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Health Promoting Behavior Among Chronically Ill Pacificans Living with Non-Communicable Disease in Fiji, Nauru, and Kiribati

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Abstract

Introduction: Individuals in the developing world are quick to adopt patterns of behavior that mimic Western trends even when those trends have negative long term effects on health. In this study we relate survey results describing attitudes and perceptions toward individual health responsibility of people being treated for non-communicable diseases including diabetes, hypertension, and cardiovascular disease in order to improve public health interventions. PHD, 2009; (15) (2); pp. 55 - 65.

Methods: We conducted convenience sample surveys in both English and native languages at outpatient clinics and hospital centers in Fiji, Nauru, and Kiribati with people being treated for non-communicable diseases. We used the Health Promoting Lifestyle Profile in regression analyses to explore underlying factors explaining patient attitudes in managing their illnesses.

Health Promoting Lifestyle Profile

This section contains statements about your present way of life or personal habits. Please answer as accurately as possible. *1=Never, 2=Sometimes, 3=Often, 4=Always*

I. Health Responsibility *1=Never, 2=Sometimes, 3=Often, 4=Always*

41. Do you try to find reading materials that deal with improving your health? _____.
42. Do you question health professionals in order to better understand your illness? _____.
43. Do you discuss your health concerns with health professionals? _____.
44. Do you attend educational programs on personal health care? _____.

II. Physical Activity *1=Never, 2=Sometimes, 3=Often, 4=Always*

45. Do you engage in physical activity for 30 minutes at least three times per week? _____.
46. Do you walk as exercise? _____.
47. Do you engage in other types of physical recreational activity? _____.



III. Nutrition 1=Never, 2=Sometimes, 3=Often, 4=Always

48. Do you choose a diet low in fat and cholesterol? _____.
49. Do you limit your use of sugars and food containing sugars? _____.
50. Do you eat 2 to 4 servings of fruit per day? _____.
51. Do you eat 3 to 5 servings of vegetables each day? _____.
52. Do you eat 2 to 3 servings of milk, yogurt, or cheese each day? _____.
53. Do you eat no more than one serving of meat, poultry, or fish each day? _____.
54. Do you read labels to find the sodium and fat content of canned and packaged food? _____.
55. Do you eat breakfast? _____.

IV. Stress Management 1=Never, 2=Sometimes, 3=Often, 4=Always

56. Do you get enough sleep? _____.
57. Do you take time to relax each day? _____.
58. Do you use specific methods to control stress? _____.

Results: Our results suggest that there exist attitudinal differences among afflicted populations with regard to stress, physical activity, nutrition, and health responsibility. One unifying theme is the lack of interest in conventional public health educational methods including printed material and public lectures. These similarities and differences must be recognized by government health ministries as well as international health organizations when developing public health interventions.

Conclusion: Public health professionals and educators must develop ways to transmit the message of healthy lifestyles to populations in the South Pacific that do not give much attention to conventional public health education methods. The epidemic of non-communicable disease that is occurring in many of the Pacific Island nations will only be effectively addressed by new educational approaches.

PHD 2009, 15 (2) p

Key words: Non-communicable disease, diabetes, South Pacific region, health promoting attitudes, health promoting behavior, Fiji, Nauru, Kiribati

Introduction

Stroll along Victoria Parade in downtown Suva, the charming capital of Fiji, and among the throngs of people making their way to the central market or to the port or to any number of large stores and small shops that line the way one notices many overweight people. One would have the same sensation in the teeming, high population density town of Betio on South Tarawa, the capital island of the republic of Kiribati, or in Nuku'alofa the capital city of the Kingdom of Tonga, in Apia, Samoa, or in most other urban aggregations in the South Pacific. What one is witnessing is the physical deterioration of a noble group of peoples that have populated these small isolated islands for many thousands of years; a deterioration that has been swift in its onset and stunning in its debilitating effects on affected populations.

