SINGAPORE NUTRITION AND DIETETICS ASSOCIATION

*The Singapore Journal of*

# NUTRITION *and* DIETETICS

Official Publication of the Singapore Nutrition and Dietetics Association Vol.6 No. 1 June 1996



- **Food Habits & Body Image Among Adolescents**
- **The Importance of Pre-conceptual Nutrition**
- **Food Allergy & Intolerance**
- **Knowledge, Attitudes and Practices Study on Factors related to Food Choice**


MITA (P) No. 164 / 01/ 96 ISSN 0218-3633 $4

**Singapore Nutrition and Dietetics Association**





**Editorial Correspondence:** All articles and notices for publication, general correspondence and enquiries should be addressed to The Editor, *The Singapore Journal of Nutrition and Dietetics,* Singapore Nutrition and Dietetics Association, Tanglin P.O.Box 180, Singapore 912406, Republic of Singapore.





Typeset by Lolitho Private Limited
Printed by Multiprint Services

*The Singapore Journal of*

# Nutrition *and* Dietetics

Vol. 6 No. 1 June 1996


## EDITORIAL

*This issue of the Journal covers some interesting and varied nutrition topics. The importance of preconceptual nutrition is explored and highlights from the study of the habits of supermarket shoppers in Singapore by the Ministry of Health Food and Nutrition Department are presented. Jennifer O'Dea was in Singapore earlier this year and delivered her paper on the Food Habits and Body Image Among Adolescents, which was well received by those who attended her presentation. Thankyou to Kelloggs for sponsoring this event.*

*An interesting article on Food Allergy and Intolerance in included as well as reports from international nutrition conferences by our members which indicates that SNDA is well represented at these meetings.*

*Our thanks goes to Lynn Alexander as outgoing president for her excellent leadership and continued support of SNDA.*

*For the first time we are including interesting nutrition Websites for those members who wish to connect to the Internet to increase their access to nutrition information.*

*Happy Reading*

**Margaret Hays**
*Editor*

## CONTENTS

# The Seventh Asian Congress of Nutrition
# 7-11th October 1995
# Beijing, China

## Towards Achieving the Nutritional Goals of the Asian Population

*Tan Peck Yan Peggy*

The Seventh Asian Congress of Nutrition was held in Beijing, China from 7-11th October 1995. Hosted by the Chinese Nutrition Society at the Friendship Hotel, the Congress attracted slightly over one thousand representatives from more than forty five countries. Approximately two hundred representatives were from the Republic of China itself.

The Congress featured eight plenary lectures, two hundred and forty(240) symposia, one hundred and seventeen(117) free communications and three hundred and seventy-nine (379) posters. These were tightly packed over three and a half days. Main areas covered included topics ranging from minerals and trace elements, fatty acids, anti-oxidants, nutritional surveillance, Asian dietetics to functional foods.

Among the outstanding plenary lectures was John R Lupien's (FAO) address on 'A Global View of Food Supply, Access to Food and Nutrition Adequacy'. Despite global progress in increasing food supply and improving nutritional status, some countries are suffering setbacks. However, for those who have progressed, different sets of nutritional problems have arisen. Dr Lupien concluded that "in all countries, improving the nutritional well-being of populations depends upon the effective preparation, implementation and co-ordination of a wide range of agricultural, health, educational, economic, trade and development policies". And in his insight into "Current Food and Nutrition Situation in South and South-East Asian Countries", C Gopalan (India) discussed the varying stages of developmental transition, the nutritional deficiencies and excesses in this region. He also noted that with increasing life expectancy, geriatric nutritional problems would demand increasing attention.

In the Symposium on "Mineral Nutrition and Health", Warren T K Lee (Hong Kong) presented a very interesting paper on the "Higher Calcium Absorption efficiency in Chinese Children as evident by using a Stable Isotope Technique (Ca42 and Ca44)". In it he suggested that the calcium RDA for Chinese children should be lower than the U.S. RDA (800 mg), which is based on an estimated 40% calcium absorption as reported for white children. The result of his study showed that there is an adaptive mechanism controlling calcium absorption in habitually low calcium intake Chinese children with adequate vitamin D as they have a higher calcium absorption.

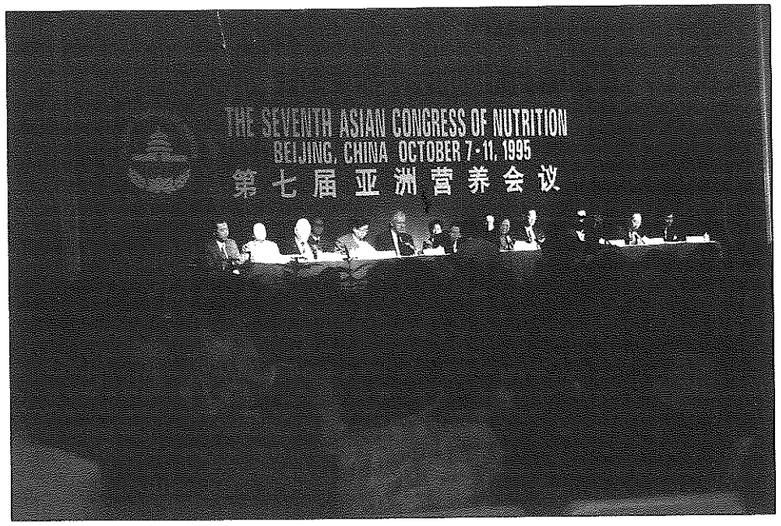
Another interesting symposium paper was G L Baker's (USA) presentation on "Lipid needs in Pregnancy". He weighed the effects of restricted-fat diets in pregnancy against the nutritional requirements of the foetus and breast-feeding infants. He advised caution in consuming supplemental dietary sources of long-chain polyunsaturated fatty acids as this needs further controlled studies. And in "Essential Fatty Acid Needs in Infancy", Diersen-Schade (USA) discussed the controversial subject of adding long-chain polyunsaturated fatty acids (LCP) to infant formula. He suggested additional clinical research pertaining to the safety and efficacy of adding LCP to fomulas.

Much applause was given to the Singapore speakers, Dr M Yap and Ms Toh H K, for their excellent papers in the Symposiums: Food, Nutrition and Ethnicity and Childhood Nutrition and one free communication: Food Habits and Dietary Pattern. The speakers attracted not only many requests for detailed reports of their presentations but also received encouraging feedback on Singapore's high standards in the nutrition field.


*Photo L to R: Miss Toh Hui Kheng, Dr Mabel Yap and Miss Tan Peck Yan Peggy*

*Miss Tan Peck Yan Peggy is a practising dietitian in the Food and Nutrition Department of the Ministry of Health, Singapore.*






*Panel discussion at the Seventh Asian Congress of Nutrition.*

A particularly interesting and good speaker was Dr Schultink J W (SEAMEO-TROPMED), who represented Indonesia. Dr Schultink presented his well-organized study on the "Alleviation of anaemia in pre-schoolers using public health approach with weekly iron supplementation". The aim of his study was to select an effective way to reduce anaemia prevalence at the community level.

The symposium on "The New Frontiers in Asian Dietetics" looked into dietetics training and human resource development and the marketing of services to community health centres and food industries. Dr Chwang L C (Taipei) presented a paper on the effect of National Health Insurance and the shifting from hospital-operated to contracted-out meals on patients' nutritional care and the regression of clinical dietetics services in her country.

Undoubtedly, the congress had successfully served as a forum for the exchange of information and experiences in nutrition research, training and action programmes, and as an excellent opportunity for initiating future collaboration among nutritionists in their noble bid 'towards achieving the nutritional goals of the Asian population'.

# Food Habits and Body Image Among Adolescents - Educational Strategies

*Jennifer O'Dea*

**Introducton**

Pubertal development is characterised by rapid physical growth, large increases in hormone levels and the appearance of secondary sexual characteristics. Rapid changes to the adolescent's height, weight and proportion of body fat are a normal part of pubertal development, yet a significant proportion of young people today seek the Western cultural ideal of slimness. It is appropriate that adolescents learn sensible and effective methods of weight control, as overweight and obesity are prevalent among adolescent[1] and adult populations [2]. The association between overweight, obesity and health risks are well documented. What is less well understood is the relationship between body weight and other factors such as body image, self esteem, food habits and other psychological variables. Studies have shown that dieting and weight control practices are undertaken by adolescents [3,4] and that some of these practices are dangerous[5,6].

The aim of this study was to examine the inter relationships between adolescents' body weight and their food habits, body image, self concept, eating disorders, behaviours and attitudes, depression and anxiety. This study investigates differences in these variables between overweight and normal weight adolescents. Differences between those adolescents who perceive themselves to be overweight and those who do not are also examined.

## METHODS

**Participants**

Students in years 7 to 10 from eight secondary schools in New South Wales were asked to participate. The schools include four public schools and four Catholic schools which incorporated a wide range of socioeconomic backgrounds and were typical of the wider adolescent population. Informed consent was provided by School Principals, teachers and students. Ethical approval was obtained from the New South Wales Department of School Education and the University of Sydney Human Ethics Committees.

*Jennifer O'Dea is a Lecturer in Nutrition Education at the University of Sydney. She presented this paper at a talk supported by SNDA and Association of Home Economists, and sponsored by kelloggs.*

**Anthropometric Measurements**

Height and weight were taken by trained assistants. Height was measured without shoes to the nearest 0.5 centimetre using a portable stadiometer. Weight was measured without shoes in light clothing using calibrated Soenie digital scales to the nearest 0.01 kilogram.

**Questionnaires**

Students completed a questionnaire relating to demographic details, food habits, weight control practices, body image (Too Thin, About Right, Too Fat) and desired body weight (Lighter, Current Weight, Heavier).

The Physical Appearance ratings of students were obtained by asking students to rate themselves out of a possible 10 points (10 being perfect) for general self appearance and how other people, the opposite sex, their mother and their father would rate them.
Mean ( ± standard deviation) scores were calculated for these measures.

A subset of adolescents (470 out of the total 909) also completed the Eating Disorders Inventory (EDI)[7], the Harter Self Perception Profile for Adolescents [8], the Beck Depression Inventory [9] and the Spielberger State-Trait Anxiety Inventory [10].

**Data Analysis**

Questionnaires were analysed using the Statistical Package for the Social Sciences (SPSS-X) [11]. Students standard body weight (SBW) was calculated by dividing the actual weight of each participant by the expected weight for gender, age and height which were derived from National Centre for Health Statistics (NHCS) standards [12]. This figure was then converted to a percentage. Students were divided into two groups for comparison: 1. SBW less than 110% 2. SBW 110% or more. To compare differences between groups chi square and ANOVA values were calculated. The data were normally distributed.

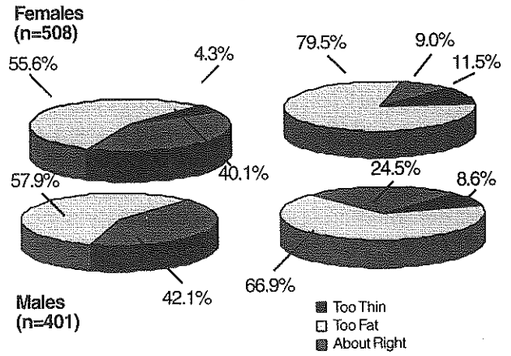
**Results**

A total of 909 adolescents aged 11.1-16.0 years (mean 13.2 years ± 0.6 years) participated in the study. This represented 44.1% (n=401) males and 55.9% (n=508) females. There was no significant difference between the numbers of males and females categorised as 110% or more of Standard Body Weight ( $\geq$ 110% SBW).



There were 28.9% of males categorised as $\geq$ 110% SBW and 35.2% of females (chi square - 3.7, P=0.06). Females were significantly more likely to perceive themselves as "Too Fat" compared with males (36.3% versus 18.0%, chi square=37.8, $p \leq 0.0001$) and adolescents of $\geq$ 110% SBW were also more likely to perceive themselves as "Too Fat" compared with the < 110% SBW group (50.9% versus 17.4% respectively, chi square=116.3, p<0.0001).

Figure 1 illustrates the body image of adolescents by gender and SBW grouping.




The majority of adolescents of $\geq$ 110% SBW perceived themselves as "Too Fat" (55.6% of males and 57.9% of females, but 40.1% and 42.1% respectively perceived their body weight to be "About Right").

Similarly, 9% of males of < 110% SBW and 24.5% of females perceived themselves as "Too Fat".

Desired body weight of adolescents followed a similar trend with 77.8% of $\geq$ 110% SBW adolescents desiring lighter body weight and 16.4% and 5.8% desiring their current weight or heavier weight respectively. Among the <110% SBW group, 43.4% reported desiring a lighter body weight and 35.0% and 21.6% desiring their current weight or a heavier body weight. The $\geq$ 110 SBW were significantly more likely to desire a lighter body weight (chi square = 123.3, p<0.0001). Similar results were obtained when the adolescents were divided into < 120% SBW and <120% SBW groups. 82.6% of the former and 32.6% of the latter reported desiring a lighter weight and 4.8% of the former and 19.2 % of the latter desired heavier body weights.

The $\geq$ 110% SBW group was significantly more likely to lose weight in comparison to the < 110% SBW group as shown in Table1.

**Table 1 Dieting practices of adolescents by weight grouping**

| | Females (n=508) | | chi square | Males (n=401) | | chi square |
|---|---|---|---|---|---|---|
| | >110%SBW (n=179) % | >110%SBW (n=329) % | | >110%SBW (n=116) % | >110%SBW (n=285) % | |
| Diet to lose | 46.4 | 25.1 | 22.9*** | 27.6 | 7.1 | 30.3*** |
| Diet to gain | 0.5 | 4.5 | 4.4* | 2.7 | 8.7 | 4.5* |

Whilst the $\geq$ 110% SBW group were more likely to report dieting to lose weight than the <110% SBW group, both males (7.1%) and females (25.1%) in the <110% SBW reported dieting to lose weight. A significantly greater proportion of the <110% SBW group reported dieting to gain weight, yet 0.5% of females and 4.5% of males in the $\geq$ 110% SBW also reported dieting to gain weight. These results were virtually the same when analysed among the $\geq$ 120% SBW and <120% SBW groups. Among these groups, 41.9% and 0.6% of the >120% SBW group reported dieting to lose and gain weight respectively and 19.9% and 5.6% of the <120SBW reported dieting to lose and gain weight.

