, these barriers become the problems for entrepreneurs and he/ she faces problems at every stage of enterprise setting, from incitation of the business to the marketing of the product. Desai (2000) has divided the problems of entrepreneurs into two parts, the internal and the external problems. Internal problems are the ones that are not influenced by the external forces and can be controlled by entrepreneurs themselves, example, the problems related to production channel, distribution

channel, technical know how etc. The external problems are those, which result from factors beyond the control of entrepreneurs', example, the availability of power and other infrastructure facilities.

Deolankar (1999) threw light specifically on the problems of the entrepreneurs in India. A major problem in India is inadequate availability of trained skills. Though many personnel are skilled in manufacturing, they are not always adequately trained especially in technical and managerial aspects of the job. Marketing expenses were also identified as one of the problem by Raghav (2002). Finances for the business establishment are the biggest hurdle, in which, lack of adequate operating capital is typical. In such a situation procurement of finances from the financing institution becomes the major challenge. The initial barrier in procurement of finances is the mindset of an entrepreneur, where the entrepreneur has pre-set apprehensions to procure finances from the financial institution. Weave (2000) has put forth some of them, like they do not have a real picture of the specific advantages of a financial institution and do not know how to go about financing the whole project. They fear loosing control of their business and they do not want to account to the outsiders.

To overcome the hurdles, every entrepreneur develops his/her own solutions to sort out the problems and these solutions become the strategies for the entrepreneurs to deal with the problems. Jain (1985) pointed out a few points while making any problem solving strategy, which included building the problem solving attitude, recognizing the problem and its seriousness, formulating and testing the possible causes, establishing objectives, examining results to be acheived and comparing of solutions. Deolankar (1999) and Donaldson (1986) have discussed about the strategy to raise funds for the enterprise, which include planning for funds, raising of funds, allocation of funds and control of funds.

Researchers in the past (1978 to 1990) have concentrated on the various problems encountered by the entrepreneurs during procurement and repayment of finances, namely; implication of government policies, multiplicity of documents, requirement of security, lack of effective monitoring and information system etc. However, in the recent years (beginning of 1990's) there appears to be a shift of focus, may be due to the changing needs of an entrepreneur and his/ her surrounding environment. The problem solving strategies adopted by the entrepreneurs during procurement and repayment of finance from the financial institution, is a new area of research wherein, problem-solving strategies like; rapport building, managerial competence and technical competence are examined.

Thus the present paper is designed to throw light upon the problems, which an entrepreneur encounters at the various stages of procuring and repaying the finance. It will bring into focus the problems pertaining to three important aspects i.e. rapport building, managerial competence and technical competence of the entrepreneurs, and also problems that are associated with the financial institution. The concern of the paper is to probe into research questions like; what are the various problems and problem solving strategies adopted by the entrepreneurs during procurement and repayment of finance? Does the problem solving strategy of the entrepreneur depend on age, gender, number of years of experience, professional qualification, personal monthly income, type of family, family monthly income, business inheritance and annual turn

over. The study hypothesizes that (i) there is an association between the problems and extent of problem solving strategies with regard to procurement and repayment of finances, and selected personal, family and situational variables viz., (ii) there exits a relationship between the problems, and the extent of problem solving strategies of entrepreneurs during the procurement and repayment of finance.

MATERIAL AND METHODS

The descriptive research design was thought to be appropriate to carry out the study. A questionnaire schedule was used to collect the data for the present research which constituted of questions pertaining to the personal and business profile, age, gender, professional qualification, numbers of years of experience, personal monthly income, type of family, family monthly income, annual turnover, gross profit, type of loan, source of finance, loan detail and facilities availed from financial institution. Problems encountered by the entrepreneurs related to rapport building (problems in maintenance of relationship with the financial institution and good will in the market), managerial competence (problems which an entrepreneur faces due to lack of administrative abilities, ignorance, power less decision making and lack of creativity), technical competence (problems faced by the entrepreneurs at the time of completion of project report, future projections of the project, technological up gradation and certain situational barriers) and problems related to the financial institute (problems which an entrepreneur encounters due to the regulatory processes of the financial institution in terms of seeking information, documentation and legal formalities during procurement and repayment of finances) were assessed