The situation was not always so. Before a strong Western influence was felt in the Pacific, island peoples' food consumption patterns included root crops, tropical fruits and vegetables, fish, and game, all foods rich in nutrients and low in processed sugars and fat (1). There was little incidence of obesity and the accompanying illnesses that are characterized by being severely overweight including diabetes, cardiovascular disease, hypertension, renal disease, and the retinopathies and neuropathies that are characteristic of diabetes.



Beginning in the 1960s, just prior to the independence granting movement in the region, the wage economy became a much more familiar phenomenon. People could, for the first time, afford to purchase imported food rather than having to farm, fish, or hunt. Epidemiological research has firmly established a relationship between these consequences of higher living standards and ill health (2). The food that was and continues to be imported was much higher in sugar, salt, fat, and cholesterol than the traditional foods of the region. This economic sea change caused a "mortality transition" whereby people began to sicken and die from non-communicable diseases (NCDs).

In the Federated States of Micronesia (FSM) the incidence of obesity in the population of those between 35 and 55 years of age is 80 percent while the rate of diabetes is 20 percent. By comparison, the U.S. rate of diabetes in the age group 45 to 55 is about 7 percent (1). The incidence of diabetes approaches 40 percent in the adult population of Nauru, and 25 percent in both the Indian and indigenous Fijian populations in Fiji (3). These high incidence rates have been attributed to increasing levels of urbanization, changes in diet and physical activity patterns, and possibly a genetic predisposition to obesity. Diabetes affects upwards of 30 million people in the Western Pacific region with predictions of this number doubling over the next twenty years (4). Approximately 20 percent of male Nauruans and I-Kiribati, and 15 percent of females, die due to NCDs before they reach the age of 40. Cardio-vascular disease (CVD) affects approximately 27 percent of the female population of Kiribati. The prevalence of CVD in male and female Indo-Fijians is 25 percent and 17 percent respectively. Further, approximately 20 to 30 percent of the adult population of Fiji is afflicted with diabetes (3).

Governments in all Pacific Island nations (PINs) have dealt with the problem of lifestyle illnesses by offering treatment to those afflicted and educational programs to the general population to control the spread of these illnesses. As the prevalence of NCDs has become more widespread within PINs the cost of treatment has become a financial burden that is no longer sustainable. Public health budgets are spread so thin that even basic medical services such as the provision of oral medication for the control of diabetes and hypertension are many times unavailable or available only at limited times and in limited quantities.

One avenue of epidemiological research dealing with NCDs has attempted to identify unique individual behaviors that contribute to specific health outcomes and the underlying personal factors that determine those behaviors (5). Determining these personal factors can lead to the development of more effective educational programs that attempt to eliminate risky behaviors and promote those that contribute to a healthy lifestyle (6).

Earlier work has demonstrated that positive health outcomes can result from regular exercise (7), quitting smoking (8), maintaining an ideal weight (9), good nutrition (10), and minimizing stress levels (11). In work examining perceptions of diabetes, increased levels of stress from environmental and familial stressors worsened diabetic symptoms among individuals in American Samoa (12).

The purpose of this work was to compare the health promoting lifestyle behaviors of chronically ill populations in Fiji, Kiribati, and Nauru to explain the underlying factors influencing patient attitudes and experiences to better shape and target public health interventions.



Methods

The authors obtained permission from the Ministries of Health of Nauru, Kiribati, and Fiji to conduct surveys during June, 2003, and July 2004, among people being treated for NCDs at primary hospitals and clinics. We visited the Republic of Nauru Hospital in Yaren district and spoke with outpatients in the medical and dialysis clinics. We traveled to Kiribati Central Hospital in the Birkenibau district on Tarawa and spoke with people waiting for treatment and consultation at the daily medical clinic. In Fiji, we visited the Colonial and War Memorial Hospital in Suva, the Raiwaqa medical and diabetic clinic in Suva, the Valelevu medical clinic in the Suva peri-urban region, the Lautoka Hospital in Lautoka on the western side of the main island of Viti Levu, and the Labasa Hospital in Labasa, the largest town on Vanua Levu, Fiji's second largest island. We spoke with a total of 409 patients, 308 in Fiji, 60 in Nauru, and 41 in Kiribati.