The $\geq$ 110% SBW group were more likely to report regularly missing breakfast (26% versus 17%, chi square=8.26, p<0.01) and the evening snack (50% versus 33%, chi square=20.7, p<0.0001).

Table 2 contains the weight control practices of female and male adolescents.

**Table 2 Weight control practices of adolescents according to SBW weight grouping**

| | Males (n=401) | | $\chi^2$ | Females (n=508) | | $\chi^2$ |
|---|---|---|---|---|---|---|
| | > 110% SBW (n=179) % | <110% SBW (n=329) % | | > 110% SBW (n=116) % | <110% SBW (n=285) % | |
| Not eating between meals | 52.3 | 26.9 | 16.3*** | 90.0 | 66.1 | 23.7*** |
| Missing meals | 13.7 | 11.4 | 0.2 | 56.8 | 38.5 | 7.6** |
| Own diet | 42.3 | 16.5 | 17.9*** | 80.4 | 49.0 | 28.2*** |
| Magazine Diet | 9.5 | 6.1 | 0.8 | 56.4 | 28.3 | 18.7*** |
| Exercise | 81.9 | 59.3 | 13.6*** | 97.4 | 83.5 | 16.7*** |
| Excessive exercise | 28.6 | 20.1 | 1.6 | 44.3 | 23.9 | 9.9** |
| Low joule foods only | 31.3 | 16.5 | 7.11** | 76.8 | 45.5 | 26.9*** |
| Keeping busy | 48.6 | 27.1 | 9.8** | 76.9 | 48.3 | 22.0*** |
| Becoming vegetarian | 7.1 | 6.1 | 0.1 | 41.6 | 17.1 | 15.9*** |
| Drinking water before meals | 28.2 | 18.1 | 3.1 | 72.1 | 44.5 | 18.0*** |
| Fasting/Starvation | 7.2 | 5.5 | 0.3 | 39.7 | 19.2 | 11.4** |
| Avoiding situations where there will be food | 18.6 | 6.2 | 8.3** | 46.8 | 22.5 | 15.5*** |
| Taking advantage of illness to avoid eating | 13.1 | 4.3 | 5.8* | 40.8 | 23.7 | 6.7** |
| Natural laxatives e.g. bran | 12.6 | 7.9 | 1.3 | 31.8 | 16.9 | 5.5* |
| Laxatives | 0.0 | 3.1 | - | 17.5 | 9.1 | 3.1 |
| Vomiting | 1.5 | 3.1 | - | 19.7 | 10.4 | 3.4 |
| Smoking cigarettes | 5.8 | 7.4 | 1.6 | 24.6 | 18.9 | 0.9 |
| Trying to vomit | 2.9 | 1.3 | 1.7 | 22.9 | 14.4 | 2.4 |
| Not swallowing food | 1.5 | 1.9 | 0.1 | 10.5 | 7.4 | 0.5 |
| Slimming pills | 2.9 | 1.9 | 0.2 | 17.2 | 6.7 | 4.3* |

* p<0.05 ** p<0.01 *** p<0.001

Whilst adolescents of $\geq$ 110% SBW were significantly more likely to report having used the 20 weight control methods listed, the <110% SBW also reported using these weight loss methods. There were no significant differences between the proportion of adolescents in each group who reported using the dangerous, potentially health damaging methods such as using laxatives, vomiting, smoking cigarettes or trying to vomit in order to lose weight.

The most popular methods of weight control did not vary between groups of males and females of SBW groups. The most popular methods were:

1. Excessive exercise, 2. Not eating between meals, 3. Own diet, 4. Keeping busy to avoid eating, 5. Selecting only low kilojoule foods.

The physical appearance ratings of male adolescents did not vary significantly between weight groups. The scores of females in the $\geq$ 110% SBW were signficantly lower than other students for the rating females believed the opposite sex ($p<0.01$), their mother($p<0.05$) and their father ($p<0.01$) would give them.

Adolescents whose SBW was $\geq$ 110% were more likely to report symptoms of depression.The association between depression and anxiety symptoms and body weight is shown in Table3. Spearman correlation co-efficients (r) are given.

**Table 3 Association between depression and anxiety symptoms and body weight of adolescents**

| | SBW *r* | BMI *r* |
|---|---|---|
| Depression | 0.12* | 0.16*** |
| State anxiety | 0.08 | 0.11* |
| Trait anxiety | 0.05 | 0.07 |

* $p<0.05$
** $p<0.01$
*** $p<0.001$

Similarly, eating disorder behaviours and attitudes were positively correlated with SBW. These included Drive for Thinness($r=0.33$, $p<0.01$), Body Dissatisfaction ($r=0.38$,$p<0.01$), Ineffectiveness ($r=0.15$, $p<0.01$) and Interoceptive Awareness ($r=0.12$, $p<0.05$).

On the Harter Self Perception Profile, adolescents of greater SBW scored significantly lower for measures of self concept. These included subscales of Social Acceptance ($r=0.12$, $p<0.01$), Athletic Competence ($r=-0.18$, $p<0.01$), Physical Appearance ($r=-0.30$, $p<0.01$), Romantic Appeal ($r=-0.10$, $p<0.01$) and Self Worth ($r=-0.13$, $p<0.01$).



**Adolescents who perceived themselves as "Too Fat"**

Separate analyses for the previously mentioned variables were performed on groups of adolescents who perceived themselves as "Too Fat"compared with those who perceived themselves as "About Right" or "Too Thin".

Of the adolescents who perceived themselves as "Too Fat", 64.8% of males and 56.3% of females were of SBW of $\geq$ 110%. The females who perceived themselves as "Too Fat" were significantly more likely to report regularly missing breakfast (chi square=18.2, $p<0.0001$), morning snack (chi square=7.3, $p<0.01$), lunch (chi square = 7.8, $p<0.01$), afternoon snack (chi square=7.3, $p<0.01$), dinner (chi square=6.2, $p<0.01$) and the evening snack (chi square=14.4, $p<0.0001$).

Other results were significant for both males and females. Those adolescents who perceived themselves as "Too Fat" were significantly more likely to report dieting to lose weight (chi square=196.3, $p<0.0001$), desire weight loss (chi square=167.8,$p<0.0001$), have lower physical appearance ratings on all the scales ($p<0.0001$) and report using more weight loss methods [mean 7.0( $\pm$ 4.0)] of the 20 listed weight loss methods listed compared with 4.0 ( $\pm$ 3.0), $F=97.9$, $p<0.0001$).

**Discussion**

The results demonstrate a clear dilemma for clinicians, nutritionists, educators and those who work with adolescents. There is a significant proportion (approximately 20-30%) of adolescents who may be classified as overweight or obese and these adolescents may require some form of intervention to prevent them becoming overweight or obese adults. Overweight and obesity carry health risks as well as social stigmas which may damage the self esteem of adolescents. Conversely, some adolescents, namely those who are overweight or those who perceive themselves to be "Too Fat" are already sensitive to body weight issues and may already be involved in weight loss methods, dieting to lose weight and may desire lower body weights. These adolescents and those who perceive themselves as overweight have a poor self concept compared with normal weight adolescents or those who perceive their body weight to be "About Right". In addition, the overweight adolescents are more likely to display symptoms of depression, anxiety and eating disorders. Whilst these adolescents may appear to need help, the clinical and educational initiatives which target these adolescents have the potential to inadvertently do more harm than good. These young people are already very sensitive to their weight problem and some imagine a weight problem which does not exist. Intervening with these young adolescents may produce adverse effects if not undertaken with the utmost care. Interventions should aim to firstly ascertain the overweight adolescents' self perception, because this study demonstrated that approximately 40% of overweight boys and girls do not perceive themselves as "Too Fat". Some of these adolescents actually reported being "Too Thin" and wanted to be heavier. Similarly, some normal weight adolescents reported wanting to be thinner or heavier. Assessing adolescents' self perception before any intervention is essential if interventions are to be effective and failure to do so may account for some of the failures in obesity treatment programs in the past. The seemingly inaccurate perceptions of some of the adolescents in this study may be associated with cultural, ethnic or socio-economic factors. For example, desiring weight gain when one is already clinically overweight or obese may be related to cultural, ethnic or social class norms of beauty, health or attractiveness. Clinical assessment of individuals may serve to properly educate adolescents about a healthy body weight and may reassure the majority that their body weight is normal.

Nutrition and health education programs aimed at adolescents should promote sensible methods of weight control, eating habits and regular exercise. It would appear from this study that adolescents of varying body weights and not just the overweight have an interest in weight control issues. Some adolescents undertake unhealthy methods of weight control, such as starvation, laxative abuse, vomiting, smoking cigarettes and the use of slimming pills. Education should focus upon the general inefficacy of such methods which mostly results in loss of body fluid rather than body fat.

Self esteem programs may help adolescents to understand that the current body image norms of our Western Society and the pursuit of thinness is not necessarily healthy and that body ideals should not carry such a great importance to the overall self-concept. Adolescents should be helped to learn that they are of value no matter what their body shape or size.

**Acknowledgments**

The author thanks the Kellogg Company and the International Lite Sciences Institute (ILSI) for supporting this conference presentation.

**References**

1. Gliksman, M. D., Dwyer, T., and Wlodarczyk, J. (1990). Differences in modifiable cardiovascular disease risk factors in Australian school children: The results of a nationwide survey. Preventative Medicine, 19, 291-304.
2. National Heart Foundation of Australia (1989). Risk factor prevalence study. Survey Number 3. Sydney: National Heart Foundation.
3. Rosen, J.C. and Gross, J. (1987). Prevalence of weight reducing and weight gaining in adolescent girls and boys. Health Psychology, 6, 131-147.
4. O'Dea, J., Abraham, S. and Heard, R. (In Press). Food habits, body image and weight control practices of young male and female adolescents. Australian Journal of Nutrition and Dietetics.
5. Wertheim, E.H., Paxton, S.J., Maude, D., Szmukler, G., Gibbons, K. and Hillier, L. (1992). Psychosocial predictors of weight loss behaviours and binge eating in adolescent girls and boys. International Journal of Eating Disorders, 12, 151-160
6. Fabian, L. and Thompson, J. (1989). Body image and eating disturbance in young females. International Journal of Eating Disorders, 8(1), 63-74.
7. Garner, D.M., Olmstead, M.P. and Polivy, J. (1983). Development and validation of a multi-dimensional eating disorder inventory for anorexia nervosa and bulimia.International Journal of Eating Disorders, 2, 15-34.
8. Harter, S. (1988). Manual for the Self Perception Profile for Adolescents. Colorado: University of Denver.
9. Beck, A., Ward, C., Mendelson, M., Mock, J. and Erbaugh, J. (1961). An Inventory for Measuring Depression. Archives of General Psychiatry, 4, 61-71.
10. Spielberger, C., Gorusch, R. and Lushene, R. (1970). Manual for the State-Trait Anxiety Inventory. Palo Alto, California: Consulting Psychologists Press.
11. Statistical Package for the Social Sciences-SPSS-X, Users Guide (1985). Chicago : McGraw Hill.
12. Hamil, P.V.V., Drizd, T.A., Johnson, C.L., Reed, R. B., Roche, A.F. and Moore W. M. (1979). Physical growth: National Centre for Health Statistics percentiles. American Journal of Clinical Nutrition, 32, 607-629.

# Highlights from XXIIth International Congress of Dietetics Manila, The Philippines, February 18 - 23, 1996.

Inge Hager

The theme of the Congress "Dietetics and Nutrition in an Interdependent World" brought together 1700 dietitians from 28 countries to Manila to gather at the XXIIth International Congress of Dietetics.

Although the Congress meets every four years this has been the first one in Asia. Lectures, symposia, workshops, research reports and posters were presented by dietitians from around the world and covered the broad spectrum of the profession. The delegates had the unique opportunity to update themselves with the extensively prepared scientific programme as well as to get a glimpse of the rich cultural heritage through social events. A well-designed list of professional field trip programmes gave the delegates the opportunity to further explore their area of interest.

A special highlight of the Congress was the keynote lecture delivered by Dr. C. Gopalam, Director General of the National Institute of Nutrition of India and the first scientist outside of Europe and North Africa to be elected President of the International Union of Nutrition Science (IUNS).

In a retrospective view on the striking advances in knowledge related to dietetics and nutrition during the last two decades, he pointed out that "dietetics is currently in a state of dynamic growth-both as a science and a vocation. The subject of dietetics has now acquired important new dimensions as a result of scientific advances on the one hand, and changes in lifestyle, occupation pattern and environment, induced by on-going development transition in large areas of the world on the other. Dietetics has now emerged as a major science in its own right. Scientific advances and developmental transition have thus propelled dietetics to the forefront of health science and practice. Formidable challenges and opportunities for dietitians are now unfolding. In responding to these challenges it will be important for us to ensure that we do not stray away from our sound scientific moorings. Given the expanding scope of dietetics it will be even more important in the future, than in the past, to guard against misinformation, false leads, and exaggerated claims."

*Inge Hager is currently clinical Dietitian in the Department of Nutrition and Dietetics at Gleneagles Hospital, Singapore. She is also the Vice President of SNDA.*

**Trends in Work, Education And Training of Dietitians Around the World were Forums 1 and 2.**

The presentations of the results of an extensive survey of the work and education of dietitians around the world- Europe, Americas (USA, Canada, Mexico and the Caribeans), Africa and the Middle East, Asia and the Pacific-were truly enlightening and illustrated the diversity within the profession.

**Asia and the Pacific**

*Dr Chwang Leh Chii, Department of Food and Nutrition, Veterans Hospital Taipei, Taiwan.*

The Asian Federation of Dietitians' Association (AFDA) established in 1994 represents 9 members the dietetic/nutrition associations of Hong Kong, Indonesia, Japan, Korea, Malaysia, the Philippines, Singapore, Thailand and Taiwan. The number of dietitians in the member association is approximately 55,000. Overall 50% of dietitians work in hospitals. However, in Korea, 54% are in food service and 20% in schools.

In Japan, the Philippines and Indonesia, about 20% of the members are in public health. It is interesting to note that a growing number of dietitians are engaging in private practice/consultation, product development or promotion, and research/teaching. The broad educational background has provided a base for a variety of professional activities for dietitians.

