

The Tonga Healthy Weight Loss Program, 1995-1997

LOIS ENGLBERGER*
 VIZO HALAVATAU**
 YOSHIKO YASUDA**
 RISA YAMAZAKI**

Abstract

A health and weight awareness program was initiated 1995 by the Tonga National Food and Nutrition Committee to combat high prevalence of obesity and its associated non-communicable diseases. Data from the 1986 Tonga National Nutrition Survey indicated that 39% of women and 10% of men were obese. The Ministry of Health indicated concern over diabetes, heart disease, and hypertension, suggested to be a result of diet and lifestyle changes.

Three successive weight loss competitions were organized, in which use of radio, television, and newspaper media were major elements. A Tonga version of the 1993 South Pacific Commission weight for height chart was produced, allowing identification of overweight using body mass index. Participants were registered and given individual encouragement on diet/exercise. Prizes donated by local businesses added to the campaign, as well as the involvement of His Majesty King Taufa'ahau Tupou IV presenting the prizes to winners and giving words of advice and encouragement to his people. Aerobic exercise, public walks, weigh station manager training, and weight watcher group meetings were special activities. An unexpected element was the interest by the international press, which

proclaimed the Tonga national weight loss competitions to be the first in the world.

Comparison of the competitions showed the number of weigh stations increasing from 15 to 36. A total of 3429 participants registered and 1617 completed in the three competitions. First place winners lost from 25.5 to 28.4 kg in the competitions, which were from 4 to 6 months in duration. Difficulties encountered included problems of coordination, funds, scales, newness of the healthy weight concept, and weight gain at the close of the competition. The activity was received positively by the community, with demand for the competitions to continue. Public awareness of nutrition and fitness was greatly increased.

Introduction

The Kingdom of Tonga is a Polynesian island country with a population of around 100,000. The population is spread over 6 main island groups, with almost two-thirds settled on the main island Tongatapu. The other island groups include 'Eua, Ha'apai, and Vava'u, and the two Niuas, Niutoputapu and Niufu'ou in the far north.

Overnutrition, the present major nutrition problem, is related to changing diets and lifestyles. The 1986 Tonga National Nutrition Survey estimated that 39.1% of women and 10.0% of men were obese as defined by a Body Mass Index of ≥ 30 for women and ≥ 32 for men. Prevalence of obesity was even greater in older age women with 65.7% obesity in women between 40-49 years of age.¹

There is concern about the growing problem of non-communicable disease in Tonga, particularly diabetes, high blood pressure, and heart disease, the Tonga Ministry of Health reporting an increasing incidence of hospital admissions due to diabetes as well as increasing prevalence of diabetes-related limb amputations.²

Plans were initiated in 1994 by the Tonga National Food and Nutrition Committee to carry out a weight loss competition, the Central Planning Department Nutrition Unit, where it is based, as the main implementing body. The project strategy was to provide a fun community activity which adult men and women would be interested in joining. The first competition targeted adults on Tongatapu, the main island of Tonga, the successive two competitions expanding to the outer islands.

* Now UNICEF Health and Nutrition Advisor, P. O. Box 2299, Pohnpei, Federated States of Micronesia, formerly Nutrition Advisor, Central Planning Department, Tonga Is. ** Halavataua is Nutrition Planning Coordinator, Yasuda is JOCV Fitness Instructor and Yamazaki is JOCV Nutritionist, all at Central Planning Department, P.O. Box 827. Nuku'alofa, Tonga.
 Correspondence to Lois Englberger at the above address or e-mail: nutrition@mail.fm

Table 1. Dates and locations of Tonga Healthy Weight Loss competitions, 1995-1997

Competition	Dates	Location
First	Aug. 1, 1995 – Jan. 31, 1996	Tongatapu
Second	April 1 - September 30, 1996	Tongatapu, 'Eua, Ha'apai, Vava'u
Third	June 16 - October 10, 1997	Tongatapu, 'Eua, Ha'apai, Vava'u

Methods

The first competition required considerable planning and preparatory work. New scales and height-measuring equipment were obtained to complement those available. Fifteen weigh stations were originally selected, mainly in the capital city Nuku'alofa, to minimize coordination and transport difficulties. Weigh stations were selected on the basis of access to the public and availability of staff to take on extra work responsibilities. Government offices, the Nuku'alofa Post Office, Hospital, bank offices, schools and agricultural offices were the main stations. One or two persons from each weigh station were designated as weigh station managers, and they were trained to uniformly weigh, measure height, record, and advise participants on diet and exercise.