Survey Instrument

A number of health behavior surveys have been developed to enable quantification of health promoting behaviors including the Health Promoting Lifestyle Profile (HPLP)(13). The HPLP was designed to assess the relationship between several different lifestyle behaviors and health status. The questionnaire has a four point response format with seventy items that are divided into six subscales. We chose to use four of the six subscales that were most pertinent to our research interests including health responsibility, physical activity, nutrition, and stress management. (A comprehensive listing of the questions posed is given in the appendix of this paper).

Results

The survey methodology requires that average values for all questions within a particular category are used rather than answers to individual questions. For example, the health responsibility portion has eleven questions dealing with assessing the relative aggressiveness of the survey respondent toward learning more about his illness, toward overall health consciousness, and his willingness to engage health professionals in an information eliciting dialogue. One way to learn more about the character traits and possible motivations influencing actions that enhance health responsibility and other factors in the respondent's answers is to analyze the average response values for each category. Using these average response values as dependent variables and selecting potentially revealing demographic traits as explanatory variables we constructed four sets of regression equations reflecting the four measures of health promoting lifestyle actions. In what follows we provide our *ex ante* hypotheses regarding those influences for each of the four measures, the regression results, and analyses of those results.

Health Responsibility

We used uniform variables across all three countries in describing the factors that influence health responsibility. These included age (age), whether a respondent was a diabetic (diab), whether the respondent was married (mari), whether the respondent drank alcohol (alcol), number of family members (numfam), number of school years (yrschol), gender (sex), and for Fiji, race, as the population of Fiji is about evenly split between indigenous Fijians, and people of South Indian ancestry (race).

We believe that as individuals age they become more aware of maintaining their health or, if ill, attempting to alter their lifestyle to enhance their quantity and quality of life prospects. We surmised a positive relation between age and health responsibility. Similarly we thought that diabetics would be more conscious of the factors that need to be changed or implemented in their lives to improve quality and quantity. Further,



marriage generally confers greater responsibility on most individuals including a concern for one’s personal health as a familial responsibility. We therefore expected married respondents to have higher health responsibility average responses measured as a negative sign on the regression coefficient.

We expected non-drinkers to have a greater concern for their health. Further, as family size increases, people have less time to concern themselves with personal health issues and be more concerned about other family members. This is especially true among females. We therefore expected an inverse relationship between number of family members and health responsibility as well as greater personal health responsibility among males than females. We also expected the better educated to be more aggressive in seeking information about their illness and in querying health professionals about better ways to manage their disease.

Finally, we had no a priori sense of how racial categories would influence health responsibility. The only race marker used was in the Fiji survey as the populations of Nauru and Kiribati are homogeneous. The prevalence of diabetes in the population of Fiji is similar among indigenous Fijians and Indo-Fijians.

Health Responsibility (HRAVG) Discussion

Table 1. Health Responsibility (HRAVG)§

	Nauru	Kiribati	Fiji
Age	0.338 (2.285)**	0.228 (1.335)	0.041 (0.623)
Diab	-0.138 (-1.040)	-0.046 (-0.285)	-0.055 (-0.971)
Mari	-0.024 (-0.168)	-0.151 (-0.960)	-0.058 (-1.013)
Alcol	(-0.118) (-0.858)	0.427 (2.223)**	0.136 (2.077)**
Numfam	-0.299 (-2.008)**	-0.014 (-0.083)	-0.098 (-1.701)*
Race	-----	-----	-0.153 (-2.469)**
Yrschol	0.181 (1.313)	0.616 (3.390)***	0.213 (3.138)***
Sex	-0.103 (-0.732)	-0.065 (-0.394)	-0.036 (-0.541)
F	1.558	2.593	4.123
R2	0.179	0.362	0.102

§ standardized coefficients
 * ** *** significance at the 90%, 95%, 99% level respectively
 t-statistics in parentheses