Australia, New Zealand and most of the member countries of AFDA (except Hong Kong and Singapore), have local dietetic education programs. Most are B.Sc programmes in universities. Australia and New Zealand also have a 1-2 year postgraduate program following a general science degree.

**Europe**

*The President of the British Dietetic Association, UK and Karen Hadell, President of the Swedish Association of Dieticians, Sweden.*

The European Federation (EFAD) has 10 member organizations and over 20,000 members. The numbers of dietitians within the individual organizations vary from 11 in Iceland to 4,300 in Germany.

Overall, 50% of the members reported working in hospitals; however, only 15% of dietitians in Finland are employed in hospitals. A wide variety of other work-sites was reported.



All countries reporting have dietetic education programmes except Luxembourg and Iceland. Both three and four year B.Sc. programmes are available at these institutions. Practice training is included in the programs and most countries require a qualifying examination. However only six of the 19 member associations have professional standards.

**Americas (USA, Canada, Mexico, and the Caribbean)**

*Doris Derelian, President of the American Dietetic Association, USA, and Lynda Corby, President of the Canadian Dietetic Association, Canada.*

Health care delivery systems are undergoing major changes in the western hemisphere. Responding to this change the practice of dietetics continues to evolve and expand.

Dietitians are found in every country in North and South America; 67,700 in the US, 34,000 in South America and 7,000 in Canada. In 1960, 80% of dietitians were employed in acute care institutions. This number had dropped to 45% in present surveys, with the remainder in management (20%), consulting / private practice (13%) and community dietetics (14%).

Diversity of practice is also evident in other countries. Clinical dietetics is the primary practice area for 75%, 50% and 33% of dietitians in Argentina, Canada and Brazil respectively. Community dietetics represents 35% of the practice in Mexico and 15% in each the US and Canada. In Brazil, 50% of dietitians work in food service administration.

There are 285, 16, 13 and 1 educational sites in USA, Canada, Mexico and the Caribbean respectively. Programs in the USA and Canada require four years university education; in Mexico five years and in the Caribbean three years. All countries except the Caribbean require registration for practice.

**Africa and the Middle East**

In Africa, there are many unfilled positions. Few dietitians are in food service administration and most of the community nutrition is handled by Home Economists.

In South Africa, dietitians are employed in private practice (36%), hospitals/clinics (11%), community (13%) and in education/research (13%).

In Israel, 68% of dietitians are employed in private practice, 9% in community work and 4% in industry. Greece, Israel, and South Africa have dietetic education programs.

Most dietetic counselling remains mainly private, and is conducted by foreign trained NGO employed dietitians.

## Summary of Abstracts and Exerpts of the Plenary Lectures

**Communicating Nutrition and Dietetic Issues: Balancing Diverse Perspectives.**

*Nancy E. Schwartz, PhD, RD, National Center for Nutrition and Dietetics, American Dietetic Association, Chicago, Illinois, USA.*

In her lecture, Dr Schwartz pointed out that as the dietetics profession prepares to enter the twenty-first century, the nutrition communication challenges and opportunities facing the profession are greater than ever.

The critical role of nutrition in health promotion, disease prevention and performance optimizing is well established and widely acknowledged. Yet on a global basis the struggle continues with issues of access, or under nutrition, and excess or over consumption, that impede attainment of our global nutrition goals.

"Key to success in nutrition communication is a clear understanding of the desirable outcome or impact on the target audience. Our basic nutrition goal is protecting and promoting nutritional well-being for all".

In her conclusion she called upon the delegates to enter the twenty-first century with the clear vision that access to nutritionally adequate and safe food should not only just be a right of each individual but should become a global reality as well.

The delegates should accept the challenge to become an advocate for nutrition education and public policies that recognize the potential of nutrition communication to contribute to global nutrition goals.

**Linking the world through ISO 9000: Focus on Food Services.**

*Miflora M. Gatchalian, Quality Consultants International Inc., Metro Manila, Philippines.*

The standards set by International Organization for Standardization (ISO) are currently adopted by more than 70 countries, virtually linking the world in the use of common quality management standards. The ISO 9000 series has in fact revolutionized the manufacturing and services industries, although the food service industry has been slow in its adoption of the standards. In a highly competitive world, the survival of any institution lies in its capability to satisfy and delight the customers. For the food service industry where feedback from the customer is almost instantaneous, maintaining standards across every part of the business process is a necessity.

As such, the goal is to focus on long-term directions which should continuously achieve and exceed customer satisfaction. This approach will require effective management of human and material resources to produce quality goods and services.

She concluded that the acceptance of ISO 9000

certificates across the borders will definitely link the world as one country practices what other countries have accepted. The creation of confidence on quality capabilities based on the certificate has spread worldwide, linking the nations by meeting the standards for quality management systems.

**The Science and Public Health of Clinical Nutrition**

*Mark L. Wahlqvist, Monash University, Monash Medical Centre, Melbourne, Australia.*

Clinical nutrition has now become part of the practice of all the major health care disciplines (internal medicine, surgery, pediatrics, obstetrics and gynecology, psychiatry and investigative medicine). It is also operative at each level of care(primary, secondary and tertiary). Its methods are epidemiological, diagnostic, therapeutic and preventive. What distinguishes it from traditional and alternative health practices dealing with food and food components is the scientific method. Thus it is characterized by active research and change, rather than dogma.

Problems are:

1. The quantifiability of its measurements especially in food intake, energy balance, body composition and nutritionally-related biological functions. But while every effort needs to be made to quantify and minimize defined error, precision and accuracy in clinical nutrition are not necessarily greater than in other clinical activities.
2. Multi-disciplinarity which is demanding of clinical nutrition practitioners and where specialization is only a partial solution. The art of multi-disciplinarity, with program developments in areas like osteoporosis, eating and body compositional disorders and the aged can allow team leadership by clinical nutritionists.
3. The need to integrate and model large and complex data bases, in non-steady conditions; notably, food intake patterns, energy expenditure and body compartment imaging.

Clinical nutrition must seize the opportunity that informatics provides to handle these problem areas and, in so doing, shape a new future for itself and human health. It must also maintain a global and international approach as the nutrition problems of the developed and developing world come together through food cultural interaction, food trade, over population and food shortage, environmental degradation, and urbanization. The problems are no longer simply under, or over nutrition, since physical inactivity, various food component deficiencies (micronutrient and phytochemicals), contaminated food and water, and substance abuse have crossed regional boundaries. The clinical nutritionist at best is also a public health nutritionist engaged in health promotion in all its forms, environmental protection, health advocacy, and prevention at the primary, secondary and tertiary levels.

**Ethical Issues in the Practice of Dietetics and Nutrition**

*Kristen Mc Nutt, Consumer Choices, Inc., Michigan, USA.*

The profession of nutrition and dietetics is becoming more interested in and sensitive to ethical topics. Several professional associations have published Codes of Ethics or similar documents and conducted educational programs on this topic.

To learn and discuss ethical questions a framework is essential for analyzing appropriate steps and taking courses of actions prior to conducting and risking peer criticism.

Many decisions have to be faced today which are not as simple as telling the truth or performing what has been promised to be done. The most difficult choices arise when abiding by either of two equally important ethical principles would give different answers to the question, "What should I do ?"

She concluded that in an interdependent world linked by high tech information systems the adherence to established Code of Ethics will be essential for maintaining high professional standards.

**Professional Field Trip**

**The Phillippine Heart Center**

The chosen destination for the professional field trip was to the National Health Center. A warm Mabuhay welcome greeted the delegates and the true Filipino hospitality could be felt throughout the visit.

As the first Heart Center of its kind in Asia equipped with the state-of-the-art facilities and services, the Philippine Heart Center offers a comprehensive program of patient care, education and training, research and public information.

The Center maintains a pool of well-trained and highly experienced physicians and other medical personnel who utilize some of the latest technology and procedures in the treatment of cardiovascular diseases.

Located in the heart of Quezon City, the center serves about a thousand patients daily. It also conducts post graduate courses, training, seminars and symposia on the diagnosis and management of cardiovascular diseases.

At the conclusion of the XXIIth International Congress of Dietetics, Irene Mackay, President of the British Dietetic Association, extended a kind and colorful invitation to the delegates and their associations to attend the XXIIIth International Congress of Dietetics in Glasgow, Scotland, 23-27July, 2000.

*Author gratefully acknowledges sponsorship of Nestle (S) Pte Ltd and SNDA to attend this conference.*



# Food Allergy & Intolerance

Robert H Loblay and Anne Swain

Browsing through the health section of any large bookstore is likely to leave a casual observer with the impression that food allergy has assumed epidemic proportions. Depending on the particular author's perspective, this may be blamed on adulteration of the food supply and environment with toxic substances (sometimes called an "allergy to the 20th century"), overuse of antibiotics and excessive consumption of refined carbohydrates (causing "yeast allergy") or even unrecognised mercury poisoning due to widespread use of amalgam dental fillings.

We are aware that the chief culprits are food additives, yeast, sugar, wheat or milk, and that these may cause conditions as diverse as arthritis, bowel disease, migraine, asthma, schizophrenia, hyperactivity and even criminal behaviour. In some cases the immune system is said to be weakened, causing cancer or allowing the AIDS virus to run amok.

How much truth is there in these assertions? Most doctors are sceptical about sweeping claims, often made by natural-therapy practitioners. In most cases, objective studies have failed to confirm the existence of food allergy. There is, however, a growing appreciation within the medical profession that adverse food reactions can occur in some people even though they may not be caused by allergies in the correct sense of the term.

**True Food Allergy**

When an individual experiences unpleasant symptoms after exposure to something that is harmless to the majority of people, there is a natural tendency to regard this as an allergy. However, it is important to recognise that a true allergy is only one of many possible causes of adverse reactions to things in our diet and environment.

Allergies are caused by stimulation of the immune system and the formation of potentially harmful antibodies in the bloodstream and body tissues. Where foods are concerned, it is rare for such antibodies to cause problems, except in infants and young children.

Older children and adults may certainly have reactions to certain foods, but these are usually due to the chemical "side effects" of certain natural or artificial constituents of the diet. For this kind of problem "food intolerance" is a more suitable term. Correct classification of these two kinds of food reaction is important, because there are different approaches to diagnosis and treatment, depending on the underlying cause in each individual.

*Robert H Loblay and Anne Swain work at the Allergy Unit, Department of Clinical Immunology Royal Prince Alfed Hospital, Missenden Rd., Camperdown NSW 2050*

True food allergy is usually easy to recognise. It manifests itself mainly in infants and children with a history of eczema, against a family background of allergic diseases (such as asthma, hay fever, and eczema). Most children are allergic to only one or two foods (commonly eggs, milk, wheat, fish and/or peanuts) that even in very small amounts provoke the same reaction - often within minutes or hours of ingestion.

Symptoms often begin after weaning, and can include colic, diarrhoea, an itchy rash around the mouth, hives or eczema. Sensitivity can sometimes be exquisite, such that even the smell of a peanut or fish may produce a reaction, and, on rare occasions, serious shock may occur.

The problem can be more insidious in children with chronic eczema, and the relationship between diet and the rash may only be recognised after the relevant foods have been withdrawn and subsequently reintroduced. For about one in ten children with asthma, a food allergy may occasionally be significant in triggering attacks, but this is rarely the case in adult asthmatics.

Screening tests are of little value in the diagnosis of true food allergy. When symptoms only occur in relation to a specific food, the diagnosis can be made from the history of the person and further investigation may be unnecessary. Skin or blood (RAST) tests are usually only helpful to confirm the diagnosis in doubtful or difficult cases.

Besides, a positive result is of no significance unless the food itself produces an obvious reaction when eaten. Antibodies to foods are commonly found in healthy individuals. If allergy is suspected, the most reliable approach is the withdrawal of the major food allergens for at least two weeks. For those with a history that suggests a true food allergy reaction but there is some doubt about the diagnosis, subsequent challenge should only be done under strict medical supervision.

- Once a true food allergy is recognised total avoidance of the relevant food is required.
- Challenges should be done under medical supervision.

If severe reactions persist, lifelong avoidance of the particular food may be necessary.

**Food Chemicals**

Reactions to chemical components of the diet are much more common than true food allergies. They are caused by various organic chemicals occurring naturally in a wide range of plant and other foods, or by additives (such as preservatives, colourings or flavourings) used in food processing. Chemically there's little difference between "natural" and "artificial" ingredients. Both may cause adverse reactions in sensitive people if sufficiently large amounts are consumed.

Although much attention has been paid in recent years to the adverse effects of food additives, reactions to natural food chemicals are a more frequent and insidious problem. Natural chemicals are found in small amounts in virtually all plant and animal foods, and some of these, such as vitamins, have important nutritional functions. Others have antibacterial actions and can act as natural preservatives. In fact, many plants contain chemicals that are poisonous to humans. The human diet has undoubtedly evolved to avoid the most toxic substances.

Some plants also contain chemicals that have medicinal or mood-altering properties. These are a rich source of pharmaceutical and other drugs. Many of these natural chemicals in foods are responsible for their particular flavour and aroma, and as a general rule, the stronger the taste and/or smell of a particular food, the richer its content of natural chemicals.

In sensitive people, food chemicals can cause undesirable side effects in exactly the same way medications and other drugs do. Individual susceptibility seems to be partly inherited and partly due to other factors such as general health, nutrition, metabolism, age and sex. In general, women tend to be more sensitive than men, and this may be due in part to hormonal differences.

One of the most widely distributed of the natural chemicals capable of provoking symptoms come from a family of substances known as salicylates. Aspirin is a member of this family and its medicinal properties have probably been exploited unknowingly in may herbal remedies for thousands of years. Although salicylates were first isolated from willow bark more than a century ago, it has only recently been found that they are present in varying amounts in a wide range of plant foods. These include most fruits and vegetable, herbs, spices, nuts, wines, tea and coffee, honey, yeast and other extracts, some aromatic oils (such as wintergreen) and strong flavouring such as mint.

On a diet rich in these foods it is possible to consume as much as the equivalent of half an aspirin a tablet a day. Over an extended period this can produce significant side effects in some people. Whether it might also produce beneficial effects in others is at present unknown. In these plant foods, benzoates and salicylates are present as natural preservatives and flavourings. Some are identical to those added to processed foods. A diet rich in fruits and vegetables may provide several hundred milligrams of these and related substances daily.