The first competition was held only on the main island Tongatapu. In the second and third competitions, weigh stations were organized in the outer islands 'Eua, Ha'apai, and Vava'u as well. Although resources did not allow for the inclusion of the outer islands of the Niuas, a monthly walking program was initiated there in the third competition.

A Tonga version of the "Look Fit, Be Healthy! Weight for Height Chart" of the South Pacific Commission (SPC) was produced, to allow identification of overweight and obesity and those individuals eligible for the competition. The chart is based on the Body Mass Index (BMI), an index calculated by weight in kilograms divided by height in meters squared. According to the chart, those adults 18 years and older with a BMI 27-32 are defined as overweight, whereas adults with a BMI over 32 are defined as obese.³

A diet/exercise leaflet was prepared in Tongan and English for general advice. Participating individuals were advised to set goals for weight loss, with 0.5-1 kg per week suggested as a good result. Thirty to sixty minutes a day of exercise was recommended, with a diet based on fish, seafood, green leaves, fruits, vegetables and root crops. A Tonga version of the SPC Three Food Group poster was produced to encourage healthy island foods and was displayed at weigh stations.

Rules were established in the first competition, including the requirement to weigh monthly at the station where registered, and to be overweight. In succeeding competitions, all participants desiring weight monitoring were

welcomed to join, regardless of overweight status. In the first competition, there was a single prize category, that of Total Weight Loss. Other categories of Reaching Healthy Weight for Height and Maintaining Weight Loss were added in the second and third competitions.

The first competition was held in 1995, and its success and demand by the public led to succeeding competitions in 1996 and 1997. See Table 1.

Most weigh stations were in the capital city Nuku'alofa to minimize problems of coordination and transport. See Table 2.

All weigh stations of the first competition remained active in the second and third except for two village stations organized in the first, in which there were problems of coordination and transport. In the second competition, all weigh stations remained active in the third.

Meetings for the weigh station managers were initiated in the first competition, and these were held monthly throughout the second and third competitions. Although not all weigh station managers could attend, the meetings were helpful for providing motivation, information, and training.

Equipment at the weigh stations

Proper equipment and materials were important. Each weigh station had these available:

- Scales (either on permanent or sharing basis)
- Height Measure (prepared on cardboard with measuring tape, some microtoise)
- Registration Book (uniform hard-back record books supplied to all)
- Weight for Height Poster and Diet/Exercise Leaflet
- Competition Flier with Rules/Prizes/Dates/Other Information
- Flier on hypertension (provided in second competition)
- Referral letter to doctor for hypertension (provided in third competition)

The Registration Book for each station included:

- Participant Name and whether Participating in Previous Competitions
- Sex/Age/Address/Telephone
- Height and Maximum Healthy Weight for Height
- Weight for Each Month in the Competition

Table 2. Weigh stations of the Tonga Healthy Weight Loss competitions, 1995 - 1997

Government Offices	Ministry of Agriculture	Ministry of Education
Central Planning*	Head Office*	Tongatapu Primary Schools*
Vaiola Hospital*	Extension*	Nuku'alofa Schoolteachers***
Nuku'alofa Post Office*	Quarantine**	Teachers Training College**
Nuku'alofa Police Station*	Alaki Village**	
Ministry of Finance*	Western District***	Bank Offices/Staff
Electric Power Board*	Eua**	Bank of Tonga- Vuna*
Vava'u Ministry of Health**	Ha'apai**	Bank of Tonga- Head**
Prime Minister's Office***		Development Bank*
Parliament***	Fitness Groups	MBF Bank**
USP Extension Campus***	Lupe Malie**	National Reserve Bank***
	Teufaiva Fitness Centre**	
Church Groups	Community Fitness/CPD***	Commercial Groups
Wesleyan Office**		Kinikinilau Shopping Centre*
Toutaimana**	Women/Community	Royal Tonga Airlines***
Seventh Day-Havelu**	Langafonua Women**	
Siuloulai**	Tonga Family Planning**	

Note: The above 36 stations were those of the third competition.