Table 1 provides the first equation regression results. Age and number of family members were the only significant variables explaining variation in HRAVG in the Nauru sample. Both variables had the hypothesized sign. Larger families decrease individual health responsibility while older people are more concerned about taking action to improve their health. On Kiribati whether one was a drinker of alcohol was more important in explaining HRAVG than age or number of family members though the signs were the same in both sampled populations. Non-drinkers were more health responsible. School years was highly significant on Kiribati although average number of years in school was much higher in the Nauru sample. Perhaps a more uniform and higher level of education on Nauru caused little variation in attitudes whereas the Kiribati sample had wider variation in that variable and therefore proved significant. Non-drinkers, higher levels of schooling and fewer family members all were significant in the Fiji sample along with race. Indo-Fijians were more concerned about health responsibility than indigenous Fijians. The sign on sex indicates that males in all three sample populations were more active in health responsibility than were females though not to the extent that the gender difference was statistically significant.

Physical Activity (PAAVG)

Table 2. Physical Activity (PAAVG)§

	Nauru	Kiribati	Fiji
Age	-0.224 (-1.421)	-0.008 (-0.144)	-0.072 (-1.085)
Diab	-0.052 (-0.371)	0.151 (0.881)	-0.008 (-0.148)
Mari	-0.051 (-0.334)	0.067 (0.404)	-0.008 (-0.132)
Alcol	-0.087 (-0.596)	0.345 (1.698)*	-0.154 (-2.290)**
Numfam	0.104 (0.659)	-0.095 (-0.528)	0.011 (0.186)
Race	—	—	-0.016 (-0.256)
Yrschol	-0.065 (-0.442)	0.396 (2.060)**	-0.154 (-2.152)**
Sex	-0.082 (-0.545)	-0.108 (-0.617)	0.020 (0.302)
F	0.560	1.830	2.585
R²	0.073	0.286	0.067

§ standardized coefficients
 * ** *** significance at the 90%, 95%, 99% level respectively
 t-statistics in parentheses



Table 2 provides regression results for physical activity (PAAVG). We used the same explanatory variables in the regression equation determining factors that influence physical activity. We expected older people to be more concerned about maintaining activity levels and attempting to remain active to help keep in abeyance the progressive aspect of their illnesses.

We found negative attitudes toward physical activity among both sexes in all three countries. Further, being married and family size would negatively affect openness to exercise because of time and energy constraints we suppose.

We expected those with greater levels of formal education to realize the benefits of exercise and those who regularly consumed alcohol would not. Further, diabetics understand the importance of physical activity in managing their illness and therefore would be more willing to include extra activity if physically possible to their every day pursuits. Finally, race in Fiji. Indigenous Fijians are sports minded and arguably more physically active during the various stages of their lives than Indo-Fijians. The Indian population is better educated and more successful in business, and less physically active. This may make Indo-Fijians more open to exercise regimes.

Physical Activity Discussion

None of the explanatory variables had significant predictive power for Nauru and the R² is low. The signs on the regression coefficients agree in most cases with our *a priori* assumptions. However, those with greater levels of education had lower mean scores in this category indicating that the better educated, who typically are employed in the public sector, were occupied with the significant policy problems that the island faces with little time for exercise. Those who were diabetic engaged in greater levels of physical activity than non-diabetics.

In Kiribati, years of schooling and whether a respondent was a drinker were the only significant explanatory variables. Diabetics were less likely to engage in physical activity, as were the married. Family size was negatively correlated with physical activity.

In Fiji, years of schooling and alcohol were positively correlated with physical activity. The sign on the race variable indicates that Indo-Fijians are more open to exercise although there was no statistical difference between the racial groups. Further, although two variables were statistically significant the overall explanatory power of the equation was low.