Several other naturally occurring substances can also cause adverse reactions in sensitive people. One important family of chemicals, known as amines, is found in foods like tasty cheeses, chocolates, wine, bananas, mushrooms, tomatoes, oranges and avocados. Monosodium glutamate (MSG) is also widely used as a flavouring. Although MSG is often associated with Chinese cooking, its active ingredient (glutamate) is also present naturally in tomatoes, parmesan cheese, stock cubes, meat and yeast extracts, and a number of other foods. For some, milk sugar (lactose) can cause problems, but it is rare for refined sugar (sucrose) to provoke symptoms.

Some people can experience adverse side effects from certain food additives, and this usually goes hand in hand with a tendency to react to natural chemicals. The most common problems are caused by preservatives, colourings and flavourings regardless of whether these are "natural" or "artificial". It should, however, be emphasised that many food additives are quite safe, even for those with the most sensitive constitutions.

**Food Intolerance**

Chemical intolerance can occur in people from allergic as well as nonallergic families. Symptoms can begin at any age, either suddenly or more slowly. Sometimes a change of diet is responsible; in other cases a virus infection or serious illness is the trigger, particularly when there has been a sudden loss of weight. Heavy exposure to certain dietary substances (such as these in coffee, rich and spicy foods, chocolates, alcohol and "junk" foods) can be a contributory factor. Reactions to drugs or environmental chemicals can occasionally be involved.

Symptoms often include irritation of the skin, mouth, throat, stomach or bowels. It is common for people to experience recurrent hives and swellings, mouth ulcers, nausea, stomach cramps or diarrhoea. Headaches and a general feeling of lethargy are also common and can be associated with mental impairment or unpredictable mood changes. In children, so-called hyperactive behaviour disturbances can also occur, but the nature of this problem is controversial, and psychological factors must be taken into consideration.

The situation can become very complex in people who also have true allergies. Asthmatics can sometimes develop quite severe attacks after exposure to sulphite preservatives, aspirin or MSG. Other substances tend not to affect the chest. In children with eczema, true food allergy can coexist with a tendency to react to dietary chemicals so that foods may aggravate the condition for both reasons.

Reactions to food chemicals can sometimes be quite sudden. More often they are delayed by many hours or else develop gradually due to a build-up from the combined effects of many different foods over several days. As a result they can be difficult to diagnose until the diet is systematically investigated. However, it should be stressed that similar symptoms can occur for many other reasons, and diet should only be considered as a cause when more serious underlying conditions (including psychiatric disease) have been excluded by a doctor.

**Investigation and Management of Food Intolerance**

In many cases a relatively minor change of diet, with removal of those foods that cause the most obvious reactions, is all that needs to be done to solve the problem and professional help may not be required. However, in more sensitive patients, or in those with severe and disabling symptoms, it is often necessary to examine the diet as a whole. This should be done under the supervision of an experienced doctor and dietitian. Information about where to go for expert medical and dietetic advice is available through the dietetics departments of most teaching hospitals.

Although some chemicals tend to cause problems more than others, each person reacts in an individual way. As a result there is not a single "right" diet for people with food intolerance. What suits one person will not necessarily suit another. The approach developed at Royal Prince Alfred Hospital involves four stages.

1. The first step is to find out whether or not a person's symptoms are likely to be diet-related. This is done by prescribing a very strict "elimination diet" for a minimum of two weeks to see whether the symptoms subside and disappear. This diet has been carefully designed to avoid all the known chemicals that might be involved. If symptoms do not subside after six weeks, it is unlikely that food intolerance is an important factor and the patient can go back to a normal diet.

2. If symptoms do disappear on the elimination diet, the next step is to find out what chemicals are the problem in each case. This is done by giving the person a series of "challenges" where the individual receives dietary chemicals one by one, orally, to see which ones bring on the symptoms.

The most objective way of conducting challenges is as a "double-blind" procedure - with dummy tests included - so that neither patient nor therapist knows what is being taken until the tests are completed.

3. Once the problem chemicals are identified in this way we prescribe an individualised diet. Armed with a detailed knowledge of the offending foods, it is possible to give reliable advice about what to avoid.

4. Over the following weeks and months, patients are encouraged to carefully try out small amounts of the suspect foods in a systematic way, according to their chemical composition, since the degree of sensitivity varies from person to person. Over a period of time it is also possible for many individuals to build up some resistance to problem chemicals by regular exposure to small amounts. This needs to be done with care. The objective is to end up with as varied and balanced a diet as possible without a return of symptoms.

During each phase, care must be taken to make sure that the diet is nutritionally adequate and to take suitable supplements if necessary. Successful testing requires involvement of an experienced dietitian with particular knowledge of the chemical composition of all commonly eaten foods. Attention to minor details can be critically important.

Withdrawal symptoms are common toward the end of the first week of dietary elimination, and subsequently the body often becomes more sensitive to food chemicals. Previously tolerated foods containing small amounts of these substances may now begin to cause symptoms, so that apparently minor indiscretions or mistakes in the elimination diet may be responsible for the non-disappearance of symptoms. It is also important for the dietitian to give each patient detailed advice on such matters as reading labels, shopping, food preparation, recipes, coping with social occasions, parties and travel.

Systematic dietary testing takes two or three months to carry out, and can generally be conducted on an outpatient basis under appropriate supervision. However, patients at risk of developing serious reactions (such as asthmatics and those who have had episodes of swelling of the throat or collapse) are routinely hospitalised for graded-dose challenges.

# The Importance of Pre-conceptional Nutrition

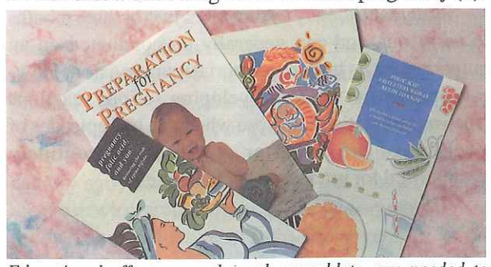
*Nehal Kamdar, B.Sc. (Diet.)*
*Lynn Alexander, B.Sc. Hons. (Diet.), RDS*

Recent years have witnessed marked improvement in health care. Maternal mortality and morbidity as well as infant mortality have dropped greatly due to rapid advances in perinatal care, better living conditions and better nutrition during pregnancy. For a long time our ancestors have taken procreation as a matter of destiny. Maternal and perinatal death was often considered as an act of God. This fatalistic approach is now fast changing. Pregnancy entered into by couples who are prepared will have a better chance of a good outcome compared to one that comes at a time when the woman's body is ill-prepared for carrying the foetus(1).The importance of preconceptional nutritional status in relation to birth outcome is now recognised.

## Risks of poor pre-conceptional nutrition

Organogenesis occurs from around the 17th day after conception until 8 weeks gestation (2). During organogenesis the embryo already depends for nourishment to a large extent on the mother's blood. Early pregnancy nausea may limit appetite and make nutritional inadequacy more likely during this vulnerable period.

Undernutrition in early pregnancy has been observed to increase the incidence of birth defects. Babies conceived during the Dutch famine of 1994/45 had a higher incidence of severe congenital abnormalities compared to babies conceived before the famine (3). Further evidence that good pre-conceptional nutritional status improves pregnancy outcome has emerged from the American Special Supplemental Food Programme for women, infants and children, where improved diet after one pregnancy, and before the next, increased the mean birth weight and reduced the risk of low birth weight in the second pregnancy (4).




*Educational efforts, e.g. through pamphlets, are needed to raise awareness among women about the importance of pre-conceptional nutrition.*

*Nehal Kamdar and Lynn Alexander are dietitians in the Department of Nutrition and Dietetics at Kandang Kerbau Hospital, Singapore. Lynn Alexander is also a Main Committee member of the SNDA.*

## Who is likely to be at risk?

- *Women who have had 2 or more pregnancies in quick succession, as their nutrient stores may be depleted.*
- *Those following nutritionally restricted diet such as slimmers, recent vegetarians or those with poor/ irregular eating habits and those from low income groups.*
- *Women who are underweight (<85% of standard) or overweight.*
- *Those suffering from chronic illness, eg. diabetes.*
- *Those on long-term oral contraceptive use.*
- *Women with poor obstetric history.*
- *Those who are breastfeeding.*
- *Smokers, alcohol or drug abusers.*

## Low pre-conception weight and pregnancy outcome

Low maternal pre-pregnant weight, which in many cases reflects nutritional status, is known to increase the risk of growth retardation in infants.

One study found that women with a BMI below 19.1 had a three fold higher risk of delivering small for gestational age babies (5). Thus conception is best delayed in underweight women, until normal weight is approached.

Underweight is also an important cause of amenorrhoea. Fertility can often be restored in underweight women, through dietary counselling to achieve weight gain (6). A BMI at the higher end of the 20 - 25 healthy range, e.g. 24, is suggested as optimal for conception and pregnancy outcome (7).

*Green vegetables appear to be the most significant contributors of folic acid in the Singapore diet.*



## High pre-conception weight and pregnancy outcome

Women entering pregnancy with a BMI over 30, face a higher risk of hypertension and diabetes during pregnancy. There is also a higher risk of anaesthesia-related complications in overweight pregnant women undergoing caesarian section operations (8). Babies born to overweight mothers have a greater incidence of macrosomia (big baby syndrome) and paradoxically, intrauterine growth retardation.

Obesity is associated with high incidence of amenorrhoea. Weight reduction alone is often successful in restoring ovulatory cycles in women with obesity and chronic anovulation (9).

For overweight women, weight should ideally be reduced pre-conceptionally and then 3 months allowed on a more liberal diet. Women who are mildly overweight and who are planning to become pregnant should be discouraged from weight loss or slimming diets 2 - 3 months prior to conception (10).

## The role of pre-conceptional folic acid in preventing neural tube defects

Much of the current interest on pre-conceptional nutrition focuses on folic acid. After more than a decade of uncertainty, it is now clear that the majority of neural tube defects (NTDs) can be prevented by an adequate maternal intake of folic acid around the time of conception and in early pregnancy (11). The conclusive evidence comes from two recent randomized controlled trials. In 1991 Medical Research Council, UK published the results of a large study on folic acid supplementation (12). The study concluded that 4mcg/day supplementary folic acid taken before conception until 12 weeks of pregnancy reduced the risk of NTD recurrence by 72%. A trial in Hungary showed that a multivitamin supplement containing 800mcg folic acid, taken periconceptionally, significantly protected against first occurrence of NTD (13).

## Folic acid recommendations

The Department of Health, UK (14), recommended in 1992 that:

*An alternative to the 5mg folic acid tablet (right) is to take an ante-natal multivitamin preparation with a lesser amount of folate. Note that some ante-natal preparations do not contain folate.*

a) women with a previous NTD baby who may become pregnant should be prescribed 5 mg folic acid daily (4 mg if preparation becomes available)

b) women planning a pregnancy should be advised to take 400 mcg folic acid as a daily supplement from attempting to conceive until the 12th week of pregnancy.

In 1992 US Public Health Service recommended 400 mcg/day for all women capable of becoming pregnant (15). This year has seen the launch by FDA of the American flour fortification programme. Flour will be fortified with folate to 140 mcg/100g, a level four times that found in normal wholemeal flour (16). It must be noted that the most appropriate food for fortification will vary from population to population. In some countries legislative changes will be necessary before folic acid can added to foods in amounts likely to provide most women with sufficient folate to prevent NTD in their off spring.

## Local folic acid intakes

No published data were found on local consumption of folic acid. Therefore a small survey of 20 women, 17 - 40 years of age, was conducted by the Department of Nutrition and Dietetics, Kandang Kerbau Hospital, in 1996. Average folic acid intake calculated from a 24-hour diet recall was found to be 137 mcg/day (range 44 - 288 mcg). Almost half (47%) of the folic acid was supplied by green vegetables.

Subjects were questioned with regard to frequency of consumption of foods containing significant levels of folic acid. It was found that 70 - 80% of women consumed pulses and breakfast cereals once a week or less. Only 30% took orange or orange juice 5 times or more a week. Only 50% took bread 5 or more times a week, implying that if bread were to be fortified with folate as it is in UK, it would not impact a significant number of the target population.

## How can pre-conceptional folic acid requirements be met?

There are relatively few good sources of folic acid (see Table 1). In order to achieve 400 mcg folic acid in the daily diet, the following would need to be consumed:


*The preformed vitamin A (retinol) content of ante-natal supplements should be checked, especially when used pre-conceptionally. Some products, sueh as the one on the left ("Pronavit"), are free of vitamin A.*

2 servings of green leafy vegetables
+ 1 serving of other vegetables or pulses
+ 2 serving of orange/orange juice
+ 2 servings of wholegrains, egg or other foods of moderate folate content

As up to 80% of folic acid is destroyed during cooking, vegetables should be cooked for as short a time as possible to maximise the available folate.

**Table 1 Approximate folic acid content (mcg) in selected foods.**

| | |
|---|---|
| ½ cup spinach, broccoli, cooked | 115 |
| ½ cup beans cooked | 50 - 150 |
| ½ cup other vegetables, cooked | 50 |
| 2 teaspoons Bovril or Marmite | 99 |
| ½ cup fortified breakfast cereal | 0 - 100 |
| 1 cup orange juice | 48 |
| 2 small potatoes, boiled | 47 |
| 2 tablespoons wheatgerm or bran | 45 |
| ½ big square taufu | 22 |
| 2 slices wholemeal bread | 20 |
| 1 egg | 20 |
| 1 bowl unpolished rice | 16 |

*Source: McCance & Widdowson's The Composition of Foods, 5th ed. 1991, and Bowes and Churches' Food Values of Portions Commonly Used, 16th ed. 1994.*

With dietary counselling and a determined effort, a folic acid intake of 400 mcg/day can be achieved. If, however, the ideal pre-conceptional folate intake is actually 600mcg/day, as suggested by BDA (10), then it would be practically impossible to achieve without the use of supplements or fortification of appropriate foods.

Presently, the only folic acid tablet available for supplementation is 5mg. Such a high dose is felt to be unnecessary for low risk women. Over supplementation of folic acid can mask neurological manifestations of pernicious anaemia. It may also block zinc absorption, which could increase pregnancy complications such as infection, bleeding, foetal distress, prematurity or death. Maternal side effects to GI tract, skin and CNS have also been noted (17, 18). An alternative to the 5mg tablet is to supplement with a pre-natal multivitamin preparation containing 400 - 1000 mcg folic acid, or a milk-based fortified maternal beverage supplying 400 mcg folate (these alternatives should be free of or low in pre-formed vitamin A).