* Stations started in first competition, continued in second and third

** Stations started in second competition and continued in third

*** Stations started in the third competition

- Records of blood pressure and % body fat, if measured

Scales were most important. See Table 3 for a summary of scales obtained. Some stations had their own scales, such as Tonga Family Planning and Kinikinilau. There was no need to standardize scales, as participants were required to weigh at one station.

Blood pressure, and per cent body fat taken by bioelectrical impedance, were measured when possible. Waist and hip measurements were introduced and explained to participants when possible.

Results

Participation and weight loss results

See Table 4 for a summary of the participation and weight loss results.^{4,5,6} A total of 3429 participants registered in the three competitions. The number registering ranged from almost a thousand in the first, increasing to well over a thousand in the second, and decreasing in the third competition. The less active and shorter advertising campaign in the third competition is implicated in the decrease in participation.

However, despite the decreased registration in the third, the number completing was almost the same as in the second, the percentage rate completing increasing from 49.7% to 56.8% and was much improved over the completion rate of 32.8% in the first competition. With 1617 participants completing the three competitions, the overall completion rate was 47.2%. Completing participants were defined as participants who came either to the last or second to last weighing and were recorded for four months for the first two competitions with length of 6 months or recorded for three months in the third competition with the length of 4 months.

More women than men participated in the competitions. In the first competition, 699 women registered, compared to 284 men. The breakdown for men and women registering was not calculated in the second, but the comparison calculated in the third showed again more women participating, 792 women registering compared to 341 men. More than two times as many women as men completed in the three competitions, 1119 women compared to 498 men. On the other hand, men won in both the first and third competitions.

A total of 2647 kilograms weight was lost in the three competitions, the winners of the three competitions losing from 25 to 28.4 kilograms in the 4- to 6-month period. An

Table 3. Scales available at weigh stations

Scales description	No.	Date received	Max. weight	Supplied by
Healthometer	7	July 1995	140 kg	UNICEF
Balance Beam				
Seca Electronic	2	July 1995	150 kg	UNICEF
Soehnle Electronic	11	Nov.1996	150 kg	WHO
Tanita Electronic Body Fat Monitor/Scale	2	1996, 1997	136 kg	Tanita, Japan support

average of 319 participants lost weight per competition.

Different parameters of the competitions including increase in weigh stations and improvement in completion rates show that there has been a steady growth of the program. See Table 4.

Blood pressure measurements results

Blood pressure measurements were done in the second and third competitions for registering and completing participants when possible. These could not always be done due to limited equipment and staff. In the third competition, eighteen of the thirty-six weigh stations were visited for measuring blood pressure. Of the 324 participants measured, 32.4% were found with hypertension as defined by systolic/diastolic readings of over 150/90. These were given doctor referral and advice. A greater percentage of the males in both Tongatapu and Ha'apai were found with hypertension. Although the numbers were low for comparison, there was less hypertension found in Ha'apai, the rural area. See Table 6.

Body Mass Index results

An analysis of Body Mass Index (BMI) values of participants was done in the third competition to give an indication of the degree of obesity of the participants. Values of BMI were calculated for the participants both at the beginning of the competition and the end. For the purpose of this analysis, obesity was defined as a BMI of ≥ 30 , according to World Health Organization standards. See Table 7.