Further, a scale was developed to study the extent of problem solving strategies adopted by the entrepreneurs during procurement and repayment of finance with regard to the three selected strategies namely; rapport building, managerial competence and technical competence. The scale was tested for its content validity and reliability. Split-half technique was used to establish reliability. The reliability co-efficient for the scale of problem solving strategies of entrepreneurs was estimated to be 0.9. The data gathered through the survey method was meaningfully organized by computing the frequency and percentage with regard to personal and business profile and problems and extent of problem solving strategies of the entrepreneurs with regard to procurement and repayment of finance. Mean and S.D were computed for continuous variables, and descriptive analysis and inferential analysis was carried using the ANOVA and co-efficient of correlation.

FINDINGS AND DISCUSSION

1.Findings related to the personal, family and business profile of the entrepreneurs

The data on the personal profile of the respondents revealed that the mean age of the respondents was 39.50 years. It was found that little less than one-half of the respondents belonged to middle age group, ranging between 35 to 50 years. Ninety per cent of the respondents were male entrepreneurs while only ten percent of the entrepreneurs were females. It was observed that about 83 per cent of the entrepreneurs were graduates holding degrees like B.A/B.Com/ B.Sc, while 17 per cent of entrepreneurs hold professional or post graduate degree. About 40 per cent of the entrepreneurs had moderate experience ranging between 11 to 20 years with mean of 16.03 years. It was seen from the data that little more than one-third of the entrepreneurs earned personal monthly income between Rs.15, 000 to Rs. 25,000 with a mean of 19,211.50.

The data on family profile revealed that majority of the respondents resided in joint families. Further; it was found that about 42 per cent of the entrepreneurs earned family income higher than Rs. 50,000 with a mean of Rs. 41,180.60.

The data on the business profile of the respondents revealed that more than one-half of the entrepreneurs had inherited the family business. A little more than one-half of the respondents started or joined the business between 20 to 25 years with mean age of 23 years. It was revealed from the data that about 42 per cent of the entrepreneurs owned trading units and majority of the entrepreneurs were the sole proprietors of the business. One-half of the entrepreneurs had annual turnover greater than 40 lakhs with mean of 31.5 lakhs while majority had the annual gross profit ranging between 1 to 5 lakhs.

Data on financial assistance revealed that majority of the respondents had procured finances from bank. It was found that almost every entrepreneur procured finance for the entire amount he/she had availed for. Majority of the respondents had procured finance at reducing rate of interest, majority of the respondents opted for short term financing, using cash credit facilities and about one-half of the respondents paid 14 to 16 per cent rate of interest with an observed mean of 15.6 per cent. Majority of the respondents adopted repayment procedure in monthly installment, very few entrepreneurs had availed for facilities like overdrafl and bill of purchase.

2. Findings on problems encountered in the procurement and repayment of finance

Thirty two problems related to the procurement and repayment of finance were categorized under four subheads namely; problems related to the rapport building of the entrepreneur, problems related to their managerial competence, problems related to their technical competence and problems related to financial institutions. In the score range of 32 to 64 a higher score indicated that more number of problems was faced by the entrepreneurs and vice versa. The observed mean and S.D. for the overall problems faced by the entrepreneurs were 42.8 and 5.11 respectively. From the categorization done on the basis of equal interval, it was found that about one-half of the respondents scored low with regard to problems encountered during procurement and repayment of finance, a little less than one-half of the entrepreneurs scored moderately for the problems. However, it was found that very few entrepreneurs scored high for the same. Indicating that overall the entrepreneurs did not face any major problem in procurement and repayment of loans. A comparative picture of the four problem categories revealed that entrepreneurs of the present study faced more number of problems related to financial institution and managerial competence as compared to the problems related to rapport building and technical competence during the procurement and repayment of finance from the financial institution. An individual assessment of each of the four categories is as follows.