### Vitamin A in the preconception diet

Last year, researchers in Boston University (19) published findings that a suprisingly low dose of vitamin A(10,000 IU), or four times the RDA, appeared to increase the risk of birth defects when taken pre-conceptionally and in early pregnancy. They estimated that one out of every 57 babies born to women who were taking more than 10,000 IU of vitamin A had birth defects as a result. The defects involved malformations of face, head, heart and nervous system.

Most multivitamin supplements contain 5,000 IU or less. However, some multivitamins or straight vitamin A capsules sold in health food stores or pharmacies can have as much as 25,000 IU. To be safe, women of child-bearing potential should not take supplements of vitamin A exceeding 5000 IU. Women should also be discouraged from taking large servings of liver frequently, and may need to reduce intake of cod-liver oil and vitamin A-fortified foods. In the UK, women have for some time been told to avoid liver when pregnant or planning pregnancy (10). It is important to note that beta-carotene appears to be completely safe.

**Table 2 Approximate range of preformed Vitamin A content (IU) of selected foods and supplements.**

| | |
|---|---|
| 100g pig's liver | 58,650 |
| 1 capsule pregnancy multi-vitamin supplement | 0 - 6,000 |
| 2 teaspoons cod liver oil | 4,000 |
| 1 capsule cod liver oil | 2,700 - 4,000 |
| 1 serving milk-based fortified maternal beverage | 330 - 1,600 |
| 1 cup (240ml) reconstituted vitaminized skim milk | 650 |
| 3 teaspoons Milo, Nestum, Ovaltine and similar fortified beverage mixes | 250 - 450 |
| 1 cup (240ml) fresh whole milk | 400 |
| 1 egg | 320 |

*Source: Product information and McCance and Widdowson's The Composition of Foods, 5th ed, 1991.*

### Conclusion

At the time of conception and organogenesis, most women do not even realize yet that they are pregnant. Hence, the importance of establishing good nutrition before pregnancy. Pre-conceptional nutrition counselling by a qualified dietitian should ideally be arranged for all planned pregnancies, but especially for those women identified to be at risk of compromised nutritional status. Educational efforts are needed to raise awareness among all women of child-bearing age about the importance of good diet, desirable weight, sources of folic acid, cautions on excessive vitamin A and other concerns. A more extensive review of the issues to consider in preconceptional nutrition counselling can be found elsewhere (10).

In the words of a local obstetrician: "Pre-pregnancy counselling to ensure a healthy pregnancy is an exercise that all couples, especially those with risk factors, should participate in. The reward, a well pregnancy and a healthy baby" (1).

*This paper was presented at the 4th Annual Scientific Meeting of Kandang Kerbau Hospital, Singapore, 1996.*



### References

1. Liauw, P., Towards a Healthy Pregnancy : Pre-Pregnancy Counselling, General Practitioner, 1994.

2. ACOG Technical Bulletin., Preconceptional Care. Int. J. Gyn. Obs. 1995, 50 : 201 - 207.

3. Stein Z., Susser M., Saenger, G. et al. Famine and Human Development: The Dutch Hunger Winter of 1944/45, New York: Oxford University Press, 1975.

4. Caan B., Horgen D.M., Margen S., et al. Benefits associated with WIC supplemental feeding during the interpregnancy interval, Amer. J. Clin. Nutr. 1978, 45 : 29 - 41.

5. Van der Spuy A.M., Steer P.J., McCusker M., et al, Outcome of pregnancy in underweight women after spontaneous and induced ovulation, Br. Med. J. 1988, 296: 962 - 965.

6. Bates G.W., Bates S.R. and Whitworth N.S., Reproductive failure in women who practice weight control, Fertility and Sterility 1982, 37:3, 373 - 378.

7. Wynn A. and Wynn M., The need for nutritional assessment in the treatment of the infertile patient, J. Nutr. Med. 1990; 1:315 - 324.

8. Perlow J.H., Obstetric management of the obese patient, Contemp. Ob/Gyn., Nov. 1995, 15 - 48.

9. Bates G.W. and Whitworth N.S., Effect of body weight reduction on plasma androgens in obese infertile women, Fertility and Sterility 1982, 38 : 406.

10. The British Dietetic Association, Position Paper-Preconceptional Nutrition, May 1994.

11. Bower C., Folate and neural tube defects, Nutr. Rev. 1995, 53, 9: S33 - S38.

12. Wald N., Sneddon J., Densen J., et al., Prevention of neural tube defects: Results of the Medical Research Council Vitamin Study, Lancet 1991, 338: 131 - 137.

13. Czeizel A. and Dudas I., Prevention of first occurrence of neural tube defects by periconceptional vitamin supplementation, N. Engl. J. Med. 1992, 327 : 1832 - 1835.

14. Department of Health, U. K. Folic acid and the prevention of neural tube defects, Report from an Expert Advisory Panel, 1992.

15. US Department of Health and Human Services, Public Health Service Centres for Disease Control, Recommendations for the use of folic acid to reduce the number of cases of spina bifida and other neural tube defects, MMWR 1992, 41 (RR-14):1 - 7.

16. Hine R.J., What practitioners need to know about folic acid, J Amer. Diet. Assoc., 1996, 96 : 451 - 452.

17. Drugdex. 1996. Micro Medex: U. S. A

18. Briggs G.B, Freeman R.K, Yaffe S.J., Drugs in pregnancy and lactation. Williams and Wilkins. Baltimore, 1994. 4th edn.

19. Rothman K.J., Moore L.L., Singer M.R. et al., Teratogenicity of high vitamin A intake, N. Engl. J. Med. 1995, 333 : 1369 - 1373.

# Nutrition and Fitness

*3rd International Conference on Nutrition and Fitness, Olympia Stadium, Athens, Greece May 24-27, 1996*

*Inge Hager*

**Introduction**

The International Conference on Nutrition and Fitness is dedicated to the concept of positive health as articulated by Hippocrates in 480 BC.

"Positive health requires a knowledge of man's primary constitution (what today we would call genetics) and of the powers of various foods, both those natural to them and those resulting from human skill (today's processed food). But eating alone is not enough for health. There must also be exercise, of which the effect must likewise be known. The combination of these two things make regimen, when proper attention is given to the season of the year, the changes of the winds, the age of the individual and the situation of his home. If there is any deficiency in food or exercise the body will fall sick".

*Hippocrates 480BC*

**Objectives**

- Review and critique the latest scientific information on nutrition and fitness
- Determine the relationship between nutrition and fitness to chronic diseases
- Consider the psycho-social and other determinants of physical activity
- Stimulate national governments and the private sector to coordinate and thus maximise their efforts

**Highlights**

## NUTRITION

### Fluid Needs for Physical Activity During Exercise

*F. Brouns, Department of Human Biology, University Limburg, Maastricht, The Netherlands*

Practice as well as scientific studies have clearly shown the effect of fluid loss on physical performance capacity. Generally a fluid loss of >1 liter is known to influence oxygen transport capacity and physical performance. When exercise takes place in the heat, dehydration additionally reduces heat flux from the muscles to the periphery, causing the core temperature to rise thus having further impact on central fatigue and performance. Additionally, thermal stress may increase to such an extent that normal organ functions and health become threatened. In respect to themoregulation and performance, it is important for the athlete to be maximally hydrated at the onset of exercise and to rehydrate appropriately during and after exercise.

Gastric emptying and intestinal absorption studies have shown that well composed carbohydrate-electrolyte drinks are absorbed faster, retained better and improve performance more than plain water, mineral water, and mineral-apple juice mixtures. The need to ingest a large amount of fluid is strongly influenced by the climatological conditions, as well as the type of exercise. As such cyclists are able to ingest more fluid than runners. In his conclusion he recommended, that in order to rehydrate and to maintain performance capacity at a high level, the athlete should ingest 400-800 ml of non-hypertonic fluid per hour, containing 60-80 g of carbohydrate, and 400-1100 mg of sodium.

### Fluid needs for Physical Activity - Post Exercise

*Recovery After Exercise: Restoration of Fluid Balance, R. J. Maughan, University Medical School, Aberdeen, Scotland*

Ingestion of plain water after exercise-induced dehydration is know to depress the plasma sodium concentration and osmolality, reducing the drive to drink and stimulating urine output. Both factors will prevent effective hydration. In studies Maughan et al investigated the effects of drink composition and the volume consumed on the effectiveness of the restoration of fluid homeostasis after exercise in the heat.

In one study, a prescribed volume of fluid was ingested after a fixed sweat loss induced by exercise in the heat. In a second study, ad libitum intake of fluids had been allowed of varying composition and palatability. The effectiveness of rehydration in these studies had been assessed primarily by measurements of net fluid balance during the recovery period after exercise and of changes in blood volume and electrolyte concentration

For effective rehydration, drinks should replace electrolytes loss in sweat as well as volume loss: this means that they should contain moderate (50-60mmol/l) levels of sodium, and possibly also some potassium. To surmount on going urine losses, the volume consumed should be greater (by at least 50% ) than the volume of sweat lost.

Palatability of drinks is important in stimulating intake. Where there is an opportunity for eating in the recovery period, the electrolytes required may be ingested as solid food consumed with a drink, but it is recognised that there are situations where consumption of solid foods is not possible and all intake will be in liquid form.

He concluded that for maximum performance all athletes should attempt to remain fully hydrated at all times. This will only be achieved if a volume of fluid in excess of the sweat loss is ingested together with sufficient electrolytes.

## EXERCISE

### Good Cardiorespiratory Fitness Is Associated With Reduced Progression of Carotid Atherosclerosis

*T. A. Lakka et al, Research Institite of Public Health, University of Kuopio, Kuppio, Finland*

Physical activity and good cardio respiratory fitness have been found to be associated with decreased cardio vascular morbidity and mortality in a number of population studies. However, there are few studies concerning the relation of physical activity and cardio respiratory fitness with atherosclerosis, the most important cause of cardio vascular diseases.

Lakka et al studied the relation of conditioning leisure time physical activity, assessed quantitatively by a 12 month history, and directly measured maximal oxygen uptake ($VO_2$ max) with the progression of carotoid atherosclerosis among 972 men in Eastern Finland. Intima-media thickness (IMT) was used as a measure of carotoid atherosclerosis.

In co-variant models adjusting for age, cigarette smoking, serum LDL cholesterol, systolic blood pressure and plasma fibrinogen, men with the $VO_2$ max of <25,26-35,35-46 and >45 ml/min x kg had a mean change in the mean IMT of 0.15, 0.10, 0.12 and 0.99mm respectively.

He concluded that the preliminary findings suggest that progression of carotoid atherosclerosis is slower among men who have good cardiorespiratory fitness who engage in vigorous physical activity than among physically less active or less fit men.

### Physical Activity in the Prevention and Management of Cardiovascular Disease

*R. B. Birrer Catholic Medical Centre, Jamaica, New York*

Physical activity improves functional capacity, quality and length of life. In addition exercise training reduces clinical symptoms in patients with cardio vascular disease (e.g. coronary artery disease, hypertension, peripheral arterial disease, heart failure). The maximal oxygen uptake ($VO_2$ max) increases 10-60% through improvements in the arteriovenous oxygen difference, submaximal heart rate and maximal stroke volume. Because improvements in submaximal endurance capacity can occur in healthy subjects despite a modest increase in $VO_2$ max, increases in maximal work capacity may understimate the functional benefits of exercise training. Physical activity has a favourable impact on such important cardiovascular risk factors as blood lipid levels, glucose tolerance, and blood pressure. In addition, regular physical activity enhances positive behaviours like better nutrition and weight control, helps shed negative practices like smoking and reduces psychological stress. Overall morbidity and mortality from a cardio vascular event is significantly reduced. Evaluation consists of a medical history, physical examination, and a guided exercise test when appropriate. An individualised exercise prescription is based on the initial clinical and exercise evaluation. It consists of a mode (continuous activity of large muscle groups), frequency (3-5 times per week), duration (20-40 minutes with 5-10 minute warm-up and cool-down periods), intensity (40-85% of $VO_2$ max), progression (graded intensity and duration), and special instructions (diet, warnings, medication, etc.). Follow-up through supervision and monitoring should be performed most extensively when dealing with high-risk patients. Major cardiovascular complications during exercise, although rare, include sudden death, acute myocardial infarction and cardiac arrest. He concluded that a well designed, carefully supervised exercise prescription allows most individuals to achieve optimal physical and emotional health.

### Current Concepts of Exercise Prescription for Prevention and Management of Osteoporosis

*H. Suominen Department of Health Sciences, University of Jyvakyla, Finland*

There is general agreement that physical activity is important both for the prevention of osteoporosis and for the rehabilitation of the osteoporotic patient. It is welldocumented that immobilization results in rapid bone loss and that bone responds to the physical stress of exercise. Regular physical activity is likely to contribute to the attainment of peak bone mass and also to slow down the decline in bone mineral density in middle-aged elderly people.

Moreover, exercise can improve neuro muscular competency and thus reduce the predisposition to fracture-risk falls. The current concepts of exercise prescription for the prevention and management of osteoporosis, however, differ according to the viewpoints and personal interests of different scientists and practitioners and the age and sex and other characteristics of those being studied. Even though several exercise interventions have suggested positive

*Inge Hager is currently Clinical Dietitian in the Department of Nutrition and Dietetics at Gleneagles Hospital, Singapore. She is Vice-President of SNDA.*

effects on bones, prospective trials do not seems to match the differences obtained in bone mineral density between athletes and controls in some studies.

In addition to the unrealistic aims of generally applying the intensive exercise practised by athletes, the impacts of strength-demanding, fast and unusual movements, which seem to be particularly osteogenic, involve a risk of damage especially in older people. It has also been suggested that increasing the volume of intensive training such as long-distance running may even be rather detrimental to bone health.

The question remains as to whether a small percentage gain of bone mineral density, possibly achieved by moderate exercise when compared to conditions under which immobilisation is avoided, is of clinical significance for bone strength or whether there are other training-induced changes in bone structure and general performance which could inhibit the occurrence of fractures.