At the beginning of the competition, the average BMI values for men and women of both age groups fell in the obese category, with a value of 33 for younger and older men and younger women, but 35 for older women. The BMI averages did drop at the end of the competition for completing younger age group participants to 32 for both men and women. The average BMI values did not show a decrease at the end of the competition for the older age group men and women. Clearly, there was more obesity among the women and among the older age group participants. At the end of the competition, it was seen that most progress was found among the younger men and the older women.

Table 4. Comparison of parameters of 1st, 2nd, and 3rd competitions

Competition parameters	1st	2nd	3rd
# Weigh stations	15	26	36
# Months in competition	6	6	4*
# Participants registered	983	1313	1133
# Participants completing	322	652	643
% Completing	32.8%	49.7%	56.8%
# Participants losing weight	229	367	361
% Participants losing weight**	71.1%	56.3%	56.1%
# Kilograms weight lost	1168 kg	1335.7 kg	1142.8 kg

* The shorter length of competition in the 3rd due to changes in staff and the timing of the prize-giving to coincide with World Food Day.

** % participants losing weight calculated as percentage of participants completing.

Discussion

The prevalence of obesity in Tonga is reaching epidemic proportions similar to other parts in the Pacific. Changes in lifestyle with less activity, increased availability of energy-dense food, as well as a presumed genetic adaptation favoring fat deposition have been suggested by other researchers to be the cause of this epidemic. Community-wide primary prevention programs promoting healthy diet and physical exercise have been recommended.⁷

The Tonga Healthy Weight Loss Program is a positive activity to combat the serious problems of obesity and non-communicable disease in Tonga. The competition involved obese, overweight, and healthy weight participants, aiming at preventative health. The name "Tonga Healthy Weight Loss Competition" was chosen so that the public could associate health benefits with weight loss. Participation was open to all adults, men and women 18 years and older, the break-off age of 18 due to the difficulty using the body mass index for overweight and obesity in adolescence.

Though the competition was open and equally accessible to both men and women, there was a predominance of women, both in registering and completing. Also, most of the weigh station managers were women.

A recent doctoral thesis carried out on adolescent obesity in Tonga has studied the cultural attitudes and values relating to the onset of obesity. One finding was that there is more obesity among adolescent girls than among the boys. Other points brought out were that girls had less healthy attitudes about food and less healthy food habits, the importance of the channel of health messages, a need for programs to not be too prescriptive, and fatalistic views in explaining health conditions.⁸ It is hoped that a better understanding of these will help to address the problem.

Exercise groups

Many participants were interested in exercise groups. A group "Walk for Health" was initiated in Nuku'alofa in the first competition and was continued later as a monthly activity. These Walks for Health became a popular symbol for the fitness movement and began to be used in other events in Tonga, such as the celebration for the King's birthday, the Royal Agricultural Show, and unity acts of Parliament. Aerobic classes provided much interest and motivation. An additional staff member for fitness instruction was added to the Nutrition Unit, and the fitness program was expanded.

Motivational meetings and maintaining interest

Weight watcher meetings were initiated in the first competition and featured talks by guest speakers. Later, these meetings featured cooking classes teaching new low-calorie recipes using healthy local foods. Several were televised, providing wide coverage.

Factors promoting success of weight loss seemed most importantly to be those of motivation. The weigh stations with the best group performances had active weigh station managers who provided needed support and motivation. Individuals with strong motivation also did well.

Media

The local radio, newspapers, and television were used extensively, and contributed much to the program. A weekly radio program provided competition details, updates on weight losses from the weigh stations, interviews with successful weight-losing participants and others involved. One participant referred to it as "Our Program". The local *Chronicle* newspaper provided weekly ads of the Walks for Health for no charge using the logo of a sports shoe and included regular articles on competition updates. Televised spots advertising the monthly Walks for Health and featuring shots of previous walks became popular.

The international media visiting the Kingdom to cover the story created considerable interest. Radio programs from overseas first started interviewing those involved with the program, and later the activity was covered by several television documentaries including the New Zealand 60 Minutes, CNN News, and popular magazines as *Marie-Claire* and *Reader's Digest*. These brought attention to the country overseas, and also created interest in the activity locally.