Nutrition

Table 3. Nutrition (NUTAVG)§

	Nauru	Kiribati	Fiji
Age	0.184 (1.195)	0.383 (2.306)**	0.007 (0.109)
Sex	-0.410 (-3.138)***	-0.201 (-1.292)	0.037 (0.551)



Race	—	—	0.105 (1.673)*
Numfam	-0.004 (-0.028)	—	0.139 (2.384)**
Yrschol	0.053 (0.420)	0.582 (3.424)***	0.244 (3.466)***
Alcol	0.060 (0.457)	0.631 (3.537)***	-0.046 (-0.682)
Diab	-0.193 (-1.690)*	-0.274 (-1.803)*	-0.092 (-1.680)*
Employ	0.095 (0.641)	-0.313 (-1.997)*	-0.087 (1.412)
F	2.950	3.462	2.665
R2	0.325	0.472	0.068

§ standardized coefficients
 * ** *** significance at the 90%, 95%, 99% level respectively
 t-statistics in parentheses

Table 3 provides regression results for nutrition (NUTAVG). This series of equations includes employment because individuals employed in the formal labor sector may have the ability to provide a greater variety and more nutritious as well as more secure access to food.

We expected that diabetics would be especially concerned with their food intake and therefore thought this variable to be significant in all three equations. In addition, those formally employed may have the means to provide a more wholesome diet for themselves and their families. We had no *a priori* view of the influence of gender. We expected family size to be positively correlated with nutritional issues. Finally, as people age they become more concerned about the nutritional value of the foods they consume and in particular of those foods that could be potentially harmful to their health.

Nutrition Discussion

The regression equation had significant explanatory power for Kiribati. All the included explanatory variables were significant except sex and the sign on that variable was as expected. As people age their concern for nutrition increases. This was true in all three countries though only in Kiribati was the age variable significant. There is a positive relationship between schooling and concern for nutrition in all countries. As expected, being diabetic concentrated one’s concern for food intake. This was the strongest result across all countries. Diabetics were concerned about maintaining a nutritionally sound diet; one that would potentially improve their diabetic condition or at least prevent deterioration. Men were more concerned with nutritional matters in Nauru and Kiribati. The opposite was true in Fiji. Being formally employed improved nutrition scores for the Kiribati and Fiji samples though only in the Kiribati sample was the variable significant. In Nauru employment played no significant role in nutritional concern.



Finally, indigenous Fijians were more aware and concerned about nutrition than were Indo-Fijians. Both populations suffer from about equal rates of diabetes while native Fijians have higher rates of obesity. Indo-Fijians consume a traditional South Indian diet which is rich in animal fat. The Indian population has maintained this traditional diet to a greater degree than have native Fijians maintained theirs. The R2 on the Fiji equation indicates low explanatory power for the total equation in spite of four of the eight included variables being statistically significant. Both the Kiribati and Nauru equations indicate more explanatory power.

Stress

Table 4. Stress (STRESSAVG)§

	Nauru	Kiribati	Fiji
Age	0.268 (1.701)*	0.445 (2.439)**	0.034 (0.489)
Race	—	—	0.041 (0.630)
Sex	-0.152 (-1.057)	-0.107 (-0.625)	0.050 (0.723)
Yrschol	0.074 (0.533)	0.519 (2.780)***	0.093 (1.284)
Alcol	-0.109 (-0.751)	0.244 (1.246)	0.027 (0.388)
Diab	-0.239 (-1.744)*	0.069 (0.414)	-0.058 (-0.975)
Employ	0.007 (0.045)	-0.235 (-1.368)	0.030 (0.470)
Numfam	-0.056 (-0.364)	0.034 (0.197)	0.008 (0.138)
Mari	-0.177 (-1.209)	0.085 (0.529)	-0.042 (-0.705)
F	1.351	2.214	0.524
R2	0.181	0.364	0.016

§ standardized coefficients
 * ** *** significance at the 90%, 95%, 99% level respectively
 t-statistics in parentheses

Table 4 provides regression results for stress (STRESSAVG). We expect that older individuals develop better coping mechanisms for stress because of greater life experiences, and of a greater need for methods to deal with chronic long term illness. Further, the better educated may be more successful in using alternative



stress relief methods. We had no a priori expectations about whether men or women handled stress more effectively, though we expected diabetics to be more successful in dealing with stress.