2a.Problems related to the Rapport Building of the entrepreneurs

The data on problems faced by the entrepreneurs in rapport building i.e. problems in maintenance of relationship with the financial institution and good will in the market revealed that 20 to 25 per cent respondents faced the problems of (i) not having any type of reference to support their credibility, (ii) cash credit limit was not increased by the bank, (iii) lack of recognition or good will in market, since they were beginners. Further, 14 to 15 per cent of the entrepreneurs faced

problems like (i) inability to find guarantors and (ii) guarantors having a hitch to give the guarantee. Reasons that an entrepreneur faces less problems related to rapport building could be that more then one-half of the respondents of the present study had inherited their family business. Thus the present generation probably was not required to initiate the process of rapport building with the financial institution and thus had encountered fewer problems. Further a respondent could face less of problems related to rapport building because they might have hired a professional consultant who would have helped them in building a rapport with the financial institution.

2b. Problems related to Managerial Competence of the Entrepreneurs

The problems which an entrepreneur faces due to lack of administrative abilities, ignorance, powerless decision making and lack of creativity are referred to as managerial competence problems. Data with respect to the same revealed that 65 to 70 per cent of the entrepreneurs of the present study faced difficulties like (i) not being aware or having incomplete information of the various schemes offered by financial institution. Fifty-five to sixty per cent entrepreneurs faced problems like (i) not being aware of the process of procuring finance, (ii) not being able to complete the documentation process in the first instance. About 26 to 32 per cent of the entrepreneurs faced problems of (i) having fear of losing control on enterprise if unable to repay, (ii) not being able to prepare the budget and anticipating the requirements. About 10 per cent respondents also faced the problems in procuring and repaying finance, as they did not have any professional consultants. Thus it can be concluded that the entrepreneurs encountered numerous problems pertaining to managerial competence.

2c. Problems related to Technical Competence of the Entrepreneur

The problems that occur during the time of completion of project report, future projections of the project, technological up gradation and certain situational barriers are referred as technical competence problems. The data on problems related to technical competence revealed that about 45 to 50 per cent of the respondents faced problems like (i) need for colossal expenditure for financing of fixed assets, (ii) availing loan at competitive rate of interest, and (iii) facing problems in technological up gradation. About 35 to 40 per cent of the entrepreneurs faced problems like (i) inability to forecast the future cash flow of the project and (ii) high initial cost of finance as compared to the earning from the project. Further 20 to 30 per cent of the entrepreneurs reported (i) unavailability of collateral security, (ii) stringent market conditions and, (iii) inability to update project report at / in first instance. About 15 to 20 per cent entrepreneurs were not provided with the entire loan amount for which they had applied, since they were beginners and they had an uncommon project in hand. Very few entrepreneurs faced problem due to less monetary value of their collateral security.

2d. Problems related to the Financial Institution

This includes the problems, which an entrepreneur encounters due to the regulatory processes of the financial institution in terms of seeking information, documentation and legal formalities during procurement and repayment of finance. With reference to the same 75 per cent entrepreneurs faced problem of lengthy documentation process. About 45 to 55 per cent entrepreneurs faced problems like (i) absence of officials to give detail information, (ii) demand

for uncommon / exceptional documents, (iii) and making numerous visits to the financial institutions. Fifteen to twenty per cent of the entrepreneurs faced problems like (i) discouragement on the part of financial institution for repayment of loan at scheduled time, (ii) absence of timely support. About 3 per cent entrepreneurs faced rigidity in terms and conditions laid by financial institutions. Eight per cent even mentioned that they had to offer unaccounted money.

3. Problem solving strategies of entrepreneurs

The scores for problem solving strategies adopted by the entrepreneurs during procurement and repayment of finances, covering three aspects namely; rapport building strategies; managerial competence and technical competence ranged between 28 to 84. Majority of the respondents (94.2 per cent) scored high with regard to their extent of problem solving strategy with scores ranging between 56 to 84, only 4.1 per cent of the respondents scored moderate on the extent of problem solving strategies with scores ranging between 35 to 55 and only 1.7 per cent of the respondents scored low on the same, indicating that overall the entrepreneurs had followed one or the other strategy to over come the problems they faced during procurement and repayment of finance. An individual account of each of the three aspects follows.