Further evidence in human studies are needed to delineate the osteogenic types of exercise such as those involving novel strain distributions and high peak strains and strain rates in bones (Lanyon, Bone 1996; 19:37S), and to examine the local changes in bone structure, geometry and mechanical properties (Cheng et al, J Bone Miner Res 1995; 10: 139. J Biomech 1995; 28: 471).

He concluded that on the basis of current knowledge, it is possible to offer several guidelines on the use of exercise, paying attention to overall good health. The best solution may not be to start a training regimen purely on account of the bones, but to design a programme with the emphasis on improving muscular performance and cardiovascular fitness and which should be enjoyable. High-impact exercise could also be applied, provided that those at imminent risk for injuries and fractures are identified in order to avoid excessive mechanical loading on the bones and to minimise the possibility of falls.

### Physical Activity and Non-insulin-dependent Diabetes Mellitis

*R. S. Paffenbarger, Jr. Stanford University School of Medicine, Stanford, California, and Harvard University School of Public Health, Boston, Massachusetts, USA.*

Foremost in the pathogenesis of non-insulin-dependent diabetes mellitus (NIDDM) are immutable genetic determinants, a reduced action of insulin in insulin-sensitive tissues, and a defect in pancreatic b-cell function. Personal characteristics and lifestyle elements that lead to the development of insulin resistance and NIDDM include aging, obesity, weight gain, central fat distribution, hypertension, hyperlipidaemia, excess alcohol consumption, and physical inactivity.

Historical observations picture societies that have abandoned physically active lifestyles (e.g. migrant and urban populations) as experiencing marked increases in NIDDM incidence rates. Cross-sectional and retrospective studies have demonstrated that NIDDM subjects in all social classes are less physically active than non-diabetic subjects. And, quantitative, prospective, cohort studies (e.g. of American college alumni, nurses, physicians, other health professionals, and selected community groups) have shown lower NIDDM incidence rates among more active individuals as compared with less active segments of these populations. Conclusive evidence of causality from clinical trials or even from alteration by intervention (spontaneous or imposed) in populations is not at hand.

By way of example, University of Pennsylvania alumni experienced lower NIDDM incidence rates with higher activity levels estimated in kilocalories (Kcal) from reported walking, stair climbing, and sports play. Rates declined as energy expenditure increased from <500 Kcal to 3500 Kcal per week. For each 500 Kcal increase in energy output, rates declined by 6%. Preliminary findings from Harvard College alumni, studied in the same way, suggested a decline in NIDDM incidence rates from adopting the habit of playing moderately vigorous sports in middle life.

The Physical inactivity of bed rest induces insulin insensitivity, hyperinsulinaemia, and glucose intolerance. In contrast, taking up endurance exercise, by both non-diabetic and diabetic subjects increases insulin sensitivity and accelerates glucose utilisation, at least for a day or two. Improved metabolic function is especially marked with habitual endurance exercise among high risk (obese, hypertensive, genetically predisposed) subjects, and exercise delays and tempers complications of NIDDM.

He concluded that although uncertainty remains as to the optimal type, frequency, duration, timing, and intensity of physical activity that would be needed, and an active and fit way-of-life is both protective against and therapeutically effective for NIDDM.

### Physical Activity in the Prevention and Management of Obesity

*V. Stich Department of Sports Medicine, 3rd Medical School, Prague, Czech Republic*

Regular exercise has always played an important role in weight control and served as a useful adjunct in the treatment of obesity.

Exercise training may affect body composition through its effects on basal and exercise-related thermogenesis, on adipose tissue lipolysis and on fat oxidation. Clinical studies examining the presence of these effects in obese subjects submitted to exercise training have shown variable results. The variations are associated with age, gender, and the type of obesity as well as with the type of training and nutrition during the training period.

Besides the direct effects on body composition, exercise training is associated with beneficial effects on several metabolic disturbances associated with obesity (disturbed insulin action, lipid and carbohyrate metabolism) contributing thus to an establishment of a state of "metabolic fitness".

Exercise training of moderate intensity used in conjunction with dietary and behavioural treatments seems to be the best modality if implementing exercise prescription in obesity treatment.

An increasing number of studies suggest the association between the level of physical activity and body adiposity. Clinical observations do find the relevant differences in the above mentioned metabolic parameters related to body composition (thermogenesis, lipolysis, fat oxidation ) between the sedentary subjects and those practicing regular physical activity. He concluded that the results of the studies suggest that a long-term increased level of physical activity may affect the body adipose tissue depot and serve as an effective means of prevention of obesity.

### Physical Activity in the Prevention and Management of Cancer

*M. Gerhaardsson de Verdier. The Centre for Epidemiology, The National Board of Health and Welfare, S-106 30 Stockholm, Sweden*

In Western countries, the major causes of premature mortality, morbidity and health care expenses in middle and older age groups are heart disease and cancer. Physical inactivity is a well-established risk factor for heart disease. However, a sedentary lifestyle has also been associated with an increased risk of different forms of cancer, in particular colon cancer.

Today, at least 40 case-controlled and cohort studies have investigated the association between physical activity and colon cancer. The epidemiological evidence for the protective effect of physical activity is quite strong. The association is evident across different study designs (case-controlled and cohort studies), different types of physical activity measured (occupational and recreational), different methods of assessing the amount of physical activity, and different considerations about confounding factors. The mechanisms discussed, included among others, are that increased physical activity may lead to a reduced bowel transit time and thus less time for contact between the colonic mucous and possible carcinogens, the effects via the immune system and/or via serum cholesterol and bile acid metabolism.

Associations between physical inactivity and the risk of endogenous hormone-related cancer, such as cancer of the breast, cervix, endometrium, corpus uteri, ovary, prostate and testes have also been discussed. Possible mechanisms include hypotheses such as effects on the levels of endogenous hormones; changes of body fat composition, and enhancement of natural immunity.

She concluded that more research is needed to investigate the biological pathways whereby physical activity contributes to health, as well as the amount, onset and continuation of physical activity necessary to afford protection. Further research is needed to explore if for example exercise also improves survival after treatment of cancer.

Meanwhile, the evidence for a protective effect of physical activity on heart disease is enough to promote moderate exercise among health persons in Western society, something that may also reduce the risk of some forms of cancer.

## Summary

The concept of positive health is still relevant and current. It is encouraging to see nutrition and exercise linked at last and I hope that this could be the beginning of many new developments in this area as we approach the year 2000.

Conferences of this nature are both relevant and pertinent and open new opportunities for the dietetic profession.

---

*Author gratefully acknowledges sponsorship from Gleneagles Hospital to attend the conference.*

# President's Annual Report 1995-1996

**The year in review**

SNDA entered its second decade this year with a record high full membership. This has been reflected in the fact that we have had many more members coming forward to become actively involved in our activities. Members rallied round enthusiastically to support the association's participation in the Ministry of Health's Nutrition Promotion Programme as part of the National Healthy Lifetyle Campaign 1995. Another very good turn out of our members was witnessed for the 1st International Conference on East-West Prespectives on Functional Foods, in which our association was involved as a co-organiser. Members have shown themselves to be pro-active in giving suggestions to the Main Committee on new programmes and future direction of the Association. This is indeed evidence that our profession is maturing and becoming firmly established in Singapore.

**The 1995-1996 Main Committee**

The committee was elected to office at the Annual General Meeting in April 1995. The selected committee members were:

| | |
|---|---|
| President | : Lynn Alexander |
| Vice-President | : Anna Jacob |
| Hon Secretary | : Sue Hixson |
| Hon Treasurer | : Inge Hager |
| Committee Members | : Ang Kai Ling |
| | Yashna Harjani |
| | Margaret Hays |
| | Louisiawati Khalil |
| | Khoo Poh Lai |
| | Leow Sooi Mee |
| | Lydia Loy |
| | Lisa Ooi |
| | Sue Pritchard |
| | Toh Hui Kheng |
| | Louisa Zhang |

A total of 11 Main Committee meetings were held in 1995-1996.

**Membership**

| Category | 1991/2 | 1992/3 | 1993/4 | 1994/5 | 1995/6 |
|---|---|---|---|---|---|
| Full | 52 | 56 | 60 | 63 | 78 |
| Affiliate | 55 | 63 | 30 | 28 | 28 |
| TOTAL | 107 | 119 | 90 | 91 | 106 |

SNDA's full membership has risen steadily over the years, but this year saw a record 24% jump in full membership! The Membership Sub-committee Chaired by Lynn Alexander and assisted by Khoo Poh Lai as Membership Secretary, met several times to review new applications. The committee is also embarking on an exercise to review and document detailed guidelines on membership criteria.

**Continuing Education (CE)**

Sue Pritchard took on the leadership of the CE Committee this year, and proved an able chairman. The third two-year cycle ended in 1995. A total of 6 members received the Continuing Education Certificate awarded jointly from SNDA and SPC.

The professional meetings organised by SNDA Continuing Education committee this year were as follows:

**3 August 1995**
"A Cohort Study of Diet and Cancer in Singapore Chinese"
by Professor Mimi Yu (USA)

**17 October 1995**
"Infant Nutritionals - Worldwide Regulations"
by Raymond J Maggio (USA)

**13 February 1996**
"Food Habits and Body Image in Adolescents-Educational Strategies"
by Jenny O'Dea (Australia)

**20 April 1996 (AGM)**
"Leanness to Last-Weight Management for the '90s
by Dr Ken Ung Eng Khean

Each of the above meetings was accredited 1 CE point for SNDA full members

**Singapore Professional Centre**

Louisa Zhang took over the representation of SNDA on the SPC council and regularly attended the meetings, keeping SNDA Central Committee well informed about the activities there. Two SNDA members, Ang Kai Ling and Gladys Wong, attended an SPC seminar on "Quality Assurance in Professional Services". SNDA will have a page in the SPC 25th Anniversary souvenir publication, kindly made possible by a corporate sponsorship.

**The Singapore Journal of Nutrition and Dietetics**

Our journal has maintained its high standard and has been well-supported by our corporate advertisers. It continues to be sent to all doctors in Singapore, and as such is an important vehicle to enhance our profession's visibility and credibility.

The June 1995 issue was produced under the Chief Editorship of Anna Jacob. Margaret Hays subsequently volunteered to take over the editorship for two issues, and the Dec 1995 issue has been published.

**Medical Association of ASEAN Exhibition, 23 April 1995**

SNDA was invited by the Singapore Medical Association to take part in an exhibition as part of the public forum organised by SMA at the MASEAN annual meeting. A table display of nutritional leaflets and SNDA publications was staffed by SNDA members.

**National Healthy Lifestyle Campaign 1995**

SNDA was invited by the Food and Nutrition Department, MOH, to take part in the Nutrition Fair, held at Ngee Ann City Civic Plaza, 3 - 10 September 1995. A committee led by Louisiawati Khalil, undertook the planning and organisation of this activity. The booth was a great success, thanks to the committee's creative effforts, the support of the 25 members who manned the booth from 10 am to 8 pm daily for the eight days of the Fair, and their young assistants-the students of the course in Applied Nutrition and Food Science, Temasek Polytechnic. Activites at the booth included our own SNDA version of the Pyramid Game, as well as nutrition quizzes. Sponsored healthy food and drink items were given away as prizes for participants. BMI assessment was also performed, and we sold the SNDA Pulses and Grains Cookbook.

**1st International Conference on East-West Perspectives on Functional Foods, Singapore, 26-29 September 1995**

SNDA was a co-organiser of this exciting event, which was held by (International Life Sciences Institute) ILSI Southeast Asia. Lynn Alexander and Sue Hixson represented SNDA on the Organising Committee. SNDA obtained three corporate sponsorships for members to attend this meeting and the three members selected were Yashna Harjani, Margaret Hays and Kath Walsh. More than 25 other SNDA members also attended; the overall number of participants at the conference was over 400, and all agreed it was a huge success.

**7th Asian Congress on Nutrition, Beijing, 7-11 October 1995**

SNDA received one corporate sponsorship for this meeting. Peggy Tan was selected and subsequently attended the meeting.

**12th International Congress of Dietetics, Manila, 28-23 February 1996**

Inge Hager was sponsored by the SNDA through a corporate sponsorship to attend this conference.

**Welcome Get-Together for New Members**

Due to the huge influx of new members this year, it was decided for the first time to hold a get-together to welcome new members. This took the form of an exotic Mediterranean-style BBQ prepared by our very own Main Committee member, Leow Sooi Mee. It was held on 3 December 1995 at Yashna Harjani's residence. Around 30 members attended, comprising new members who joined in the past two years, and Main Committee members.

**Programmes for 1996/1997**

Tentative meetings proposed in the coming year include a joint symposium with ILSI and Food and Nutrition Department, MOH, on "Dietary Guidelines", planned for July 1996, and a joint meeting with the Perinatal Society on "Infant and Child Feeding Practices-Implications for Growth and Health" to be held in August 1996.

A new Journal Club is also being planned, based on the members' response.

**Acknowledgements**

I would like to sincerely thank all members of the Main Committee and the sub-committees for their strong support and commitment over this year. It has been a privilege and an honour to work with such a great team of professionals. I would like to give very special thanks to Sue Hixson, who despite serious illness has continued to carry out her Honorary Secretarial duties as cheerfully and diligently as ever. Our thoughts and wishes are with her for a full and speedy recovery.

Appreciation is also recorded to the sponsors who have made it possible for us to hold our meetings and various activities. They include our professional meeting sponsors, journal advertisers, conference sponsors, and donors of gifts for the Nutrition Fair and the AGM.

With the recent increase in new members who have shown interest in contributing actively to SNDA, we now have a very vibrant association, and can look forward to a very exciting year ahead.