The Tonga Healthy Weight Loss Program is a positive activity to combat the serious problems of obesity and non-communicable disease in Tonga.

Prize-giving ceremonies

At the end of each competition, prize-giving ceremonies were held, with winners receiving prizes from His Majesty King Taufa'ahau Tupou IV, who himself has achieved and maintained a 70 kilogram weight loss. He encourages his people to work for a healthy weight for height, and in 1997 initiated a Healthy Lifestyles Program to encourage healthy diets, exercise, moderation in alcohol, and avoidance of tobacco.

Aerobic exercise demonstrations featured popularly in the ceremonies. The prize-giving for the 1997 weight loss competition was timed to coincide with World Food Day.

Body fat measurements

Per cent body fat measurements were initiated in the second competition and continued to be popular in the third. These measurements were taken by new equipment based on bio-electric impedance and had the advantage of looking more directly at body fat. A loss of weight may not necessarily reflect loss of body fat, as for example water loss may be involved. Also, per cent body fat measurements sometimes detect individuals who are not overweight or obese as indicated by body mass index, but who need to improve their fitness and diet. Again these measurements could not always be done, due to limited equipment and staff.

Concern was expressed by some as to relevance of the SPC Weight for Height chart for Tonga and the BMI break-off point for indicating overweight at a BMI of 27. Some have suggested that the BMI borderline between overweight and healthy is too low for Tonga. A survey was done in 1996 in conjunction with the Tonga National Food and Nutrition Committee to look at BMI in Tonga in relation to % body fat and body perception, and it is hoped that results from this survey may help address the issue.⁹

Difficulties in the program

Organizational difficulties included problems with scales, coordination, particularly with outer islands, and limited resources, staff, and transport. Due to lack of scales, some stations were required to share, adding additional coordination work. Some scales broke, and some participants weighed more than the scales' maximum. Weight gain after the competition and the need to maintain interest between competitions were issues. The use of a graph for identifying overweight and obesity involved some difficulties, as well as the appropriate BMI ranges for overweight and obesity already discussed.

Organization of the information required for the media campaign was not always easy. The decrease in number registering for the third competition is related to the less active and shorter advertising campaign on its onset.

Maintaining interest throughout the competition was difficult. Great effort was made to improve completion rates and to encourage participants to complete even if they had not lost weight. A survey was carried out in the second competition to look at the reasons why participants dropped out. Some reasons given included travel overseas and to outer islands, change of job and work office, difficulty getting to weigh station, and pregnancy. However, the

major reasons for dropout were related to not losing weight or not losing as much weight as expected, and loss of interest. Survey participants pointed out that maintaining interest in the program was very important, this remaining a challenge to competition coordinators and weigh station managers.

Availability of healthy low-cost food was a problem. Provisional figures from the 1992/93 Tonga Household Consumption and Expenditure Survey indicate that the fatty mutton flap is the item on which Tongans spend most their money.¹⁰ Imports of mutton flaps have tripled from 1976 to 1996.¹¹ There is concern that mutton flaps in Tonga may sometimes have a considerably higher fat content than the general value 27.4% presently documented.¹² A Mutton Flaps Subcommittee was established in Tonga 1995 to develop a policy on the issue.

Overcoming embarrassment about weights being taken and recorded where others could see was a problem, although the records were kept confidential.

Overcoming embarrassment about weights being taken and recorded where others could see was a problem, although the records were kept confidential. There was no problem with excess weight loss, though some weigh

station managers reported that they had to advise some participants to lose weight slowly. Social obligations to attend traditional feasts were noted as a problem in diet control.

Weight gain after the close of the competition was a problem. A survey was done to look at the weights of past participants in the first and second competitions. Of the 140 surveyed, 38.6% gained back all weight lost, and 30.7% gained some. A new prize category was included in the third competition for maintenance of weight loss to provide greater motivation for maintenance of weight loss and to provide recognition of weight maintenance even when no further weight was lost. The survey did show that 30.7% maintained their weight lost, which is a positive finding, and the winners had maintained much of their weight loss, though gaining back some.¹³

Still, despite all the difficulties and problems, the general enthusiastic feeling of the competition was very positive, allowing the work to be an enjoyable, fun activity.