3a. Rapport Building Strategies

With respect to rapport building strategies a large number of entrepreneurs adopted a few strategies to a great extent. About 70 to 85 per cent of the entrepreneurs followed strategies like (i) maintaining the past accounts and transactions which lead to good rapport, (ii) possessing goodwill in the market, (iii) having strong reference to back up the credibility. About 55 to 65 per cent of the entrepreneurs followed regularity in attending to the previous financial debts as a strategy while 22 per cent did the opposite.

3b. Managerial Competence Strategies

It was found that about 60 to 70 per cent of entrepreneurs followed the managerial competence strategies to great extent by (i) maintaining good coordination with the financial institution, (ii) having guarantors, (iii) having effective negotiations with the financial institution, (iv) having clear understanding about the funds utilization, (v) having full command over working environment and (iv) having far sighted outlook. About 40 to 55 per cent respondents adopted the strategies of preparing documents in conformity to the financial institution and having prior plans for repayments. However, 52 per cent of the entrepreneurs did not inform the financial institution well in advance about their incapability to repay.

3c. Technical Competence Strategies

With respect to technical competence strategies a large number of entrepreneurs adopted a few strategies to a great extent. About 50 to 55 per cent of the entrepreneurs adopted strategies wherein they (i) carried out detail assessment of the project, (ii) indicated the present market scenario in the project report, (iii) revealed the future technological up gradation, (iv) had high monetary value of collateral security, and (v) projected the technical feasibility of the project. In contrast, 20 per cent of the respondents communicated that (i) they did not change their bankable

securities for available credit facility, (ii) had not distinctively revealed the technological up gradation, and (iii) did not give the detailed information about the project.

4. Findings with regard to testing of hypothesis

Analysis of variance indicated that there existed no significant difference in the extent of problem solving strategies of the respondents with selected personal, family and situational variables. On computation of co-efficient correlation it was found that there existed no relationship between the problems pertaining to rapport building, managerial competence and technical competence with their respective strategies. However, a positive relationship was found between the problems related to financial institution and the technical competence strategies. Hence, higher the number of problems faced by the entrepreneurs related to financial institution, greater would be the extent of use of technical competence strategies by the entrepreneurs. It was observed on assessing the data, that if an entrepreneur follows technical competence strategies by completing the project report, reflecting the detail assessment of working capital, indicating the technical feasibility of the project, indicating the market cash flow structure, projecting the demand and share of their product in the market, and by giving the profit analysis structure of the project, he/she would face less number of problems related to financial institution.

CONCLUSION

The findings of the present study unveiled that the most popular source of finance amongst the entrepreneurs were banks as compared to finance corporations. The findings brought forth that most of the entrepreneurs of the present study were unaware, uninformed or had incomplete information pertaining to the various schemes and facilities offered by the financial institutions. It was also found that very few of the entrepreneurs opted for long-term loans. The present study bought into light the various problems, which an entrepreneur encounters during procurement and repayment of finance. It was found that an entrepreneur does face moderate number of problems, while procurement and repayment of finance from the financial institution. A comparative picture of the selected four problems namely those related to rapport building, managerial competence, technical competence and financial institution revealed that entrepreneurs encountered relatively more number of problems related to the financial institution and managerial competence. To list, a few of them were, (i) lengthy documentation process (ii) unavailability of officials to give detailed information pertaining to schemes, (iii)need to make repeated visits to the financial institution, (iv) having incomplete information about the schemes, (v) not being aware of the various schemes offered etc.

The differences in the problems and problem solving strategies adopted by the entrepreneurs while procurement and repayment of finance were not statistically significant with regard to their age, gender, personal income, business inheritance and annual turnover. The findings of the present study projected that the extent of use of rapport building strategies and managerial competence strategy adopted by the entrepreneur in the process of repayment of finances was more or less comparable.

No significant difference was found between the problems related to the rapport building, managerial competence, technical competence and financial institution, with their respective strategies. However, it was found that there exists significant relationship between problems related to financial institution and technical competence strategies, hence it could be said that

adoption of technical competence strategies by the entrepreneurs to a great extent can aid in resolving the problems related to the Financial Institution.