*Lynn Alexander President 1995/96.*

# ABSTRACTS

**EPIDEMIOLOGICAL ANALYSIS OF CROHNS DISEASE IN JAPAN: INCREASED DIETARY INTAKE OF N-6 POLYUNSATURATED FATTY ACIDS AND ANIMAL PROTEIN RELATES TO THE INCREASED INCIDENCE OF CROHNS DISEASE IN JAPAN.**

*Ryosuke Shoda, Kei Matsueda, Shigeru Yamato, and Noritsugu Umeda. American Journal of Clinical Nutrition. Vol 63. 741-5. 1996*

We examined the co-relation between the incidence of Crohns disease and dietary change in a relatively homogeneous Japanese population. The incidence and daily intake of each dietary component were compared annually from 1966 to 1985. The univariate analysis showed that the increased incidence of Crohns disease was strongly ($p<0.001$) correlated with increased dietary intake of total fat ($r=0.919$), animal fat ($r=0.880$), animal protein ($r=0.908$), milk protein ($r=0.924$), and the ratio of n-6 to n-3 fatty acid intake ($r=0.792$). It was less correlated with intake of total protein ($r=0.482$, $p<0.05$), was not correlated with intake of fish protein ($r=0.055$, $p<0.1$), and was inversely correlated with intake of vegetable protein ($r=-0.941$, $p<0.001$). The multi-variate analysis showed that increased intake of animal protein was the strongest independent factor with a weaker second factor, an increased ratio of n-6 to n-3 polyunsaturated fatty acids. The present study in association with reported clinical studies suggests that increased dietary intake of animal protein and n-6 polyunsaturated fatty acids with less n-3 polyunsaturated fatty acids may contribute to the development of Crohns disease.

**IS BEEF TALLOW REALLY HAZARDOUS TO HEALTH?**

*Akira Tajima, Sataoshi Kawahara, Kyoko Shin et. al. Nutrition Research, Vol.15, No 10, 1429-1436,1995.*

Effects of dietary lipids combined with meat powder on the concentration of serum triglycerides and cholesterol and on the accumulation of lipids in the liver were investigated. The concentration of serum triglycerides and cholesterol of rats raised with solid fats (palm oil, beef tallow, and palm-mid-fraction) were significantly higher than those of rats with soyabean oil. However, accumulation of lipids in the liver of rats raised with beef tallow was smaller than that with soybean oil. Fatty acid composition of lipids accumulated in the liver was greatly influenced by the composition of dietary lipids, while the composition of serum lipids was not significantly influenced by dietary lipids.

**SIMILAR WEIGHT LOSS WITH LOW OR HIGH CARBOHYDRATE DIETS**

*Alain Golay, Anne-Francoise Allaz, Yves Morel, Nicolas de Tonnac. et. al., American Journal of Clinical Nutrition, Vol. 63, 174-8, 1996.*

The goal of this study was to evaluate the effect of diets that were equally low in energy but widely different in relative amounts of fat and carbohydrate on body weight during a 6 week period of hospitalization. Consequently, 43 adult, obese persons were randomly assigned to receive diets containing 4.2 MJ/day (1000 kcal/day) composed of either 32% protein, 15% carbohydrate, and 53% fat, or 29% protein, 45% carbohydrate, and 26% fat. There was no significant difference in the amount of weight loss in response to diets containing either 15% (8.9+ 0.6kg) or 45% (7.5+0.5kg) carbohydrate.
Furthermore, significant decreases in total body fat and waist-to-hip circumference ratio were seen in both groups, and the magnitude of the changes did not vary as a function of diet composition. Fasting plasma glucose, insulin, cholesterol, and triglyceride concentrations decreased significantly in patients eating low-energy diets that contained 15% carbohydrate, but neither plasma insulin nor triglyceride concentrations fell significantly in response to the higher carbohydrate diet. The results of this study showed that it was energy intake, not nutrient composition, that detemined weight loss in response to low-energy diets over a short time period.

**ASSOCIATON OF FAT AND MUSCLE MASS WITH BONE MINERAL DENSITY IN ELDERLY MEN AND WOMEN**

*Richard N. Baumgarther, Patricia M. Stauber, Kathleen M. Koehler. et. al., American Journal of Clinical Nutrition, Vol.63, 365-72,1996.*

Associaton of fat and muscle mass with bone mineral status were studied in 301 men and women aged > 65years. Bone mineral and soft tissue composition were estimated by using dual-energy X-ray absorptiometry. Uni-variate co-relations suggest that muscle is associated more closely than fat with bone mineral content (BMC) as well as with bone mineral density (BMD) in men. In women, however, co-relations of BMC with muscle were only slightly greater than those with fat and co-relations with BMD were consistently greater with fat than with muscle. This suggests that co-relations of BMC with muscle are influenced by bone and body size, especially in women. A multiple-regression model was developed that adjusts BMC for bone area, knee height, age, and the independent effects of fat and muscle. In men, muscle remained more closely associated significantly with BMC than with fat. In woman, fat mass was associated significantly with BMC but muscle mass was not. The exception was for women taking estrogen, in whom neither fat nor muscle was associated significantly with adjusted BMC. This study suggests that body fatness may be more important than muscle in maintaining bone mineral density in elderly women not taking estrogen.



# Knowledge, Attitudes & Practices (KAP) Study On Factors Related To Food Choices

## Highlights of Findings

*Food and Nutrition Department*
*Ministry of Health*
*August 1995*

*Sue Pritchard & Toh Hui Kheng*

### Introduction

In May 1995, the Food and Nutrition Department of the Ministry of Health conducted a survey among 500 supermarket shoppers to determine their knowledge, attitudes and practices towards healthier food choices.

### Objective

The objectives of the survey were:

1. To assess shoppers' awareness of the Healthy Diet Pyramid
2. To determine the consumption of nine categories of food - the usual choice for each category - the reasons behind their choices
3. To ascertain awareness of healthier alternatives.

### Methodology

Five hundred shoppers aged 18 years and above were interviewed at ten NTUC Fairprice supermarkets. NTUC Fairprice, Singapore's largest supermarket group, was chosen as representative of supermarkets nation-wide. The supermarket locations reflected the different socio-economic levels of the Singapore population.

The questionnaires were administered by four polytechnic students on attachment to the Department. The first shopper who left the supermarket at each 15-minute interval was invited to participate. Each interview lasted approximately ten minutes.

### Profile Of Respondents

Out of the 500 respondents interviewed, 30% were males and 70% females. Most of the respondents were Chinese (76%), followed by Malays (9%), Indians (8%) and other races(7%). By age grouping, 17% were between 18-29 years, 73% were between 30-59 years and 10% were aged 60 years and above. In terms of educational level, 26% had primary education or less, 52% had secondary education and the remaining 22% were tertiary educated.

*Prepared by Sue Pritchard and Toh Hui Kheng*

### Highlights of Findings

#### Awareness of the Healthy Diet Pyramid

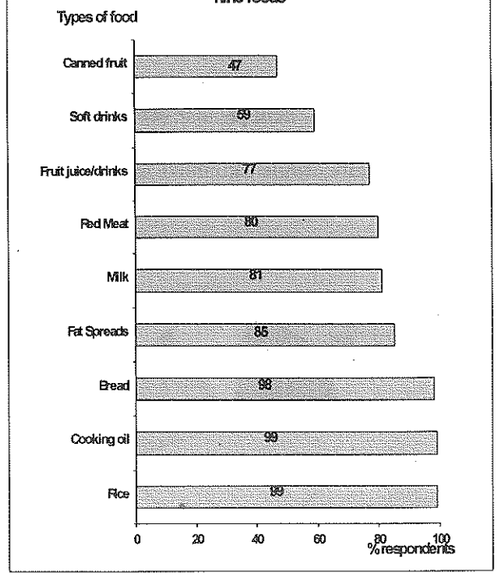
The Department first introduced the Healthy Diet Pyramid in its educational materials four years ago. The Healthy Diet Pyramid is intended to be used as a guide to facilitate food choice and meal planning to achieve a balanced diet. However, when interviewers asked shoppers if they had heard of the Pyramid, only 17% responded positively.

#### Consumption of common foods

Shoppers were asked if they consumed nine common foods: rice, bread, milk, fat spread, cooking oils, soft drinks, fruit drinks/juices, canned fruits and red meat.

Foods like rice, bread and cooking oil were commonly eaten by most. Over 75% reported using milk, fat spreads, fruit juices/drinks, and red meat. Soft drinks and canned fruit were less widely used; only 59% drank soft drinks and less than 50% used canned fruit (Fig 1).

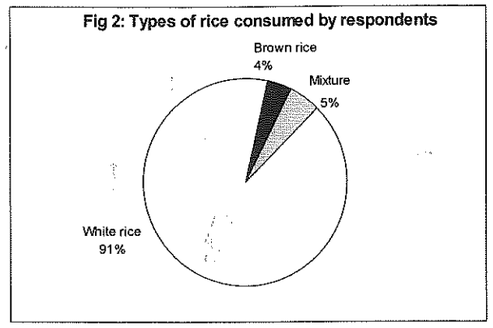
Fig 1: Distribution of respondents who consumed the nine foods



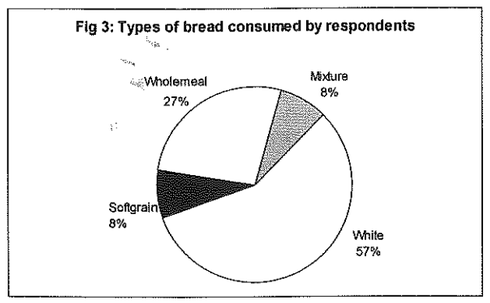
## Shoppers' Usual Food Choices

Shoppers were further asked to name their usual choices for the nine food categories. For example, shoppers who reported they ate rice were asked to specify which sort of rice they usually ate.

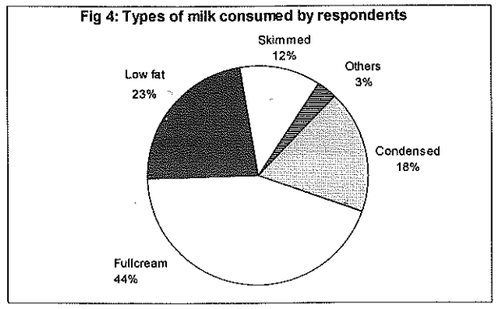
White rice was the usual choice for shoppers. Majority (91%) reported consumption of white rice; while 4% ate brown rice (Fig 2).



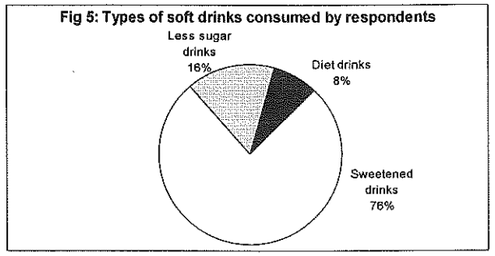

Among bread eaters, white bread ranked highest. More than half (57%) reported that it was their usual choice; 27% ate wholemeal bread; and less than 10% chose the new soft grain varieties (Fig 3).



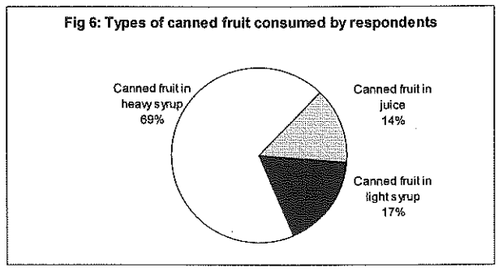

Shoppers reported using a wide variety of milk. Full-cream milk was most popular, (44%), while only half that number used low fat milk. About 18% used condensed milk, while skimmed milk was least popular (12%) (Fig 4).




Among those who take soft drinks, the majority chose sweetened drinks. Less-sweet drinks attracted only 16%, and diet drinks just 8% (Fig 5).



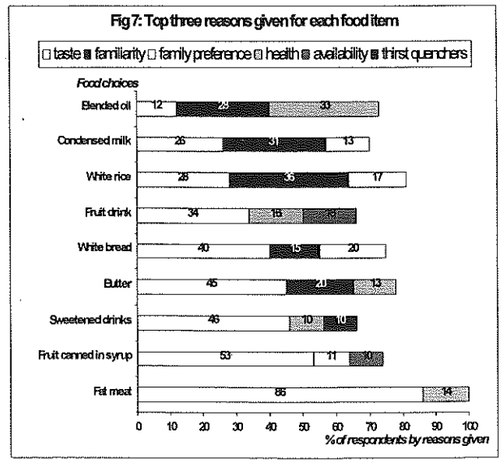

Canned fruit users preferred sweetened varieties, with 69% choosing fruit canned in heavy syrup. Fruit canned in light syrup attracted only 17% and that canned in juice just 13% (Fig 6).




## Reasons for shoppers' usual food choices

The four most common reasons shoppers gave for their food purchases were taste, health, familiarity and family preference.

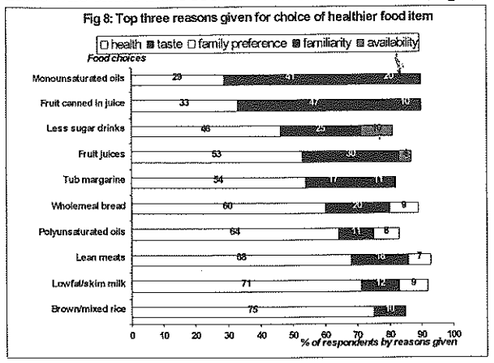
Taste was the most commonly cited reason of shoppers who consumed white bread, butter, fatty meat, sweetened soft drinks, fruit drinks and fruit canned in heavy syrup (Fig 7).





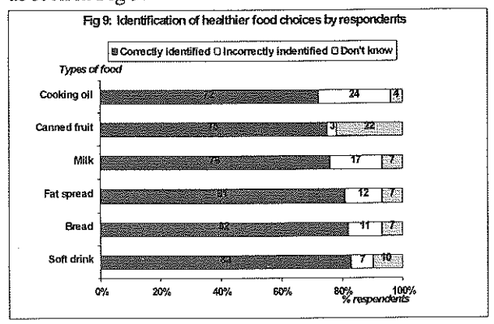



For healthier alternatives like wholemeal bread, low fat and skimmed milk, tub margarine, brown rice, polyunsaturated oils, fruit juice, and lean meat, health was the most popular reason, cited by 50% or more of those who chose these foods. Taste ranked second (Fig 8).