Employment was seen affecting stress management either positively or negatively. For instance, those employed may be able to deal with stress more successfully since they are subjecting themselves to the dual burden of work and illness management. On the other hand, the unemployed are able to avoid that extra burden of stress associated with the workplace and could focus on dealing solely with their illness. How the family situation affected ability to manage stress was also difficult to hypothesize *ex ante*. Being married and having children could help alleviate the stress burden. But a family situation could also lead to increased stress. Elstad, et al. have recently reported worsening of diabetic symptoms related to familial stressors among people in American Samoa (12).

Stress Discussion

The regression equation had reasonable explanatory power for Kiribati but less for Nauru and Fiji. In the Kiribati sample both age and years of schooling were significant, both having positive impacts. Age had similar impacts in Nauru and Fiji. None of the variables were significant in the Fiji equation in explaining stress management. In Nauru and Fiji, being a diabetic increased one's ability to deal effectively with stress. The other descriptors were insignificant and inconclusive in explaining the variation in the dependent variable. Alcohol consumption, formal employment, marital status, and number of family members changed signs between equations and were insignificant in all equations. The race variable in the Fiji equation indicated that native Fijians were better able to manage stress.

General Discussion

The Pacific region has seen an increase in the incidence of NCDs as infectious disease has become less common and as the relative wealth of most of the region has improved. The burden of these illnesses is both financial to the individuals afflicted through lost productivity, and emotional, through increased pain and suffering. The financial impacts are also severe and mounting for the governments involved due to the costs of disease treatment. The cost of managing NCDs in the Pacific accounts for more than half of all health care expenditures in some Pacific island countries. From a personal perspective these illnesses exact a toll on both individuals suffering from these illnesses and their families who are deprived of both the emotional and physical energies someone in good health can contribute to the family hearth as well as the potential financial contribution to the family purse.

We have sought to analyze the factors that contribute to the emotional state of those suffering from NCDs. Though different messages emerge from each of the estimated regression equations there are some unifying themes. One of these is education. Better outcomes can be expected when populations are better educated. They are more aware of effective management mechanisms for dealing with their illness and more willing to apply those mechanisms to their daily lives. Another unifying theme is age. The older the individual the more likely he will be interested in aggressively dealing with his illness in the hope of recovering some level of lost ability and energy.

Of course, the efficient intervention would occur when people at risk for NCDs are young to cause them to avoid lifestyle decisions that contribute to illness onset. Much more aggressive measures to promote prevention among the young are needed which must include novel approaches. Health professionals and educators must develop ways to transmit the message of healthy lifestyles to populations that do not give



much attention to conventional health education methods. The poster and brochure that go unread and unnoticed do little to educate populations that need more information about the choices they make and the lifestyles they lead. From a public policy perspective greater emphasis must be placed on developing more effective educational programs to avoid the concurrent social and financial crises that many PINs face as a result of this public health situation. Effective plans of action to institutionalize prevention in public health care workers and in the general population are needed.

Acknowledgements

This research was funded by a grant from the University Research Committee of the University of the South Pacific, Suva, Fiji. We are grateful for their financial support and confidence. We are indebted to the individuals in the Ministries of Health in Fiji, Nauru, and Kiribati for allowing the research team access to the hospitals and clinics in their respective countries. We thank the student enumerators that worked with us during the survey process for their energy and abilities. And to the 409 people we had the good fortune to meet and speak with about their illnesses and the ways in which they cope, our thoughts are with you and the others you represent. May your lives become easier with new discoveries to deal with NCDs, and may the resources be available in each of your countries to provide you with everything you need to live full and productive lives.

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ISSN 1015-7867



Pacific Health Dialog

**Journal of Community Health and
Clinical Medicine for the Pacific**



**The Health of Samoans
and other Pacificans**

Volume 8 • Number 1

March 2001