REFERENCES

Cole in Basotia, K.S. (1999), Handbook of Entrepreneurship Development, New Delhi: Mangaldeep Publication, pp. 45-47.

Deolankar, V.(1999), "Banking Finance and Entrepreneurship" New Delhi: Common Wealth Publishers, pp. 115-120.

Desai,V. (2000), "Dynamic of Enterpreneuraial Development and management". Mumbai: Himalaya Publication House, pp 122-124.

Donaldson in Griffin,R.W. (2000) "Fundamental of Management", New York: Mc Graw Hill Publishing House, pp. 176-177.

Jain (1985), P.C. in Desai, V (2000), "Dynamic of entrepreneurial Development and Management", Mumbai: Himalaya Publishing House, pp 122-124.

Raghav (2002), "Source of Finance"- (Getting Money), in http://smallbusinessfinance.com

Say, J.B. (2000), "Entrepreneurship", http://westaction.org/definitions/def-enterpreneure-ship-1.html.

Weave, R in Griffin, R.W. (2000), (Fundame ntals of Management", New York: Mcgraw Hill Publishing House, PP.126-132.

OTHER PUBLICATIONS OF THE RESEARCH CENTRE

1. READY RECKONER	**-25 Rs.**
2. GALACTOGOGUES & BREAST FEEDING	**-25 Rs**
3. NUTRITION FOR NERVES	**- 15 Rs.**
4. GOLDEN GREENS	**- 35 Rs**
5. DISSERTATION TITLES	**-10 Rs**
6. HOW WILL I BE IN THE MILLENIUM	**-12 Rs**
7. RESEARCH REACH (Prescription for perfection in paper presentation)	**-10 Rs.**

The Above publications are available on payment. Outstation orders will have to cover postage costs.

NOTE: Research Reach is a bi-annual publication of the Research Centre of Nirmala Niketan, College of Home Science covering current, original and authentic Research and Development work from all branches of Home Science. Subscription for each year would cover 2 issues (January and July). Previous issues (2002 onwards can be made available upon request)

Subscription Order Form

Subscription Rates

Institutions

1 year Rs.440

2 years Rs.855

3 years Rs.1270

Individuals

1 year Rs.240

2 Years Rs.455

3 Years Rs.670

Date_____

To
The Chief Editor,
Research Centre, College of Home Science,
Nirmala Niketan, 49, New Marine Lines,
Mumbai-400020.

Madam,
Please (tick as applicable)

Enroll me as a Subscriber ☐

Renew my Subscription ☐

To the Research Reach, Journal of Home Science for the year/ years _____

I am enclosing a Demand Draft for Rs._____
(Please give appropriate amount as per the rates given drawn in favor of **'Nirmala Niketan Institute'**.
The subscription rates are inclusive of postage charges)

I would like to receive my copies of Research Reach at the following address:

Name:_____
Address: _____
_____
_____
Telephone No:_____
Email Address_____
Yours faithfully

Signature

NAAC SPONSORED

NATIONAL SEMINAR

ON

INNOVATIVE PRACTICES FOR EXCELLENCE IN HIGHER EDUCATION

ON

28th-29th Nov. 2008.

Organised By

College of Home Science Nirmala Niketan

ABOUT THE SEMINAR

Educational institutes all over the country have in varying tines frames evaluated themselves, been assessed by NAAC and assigned grades.

Quality enhancement is however a continuous process. All colleges have the potential to usher in quality by working out improvised intervention strategies. Innovative practices can be used as a vehicle, which help in thinking 'Out of the Box' for all aspects related to quality education.

The objectives of the seminar are :

1. To provide a platform for sharing of innovative practices in a quest for excellence in higher education.

2. To establish benchmark indicators within and across colleges for quality in higher education.

WHO CAN ATTEND

Teaching faculty, librarians and administrative staff.

IMPORTANT DATES

30th Sep. 2008.

For registration and other details refer website. www.nirmalaniketan.com

Registration Fee and Form

Registration Fee : Rs. 600/-. till 30th Sep. 2008.
Registration with late fees of Rs. 800/-.