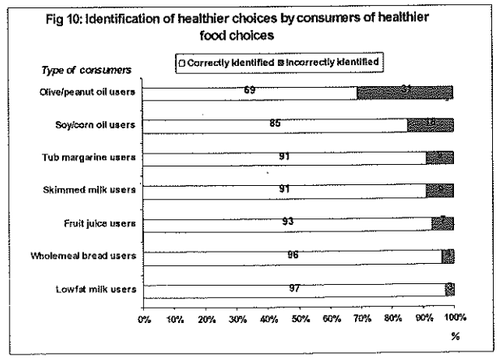


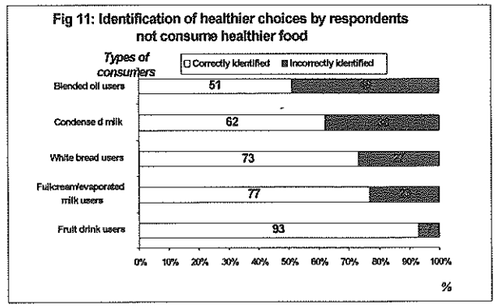

## Shoppers' identification of healthier food choices

Shoppers were asked to identify which types of bread, milk, fat spreads, cooking oil, soft drinks and canned fruit they thought were healthier choices. For most shoppers, this was an easy task. Over 70% of all respondents were able to identify the healthier choices, as seen in Fig 9.




As expected, most shoppers who consumed healthier choices were able to identify healthier options (Fig 10). However, it is interesting to note that a high proportion of respondents who did not consume healthier food items were also able to identify the healthier choices of food (Fig 11).




## Implications for nutrition education

The survey has indicated a need to actively promote the Healthy Diet Pyramid as a tool in achieving a balanced diet, as only 17% of the adults sampled were aware of the Pyramid.

A high proportion of shoppers were aware of healthier food alternatives. Their knowledge, however, was not matched by the consumption of these healthier choices. In Singapore taste, familiarity, and family food preferences influence food selection more than cost and packaging. Nutrition education efforts should include opportunities for consumers to taste and become familiar with these healthier alternatives.

## Conclusion

The 1995 nutrition programme of the National Healthy Lifestyle Campaign was timely to promote the Healthy Diet Pyramid. During the Campaign, the emphasis was on the overall diet, and how food choices can be co-ordinated to achieve variety, proportion and balance using the Pyramid as a guide. The Department conducted a series of nutrition fairs, where the public were able to familiarise themselves with a wide range of healthier food choices through cooking demonstrations, tasting sessions and food displays. Nutrition information was reinforced through interactive panels, computer games, pamphlets and posters.

# MEETINGS

**11-13 October 1996**
**5th Workshop on Medical Writing**
Organiser: Annals, Academy of Medicine, Singapore
Co-Sponsor: Ministry of Health Singapore
School of Post Graduate Medical Studies
National University of Singapore.

**4-6 November 1996**
**International Conference on Highly Unsaturated Fatty Acids in Nutrition and Disease Prevention**
Venue: The Barcelona Hilton
Barcelona, Spain
Contact: Secretariat
PUFA Barcelona '96
c/o F Hoffman-La Roche Ltd
Building 241/1001, CH-4002
Switzerland

**23-27 March 1997**
**3rd International Congress on Vegetable Nutrition**
Venue: Loma Linda University
Contact: Patricia K Johnston
Congress Program Chair
School of Public Health
Loma Linda University
Tel: 909-824-4578
Fax: 909-824-4087
E-mail: pjohnston@sph.llu.edi.

**25-27 June 1997**
**12th Symposium on Echocardiology and Ninth Meeting of the Interational Cardiac Doppler Society**
Venue: Erasmus University Congress Centre
Rotterdam Netherlands
Contact: LMC Congress and Business Services
P O Box 593, 3700 An Ziest
Netherlands
Tel: 31-343-515-314
Fax: 31-343-533-357

**29 June-3 July 1997**
**4th International Conference on Preventive Cardiology**
Venue: Montreal
Contact: Secretariat
1224, Stanley Street
Suite 221
Montreal, Quebec h3B 2s7
Tel: 514-878-2530

**27 July -1 August 1997**
**16th International Congress of Nutrition**
Venue: Montreal, Canada
Contact: Secretariat
16th International Congress of Nutrition.
National Research Council of Canada
Ottawa, KIA OR6
Canada
Tel: 613-993-9009
Fax: 613-957-9828

**9-12 August 1998**
**The 2nd Asian Congress of Dietetics**
Venue: Hotel Inter Continental
Seoul & Korea Exhibition Centre (KOEX)
Contact: Conference Secretariat
ITERCOM Convention Services, Inc.
4FL., Jisung Bldg., 645-20
Yoksam 1-dong, Kangnam-gu
Seoul 135-081, Korea
Tel: 82-2-501-7065, 566-6339
Fax: 82-2-565-2434. 3452-7292
E-mail: intercom@soback.kornet.nm.kr

**23-27 July 2000**
**13th International Congress of Dietetics**
Venue: Edinburgh, Scotland
Contact: Congress Secretariat
c/o Meeting Makes
50 George Street
Glasgow G1 1QE
Scotland
Glasgow



# NEW BOOKS

**EATING DISORDER AND OBESITY: A COMPREHENSIVE HANDBOOK**
*Edited by: KD Brownell and CG Fairnburn. 1995, 583 pages. Hardcover. Price $55.00. The Guilford Press, New York.*

This book is a comprehensive reference on recent and clinical issues in eating disorders, dieting, and obesity for health workers and practitioners. A total of 105 internationally recognised in their field have contributed to the critical reviews found in the book. Each chapter refers the readers to relevant publications with a brief description of the reference. This unconventional format provides a quick access to clear and concise information on food intake, eating disorders and weight regulation or for those treating disorders of eating and obesity.

The book begins with an overview of biological and psychological inputs to the energy-balance equation. The next section discusses the social and cultural influences on eating, and examines the possible link between dieting and eating disorders. This is then followed by a section on measurement of food intake, body composition, energy expenditure and psychopathology. The fourth section represents a diverse list of therapeutic perspectives on eating disorders. The last two sections cover extensively on obesity and its treatment, as well as their complicated clinical problems. This book has brought together current thinking and expertise on eating disorder and obesity in a new and unusual format.

**NUTRITION AD DIET THERAPY REFERENCE DICTIONARY, 4th Edition .**
*Edited by Rosalinda T Lagua and Virginia S Claudia, 1996, 491 pages. Softcover. Chapman and Hall, New York.*

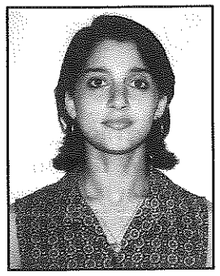
This small book provides up-to-date information on many topics covering all aspects of nutrition. It covers specialised diets, nutritional therapy for many disorders including inborn errors of metabolism and organ transplantation, 145 drugs and their effects on nutrition, and more than 150 nutritional products with information on their uses and compositions. Several topics such as dialysis and tube feeding are covered extensively in the book.

This book is valuable as a quick and handy reference for it has explanation and definition for more than 3000 entries from "abetalipoproteinemia". It also comes with 50 appendices that include classification of nutrients, nutritional assessment indices. Us dietary guidelines, reference values for nutrition labelling, normal laboratory values, and cultural and religious food practices.

## 1996 Committee Photo

*Back: Khoo Poh Lai, Lynn Alexander, Sue Pritchard, Gladys Wong, Petrina Lim, Ang Kai Ling.*
*Front: Luisa Zhang, Inge Hager, Anna Jacob, Toh Hui Kheng.*
*Absent: Sue Hixson, Doris Fan Chin, Leow Sooi Mee, Margaret Hays, Lee Hee Hoon*

# Career Profile:



**Dr Indira Nathan**
**Member SNDA**
*Current Position: Health Therapist*
*Food and Nutrition Department*
*Ministry of Health*

*Indra was interviewed by Leow Sooi Mee*

Dr. Nathan did her first degree in Dietetics at the then Leeds Polytechnic, U.K. and graduated with an honours in1990. Upon graduation she did locum work at various hospitals in London and Bristol.

In 1991 she received a research position at the Liverpool John Moores University working with Dr. A. F. Hackett, Reader in Community Nutrition. This involved a study of the Dietary Intake and Growth of vegetarian children aged 7-11 years compared with matched omnivores. Completion of this project led to her being awarded a Doctor of Philosophy. She holds the distinction of conducting the first such study in the U.K. The results were published in the British Journal of Nutrition at the beginning of 1996. Her findings created national interest and were recently reported in The Times newspaper, London.

She then went on to become a part-time Research Fellow at the Guys Dental School, London. She worked closely with the consultant in Paediatric Dentistry. Professor G. J. Roberts, to study the effect of diet during infancy on dental health. In parallel she worked as a Dietitian at Guy's Hospital and was involved in clinical trials to examine the effect of the amino acid tryptophan on the symptoms of patients with Chronic Fatigue Syndrome.

Born in West Malaysia, she left with her family for the U.K. at the age of 6 months. She has lived there ever since but is now residing in Singapore after her marriage to a Singaporean. She is not unfamiliar with the region however as she has, in 1990, worked at the Palm Oil Research Institute (PORIM). At PORIM she was involved in animal studies examining the effects of Palm oil, Soya Bean Oil and Coconut Oil on the cholesterol levels of rats.

Presently Dr Nathan has taken up a post at the Food and Nutrition Department, Ministry of Health, Singapore. Her work includes consultations, the production of nutrition education materials, lecturing and radio interviews. She is presently involved in the organisation of the 1996 National Healthy Lifestyle campaign.

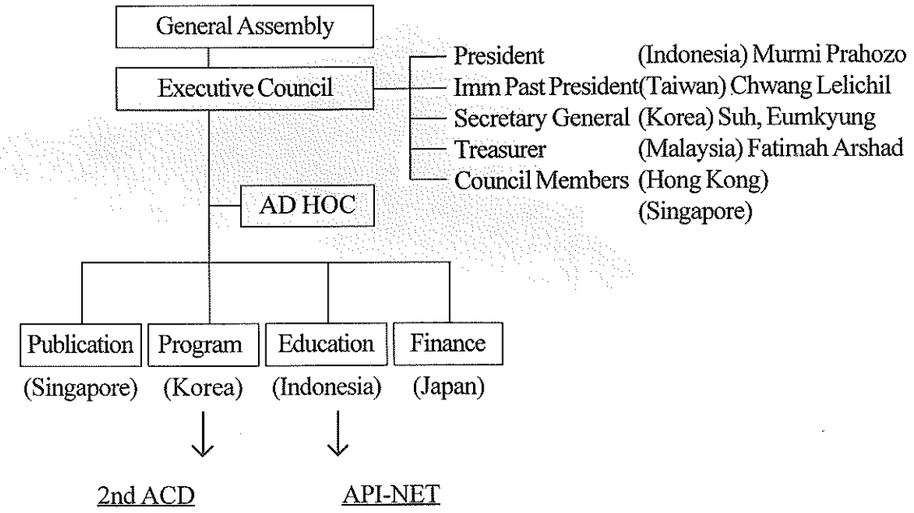


# Asian Federation of Dietetics Associations (AFDA)

At the XXIIth International Congress of Dietetics in the Philippines, plans were discussed for the 2nd Asian Congress of Dietetics to be held in Korea on 9-12 August 1998

The organizational structure of AFDA was also defined at this meeting. It is currently as follows:

## Organization Chart of AFDA




| Asian Congress of Dietetics 1998 in Seoul, Korea | The Asia Pacific Inter institutional Network of Nutrition Education and Training in Dietetics & Food Service Management |
|---|---|
| (3rd ACD, 2002 in Malaysia) | |

## Nutrition Websites of Interest:

Food and Nutrition Department, MOH Singapore http://www.gov.sg/moh/mohiss
Global network navigator medical table of health resources http://gnn.com/wic/wics/med.new.html
World Health Organization http://www.who.ch

| | |
|---|---|
| American Diabetes Association | http://www.diabetes.org |
| Centers for Disease Control and Prevention | http://www.cdc.gov |
| Consumer Information Center | http://www.pueblo.gsa.gov. |
| FDA Center for Food Safety & Applied Nutrition | http://vm.cfsan.fda.gov/index.html |
| University of Michigan Medical Center | http://www.med.umich.edu |
| Tulane University Medical Center | http://www.mcl.tulane.edu |
| Johns Hopkins Medical Institutions | http://cwis.welch.jhu.edu |
| OncoLink, University of Pennsylvania Cancer Center Resource | http://cancer.med.upenn.edu |
| University of Wisconsin, InfoLink | http://www.biostat.wisc.edu |
| US National Library of Medicine | http://www.nim.nih.gov |
| Global network navigator medical table of health resources | http://gnn.com/wic/wics/med.new.html |
| World Health Organization | http://www.who.ch |

# Singapore Nutrition and Dietetics Association

## APPLICATION FOR MEMBERSHIP

Application forms are available from the Honorary Secretary, Singapore Nutrition and Dietetics Association, Tanglin P. O. Box 180, Singapore 912406.

### MEMBERSHIP

**Full members** must hold a degree, diploma or any other recognised professional qualification in dietetics or nutrition. Please assist us in processing your application by submitting the following:-

1. A copy of degree/diploma
2. Course syllabus and description
3. Transcripts
4. Other supporting information such as work experience and verification statement from other dietetics/nutrition associations.

**Affiliate members** shall be any person who, in the opinion of the Committee, holds a scientific qualification in medicine, health of food science and occupies a position allied to the profession of dietetics, and /or nutrition.

**Corporate members** shall be any suitable corporate body interested in work of the Association and in the promotion of dietetics and nutrition.

Persons eligible for full membership shall not be entitled to affiliate membership.

**MEMBERSHIP FEES** (fiscal year in June-May)
Full members shall be required to pay an annual membership fee of $60.00. Full members joining part of the way into the year may pay a pro-rated subscription, this being calculated from the beginning of the month after membership is confirmed.

Affiliate members shall be required to pay $20.00 per annum. Affiliate members joining in the second half of the year (Dec-May) may pay $10.00.

## SUBSCRIPTION FORM

*(THE JOURNAL IS DISTRIBUTED FREE TO ALL MEMBERS)*

To: The Editor, The Singapore Journal of Nutrition and Dietetics, Singapore Nutrition and Dietetics Association, Tanglin P. O. Box 180, Singapore 912406, Republic of Singapore.

Please enter my name for a one-year subscription (2 issues) of THE SINGAPORE JOURNAL OF NUTRITION AND DIETETICS from Vol. ..... No ..... for which I enclose a cheque/cash/money order for S$8 (US$16 for overseas subscription) inclusive of postage, made payable to: **"Singapore Nutrition and Dietetics Association"**.

NAME: .....

ADDRESS: .....

..... TEL: .....

OCCUPATION: .....