Conclusion

Very positive results can be achieved with the problems of obesity, overweight, and non-communicable disease, if approached with a positive and fun community activity such as a weight loss competition. Weight loss is difficult to maintain, but is possible and can be achieved with regular physical exercise, healthy diet, and sufficient motivation.

The strong support from government, local businesses, community groups, and the King was a major factor in the success of the program. Also, close collaboration between governmental and non-governmental groups, the private sector, and the media was extremely important.

The activity has become popular among the people, and there is enthusiasm in continuing the program on an annual basis, with the prize-giving coinciding with World Food Day. Still the challenge remains as expressed by His Majesty in an article for the *Marie-Claire* magazine, "I'd like to see Tongan people return to having a reputation for being strong athletes, not for being obese."¹⁴

Acknowledgements

The authors would like to acknowledge support provided by the Tonga National Food and Nutrition Committee, Mr. Paula Lavulo, its Chairman and Director of Planning, all weigh station managers, and many staff of the Ministries of Health, Education, Agriculture, the Central Planning Department, and the media. The New Zealand Overseas Development Aid, Japanese Volunteer Program, Australian Small Grants Scheme, United Nations Children's Fund, South Pacific Commission, World Health Organization, and local Tongan businesses providing competition prizes are acknowledged, and particularly his Majesty King Taufa'ahau Tupou IV, for his special support. Dr. Joe Flear is acknowledged for his assistance in the preparation of the manuscript.

The strong support from government, local businesses, community groups, and the King was a major factor in the success of the program.

References

1. Maclean E, Badcock J, Bach F. *The 1986 National Nutrition Survey of the Kingdom of Tonga*, Technical Report, Noumea. South Pacific Commission, 1987.
2. Ministry of Health. *Data on Non-communicable Disease*, (Unpublished), 1995.
3. South Pacific Commission. *Look Fit, Be Healthy, Weight for Height Chart*, 1993.
4. Englberger L, Halavatau V. *First Tonga Healthy Weight Loss Competition*. Presented to Tonga National Food and Nutrition Committee and Government of Tonga, March 1996.
5. Englberger L, Halavatau V. *Second Tonga Healthy Weight Loss Competition*. Government Printing Department, Tonga. December 1996.
6. Englberger L, Yasuda Y, Yamazaki R. *Third Tonga Healthy Weight Loss Competition*. Government Printing Department, Tonga May 1998.
7. Hodge AM, Dowse GK, and Zimmet PZ. Obesity in Pacific populations. *Pacific Health Dialog*, 1996: 3(1) 77-86.
8. Fusimalohi C. *Adolescent Obesity in Tonga*. (Unpublished PhD Thesis), Flinders University, Southern Australia, 1997.
9. Craig P. *Proposal for a Study of Body Perception and Percent Body Fat in Tongans*. Presented to the Tonga National Food and Nutrition Committee, 1996.
10. Statistics Department. *Household Consumption and Expenditure Survey*. (Unpublished), 1992/1993.
11. Statistics Department, Government of Tonga. *Foreign Trade Reports from 1976 to 1996*.
12. Dignan DA, Burlingame BA, Arthur JM, Quigley RJ, and Milligan GC. *The Pacific Islands Food Composition Tables*, South Pacific Commission, Noumea, New Caledonia, 1994.
13. Englberger L. *Tonga National Weight Loss Program 1995-1997*, Paper presented to the VIII Pacific Science Inter-Congress, University of the South Pacific, July 1997.
14. Broadbent L. *Marie-Claire*, September 1995.

The increasing role of multisectional co-operation between government departments has also contributed and will contribute to sound socio-economic development, including health ...

Hon. Dr. Sione Tapa: Commemorative speech
50th Anniversary Tonga Medical Association 1992